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# **RESEARCH & DEVELOPMENT**



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## CONTENTS

S.NO	TITLE	AUTHOR/S	PAGES
1	ANTIMICROBIAL ACTIVITY OF ORGANIC NLO CRYSTALS USING THIOSEMICARBAZONE DERIVATIVE	Dr.A.Geetha, Dr.C.Jeevarathinam, Dr.G.V.Pandian	1-12
2	ONLINE PROCESSING OF PAYMENT: CLIENT RESPONSIVE SERVICE DELIVERY AT THE TREASURY OFFICE PAGSANJAN, LAGUNA	Tammy O. Benelada	13-20
3	STUDENTS' COMPETENCE IN COMPOSITION WRITING: BASIS FOR A PROPOSED INTERVENTION STRATEGY PLAN	Arturo G.Palaming	21-26
4	SENTIMENTS ANALYSIS ON THE PERFORMANCE OF SECONDARY SCHOOL ENGLISH TEACHERS DURING ONLINE CLASSES	Rommel Pascual Manzon	27-30
5	GRAMAFIL APP BILANG INTERBENSYON SA PAGPAPAUNLAD NG KAKAYAHANG PANGGRAMATIKA NG MGA MAG-AARAL SA IKASAMPUNG BAITANG	Adela P.Sacay	31-37
6	ANFIS MODEL FOR BARAK RIVER SYSTEM	Nilendu Bhattacharjee	38-43
7	FOOD PRESERVATION IN CONTROLLING FOOD SCARCITY UNDER ECONOMIC MELTDOWN IN NIGERIA	Dr. Ayodele Olaiya AYENI	44-45
8	ASSESSMENT ON THE QUALITY OF SERVICE OF DFA REGIONAL CONSULAR OFFICE SAN PABLO RELATIVE TO ITS CITIZEN'S CHARTER	Myriel Angelie P. Castañeda	46-61
9	WATER QUALITY INDEX EVALUATION FOR MONITORING WATER QUALITY OF RIVER BARAK	Nilendu Bhattacharjee	62-66
10	DEVELOP A TOMATO IRRIGATION SCHEDULE	R.A. Muradov, A.N. Ubaydillayev, D.A. Ubaydillayeva	67-70
11	ASSESSMENT ON THE OPERATIONS OF SINILOAN WATER DISTRICT'S DIVISIONS: BASIS FOR THE PROPOSED REENGINEERING AND RATIONALIZATION OF SINILOAN WATER DISTRICT	Almira A.Dalusong	71-79
12	THE PUBLIC EMPLOYMENT SERVICE OFFICE (PESO) IN THE CITY OF BIÑAN: AN ASSESSMENT	Jamaica C.Cortez	80-85
13	EXTENT OF IDENTIFICATION OF POOR HOUSEHOLDS AND LEVEL OF ASSURANCE OF LISTAHANAN IN	Jhohanna A.Acebes	86-99

	MAUBAN, QUEZON		
14	GENDER APPROACH IN EDUCATION: LOOKING AT THE PROBLEM	Khamidov Akmal Amrulloevich	100-103
15	ANDROGEN RECEPTOR VALUES FOR PREDICTION OF SURVIVAL OF PATIENTS WITH THREE TIMES NEGATIVE BREAST CANCER	Juraev M.D ., Atakhanova N.E ., Almuradova D.M.,Gaziev L.T . Ziyayev Sh.V	104-106
16	ASSESSMENT OF RESEARCH MANAGEMENT PRACTICES OF THE HALAL GOAT PROJECT OF SKSU	Mamalinta, Normina A.	107-113
17	FORMULATION DEVELOPMENT AND CHARACTERIZATION OF AZOLE DERIVATIVE LOADED ETHOSOME AND LIPOSOME: A COMPARATIVE ASSESSMENT REPORT	Gourav kumar Bairagi, Priya Thakur, Souvik Sen	114-120
18	EVALUATION OF PERCEPTION OF EXTEROCEPTIVE SENSATIONS IN PRETERM NEONATES-A PILOT STUDY	Sandhya AM, Haritha KN, Bhattacharjee M, M, Patil V, Mane SS	121-128
19	FEATURES OF ADVERTISING LANGUAGE AND ITS STUDY	Allaberganova Nilufar Matnazar qizi	129-132
20	SOURCES OF FINANCING FOR NGOs	Goolbahor Abdusattarovna Karimova	133-135
21	A REVIEW ON GUNJA ABRUS PRECATORIUS	Dr.Sreedevi V P, Dr. Aiswarya Babu. MD(Ayu)	136-139
22	BIOECOLOGICAL FEATURES OF MEDICINAL PLANTS Mentha asiatica Boriss	Davletmuratova Venera Begdullaevna	140-141
23	SOME BIOLOGICAL FEATURES AND SEED PRODUCTIVITY OF CATALPA SCOPOLI SPECIES UNDER VARIOUS SOIL SALINITY CONDITIONS IN KARAKALPAKSTAN	Doszhanova Gaukhar	142-144
24	THE FAUNA OF THE CARABIDA (COLOEPTERA) OF THE KYZYL KUM DESERT	Kalimbetova Rose	145-147
25	POLYMERIC FRAMETERING FOR REDUCING THE FLAMMABILITY OF CELLULOSE MATERIALS	Kamalov Djangabai Kaipnazarovich, Eshniyazov Rustem Naurizbaevich, Khabibullaev Amet Jandullaevich, Mukhamedgaliev Bakhtiyar Abdikadirovich	148-151
26	APPLICATION OF BIOLOGICAL METHODS IN FORENSIC MEDICAL EXAMINATION	Kurbanova Alfiya Ismailovna, Kurbanov Ulugbek	152-153
27	THE EDUCATIONAL POTENTIAL OF THE FAMILY AS A NECESSARY CONDITION FOR THE SOCIAL ACTIVITY OF THE GROWING PERSONALITY	Orazbayeva Gulbahar	154-161
28	THEORETICAL AND PRACTICAL FOUNDATIONS FOR THE DEVELOPMENT OF THE FOOD INDUSTRY ENVIRONMENTAL PROBLEM	Tleuov Nietulla Rakhmanovich	162-166
29	ANALYSIS OF GLOBAL ENVIRONMENTAL PROBLEMS	Valieva Orazgul, Perdebayeva Gaukhar, Aimbetova Sharipa	167-169
30	DIFFERENTIAL RESISTANCE TO ALTERNATING CURRENT DURING BREAKDOWN OF CURRENT IN DEEP LEVELS IN A SILICON P-N JUNCTION	Tagaev M.B., Abdreymov A.A.	170-176
31	IMPLEMENTATION OF DIGITAL	Barno Rakhmatullaeva	177-180

	TECHNOLOGIES IN FOREIGN LANGUAGE TEACHING		
32	RESEARCH REVIEW OF RASAPUSHPA	Dr.Jitendra Moharana, Dr.Rajeshwari V Kamat MD Ayu	181-184
33	A STUDY ON FINANCIAL PERFORMANCE OF MRF TYRES LIMITED	Mr.P.Kanagaraj, Ms. K. Nandhini	185-189
34	PLACE OF YOGA IN 'NATIONAL EDUCATION POLICY 2020'	Mrs.Rashmi P.Ranade, Dr. Jaydeep D. Nikam	190-193
35	FLORA OF SANGAT SAHIB BHAI PHERU KHALSA SENIOR SECONDARY SCHOOL, FARIDKOT, PUNJAB, INDIA	Rai Singh Dhillon, Bhupinder Kaur Sran, Swarnjit Singh Gill	194-203
36	INFLUENCING FACTORS AFFECTING THE IMPLEMENTATION OF REPUBLIC ACT 9003(ECOLOGICAL SOLID WASTE MANAGEMENT ACT) IN THE PROVINCE OF LAGUNA	Severina Verna P.Oandasan	204-217
37	PEDAGOGICAL MECHANISMS OF IMPROVING THE CULTURE OF HEALTHY LIFESTYLE OF STUDENTS	Roziyeva Mukhayo Erkinovna	218-219
38	UNDERSTANDING MIGRATION PATTERNS IN RAJAPAKHAR BLOCK OF VAISHALI DISTRICT, BIHAR	Aditi Kumari	220-226
39	LE TOURISME DE MASSE POST-COVID : RENOUVEAU DES PRATIQUES TOURISTIQUES ET DES ADAPTATIONS EN TUNISIE	Hanane Abichou	227-235
40	EXPLORING AN EFFECTIVE PEDAGOGY FOR GENERAL STUDIES COURSES DURING COVID 19 PANDEMIC IN 2 TERTIARY INSTITUTIONS IN GOMBE LOCAL GOVERNMENT AREA, GOMBE STATE, NIGERIA	Dr. Lucy Chioma Usen	236-243
41	EFFECT OF YOGA PRACTICES ON SELECTED PCOS SYMPTOMS RELATED VARIABLES AMONG WOMEN STUDENTS WITH POLYCYSTIC OVARY SYNDROME	G.Meenatchi, Dr. P. Anbalagan	244-249
42	COMPARISON ON SELECTED PHYSIOLOGICAL VARIABLES COMPONENTS AMONG TRADITIONAL EVENTS PARTICIPANTS OF JALLIKATTU AND SILAMBAM	P. Atheeskumar, Dr.P. Anbalagan	250-253
43	THE IMPACT OF ARTIFICIAL INTELLIGENCE ON LABOR MARKETS	Dr. Mahesh Bansiya, Dr. Hansraj Patidar	254-259
44	CURRENT STATE OF THE BUKHARA DEER (CERVUS ELAPHUS BACTRIANUS) IN THE SOUTHERN ARAL REGION	Dosnazarova Umit, Kidirbayeva Arzygul	260-262
45	BIOECOLOGICAL FEATURES OF COLLEMBOLA IN THE CONDITIONS OF THE REPUBLIC OF KARAKALPAKSTAN	Erzhanova D. M., Ishanov A.A.	263-265
46	USE OF EDUCATIONAL TRADITIONS OF FOLK PEDAGOGY IN FORMING YOUTH WORLD VIEW	Turemuratova Aziza Begibaevna	266-268
47	QUANTITATIVE CHANGES IN THE PHYSIOLOGICAL GROUPS OF MICROORGANISMS IN RICE	Turemuratova U.T.Bakhieva L.A.	269-271

	VEGETATION PHASES IN THE RICE FIELDS OF THE NUKUS REGION		
48	PHILOSOPHY OF EDUCATION: RETROSPECTIVE AND METHODOLOGICAL APPROACHES	Baykabilova Pariozod Amanbayevna, Urinbayev Inomjon Mansur ugli	272-274
49	WAYS TO IMPROVE CREDIT RISK MANAGEMENT IN COMMERCIAL BANKS	Razzakov Talatjon Nigmatovich	275-280
50	IMPACTS OF LADDER TRAINING ON SELECTED PHYSICAL FITNESS VARIABLES AMONG KABADDI PLAYERS	E.Santhana Selvi, Dr. P. Sridar	281-284



# ANTIMICROBIAL ACTIVITY OF ORGANIC NLO CRYSTALS USING THIOSEMICARBAZONE DERIVATIVE

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## ABSTRACT

Thiosemicarbozones are having enormous medicine applications due to the presence of hetero atom nitrogen and sulfur in its molecular structure. The carbonyl compounds are also having the largest clinical applications to cure many diseases. We merged these two classes of organic compounds and their substitution by solution growth techniques of crystal growth tested as antibiotic against few fastidious and non fastidious gram +ve and gram -ve organisms. Ortho substituted para substituted and Meta substituted benzaldehydes were merged with thiosemicarbazone and prepared. Thiosemicarbazone of (2-chlorophenyl) methylideneamino thiourea, when compared with linear optical material, these NLO have high medicinal application since it is the photo dynamic therapeutically more active, proved by the early researches mentioned in the experimental part. These one compounds were tested against. *Streptococcus Aureus*, the following experimental method was adopted find out the antimicrobial activity. MTT assay by colorimetric method, Cell viability percentage calculation method, Half inhibitory maximum (IC<sub>50</sub>) by calculation method. Agar disc diffusion method. Inhibition zone width by agar disc diffusion method, EUCAST and NCCLS database analysis to compare the MIC and inhibition zone width of existing antibiotic against the above said one organism, Graphpad prism software is used to find out the absolute, relative IC<sub>50</sub> value and hill slope value, ECOF finder software to find out the epidemiology cutoff value, WHONET 5.6 software analysis is used to find out resistant, susceptible or intermediate nature of commercially existing antibiotics. Size and structure of the newly designed antibiotics compare with the structure of commercially existing antibiotics and structure of organisms.

**KEYWORDS:** MTT Assay, Cell Viability, IC<sub>50</sub>, Agar Dis Diffusion, Graph pad, EcoF Finder, EUCAST, NCCLS.

## 1. INTRODUCTION

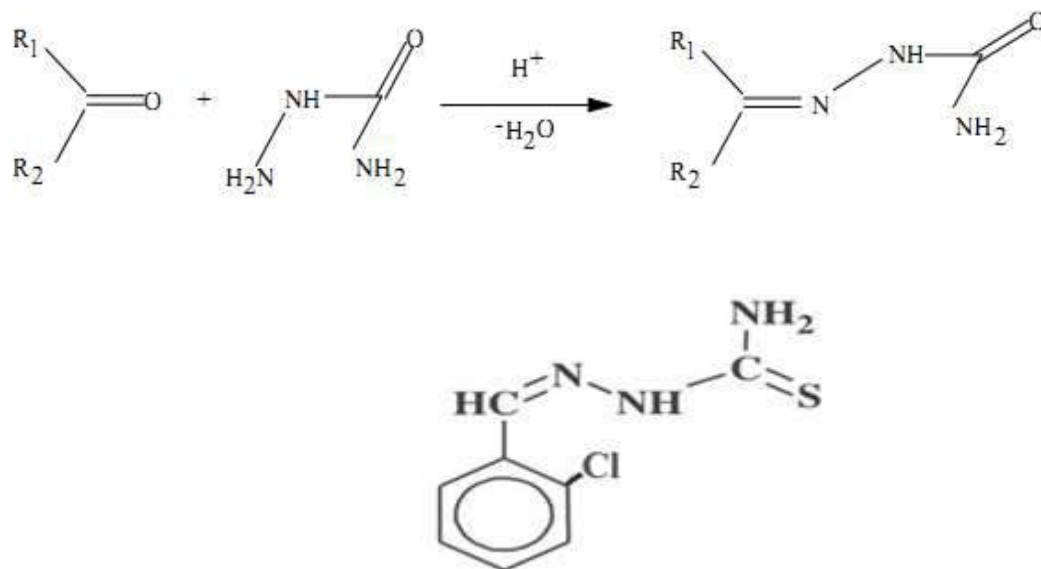
Throughout history, it has been a major worldwide problem to treat microbial diseases caused by bacteria and fungi due to impetuous development of resistance to antibacterial and antifungal drugs. In recent decades, the incidence of fungal infections has gone up all over the world. The development of new therapeutic agents is one of the essential goals in medicinal chemistry. Thiosemicarbozones have been investigated for medicinal studies for a long while due to their wide range of biological activities including antineoplastic, antimycobacterial, antibacterial, antifungal, antiviral, and antimalarial effects and versatility as nitrogen and sulfur donors allowing them to bring on a great variety of coordination modes. The organic crystals of thiosemicarbazone derivatives have high thermal stability and Non-linear optical properties. In addition thiosemicarbazone molecules containing  $\pi$ -electron conjugation system asymmetrized by the electron donor and acceptor groups are highly polarizable entities for NLO applications. Hence, In the present study the preparation, growth and Anti-Microbial efficiency of thiosemicarbazone derivatives of 2 Chloro benzaldehyde crystals is reported.

## 2. EXPERIMENTAL DETAILS

To a hot solution of 1.82 g of thiosemicarbazide dissolved in a 160 ml of methanol, a solution of 2.8114 g of 2-Chlorobenzaldehyde dissolved in 70 ml of methanol stirred for 30 minutes. The aggregate became stirred and refluxed for 4 hours. Then it become filtered and the filtrate become concerned with 1/2 the volume. The saturated solution was kept in rest and the beaker becomes blanketed with polythene paper. Some holes had been made on the polythene cover to facilitate sluggish evaporation. By means of adopting the



solution growth technique crystals of thiosemicarbazone of 2-Chlorobenzaldehyde have been grown from the supersaturated solution at room temperature. Crystals were gathered by way of filtration, washed with cold ethanol and dried in desiccators. These crystals had been suitable for characterization studies. Similarly other two compounds were prepared and recrystallization with suitable reagent and solvent respectively. It was characterized by FT-IR Study, UV-Study, NMR Study ( $^1\text{H}$  NMR AND  $^{13}\text{C}$ -NMR), X-Ray Diffraction Studies, TGA Study, NLO Study.



### 3. ANTIMICROBIAL STUDY

#### 3.1. Disc Diffusion Test-Preparation of Mueller-Hinton Agar:

Mueller-Hinton agar need to be prepared from a commercially available dehydrated base, according to the manufacturer's instructions. Right away after autoclaving, allow it to chill in a 45 to 50° C water tub. Pour the freshly prepared and cooled medium into glass or plastic, flat bottomed petri dishes on a degree, horizontal surface to give a uniform depth of approximately 4 mm. This corresponds to 60 to 70 ml of medium for plates with diameters of 150 mm. The agar medium has to be allowed to cool to room temperature and, until the plate is used, stored in a refrigerator (2 to 8° C). Plates need to be employed within 7 days after cooling with the aid of incubating at 30 to 35° C for 24 hours or longer.

#### 3.2. Preparation of antibiotic stock solutions.

Stock solutions are prepared by formula

$$(1000/P) \times V \times C = W,$$

in which, P = efficiency of the antibiotic base, V=volume in ml required, C=final concentration of the solution and W=weight of the antimicrobial to be dissolved in V.

#### 3.4. Disc diffusion strategies

The Kirby-Bauer and Stokes' strategies are typically used for antimicrobial susceptibility testing, with the Kirby-Bauer technique being endorsed by the NCCLS. At least 3 to 5 well-isolated colonies of the same morphological type are decided on an agar plate subculture. The pinnacle of each colony is touched with a loop, The boom is transferred into a tube containing 4 to 5 ml of a suitable broth medium, along with tryptic soy broth. The broth subculture is incubated at 35°C till it achieves or exceeds the turbidity of the 0.5 McFarland wide spread (typically 2 to 6 hours)

#### 3.5. Analyzing Plates and deciphering results

After 16 to 18 hours of incubation, each plate is tested. If the plate turned into suitably marked and the inoculum become accurate. The diameters of the zones of entire inhibition (as judged by way of the unaided eye) are measured, including the diameter of the disc. The sizes of the zones of inhibition are interpreted and the bacteria are recommended as Susceptible, intermediate, or resistant to the antibiotic agents which have been examined.





### 3.6. MIC- Minimal Inhibitory Concentration

#### MIC

The MIC is the lowest concentration of antimicrobial agent that absolutely inhibits colony formation. If there's no growth at lower concentration however there is an increase at higher concentrations.

#### MIC Break Point

The concentration of the antibiotic at which maximum inhibition of bacteria is called MIC breaking point Susceptible (S) MIC < breakpoint of the given organism. Likely to be effective > 90% of the time. Intermediate (I) May be powerful at better doses or if antimicrobial concentrates. Resistant (R) MIC > breakpoint of the organism. Not going for you to achieve powerful degrees of the drug at secure doses.

### 3.7. IC50 and IC90 values

After the MIC values are study, further analysis of the inhibitory concentration at 50% (IC50) and 90% (IC90) of the bacterial lines are completed. Basically, the IC50 or IC90 is used to determine the dosage treatment of antimicrobial agent for in vivo medicine towards the pathogen inside the area to recognize the effectiveness of each drug. The method used to decide IC50 and IC90 values is Graph pad prism software

#### Formula:

$$IC_{50} = \frac{A+B}{2}; \text{ when } A = \frac{50 \times \text{MIC value of the next \% lower than 50\%}}{\text{the next \% lower than 50\%}}$$

$$B = \frac{50 \times \text{MIC value of the next \% higher than 50\%}}{\text{the next \% higher than 50\%}}$$

$$IC_{90} = \frac{C+D}{2}; \text{ when } C = \frac{90 \times \text{MIC value of the next \% lower than 90\%}}{\text{the next \% lower than 90\%}}$$

$$D = \frac{90 \times \text{MIC value of the next \% higher than 90\%}}{\text{the next \% higher than 90\%}}$$

### 3.8. MTT Assays Study

#### A. Cell culture

Bacteria had been cultured in liquid medium (DMEM) supplemented 10% Fetal Bovine Serum (FBS), a 100 ug/ml antibiotics, and maintained under an environment of 5% CO<sub>2</sub> at 37°C.

#### B.MTT assays

Assays which allow for the quantitative dimension of cellular loss of life in the course of cell subculture are important to any test involving variable strains or ex vivo cell clinical samples. Plate 1,000-100,000 cells in step with properly in a 96-nicely plate and incubate with an appropriate incentive for the desired time (generally 6-48 hours). Take away medium and wash cells with PBS. Upload MTT made up in medium to a very last concentration of 0.5 mg/mL.

Incubate for 30 minutes to 4 hours at 37°C, until intracellular crimson formazan crystals are seen below microscope. Put off MTT and upload solubilizing solution and tritrate. Incubate at room temperature or 37°C for 30 minutes to 2 hours, till the cells have listing and red crystals have dissolved. Measure absorbance at 570 nanometer

### 3.9. Application of Computers in Antibacterial Susceptibility Testing

#### A.WHONET 5.6 Software

Whonet 5.6 software was utilised to find out the <http://www.Who.Int/emc/WHONET/instructions.Html> This Programmed is beneficial in supplying cutting-edge recommendations, protocols to nearby laboratories, in figuring out the clusters of resistant isolates and rising outbreaks

**B.Graph Pad Prism 8 Software**

Graph Pad Prism 8 Software was utilised to find out the IC 50 and EC 50 Value by the Nonlinear Regression Methods.

**C.Test ECOF Finder**

Test ECOF Finder was utilised to find out the ECV for the drug against bacteria's and to find out the drug wild types are not non wild types.

**4. RESULTS AND DISCUSSION****4.1. Antimicrobial Activites**

The existing antibiotics for this organism *Streptococcus aureus* are Methicillin, Cefoxitin, cefixime and oxacillin. Their MIC break point is obtained from EUCAST and NCCLS data base. Their Susceptible MIC break points are  $>2$  mg/l ,  $>4$ mg/l ,  $<0.5$  mg/l and  $>2$  mg/l respectively shown in the TSC2CB has optimum MIC break point 16 mg/l or 160  $\mu$ g/ml.

**4.2. MTT ASSAY TEST**

S. No	Tested Sample Concentration ( $\mu$ g/ml)	Cell viability (%)			Mean Value (%)
		(In Triplicates)			
1.	Control	100	100	100	100
2.	100	38.73	39.82	44.2	40.91
3.	90	49.45	50.32	46.38	48.71
4.	80	50.76	51.2	53.82	51.92
5.	70	58.86	55.57	58.42	57.61
6.	60	62.8	55.79	60.17	59.58
7.	50	65.42	61.7	62.8	63.3
8.	40	65.64	63.67	64.77	64.69
9.	30	77.24	67.83	66.52	70.53
10.	20	77.46	79.21	73.74	76.8
11.	10	94.09	94.09	94.09	91.6
12.	5	98.68	99.12	87.74	95.18
13.	2.5	99.56	99.78	89.93	96.42
14.	1.25	96.93	97.81	89.49	94.74
15.	0.625	91.90	96.49	88.18	92.19

Table: 1.1

IC50 values is the amount of drug leads to inhibit the half of targeted bacterias it is manually calculated by using the formula it was found to be 0.83  $\mu$ g/ml. Graphpad prism 8 software is utilized to find the IC50 value and to draw the curve between cell viability % and log c [ $\mu$ g/ml]. The IC50 absolute value was 0.83  $\mu$ g/ml and relative IC50 range is between 0.76 and 0.91  $\mu$ g/ml. This is  $<1$   $\mu$ g/ml. This IC50 is optimal for good drugs. The hill slope value of the curve is -ve indicates the +ve inhibition of *Streptococcus*



aureus by TSC2CB derivative. The IC 50 values of existing antibiotics Methicillin,Cefoxitin,Cefixime,Oxacillin against this bacteria are also lesser than 1 µg/ml.

#### 4.3. GRAPPAD PRISM 8 ANALYSIS

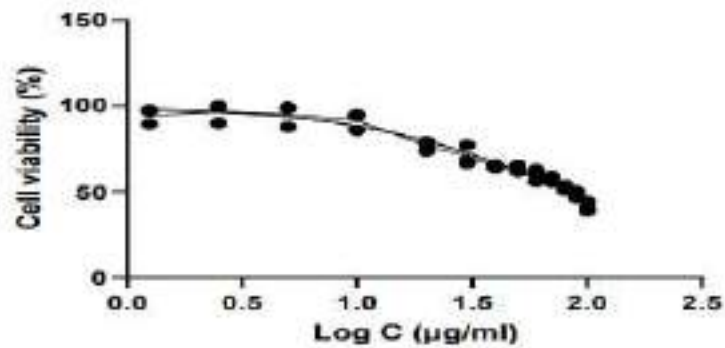
log(inhibitor) vs. normalized response -- Variable slope	
<b>Best-fit values</b>	
Hill Slope	-0.9556
IC50	0.83
<b>95% CI (Profile like lihood)</b>	
LogIC50	1.883 to 1.960
Hill Slope	-1.083 to -0.8413
IC50	0.7643 to 0. 9128
<b>Goodness of Fit</b>	
Degrees of Freedom	37
R squared	0.9528
Sum of Squares	643.7
Sy.x	4.171



Sum of Squares	643.7
Sy.x	4.171
<b>Replicates test for lack of fit</b>	
SD replicates	3.898
SD lack of fit	4.754
Discrepancy (F)	1.487
P value	0.1957
Evidence of inadequate model?	No
Number of points	
# of X values	39
# Y values analyzed	39

Table:1.2

#### 4.4. HILL SLOPE CURVE



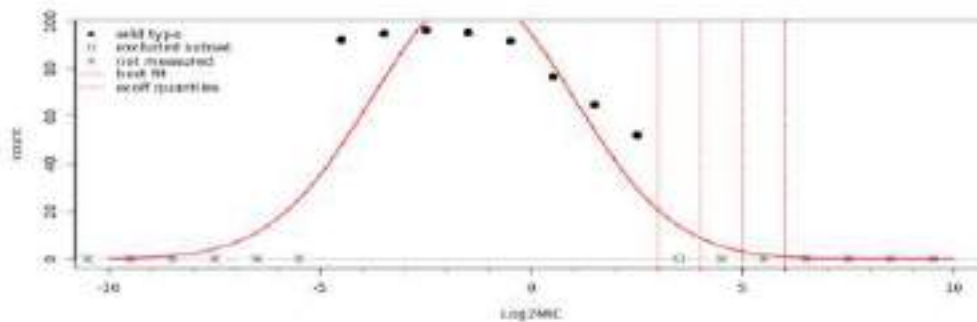


#### 4.5. MIC AND MIC BREAK POINT

S. No	Tested sample concentration (µg/ml)	Cell Viability (%) Mean Value
1	160	0
2	150	0
3	140	0
4	130	0
5	120	7.5
6	110	22.8
7	100	40.91
8	90	48.71
9	80	51.92
10	70	57.61
11	60	59.58
12	50	63.3
13	40	64.69
14	30	70.53
15	20	76.8
16	10	91.6
17	5	95.18
18	2.5	96.42
19	1.25	94.74
20	0.625	92.19

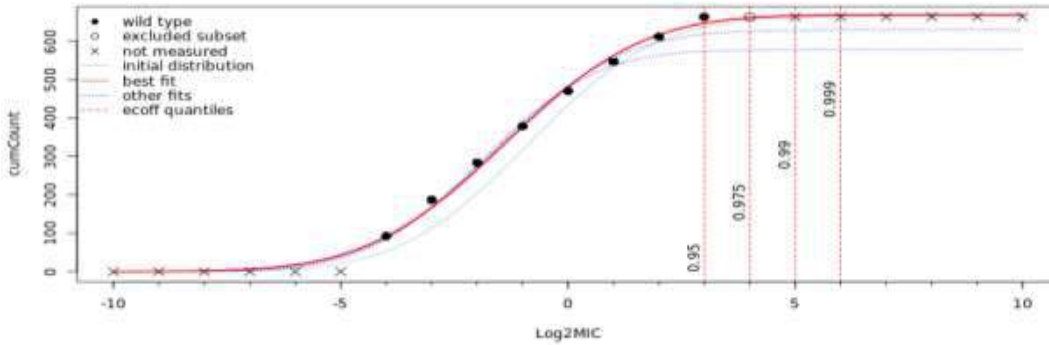
Table:1.3

#### 4.6. DENSITY CURVE





#### 4.7. CUMULATIVE CURVE



#### 4.8. EPIDEMIOLOGICAL STATISTICAL DATA

```

mean      sd      K
-0.8798064 2.2242261 663.5400000
Search concentration: 1 2 3 4

Formula: cumCount ~ fnorm(conc, mean, sd, K)

Parameters:
  Estimate Std. Error t value Pr(>|t|)
mean -1.3846  0.1582 -8.754 2.75e-06 ***
sd    2.3861  0.1769 13.487 3.47e-08 ***
K    668.8193 22.4319 29.816 7.13e-12 ***
---
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 18.12 on 11 degrees of freedom

Number of iterations to convergence: 8
Achieved convergence tolerance: 2.019e-06

```



```
Parameters:
      Estimate Std. Error t value Pr(>|t|)
mean  -1.3846   0.1582  -8.754 2.75e-06 ***
sd     2.3861   0.1769  13.487 3.47e-08 ***
K     668.8193  22.4319  29.816 7.13e-12 ***
---
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 18.12 on 11 degrees of freedom

Number of iterations to convergence: 8
Achieved convergence tolerance: 2.019e-06
---
ECOFF quantiles:
  Q_0.95 Q_0.975 Q_0.99 Q_0.999
    0.08  0.16   0.32   0.64
```

#### 4.9. WHONET 5.6 SOFTWARE ANALYSIS

By the application of whonet 5.6 software, we had analysed the action of existing antibiotics against the *Streptococcus aureus* bacteria. Type of the sample is blood and number of isolates utilized is one. The following antibiotics, which were analysed against the organism *Streptococcus aureus* and their class, sub class, code, 110 method, break point, range of susceptibility, isolate number, % resistant, % intermediate are in this case all antibiotics are resistant because their MIC break point is lower than the MIC values. They all are less effective against this organism but the TSC2CB has a lower MIC than MIC break point therefore it is susceptible.

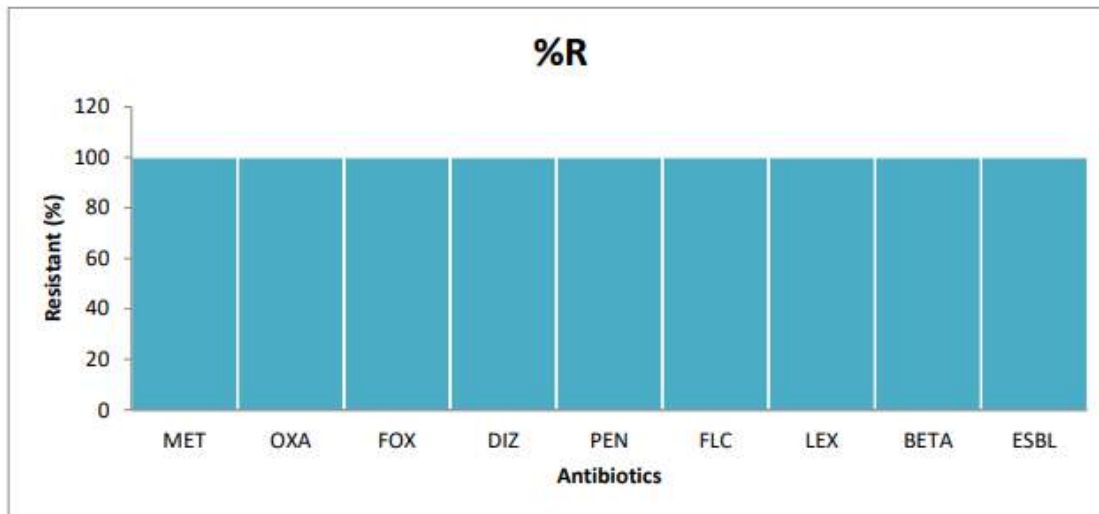


**4.9.(a). WHONET OUT PUT DATA**

Code	Antibiotic name	Antibiotic class	Antibiotic subclass	Code	Methods	Break Point	Num Ber	%R	%I	%S	%R 95%CI	Num ber
MET ND5	Methicillin	Penicillins	Penicillin (Stable)	MET	Disk	10-13	1	100	0	0	5.5-100	0
OXA ND10	Oxacillin	Penicillins	Penicillin (Stable)	OXA	Disk		1	100	0	0	5.5-100	0
FOX ND10	Cefoxitin	Cepheims	Cepharynsin	FOX	Disk		1	100	0	0	5.5-100	0
DIZ ND10	Cefditaxime	Cepheims	Cephalosporin III	DIZ	Disk		1	100	0	0	5.5-100	0
PEN ND10	Penicillin G	Penicillins	Penicillin	PEN	Disk	5-29	1	100	0	0	5.5-100	0
FLC ND	Flucloxacillin	Penicillins	Penicillin (Stable)	FLC	Disk		1	100	0	0	5.5-100	0
LEX ND30	Cephalexin	Cepheims-Oral	Cephalosporin	LEX	Disk		1	100	0	0	5.5-100	0
BETA LACT	Beta-lactamase			BETA			1	100		0		
ESBL	ESBL			ESBL			1	100		0		

**Table:1.4**

**4.9.(b). WHONET RESISTANT % OUTPUT**



**5. AGAR DISK DIFFUSION STUDY**

Petri dish plates are used to find out the inhibition zone width of the antibiotics TSC2CB against *Streptococcus aureus*. The optimum antibiotic concentration for this TSC2CB is 2.5µg/ml. The maximum inhibition zone *Streptococcus aureus* organism at 2.5µg/ml concentration of TSC2CB antibiotic is shown in the level 16 respectively. As per the EUCAST and NCCLS database the zone with >26 mm are Susceptible. There fore our new antibiotic TSC2CB is Susceptible against the bacteria *Streptococcus aureus*. From the above discussions the derivative TSC2CB was proved as a better antibiotic against *Streptococcus aureus* bacteria than the existing antibiotics by in vitro study and it is susceptible against the diseases, skin infection, pimples, high fever, boils cellulitis,,Kindney Damage, Toxic shock syndrome, bacteremia, meningitis,

Agar Disk Diffusion Methods (Inhibition Zone With)  
*Staphylococcus Aureus*-Concentration of Antibiotic 2.5µg/ml





TSC2CB (16 mm)

## 6. SUMMARY AND CONCLUSION

In vitro method of analysis is base for new drug designing from novel derivatives of organic and semiorganic NLO compounds are recently being entered into this field. Thiosemicarbozones are having enormous medicine applications due to the presence of hetero atoms nitrogen “N” and sulphur “S” in its molecular structure. The carbonyl compounds are also having the large clinical applications to cure many diseases. We merge these two classes of organic compounds and their substitution by solution growth techniques of crystal growth and tested as antibiotics against few fastidious and non fastidious gram +ve and gram -ve organisms. From the above antimicrobial following conclusions were made, the minimum inhibition concentration (MIC) values is very low for the organism Escherichia coli (0.625  $\mu\text{g/ml}$ ) against TSC2CB. The MIC break point range is between 110 $\mu\text{g/ml}$  and 130 $\mu\text{g/ml}$  in all the cases MIC break points are not equal to MIC but greater than MIC values. Therefore we concluded that susceptible type of inhibition shown by all the new compounds. The half inhibitory maximum value (IC<sub>50</sub>) was also calculated by the graph pad prism software, all the TSC derivatives have the IC<sub>50</sub> value lesser than one (<1) (0.7 to 0.9  $\mu\text{g/ml}$ ) indicated that all the prepared one TSC derivatives are efficient against the above said one organisms. The hill slope value of curve between the cell viability vs log (c) is negative for all the one TSC derivatives obtained from graphpad prism software concluded that the inhibition capacity of the one TSC derivatives are susceptible against the tested organisms. The WHONET Study results reveal that all the Existing antibiotics in medicals against the above mentioned bacteria (Organisms) are having somewhat poor than the TSC derivatives. Structures and Size of all Existing antibiotics in medicals against the above mentioned bacteria(Organisms) are having comparatively larger shape and size than the TSC derivatives, Therefore, They Lost their Surface area and enter in to and Exit from bacteria is difficult for existing antibiotics when compare with TSC derivatives. The epidemiology cut off value (ECV) for all the one TSC derivatives against all the organisms are found around 0.08 (95%)  $\mu\text{g/ml}$  in all the one case the MIC values are higher than there ECV value therefore organisms tested in this study are not belonging to wild type distribution against all the one TSC derivatives. Hence there are no chances for failure in the clinical treatment is confirmed.

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# ONLINE PROCESSING OF PAYMENT: CLIENT RESPONSIVE SERVICE DELIVERY AT THE TREASURY OFFICE PAGSANJAN, LAGUNA

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## ABSTRACT

*This study aimed to assess client-responsive service delivery in terms of timeliness, quality, Efficiency, tangibility, and transparency. The research employed the input process output format of research. Respondents were fifty walk-in clients of the Pagsanjan Treasury Office and fifty from the Cities Treasury Office. They were selected through convenience sampling. A researcher-made questionnaire was utilized to gather the respondents' perceptions on the service delivery of both offices. Findings revealed that clients of the Pagsanjan Treasury Office rated moderately high on timeliness, low on quality, relatively high on Efficiency, high on tangibility and high on transparency. In addition, clients of the Cities Treasury Office rated very high on all measures of responsive service delivery, such as timeliness, quality, Efficiency, tangibility and transparency. Moreover, significant differences in the assessment of clients of Pagsanjan and the Cities treasury office were also found. Finally, it was revealed that Cities Treasury Office is better than Pagsanjan Treasury Office in terms of timeliness, quality and Efficiency. The main challenge encountered at Pagsanjan Treasury Office is the slow transactions, while in Cities Treasury Office, it needs to be more detailed step-by-step procedures for doing transactions. It was concluded that Cities Treasury Office has a better client-responsive service delivery than the Pagsanjan Treasury Office in terms of timeliness, quality and Efficiency.*

**KEYWORDS:** *Client Responsive Service Delivery, Manual Payment and Online Payment*

## INTRODUCTION

Electronic government, or e-Government, applies information and communication technologies (ICTs) to government processes and operations to improve efficiency, transparency, and citizen participation. This definition exemplifies how ICTs are used by e-Government as a support tool for advancing good governance. The effective use of e-Government enhances the effectiveness and efficiency of governmental operations, improves processes and procedures, raises the standard of public services, enhances the use of information in decision-making, and facilitates improved communication between various governmental offices.

Furthermore, e-governance can be employed in educational institutions. According to [16] implementing e-governance can be a game changer in the performance of technical education and that executing it will assist the educational system and society.

Municipalities communicate directly with citizens in a particular way. The interaction between cities and their residents cannot be avoided: enrolling a child in school, registering an automobile, registering a business, and other activities necessitate contact with the municipality. E-Government aims to establish a new, dynamic relationship between governments and citizens that will be easier for citizens to participate in. Technology must be incorporated into routine municipal operations and public sector administration, with the requirements of the general public serving as the driving force behind this innovation.

The study of [15] mentioned that the information phase enhances the organization's internal functional efficiency through information and communication technologies. The transition from automation technologies to a concentration on Information that can be shared, in this case with advanced information and communications technology, characterizes the interaction phase. The ITCs are the driving force behind this transformation of public administration.

As stated by [5] noted in a different study that ICT use in businesses is now crucial, especially for SMEs, which comprise most global businesses. ICT adoption and application can increase productivity, potency, innovation, growth, and competitive advantages. He stated that aligning organizational and productive processes with ICT technologies is the key to effective business performance. ICT usage has significantly increased over the past few years, substantially impacting various societal and economic activities by simplifying and streamlining routine tasks. An example of using ICT in the government is using digital payment facilities.



Moreover, Philippines' digital payments environment has significantly expanded and changed recently. The National Retail Payment System (NRPS) was launched by the Bangko Sentral ng Philippines (BSP), the nation's central bank, in 2015 to encourage the growth and adoption of electronic payments throughout the archipelago of islands.

On the other hand, in the Philippines, this approach has contributed to an increase in the variety of digital payment choices available and their accessibility. This increase would have been unexpected in a historically sluggish nation to adopt the modernization of tried-and-true mainstream methods, such as cash.

For most Filipinos, who are dispersed across the massive network of more than 7,000 islands that make up the Philippines and frequently have limited access to more traditional payment infrastructures, digital payment alternatives thus represent the possibility of some level of financial independence [7].

Nonetheless, digital payments in the Philippines have made broader financial services easier to obtain and more widely available to distributed Philippines customers by relying on largely virtualized infrastructure. From [6] stated that electronic governance uses Information and communication technology (ICT) to support democratic processes, citizen connections, and public administration.

Using these ICTs improves communication between the Government and its various stakeholders. Delivering essential services is only one aspect of electronic governance because it connects the public, private sector, and Government. It breathes life and soul into the cooperation between these stakeholders and effective governance. There are several significant companies in the Philippine market for digitalized payments as of 2021, including banks, online payment services, and mobile wallet providers. Private or public companies have benefited from quicker and better communication, adequate data storage, retrieval, and processing, and the interchange and usage of information due to the increasing popularity of information and communications technology (ICT). It has resulted in the re-engineering of corporate processes, where what had initially been a quicker, more accurate, and easier way of word processing became a tool for tabulating and processing data that eventually assisted most organizations in their decision-making process.

As a result of the current growth in computerization, innovation, and internet usage, more and more users are now driven to change how they carry out jobs to take advantage of the benefits provided by ICT. As far as the government is concerned, computerization, internet usage, and web enablement, combined with process re-engineering, have resulted in an even better and faster information processing that has improved decision-making, resource utilization, and reach and accountability. Private companies have adopted ICT, such as digital payments, in their day-to-day transactions.

Digital payments offer numerous advantages to both senders and recipients of the trade for users [2]. Beyond being convenient, they can also reduce the time and costs of collecting payments. In addition, it can occur in real-time and be a more secure transaction than cash payments, which move at the speed of the carrier. Digital payments are frequently the first entry point for people into the financial system, opening the door to various products like savings, credit, and insurance in addition to cheaper costs and improved authentication features. With digital payments, vulnerable individuals can be integrated into a system of automatic deposits, pre-set SMS reminders, and other elements that can assist individuals in overcoming psychological hurdles to saving. Digital payments also provide consumers access to the larger market and can lessen the impact of unforeseen income fluctuations.

Finally, beneficiaries of digital payments may have more control over how they utilize their money, mainly if they belong to an excluded group like women or other minorities. Remittances are a crucial component of digital payments and can be a way to increase financial inclusion, as they are often the first financial product utilized by low-income persons. A faster, more affordable, and more convenient remittance process can be made possible by digital technology, increasing the amount of money sent to people in need. Digitization offers benefits to the sender as well. Digital payments improve the traceability of the payment process and, in the case of governments, prevent leakage and instances of ghost beneficiaries.

According to [12], the key to effective ICT use in the Philippines must begin locally so that the crucial stakeholders may comprehend what is being done. G-Cash and PayMaya virtual wallets are blockchain-based cryptocurrency exchanges and wallet Coins. Ph is among the Philippines' most widely used digital payment methods. Customers can use these platforms to pay for goods and services online, send money to other users, and pay at actual retail locations.

Advances in information and communication technology have revolutionized how the public sector operates as a result of the government's reinvention. The use of the Internet, websites, electronic mail, and other networking tools enabled a shift in the provision of key services and the structure of the public sector. These new public-sector technologies are now referred to as "electronic governance" or "e-governance," a phrase that has acquired considerable acceptability in the international community.

This study is one step forward in understanding whether maximizing the use of online payment facilities will improve the services of the Pagsanjan Treasury Office.

## **OBJECTIVES OF THE STUDY**

The study aimed to assess the service delivery of the Pagsanjan Treasury Office. Specifically, it sought to answer the following questions about providing responsive client services.

1. Assess the service delivery of the Pagsanjan Treasury Office relative to manual payment mode in terms of:
  - 1.1. Timeliness,
  - 1.2 Quality,



- 1.3 Efficiency
- 1.4 Tangibility; and
- 1.5 Transparency
- 2. Assess the service delivery of a City Treasury Office relative to online payment mode in terms of:
  - 2.1. Timeliness,
  - 2.2 Quality,
  - 2.3 Efficiency
  - 2.4 Tangibility; and
  - 2.5 Transparency
- 3. Is there a significant difference in the assessment of clients on the service delivery of the Pagsanjan Treasury Office and the Cities Treasury Office concerning the variables mentioned and the mode of payments?
- 4. What are the challenges the respondents encounter in delivering services by the Pagsanjan Treasury Office and the City Treasury Office?
- 5. Based on the study's findings, what suggestions can be recommended to promote client-responsive service delivery at Pagsanjan Treasury Office?

## MATERIALS AND METHODS

In the study, the descriptive and comparative survey method was used. Descriptive survey research, according to [4] focus on present occurrences in terms of conditions, behaviors, beliefs, relationships, or trends. This research approach was selected since the primary purpose of the study was to characterize how respondents rated the service delivery of the Pagsanjan Treasury Office and the City Treasury Office. Several concerns that respondents encountered while providing services for the survey were also gathered and assessed. Respondents were walk-in clients of Pagsanjan and the City Treasury office during the scheduled two weeks of data collection. Fifty (50) Pagsanjan Treasury Office walk-in clients and fifty (50) City clients.

Treasury Office was chosen through convenience sampling. It is a non-probability sampling strategy in which units are chosen for inclusion in the sample because they are the most accessible to the researcher. The questionnaire had been divided into two parts for the study. The first section analyzed client-respondent perceptions of Pagsanjan and a City Treasury Office service delivery in terms of timeliness, quality and efficiency, tangibility and transparency. Each indicator was made up of five questions on a five-point Likert Scale. These questions use verbal interpretation of mean as follows: 4.21-5.0=Strongly Agree, 3.41-4.20=Agree, 2.61-3.40=Moderately Agree, 1.81-2.60=Disagree, 1.00-1.80=Strongly Disagree.

The last part of the questionnaire collected different problems encountered by respondents during service delivery. The frequency distribution was used to describe them. The clients' service delivery problems have been outlined using frequency and percentage distribution.

The independent sample T-test was performed to compare and identify significant differences in respondents' perceptions of Pagsanjan and the Cities Treasury Office service delivery.

The collected data was tallied, evaluated, and interpreted. All collected data was treated with the highest privacy and confidentiality in accordance with RA 10173, or the Data Privacy Act of 2012.

## RESULT AND DISCUSSION

This chapter presents the data, its analysis and interpretation that shed understanding on the investigated topic.

**Table 1. Assessment of the Service Delivery of Pagsanjan Treasury Office Relative to Manual Payment Mode**

	WM	SD	VI
<b>Timeliness</b>	3.14	0.81	Moderately High
<b>Quality</b>	2.50	0.30	Disagree
<b>Efficiency</b>	3.00	1.21	Moderately High
<b>Tangibility</b>	4.36	0.51	Very High
<b>Transparency</b>	3.71	0.40	High

Table 1 revealed that the service delivery of Pagsanjan Treasury Office Relative to Manual Payment Mode was Tangibility. Data revealed that respondents rated very high on most of the statements on tangibility. An overall mean of 4.36 implies that respondents acknowledge the commendable physical layout, equipment, personnel, and communication materials of the Pagsanjan Treasury. Regarding conduciveness and cleanliness of the office, respondents answered only high, which may imply that there are still things to be done to improve the service, such as the air-conditioning system in the waiting area. This kind of facility is expected for a second-class municipality such as Pagsanjan, Laguna. Budgetary requirements for facilities upgrade are minimal. As [9] stated, the government's meagre resources hinder government sector improvements.

Furthermore, Findings revealed that respondents rated high on all statements under transparency. An overall mean of 3.71 may imply that respondents agree, but there are still questions regarding transparency inside the treasury office. It may be in



connection with some of the clients' experiences that there are transactions without the issuance of receipt happening inside the treasury office.

According to Executive Order No. 43, s. 2011, the government shall ensure transparency in government transactions and work hard to fight graft and corruption. In line with this, issues must be terminated at all costs. In addition, an overall mean of 3.14 with an SD of 0.81, interpreted as moderately high, implies that respondents disagree with the responsiveness of service delivery of the Pagsanjan treasury office regarding timeliness. These findings are disturbing as government officials should ensure satisfaction from its client. According to [13] public offices shall work as fast as possible without unnecessary delays. Respondents believe that they do not constructively handle the complaints and problems of the clients. It is also evident in the overall mean of 3.00, which means that clients disagree on the efficiency of services of the Pagsanjan treasury office. This scenario is quite common in government offices doing manual transactions. It may cause overworked, causing them to have a lot of stress on the performance of their duty. According to the Digital Philippines Foundation, the Philippine government has to solve problems in the attitude, knowledge and abilities of the server and the served. The low quality of service in the Pagsanjan Treasury office was evident in the overall mean of 2.5. Clients are not satisfied with the quality of service the Pagsanjan treasury office gives. It is brought by the traditional method of doing transactions. According to Brad (2022), manual transactions require a lot of physical effort and footwork. This scenario contributes to the low perception of the clients on the quality of service of the office.

**Table 2. Assessment of the Service Delivery of Pagsanjan Treasury Office Relative to Online Payment Mode**

	WM	SD	VI
<b>Timeliness</b>	4.38	0.51	Very High
<b>Quality</b>	4.40	0.43	Very High
<b>Efficiency</b>	4.36	0.47	Very High
<b>Tangibility</b>	4.41	0.47	Very High
<b>Transparency</b>	4.42	0.51	Very High

As gleaned on Table 2, data revealed that the Treasury Office Service Delivery to Online Payment mode were transparent, tangible, timeliness, quality and efficiency. Transparency with An overall mean of 4.42, interpreted as very high, suggests a transparent transaction done in a City Treasury Office as perceived by their clients.

According to [17] online processing is helpful in documentation and record management. It can be stored easily without fearing being destroyed by fire, flood and other natural disasters. Quick Sharing is only done as no printing is required, making it available to anyone who wants to see it as prescribed by law. It may be in connection with some of the clients' experiences that there are transactions without the issuance of receipt happening inside the treasury office noted. According to Executive Order No. 43, s. 2011, the government shall ensure transparency in government transactions and work hard to fight graft and corruption. In line with this, issues must be terminated at all costs. an overall mean of 4.41 which was interpreted as very high. It clearly manifests the commendable physical layout, equipment, personnel, and communication materials of the City Treasury Office as perceived by their clients. These findings are coherent with that [14] stated that online processing allowed any organization to get the most out of its resources while incurring the lowest cost possible. It offers additional funds for any organization for the improvement of its facilities. Respondents rated very high on timeliness offered by a City Treasury Office on their service, as evident in an overall mean of 4.38. It suggests that clients experience a faster and more convenient way of doing all their transactions inside the office. It can be attributed to the online processing of payments that can be done with other payment facilities. This finding is in relationship with [3] assert that there is no noticeable delay with the use of online or real-time processing of payments. Findings revealed that respondents rated very high on all indicators under quality. It suggests that clients are delighted with the quality of services a City Treasury Office offers. There is a designated officer to handle all their transactions, payment facilities are available, accountability is being ensured, as evidenced in the issuance of receipts, and all transactions are accurate. Having online transactions make it convenient for clients to do their transactions.

As [14] stated having online processing offers a quality and convenient experience as it incurs fewer errors compared to the traditional method of transactions. Lastly, data revealed that respondents acknowledge the efficiency of service of a City Treasury Office, evident in an overall mean of 4.36, interpreted as very high. It suggests that there is a desk officer who is knowledgeable in his work and very accessible and approachable in handling complaints constructively. They observed courtesy at all times and treated all clients fairly. As reiterated by [15] pointed out that, with the use of technology in processing payments, a high volume of tasks is being done conveniently and efficiently. The physical job of employees is lessened, resulting from decreasing workload, thus giving them more time to deal with clients' concerns positively and constructively.

E-government develops its unique institutions that blend conventional and contemporary organizational patterns. E-government has caused institutional models to be restructured in various countries to align government assets with their altered purpose and activities.



According to [12] the key to effective ICT use in the Philippines must begin locally so that the crucial stakeholders may comprehend what is being done. Thanks to this, they can readily accept the innovation that the company wishes to introduce. Second, it must be forbidden to endanger the bureaucratic organization's terms. ICT can be utilized in this way to increase process efficiency and dependability without completely getting rid of the bureaucracy. Third, updated and enhanced versions of the current information system must be used. Total system change will be open to criticism and may not be supported by employees accustomed to the old system. Last but not least, cultural change is crucial to deploying e-government. Programs that educate staff members and alter their perspectives will significantly aid them in supporting the new system that will be put in place. According to the findings of a [18] dynamic environment and environment capacity fit have a favorable impact on technology adoption. It boosts organizational performance and growth while quietly encouraging client happiness and financial independence.

**Table 3. Differences Between Pagsanjan and Cities Treasury Offices in Terms of the Study Variables**

	Pagsanjan		Calamba		df	t	p	Cohen's d
	M	SD	M	SD				
Timeliness	3.28	0.44	4.38	0.51	98.00	-11.65	<.001	-2.33
Quality	3.07	0.67	4.40	0.43	83.01	-11.88*	<.001	-2.38
Efficiency	3.13	0.68	4.36	0.47	87.24	-10.55*	<.001	-2.11
Tangibility	4.14	0.52	4.41	0.47	98.00	-2.73	.008	-0.55
Transparency	4.25	0.49	4.42	0.51	98.00	-1.71	.090	-0.34

Table 3 presents the results of timeliness, quality, efficiency, tangibility, and transparency. It was found that there is a statistically significant difference,  $t(98)=-11.65, p<.001$ , in Timeliness between Pagsanjan (M=3.28, SD=0.44) and Calamba (M=4.38, SD=0.51) at .05 level of significance. Timeliness is a crucial measure of responsiveness in government services. According to [10] the ability of audited government financial information to decrease information asymmetry is significantly reduced as the amount of time to report increases. It was supported by Baber (2013), who said that users of those reports should highly value timelier pieces.

Furthermore, it was also revealed that in terms of quality, Cities (M=4.40, SD=0.43) is higher than that of Pagsanjan (M=3.07, SD=0.67), and this difference is statistically significant,  $t(83.01)=-11.88, p<.001$  at .05 level of significance. It suggests that a City Treasury Office is better than Pagsanjan in terms of quality of services. It can be attributed to the advantage of digitalizing transactions. Based on [13], E-government plays a crucial role in improving the public sector's efficacy, efficiency, and quality. It also fosters coordination and cooperation between tiers of government, which builds public trust.

Finally, the Efficiency of Pagsanjan (M=3.13, SD=0.68) is lower than that of Calamba (M=4.36, SD=0.47), and the difference is statistically significant,  $t=-10.55, p<.001$ , at .05 level of significance. It clearly manifests the advantage of using online payment compared to manual transactions.

According to Brad (2022), online transaction is a more efficient way of doing government transactions. It was supported by [12] who stated that using ICT increases efficiency in doing government transactions.

However, no significant difference between Pagsanjan and a City treasury office regarding tangibility and transparency was found.

**Table 4. Problems Encountered by the respondents in the delivery of services at the Pagsanjan Treasury Office**

Problems	Percentage
Step-by-step procedures could be more explicit.	18%
Desk officers need to be more responsive and accommodating.	10%
Slow transaction. It takes almost a day to finish.	38%
The office could be more conducive to waiting. There are no chairs available for everybody, and it's hot.	30%
Order while falling in line is not observed. Some are sneaking in line.	4%
<b>Total</b>	<b>100%</b>



Table 4 shows the problems encountered by the respondents in the delivery of services at the Pagsanjan Treasury Office. Data reveals that most of the respondents encountered problems of slow transactions that usually consume the whole day. A crisis followed it. It can be attributed to the limited personnel and payment windows in Pagsanjan, causing slow transactions. Clients must fall in line for hours before they can do their transactions. It is a common scenario in government offices doing manual transactions. As [16] stated, a typical transaction with the government often requires a whole day. It was followed by “an office not conducive for waiting”. On the other hand, "order while falling in line is not observed" was perceived to be a minor problem in Pagsanjan Treasury Office.

Based on [13] public goods and services that are responsive expressly acknowledge and accommodate the variety of requirements of citizens. Responsive service providers use tactics that segment customers rather than a "one size fits all" approach. Creating processes that proactively seek out and consider public input or concerns can help build client bases. Additionally, responsive public goods and services aim to react rapidly to needs while avoiding unnecessary delays. Thus, the timeliness of service delivery stands out as a responsiveness metric that has a remarkable impact on individuals' faith in the capacity of public services to satisfy their requirements.

**Table 5. Problems Encountered by the respondents in the delivery of services at the Cities Treasury Office**

Problems	Percentage
Step-by-step procedures could be more precise.	57%
Desk officers need to be more responsive and accommodating.	13%
Slow transaction. It takes almost a day to finish.	4%
The office could be more conducive to waiting. There are no chairs available for everybody, and it's hot.	20%
Order while falling in line is not observed. Some are sneaking in line.	6%
Total	<b>100%</b>

Table 5 depicts the respondents' problems with service delivery at the Cities Treasury Office. The biggest issue that City Treasury Office clients encountered was problems with step-by-step transaction procedures. For older clients and clients who are not digitally savvy, internet transactions may not be the best option. According to Rye (2012), the Philippines have a small number of competent internet users, which [9] believes may be a better amount for online processing. According to [17] ICT is slowly being implemented in the Philippines, and most governments lack tools for straightforward navigation. Obtaining various documentary requirements before they can complete all of their transactions also contributed to these issues.





**Table 6. Program of Recommendation for the Improvement delivery system of Pagsanjan Municipal Treasury Office**

Action	Budget Allocation	Timeline
1. Other payment options, such as online banking, g cash, and intelligent "padala", may be offered, which can lessen the number of hours spent waiting for clients.	None	January 2024
2. Customer service training and seminars that will improve complaint handling are suggested. Designating some personnel to handle such complaints is also recommended.	10,000	October, 2023
3. A broader and more conducive area may be assigned to lessen waiting time is suggested.	100,000	January, 2024
4. Designating some personnel whose primary task is to guide the clients doing the transaction in the waiting area is also recommended	120,000	January, 2024

Based on the study's findings, the researcher notices challenge that hinder responsive service delivery at Pagsanjan Treasury Office. In line with this, the researcher created the following program of recommendation to create a client-responsive delivery system for the Pagsanjan Treasury Office. As stated by [1] are comparable to the current study in that they all explore the benefits and drawbacks of digitizing government transactions. There were obvious potential issues with the usage of ICT. The reasoning for its use and the reasons for its use around the world were also mentioned. It was stated that accessibility and convenience are two of ICT's assets, however confidentiality is the most concerning due to the ease with which internet data can be hijacked. Studies cited in this current work seek to describe the use of ICT and its contribution to industrialization.

However, an online and manual payment is a transaction that takes place via the Internet. Customers can make cashless payments with credit cards, online banking, and third-party payment apps. Online payments are convenient and may be made from anywhere. Customers are not required to wait in lines to make payments [11]. Governments are concerned about the quality of the information they have, particularly its availability and accuracy, since they have a responsibility to guarantee that citizens have access to trustworthy information so that they can fulfill their rights and duties. It calls into question the appropriate transmission of information as well as information freedom [8].

To effectively profit from real-time processing, organizational requirements and employee skill sets must be aligned, and individuals must be provided with the required computer and internet skills. People may require further training in the innovations employed with this system, or it may need to be upgraded. The move to electronic technology has provided a substantial management problem due to the requirement for modifications and environmental adaption. People may be resistant to this technology because they are afraid of using it or are unwilling to change their traditional methods of doing things. The abrupt deployment of this technology will not excite people, particularly the elderly.

**CONCLUSION AND RECOMMENDATION**

Given the findings, the following conclusions were drawn:

1. Clients of the Pagsanjan Treasury Office rated moderately high on timeliness, low on quality, relatively high on Efficiency, very high on tangibility and high on transparency.
2. Clients of the Cities Treasury Office rated very high on all measures of responsive service delivery, such as timeliness, quality, Efficiency, tangibility and transparency.



3. There is a significant difference in the assessment of the clients of the Pagsanjan and the city's treasury office. It was found that the service delivery of the Cities Treasury Office is better than Pagsanjan Treasury Office in terms of timeliness, quality and Efficiency.
4. The main challenge encountered at Pagsanjan Treasury Office is the slow transactions, while in Cities Treasury Office, it needs to be more precise step-by-step procedures for doing transactions.

Based on the conclusion of the study, the following recommendations were drawn.

1. Other payment options, such as online banking, g cash, and smart padala, can lessen clients' waiting hours.
2. Customer service training and seminars that will improve complaint handling are suggested. Designating some personnel to handle such complaints is also recommended.
3. A broader and more conducive area may be assigned to lessen waiting time.
4. Selecting personnel whose primary task is to guide the clients doing the transaction in the waiting room is also recommended.

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# STUDENTS' COMPETENCE IN COMPOSITION WRITING: BASIS FOR A PROPOSED INTERVENTION STRATEGY PLAN

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## ABSTRACT

*This study aimed to determine the students' competence in writing English compositions in terms of their content, organization, vocabulary, language use, and mechanics components; their strengths and weaknesses in writing; intervention strategy plan that could be proposed; and the implications of the findings to the teaching of English writing. To find out their writing competence along with the five components, the students were asked to write descriptive essays that were rated independently by three English teachers using the ESL Composition Profile designed by Jacobs et. al. (1981).*

*The descriptive quantitative-qualitative research design was used to obtain pertinent data. A case study was conducted to get the desired qualitative data that supplemented and strengthened the statistical data gathered. The results of the study revealed that majority of the students were described as 'good to average' in terms of their descriptive essay content; 'excellent to 'very good' in organization; 'good to average' in vocabulary; 'excellent to very good' in language use; and 'good to average' in mechanics.*

*However, calculation of the average mean scores and standard deviation in the five components of the students' writings indicated that the strengths of most of the students were in the 'organization' and 'language use' (grammar), whereas their weaknesses were in 'content development', 'vocabulary' and 'mechanics'. The case study likewise suggested similar results. Using the data as a basis, an intervention strategy plan to enhance students' writing competence along the five components was proposed and designed for classroom application.*

*Some strategies included to enhance students' language use and organization of ideas was peer editing, selective peer editing/proofreading with highlighting of errors, using graphic organizers, and essay diagramming. To enhance their content development, vocabulary, and mechanics components in writing, strategies such as adding details to complete an essay, providing Four Bases checklist, giving ample time for prewriting, facilitating collaborative writing, using word learning reinforcement, showing good writing models, using semantic feature analysis and paired word questions, preparing punctuation marks worksheets, conducting student-teacher conferences, and using authentic texts were included in the intervention plan.*

*The findings implied that English teachers should be given adequate training and should attend seminar-workshops in ESL writing pedagogy for them to have an in-depth knowledge of the complexities involved in the writing process and learn more intervention strategies that they could apply in the classroom to help students improve their writing in English with less effort, and the results of this study may be used as inputs to curriculum development and the implementation of intervention strategies in English composition writing.*

**KEYWORDS:** *Writing, Teaching, Strategies in Teaching English.*

## INTRODUCTION

As observed by many scholars in English as a Second Language (ESL), writing is an indispensable productive skill for both professionals and students. It is one of the most difficult and therefore frustrating subjects' to teach particularly in an ESL/EFL program. Individuals with writing problems may have difficulties in one or more aspects of writing skills such as proper use of grammar, conventions, punctuation, capitalization, and spelling, and some of the basic and initiating aspects of writing. It is also an unpleasant piece of work for both teachers and learners in ESL classes (Leki, 1992). For second language learners, the challenges are enormous, particularly for those who go into a university and study in a language that is not their own (Nunan, 2009). Tertiary or college teachers want to know whether or not their students are likely to profit from textbook reading, daily instruction, writing, research projects, and so on. Hence, teachers use different assessment tools for the purpose of gaining insights into the students' learning (Lundgren, 2007). Students for whom English is a second or third language (ESL) have a keen understanding of how languages work.



However, they have different skills and needs than native speakers of English because they have to deal with competing cultural expectations and competing languages, ESL students can have special difficulties seeing problems with their writing and solving them. One of the most challenging tasks for English teachers inside the classroom is teaching which includes finding the proper approach to fit the students' needs and abilities. The teacher plans activities that will help students learn and produce cohesive and coherent discourse on their way to becoming competent writers in the English language; however, many secondary and college students are having difficulties in submitting academic requirements especially when asked to do so in English.

In this situation, teachers need to understand the particular issues students are facing when involved in the writing process. Writing essays is undoubtedly one of the most important skills that should be learned and mastered both by high school and college students. In fact, writing is a powerful means of learning because students are given the chance to manipulate content. Through writing, students are likely to remember and understand concepts since they learn to connect, organize, and relate ideas together. Moreover, the kind of essays that are most commonly given to students include the following: expository essay, narrative essay, descriptive essay, persuasive essay, compare and contrast essay, argumentative essay, and research essay. The article by Cooper (2014) mentions that there are common problems many students have while writing essays. These problems include misunderstanding the essay prompt or question, inappropriate tone and language, grammatical errors, writing styles, and using sources or citations. Along this line, teachers need to understand the particular issues students are facing who have limited proficiency in English. The Conference on College Composition of Communication (CCCC) Executive Committee (2009) states that assessments of written literacy should be designed and evaluated by well-informed current or future teachers of the students being assessed, for purposes clearly understood by all the participants; should elicit from student writers a variety of pieces, preferably over a substantial period of time; should encourage and reinforce good teaching strategies; and should be solidly grounded in the latest research on language learning as well as accepted best assessment process. Authentic assessment strategies provide a better technique of checking for deeper understanding. One of the authentic assessment suggestions includes writing samples where students write a narrative, expository, persuasive, or research paper (Baldwin et. al., 2006). Writing blogs and position papers, responding to prompts to various genres, writing lab reports, producing policy statements, letters, articles, critiques, and diary entries are examples of assessment practices that stimulate real-life applications (Seanson, 2012). The grammar, spelling, punctuation, and capitalization are in fact the backbone of clear communication. Developing writers need to know that precision, clarity, and correctness add credibility to what they write (De Chantal et. al., 2008).

Likewise, skill in writing grows from both practice and experience from learning the characteristics of good work and making decisions to improve one's work. Teaching writing is an overwhelming challenge since no part of writing is a static process. Effective writing cannot be reached solely through directed practice of discrete skills. Well-crafted writing is more than technique joined to vision—more than grammar and syntax with artful presentation (De Chantal et. al., 2008). The act of writing contains its own inner tensions. Wright (2014) suggests that writers must abide by a host of rules that govern the mechanics and conventions of writing yet are also expected—within the constraints of those rules to formulate original, even creative, thoughts.

However, teachers reduce students' sense of intimidation when their writing instruction makes the three stages of writing—planning, writing, and revision—clear and explicit. To improve the teaching of writing, particularly in the context of academic tasks, is to improve the quality of thinking required of students (Langer and Applebee, 2007). Teachers then play a critical role in developing the students' skills since a good writing process involves discussion, participation, and feedback. Moreover, strengthening the quality of education is urgent and critical. Along with the current implementation of any curriculum, the education sector had set the content standards for all the different subjects. For instance, writing in English requires the use of cohesive devices in basic literary and expository written discourse such as drama, essays, speeches, research reports, and scripts for broadcast communication text. By knowing a few intervention strategies for helping ESL writers, teachers can teach more effectively. Students need frequent, guided practice in writing using the English language to develop them as academic writers. As course experts, English teachers have the challenging task of helping their students learn specific written types and conventions, a skill that not all ESL learners in the world can perfectly execute. By focusing primarily on the content of student writing, a teacher may convey to students the importance of a well-designed, well-reasoned argument and audience expectations. By giving students opportunities to carry a piece of writing through a process that includes class discussion on a topic, drafting, revising, getting feedback, and proofreading, the teacher can assure better writing and better learning.

However, whatever intervention plan a teacher should carry out, it should be guided by the results of his/her assessment of the students' writing performance in the classroom. Shifting to the classroom situation in the local context, writing compositions using English is one of the major difficulties of students. Many college students, when asked to write compositions in English, omit the necessary punctuation marks, forget to observe proper indentions and margins, do not capitalize proper nouns, use sentence fragments and choppy sentences. In addition, the students have difficulties in organizing their ideas, using a variety of sentences, and choosing appropriate words.

In fact, many of the students who studied in some of the prestigious universities had verbalized the need to strengthen the English curriculum by incorporating more writing activities to train the students in the field of writing. The students reiterated the need for students to be prepared in writing reports, researches, essays, and term papers in English since most professors expect university students to have adequate knowledge in writing. In the above data as background, the researcher was motivated to conduct a case study to determine how competent the students in writing English compositions, particularly that of writing a descriptive



composition and in what components of writing were the students weak and strong. With the findings as bases, an intervention strategy plan in teaching writing was proposed.

## STATEMENT OF THE PROBLEM

This study aimed to determine students' competence in writing English compositions. Specifically, it sought to answer the following problems:

1. How competent are the students in writing their descriptive compositions along with the following components:
  - 1.1 content
  - 1.2 organizations
  - 1.3 vocabulary
  - 1.4 language use
  - 1.5 mechanics
2. What are the strengths and weaknesses of the students in terms of the five components of writing?
3. What intervention strategy plan may be proposed to enhance the students' writing competence?
4. What are the implications of the study on the teaching of ESL writing?

## SUMMARY OF FINDINGS

### The Students' Competence in English Composition Writing in Terms of the Five Components

#### 1.1 Content

The students got a mean score of 26.45 with a standard deviation of 1.42 which is within the level of good using the ESL Profile.

#### 1.2 Organization

The students got a mean score of 18.03 with a standard deviation of 1.19 which is within the verbal description of very good

#### 1.3 Vocabulary

The mean score of the students is 17.52 with a standard deviation of 0.94 and within the verbal description of good.

#### 1.4 Language Use

The students' average mean is 22.82 with a standard deviation of 1.49 which is at the level of very good in the ESL Profile.

#### 1.5 Mechanics

The students got a mean score of 4.21 with a standard deviation of 0.58 which is within the verbal description of good.

### 2. Strengths and Weaknesses of the Students in Composition Writing

The students manifested their strengths in an organization with a mean of 18.03 and language use with a mean score of 22.82. However, the respondents were weak in the following areas: content, vocabulary, and mechanics with the mean scores of 26.45, 17.52, and 4.21, respectively.

### 3. Teaching Intervention Strategy Plan

Oftentimes while in the process of writing compositions, many students feel frustrated due to their writing difficulties. Hence, teachers must assist students by giving them specific feedback, enough models, and constructive criticisms. Similarly, teachers can use different writing intervention strategies to help students cope with their writing problems.

Some strategies included to enhance students' language use and organization of ideas were peer editing, selective peer editing/proofreading with highlighting of errors, graphic organizers, and essay diagramming. To enhance the students' content development, vocabulary, and mechanics in writing, strategies such as adding details to complete an essay, providing Four Bases checklist, ample time for prewriting, collaborative writing, word learning reinforcement, writing models, semantic feature analysis, paired word questions, punctuation marks worksheets, student-teacher conference, and using authentic texts are helpful.

### 4. The implication of the Study to Teaching ESL Writing

Since many students experienced problems in composition writing, teachers can provide various intervention strategies to help students cope with their writing difficulties. Writing practices such as summarizing, making outlines, and paragraph development should also be part of the teachers' writing activities to help students develop and improve their skills.

Because teachers are instrumental in developing the students' writing skills, they should master the nature and the different processes involved in writing by studying and looking into the results of various researches involving writing.

## Conclusions

The conclusions that follow are derived from the results and findings of the study:



1. The majority of the students were described as good to average in terms of their descriptive essay content, very good in terms of organization, good in vocabulary, very good in language use, and good in mechanics.
2. The strength of the students in writing was in organization and language use while their weakness was in the areas of content, vocabulary, and mechanics.
3. Teachers can use different strategies in providing writing interventions for students having writing difficulties.
4. English teachers should be knowledgeable about the latest research results involving the processes and strategies in teaching writing.

### Recommendations

Based on the conclusions drawn from the results of the study, the following are hereby recommended.

#### A. For the School Administrators

1. School administrators and supervisors should provide English teachers adequate training on the various processes that may be involved in writing, the research-proven strategies that can assist students, and the latest results of the different studies conducted in the field of writing. School heads or administrators can invite language experts who can help train teachers on the various approaches that can improve their teaching methodologies.

#### B. For the ESL Curriculum Planners

1. Curriculum planners should anchor learning competencies on the latest results of studies researches related to writing. In the same manner, textbook developers should include step-by-step procedures in the different stages of writing such as prewriting, drafting, and editing.

#### C. For ESL Writing Teachers

1. Vocabulary instructions should be observed inside the classroom to help students develop and a full and complete understanding of words and apply them to writing. In addition, vocabulary should be taught from a unifying context. Teachers need to select or have students select the targeted words for study from authentic texts such as newspapers, magazines, manuals, or novels.
2. Since mastery of conventions is essential to producing a quality written output, teachers should design activities or worksheets that can help students master the basic rules of conventions.
3. In order to increase the quality of the students' writing, ample time should be given to a student for prewriting, brainstorming ideas, and discussing writing plans. Teachers should not judge the students' drafts as final products but rather give enough time for the students to edit and revise their written outputs.
4. Because models offer students opportunities to critique and observe the characteristics and elements of good writing, students should be provided many good models of the genre they are writing.
5. Teachers should reinforce the students' writing skills by facilitating writing activities such as summarizing texts, outlining, and paragraph development.
6. Teachers can write their feedbacks and explain the writing errors committed by the students. In the same manner, teachers should use a set of correction symbols whose meanings are clear to the students involved.
7. Teachers should expose students to different genres such as personal narratives, how-to articles, descriptions, persuasive writing, expository writing, business letters, and research reports. Mastery of these genres allows students to adjust their written output for purpose and audience.

#### D. For the Students

Students should expose themselves to reading materials for them to learn and be familiar with different text structures. In the same way, exposure to different materials could enable them to build their own "text world". Likewise, they should also be exposed to various authentic texts by reading different materials.

#### E. For the Future Researchers

Future researchers may consider exploring more on research-driven strategies that can be used to improve the students' writing skills.

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## **SENTIMENTS ANALYSIS ON THE PERFORMANCE OF SECONDARY SCHOOL ENGLISH TEACHERS DURING ONLINE CLASSES**

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### **ABSTRACT**

*The novel coronavirus outbreak was discovered in China in December 2019 and became a global pandemic on March 11, 2020, as declared by World Health Organization (WHO). The effect of the COVID-19 pandemic did not only lead to a standstill in global economic growth but also retroverted many countries' developmental progress (Greg, 2020). It impacted many of the learning opportunities throughout the world. The curriculum has been adapted to an online format which effecting the learning strategy including both students and teachers. It has led to the prolonged closure of schools, and subsequently traditional teaching expeditiously transformed into online teaching.*

*In the light of the events, this study pertinent to examine teachers' and students' sentiments or perceptions of on the implementation of full face-to-face classes on the teaching strategies in Science.*

*Traditionally, education has mainly been supported through a variety of in school focused activities, which involve face-to-face interactions of students with peers, and work-integrated learning. In-person, education has been shown to create more student-tutor and student-student interaction, which can promote better engagement. However, due to the COVID-19 pandemic, all in-person opportunities for formal and informal learning have ceased and courses have been required to move to exclusive delivery through online education that completely alters the mode of teaching and learning that affect the physical, mental and emotional state or performances of learners specifically the teachers who are the main provider of learning.*

**KEYWORDS:** *Sentiment Analysis, Teaching and Online Learning.*

### **RATIONALE**

Amidst the COVID-19 pandemic, education across the world has transitioned to distance education. Online education is the delivery of learning materials using the internet for student-student and student-teacher interaction and for distributing educational materials. With the advancement of technology-assisted learning, teachers have started using online learning platforms to promote self-directed learning and assessment in students. The use of online education assists in engaging a large group of students with options for both synchronous and asynchronous learning.

Along with this line, synchronous learning ensures that all students learn the same content similarly while asynchronous learning facilitates information to be communicated across sites and schools, with students engaging in learning at their own pace and own time.

Similarly, online delivery of education as a component of blended learning, allows teachers to flexibly adjust to student learning styles and assess them. It may also assist teachers to provide the necessary support required for the individual student while feedback may not be possible in a large group face-to-face session. Online learning has required adjustment by both teachers and learners to adapt to new learning styles with a focus on active learning and technical support required for the delivery of teaching.

The worldwide education system is facing a new crisis due to the prolonged closure of schools and other educational institutions since March 2020 to curb the transmission of the disease and suddenly traditional classrooms have shifted into virtual classrooms having a staggering effect on the educational sector because of the enormous digital divide (Khan, 2021).

Due to the COVID-19 outbreak, 63 million teachers have been affected globally and hardly any country provided training to teachers on virtual teaching (UNESCO, 2020). Besides this, more than 320 million students, especially 130 million learners from secondary schools have been severely affected due to the nationwide lockdown (Sharma, 2020).

Around the world, there is one common drift in the education system which is emergency e-learning which means an expeditious transition to online education owing to COVID-19 as a highly infectious virus (Murphy, 2020). Virtual teaching is the only medium/source used to reduce the knowledge void that appeared because of the lockdown (Henderson, 2020). Electronic learning [e-learning] can be defined as methods for instruction that includes electronic devices and tools and the interaction between teachers and students associated with the educational process (Dobre, 2020).



Online teaching has both pros and cons for teachers and students during this pandemic. The overwhelming number of teachers confronted obstacles in e-learning due to the lack of online teaching experiences (Bao, 2020), dubious effectiveness of online assessment and evolution (Kumar, 2020), dearth of technical infrastructure in a home as well as lack of interaction, inadequate and costly internet connection.

Nonetheless, online education has led to flexibility in time and space, easy and rapid sharing of study material, quick feedback, more freedom to connect with faculty (Khan, 2020), transportation and financial cost reduction, improvement in the technological skills of teachers and students (Kim, 2020) and increase in the convenience and comfort of learners (Aithal, 2020).

As a result of the nationwide lockdown, educators began to teach virtually as they had no other option. They confronted obstacles like a lack of basic infrastructure at home, technological problems, etc. Thus, it is appropriate that virtual teaching cannot be effective without knowing the positive and negative perceptions along with obstacles faced by teachers toward e-learning, as they are frontline employees of any educational foundation.

With this backdrop, present research endeavors to scrutinize school teachers' perceptions as well as challenges concerning online teaching so that their experiences can be used by educational institutions and policymakers to bring about requisite changes through incorporating newer methods and techniques of teaching and learning during and after the pandemic.

Understanding the impact and perceptions of these processes on teacher-student engagement, learning, and behavior both positive and negative, will provide important information for teaching and learning practice in particular the influence of online education on the development of practical skills, readiness to practice and also the stress management skills in the future.

This study presents a study or analysis of the sentiments on the teaching strategies in Science that affect their performance process in the adaptation of implementation of the full face-to-face classes. Sentiment analysis on the teaching strategies of Science teachers integrated teaching in schools is being paid more and more attention. Many schools have carried out online teaching activities. However, due to the lack of face-to-face teaching, the lack of emotional communication is the key problem affecting the quality of online teaching.

## **FINDINGS AND DISCUSSION**

Face-to-face teaching is the main way for students to study effectively in this called 'new normal'. As the subject of education, students have had to quickly adapt to the new teaching mode. The change from the traditional offline teaching mode requires teachers to combine online and offline flexibly and realize the seamless transition between teaching and learning, which creates high requirements for the comprehensive teaching ability of teachers. In face-to-face classes teachers teach across the classroom, students can directly feel the presence of teachers. This mode leads to good emotional communication with teachers, which increases the investment and participation of students. This has a great impact on teaching specifically that of Science teaching.

In addition, the teaching platform and its upgrading affect the satisfaction evaluation of face-to-face teaching. Therefore, F2F teaching satisfaction is evaluated from the aspects of emotion analysis, learning investment, and teaching interaction in this time of new normal.

Teaching processes in which teachers create a harmonious teaching environment are advantageous to the students. Teachers and students can properly handle the relationship between emotion and cognition in the teaching process, and teaching modes in face-to-face teaching give full play to the positive role of emotional factors and enhance students' positive emotional experience through emotional communication. So it can cultivate and develop students' emotions, then stimulate their thirst for knowledge and spirit of exploration.

This teaching method urges them to form independent and sound personalities and characteristics. Teachers can shorten the distance between students in language, psychology, and space in classroom teaching. They deal with, adjust, guide, and control the psychological relationship between teachers and students correctly so that students can have a kind, pleasant, and positive emotional experience.

So a teaching mode of face-to-face teaching is conducive to the formation of a good and harmonious education environment full of emotions and promotes the virtuous cycle of teaching and learning.

Man is different from all other creatures because people have emotions. As far as the present situation is concerned, the channels and ways that most live broadcasting platforms provide for teachers and students to interact with each other are limited. But that is not an excuse for teachers to ignore the emotional aspects of online teaching. In online learning, teachers and students are usually separated by a computer screen. Students can see the teacher, but the teacher can't see all the students at once. With no audience in sight, the teacher is like a soloist standing in the wilderness. They easily lose their passion for teaching and feel that time stands still: their mind becomes stagnant, and they may even become incoherent. The teachers' performance is likely to directly affect the students' interest in listening to the class and thereby form a vicious circle.

There are many differences in the teaching platform, network environment, and teaching methods. During online teaching across the screen, students suffer from a lack of emotional communication with the teacher. They cannot raise awareness of their participation and cooperation and can only accept knowledge mechanically. In the network classroom, the students quietly lose interest. If truancy occurs in large numbers, then the teacher's efficacy will be greatly reduced, so that teachers and students cannot achieve emotional resonance in teaching activities.



In such an atmosphere or teaching situation, the emotions of teachers and students can be highly consistent in mutual feeling, interaction, and mutual motivation.

In the context of face-to-face teaching, the selection of teaching content and teaching strategies needs to be informed by science, especially in ensuring that the presentation form of the content is suitable for the face-to-face teaching mode. Because of their digital nature, physical classrooms are a carrier with definite memory ability. All the language and behavior of the teacher, as well as the subtle emotional reactions of the audience, can be recorded on the network. For a teacher, a casual mistake may be magnified on the internet, or even fermented into a storm of public opinion, which will bring great pressure or even negative influence on the teacher and the school.

People's normal and well-adapted lives had been disrupted by COVID-19, and many are facing mental health challenges. Mental health criteria are observed, including cognitive health, emotional health, personality health, social function, and psychological adjustment. During the COVID-19 outbreak, students' mental health often manifests anxiety, fear, depression, despair, anger, etc., and their emotions are more volatile than usual. Teachers' mental health problems are reflected in the disruption of life and work rhythms. There are insufficient boundaries between work and home for teachers.

They have less experience with online tools than before the COVID-19 outbreak. They worry about poor network connection, incorrect operation, and students' lack of concentration. In online classes, teachers face not only students but also parents and even more people, which increases the pressure on teachers.

The emphasis on scientific and emotional elements in F2F teaching is very important for all teachers and schools. The scientific design of online teaching will enable students to feel the beauty of science and emotion so that online teaching of science can become an art and a kind of enjoyment, and online teaching can become a new teaching method that complements offline teaching.

Compared with traditional offline teaching, F2F teaching is not just a change of location. In F2F teaching, the learning environment, learning methods, teacher-student relationships, and teaching management methods have all changed. F2F teaching satisfaction is closely related to students' learning ability, teachers' comprehensive quality, the network environment and hardware equipment, etc. Therefore, the evaluation of online teaching satisfaction needs to be comprehensively analyzed from multiple perspectives.

In a normal situation, the challenge of effectively transferring what is taught in a face-to-face classroom to an online version remains a problem. Most of these lecturers, who normally develop their activities face-to-face, do not reveal an interest in online learning (only about 30% to 35% consider this option). This position is caused by the lack of motivation and incentives resulting from various obstacles that can be summarized as technological readiness, absence of organizational incentive to compensate for extra work, and the prejudices related to the value of online teaching.

The education sector is one of the most affected sectors of life due to coronavirus disease 2019 (COVID - 19) pandemic. Since there is a threat of the pandemic, many people embraced the practice of social distancing, and schools suspended classes as well as its activities.

However, educators came to an idea about the different innovative ways of teaching to continue learning opportunities for students who stayed at home. These are called web classroom application wherein online lectures or webinars became possible because of different platforms. It perfectly solved the problem of many countries around the world since they have decided to close the schools.

On the other hand, Department of Education (DepEd) has come up with a decision to implement full face-to-face classes to fill in the learning gaps caused during the pandemic. The Teachers' Dignity Coalition (TDC) said that *they are fully aware about the decision made by the DepEd because they do believe that online set up is not enough to fill the gap in learning. However, they appeal to hire more teachers as soon as possible.*

Teaching and learning were different from classroom structure showed, that it merely rotates with the teacher as in control of learning. Since it is teacher centered, the classroom activities as well as the class participation was quite limited and controlled.

Most of the students, usually just had to listen and write the essential information on whatever the teacher said and wrote in front of them. In addition, the materials were limited. Students rely only on books and handouts given by the teacher.

Through various research, experience, new theories on teaching and learning has been discovered. Schools had to adjust to these new developments and to the inevitable changes of the times. Teachers give themselves a time to study with the current trends in their area of specialization in order to teach effectively. They have to adjust as well as use various teaching styles and make it a student-centered set up.

For example, majority of science teachers reported for having the difficulty in conducting their investigations, laboratory experiments and hands-on learning for students who suffer from "technophobia" or those students who are incapable of using different web classroom platforms, and considered the online format not conducive or unfit to learning.

However many educators have already innovated their teaching strategies for the better during the pandemic. A teacher reacted about the new strategies, *"it is easy to deliver as well as explain the lesson in a face-to-face set up". It is challenging, but at the same time rewarding because we were able to make it through the last two years, and it will be more effective on the face-to-face kind of learning"*



Adapting to a hybrid way of teaching and learning has become the teacher's inspiration to focus on what is most valuable as well as what is reliable, wherein it clearly supports the statement incorporating computers and other digital technologies into science classes has been shown with higher academic achievement percentage on the part of students (Greg, 2020). Using e-learning tools for science topics in education has shown commendable effects on student achievement, class engagement, and students' special needs (Khan, 2021). Learning environments that are incorporated with information technology have been shown to have benefits for learning science in terms of (a) cognitive development, (b) allowing student to experience something new, (c) supporting students' ability on different aspect, and (d) supporting students' readiness in understanding data collection (Sharma, 2020). *"The Director of Philippine Business Education highlighted that in order to catch up to the global learning standard; the students should at least double their time in education spending."*

In the explanation of Murphy (2020), teaching innovation is a process that keeps evolving so they can better compete for survival. Along with this line, it encourages the teachers and students to explore and unlock new things. Therefore, teaching innovation is considered as an instrument of constant positive change specifically in establishing and maintaining classroom environments that are learner, knowledge, assessment and community centered are very much essential especially on a face-to-face set up because it allows the students to identify, confront, and resolve preconceptions, and aside from that, it provides examples of what mastery looks like wherein thinking and learning are visible as a guide for further instruction.

The face-to-face education is the best style of education. In cluster learning, it is challenging for the students to ignore teacher and though they are not taking note of the teacher they learn one thing from that cluster. The 'group dynamics' is the main part of the face-to-face education and socialism whereas learning in teams gain confidence to share their ideas in class, and it activates the students.

As elucidated by Henderson (2020) when a student is into an online education, there are things that are attained through face-to-face education it includes volume, tone, body language, motivation, and encouragement. While on a non-verbal education, the connection between instructor and student is completely lost when internet is not available. That is why most of the science teachers innovate their strategies to a better and effective one.

Moreover, in teaching, conveying facts or findings in Science, students surely appreciate to explore the world of science on the use of innovative teaching methods to substitute the typical teaching techniques to achieve the goal. The instructional conversations is said to the process of building instructional conversations is a key method to teach science vocabulary. Allowing the students to talk in between the lectures about the experience they had with an application that has something to do with the topic of discussion. It creates a dialogue in science as they communicate using scientific and technical terms. Make this a classroom strategy to help students to learn science vocabulary.

Lastly, with all the discussion the researcher have explained, it is proper that the teaching strategies of Science teachers are to be investigated and analyze.



# GRAMAFIL APP BILANG INTERBENSYON SA PAGPAPAUNLAD NG KAKAYAHANG PANGGRAMATIKA NG MGA MAG-AARAL SA IKASAMPUNG BAITANG

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## ABSTRACT

*Isa sa tuon ng kasalukuyang kurikulum ay ang malinang ang kakayahang panggramatika ng mga mag-aaral. Pokus ng pag-aaral na ito ang mga kompetensiyang panggramatika sa unang markahan na kabilang sa Most Essential Learning Competencies o MELCs. Mahalaga ang pagsipat sa kakayahang panggramatika ng mga mag-aaral upang matugunan ang anumang gap at makabuo ng angkop na dulog upang maiangat ang kakayahang panggramatika ng mga mag-aaral. Ang pagkatuto sa gramatika ng mga mag-aaral ay kapaki-pakinabang upang lalo pa nilang mapaunlad ang pagsulat at pagsasalita tungo sa mahusay na kakayahang komunikatibo. Nilayon ng pag-aaral na ito na tukuyin ang antas ng kakayahang panggramatika ng mga mag-aaral sa ikasampung baitang, nailarawan ang antas ng kakayahan ng mga mag-aaral sa bawat kompetensi, Matukoy ang bisa ng GramaFil App sa pagpapaunlad ng kakayahang panggramatika ng mga mag-aaral sa ikasampung baitang at kung may makabuluhan bang pagkakaiiba sa kakayahang panggramatika ng mga mag-aaral bago at pagkatapos gamitin ang GramaFil App. Gumamit ng deskriptibong pamamaraan sa pag-aaral na ito. Batay sa resulta ng isinagawang pag-aaral natuklasan na sa kabuuan, umangat mula sa katamtaman tungo sa mataas na antas ang antas ng kakayahang panggramatika ng mga mag-aaral gamit ang GramaFil App. Nagpapatunay ito na mas ganap na nauuwaan ng mga mag-aaral ang aralin sa gramatika gamit ang GramaFil App, Samantalang ang kompetensi namang may mababang antas ay umangat sa mataas na antas. Kaugnay nito, upang lalo pang mapaunlad ang akademikong pagganap ng mga mag-aaral sa asignaturang Filipino, inirerekomenda ng mananaliksik na ipagpatuloy ang paggamit ng GramaFil App hindi lamang bilang interbensyon kundi bilang kagamitang pampagtuturo sa Filipino.*

## I.INTRODUKSYON

Narapat na maging inobatibo ang guro at sumabay sa pag-usbong ng makabagong paraan ng pagkatuto. Isa sa kinakailangang gawan ng inobasyon ay ang pagtuturo ng gramatika. Pokus ng kasalukuyang kurikulum na makatugon sa pangunahing layunin ng pag-aaral ng Filipino ang makalinang ng isang buo at ganap na Filipinong may kapaki-pakinabang na literasi. (DepED Curriculum Guide 2016). Kasabay nito ang digital literasi na kinakailangan ding malinang.

Sa kasalukuyan, itinuturo ng mga guro sa Filipino ang gramatika alinsunod sa nakasaad sa Most Essential Learning Competencies o MELCs gamit ang mga sangguniang "learning activity sheets", Pivot Module at iba pang mga sangguniang aklat sa Filipino. Bagaman sanay na ang mga mag-aaral sa ginagamit na kagamitang panturo mas mainam na maging malikhain, mapamaraan at maging inobatibo ang guro upang makaagapay sa kasalukuyang kalagayang pang-edukasyon at matugunan ang kakulangan ng kasanayan ng mga mag-aaral sa larangan ng gramatika. Pinatunayan ito ni Misa (2021) sa kanyang pag-aaral. Binanggit niya na mainam na pag-ibayuhin ng mga guro sa Filipino na maging mapamaraan at malikhain, pagtuturo ng wasto at angkop na gamit ng salita sa loob ng pangungusap upang malinang sa kanila ang kawastuan sa gramatikang Filipino nang magamit nila ito nang maayos sa kanilang pagsasalita at pagsulat. Mahalagang malinang ang kakayahang panggramatika ng mga mag-aaral dahil kinakailangan ito upang magkaroon sila ng kakayahang pangkomunikatibo. Kaya naman sa binagong kurikulum patuloy na binigyang tuon ang mga kakayahang panggramatika ng mga mag-aaral upang magkaroon sila ng kasanayan sa paggamit ng wika na magagamit nila sa pakikipagtalasatasan, pagbuo ng mga sulatin at mga akademikong diskurso. Binanggit ito ni Lachica (1999) sa kanyang pag-aaral na mahalaga ang ginagampanan ng gramatika sa pagpapahayag. Pinatunayan ito ni Resuello at Funclara (2021) sa kanilang pag-aaral na ang pagtuturo sa mga mag-aaral ng mga tuntunin ng wika ay tungo sa malinaw at maayos na pagsusulat at pagsasalita.

Kinakailangang ang bawat guro ay may kanya-kanyang paraan upang maihatid sa mga mag-aaral ang pagkatuto na kinakailangan nilang matamo. Mahalaga ang pagiging malikhain ng guro upang makapagbigay ng angkop na kaalamang narapat para sa mga mag-



aaral. Kasabay ng pag-usbong ng mga social media sites, ay kailangang makaagapay ang guro at maging inobatibo sa paghahatid ng pagkatuto sa mga mag-aaral lalo na ngayong panahon ng ika-21 siglo . Nararapat lamang na taglay ng mga guro ang mga kasanayan sa ika-21 siglo upang makasabay sa mga mag-aaral ng ika-21 siglo.

Mahalagang bigyang tuon ang pagtuturo ng gramatika sa kasalukuyan .Nakasaad sa Deped Order No. 34 s. 2022 ,na patuloy na gagamitin ang MELC o Most Essential learning competencies sa taong panuruan 2022-2023.Sa unang markahan ay may limang mahalagang kompetensi sa gramatika na kailangang malinang sa mga mag-aaral. Dapat itong mabigyan ng tuon upang matugunan ang kasalukuyang kakulangan may kinalaman sa usaping panggramatika.Batay sa pag-aaral na isinagawa nina Hyati et. al (2015) napatunayan na may malaking kontribusyon ang kakayahang panggramatika sa kakayahan sa pagsasalita ng mga mag-aaral.Sa pag-aaral na ginawa ni Aniciete (2019) nabatid na maganda ang naidudulot ng pagsasanay panggramatika sa pagsulat ng konseptong papel ng mga mag-aaral. Nakita na mas napaunlad ng mga mag-aaral ang kanilang kasanayan sa gramatika sa pamamagitan ng pagsasanay .

Ang kinalabasan ng pag-aaral na ito ay magiging batayan sa pagbuo ng “GramaFil App” na siyang interbensyon upang mapaunlad ang kakayahang panggramatika ng mga mag-aaral sa ikasampung baitang. Ito ay isang aplikasyong kinalalagyan ng mga aralin sa gramatika na maaaring ipasa ng guro sa tablet ng mga mag-aaral na magagamit kahit na hindi nakakonekta sa internet .Mayroon itong interaktibong pagsusulit na kagigiliwang laruin ng mga mag-aaral habang natututo sa gramatika. Naniniwala ang mananaliksik na kinailangang sumabay sa kasalukuyang pagbabago upang ganap na matuto ang mga mag-aaral sa paraang kinagigiliwan nila. Nabanggit sa pag-aaral ni Resuello at Funclara (2021) na ang pagbibigay ng mga pagsasanay sa gramatika ay lubhang nakatutulong upang ganap na matutuhan ang mga tuntunin ng wikang pinag-aaralan. Ang pag-aaral nito ay nagbigay ng kaalaman sa mga guro sa kasanayang panggramatika ng mga mag-aaral at nang mabigyang tuon ang mga kompetensi na hindi ganap na natutuhan at mabigyan ng kaukulang lunas at mabigyang diin sa pagtuturo. Magagabayan din ang mga guro sa pagbuo ng “GramaFil App” na siyang gagamitin upang lalo pang malinang ang kakayahang panggramatika at kakayahang komunikatibo ng mga mag-aaral.

Ang mga mag-aaral ng Pag-asa National High School na nasa ikasampung baitang ay isa sa nakinabang sa proyekto ng lokal na pamahalaan at nabiyayaan ng tig-isang tablet na maaaring magamit ng mga mag-aaral sa kanilang pag-aaral.Kaya naman upang maging kasiya-siya ang pag-aaral ng Filipino ay lumikha ang mananaliksik ng isang aplikasyon, ang GramaFil App na magagamit ng mga mag-aaral kahit walang internet upang mapaunlad ang kakayahang panggramatika ng mga mag-aaral.Napatunayan ito sa isinagawang pag-aaral ni Nonggod (2021) na may makabuluhang epekto ang “Basa-Pang-unawa App” bilang interbensyon sa pagkatuto sa pagganap ng mga mag-aaral sa asignaturang Filipino.

### III. MGA TANONG PAMPANANALIKSIK

Ang pag-aaral na ito ay naglalayong mapaunlad ang kakayahang panggramatika ng mga mag-aaral sa ikasampung baitang at nilalaayong masaagot ang sumusunod na tanong:

1. Ano ang antas ng kakayahang panggramatika sa bawat kompetensi ng mga Mag-aaral sa ikasampung baitang sa unang Markahan taong panuruan 2021-2022?
2. Gaano kabisa ang GramaFil App sa pagpapaunlad ng kakayahang panggramatika ng mga mag-aaral sa ikasampung baitang?
3. May makabuluhan bang pagkakaiba sa kakayahang panggramatika ng mga mag-aaral bago at pagkatapos gamitin ang GramaFil App?

### IV. SAKLAW AT LIMITASYON

Ang pag-aaral na ito ay nakapokus lamang sa paggamit ng GramaFil App bilang interbensyon sa pagpapaunlad ng kakayahang panggramatika ng mga mag-aaral.Ginamit na tagatugon ang mga mag-aaral sa ikasampung baitang ng pangkat Aguinaldo sa Mataas na Paaralan ng Pag-asa. Binubuo ng apatnapu't anim (46) na mga mag-aaral.

### V. PAMAMARAAN

#### A. Sampling

Gumamit ng purposive sampling technique sa pag-aaral na ito na kinabibilangan ng mga mag-aaral mula sa ikasampung baitang pangkat Aguinaldo.Ang purposive sampling technique ay isang di-posibilidad na sample na pinili batay sa mga katangian ng isang populasyon at ang layunin ng pag-aaral.

#### B. Pangangalap ng Datos

Sa pangangalap ng datos , humingi ng pahintulot sa pagsasagawa ng pag-aaral sa mga mag-aaral ng baitang Aginaldo sa pamamagitan ng pagbibigay ng liham pahintulot na nilagdaan ng mga magulang at mag-aaral .Naghanda ang mananaliksik ng talatanungan para sa mga respondente.

Ginamit na instrumento ang mga pagsusulit sa gramatika na ibinatay sa kompetensi mula sa MELCs o “Most Essential Learning Competencies”.Bumuo ng sampung tanong sa bawat kompetensi na may kabuuang bilang na limampung aytem at lahat ng pagsusulit ay pagpipili-pili o *multiple choice*. Kinuha ang iskor ng mga mag-aaral sa limang kompetensi sa unang markahan na nagsisilbing datos



sa pagkuha ng antas ng kakayahang panggramatika sa Filipino ng mga mag-aaral. Gumawa din ng sarbey kwestyuneyr sa mga mag-aaral ng pangkat Aguinaldo hinggil sa antas ng kahirapan  
 Ibinatay ang ginawang app sa naging resulta ng pagsusulit. Ang mga tanong ay sinagutan ng mga mag-aaral sa pamamagitan ng quiz app at ang mga tanong ay katulad ng mga tanong sa mga pagsusulit sa gramatika. Gumawa din ng sarbey kwestyuneyr sa pagtataya ng nabuong app na binubuo ng sampung tanong upang malaman ang kalakasan at kahinaan ng nasabing aplikasyon.

**C. Etikal na Isyu**

Bago isinagawa ang pagsusulit sa mag mag-aaral ay tinaya ng mananaliksik na balido ang mga tanong .Isinagawa ang pagsusuri ng mga aytem ng mga guro sa Filipino upang matiyak ang balidasyon ng pagsusulit.

**D. Pag-aanalisa ng Datos**

Sa pagtukoy sa antas ng kakayahang panggramatika ng mga mag-aaral sa ikasampung baitang pangkat Aguinaldo kinuha ang mean at SD ng resulta ng isinagawang pagsusulit .Gumamit ng limang puntong iskala na may deskripsyong lubhang mababa, mababa , katamtaman mataas at napakataas. Gumamit din ng sarbey kwestyuneyr upang matukoy ang antas ng kahirapan ng mga mag-aaral sa bawat kompetensi gumamit ng ng limang puntong iskala na may deskripsyong napakahirap , mahirap , katamtaman . madali at napakadali.

**VI. PRESENTASYON, PAG-AANALISA, AT INTERPRETASYON NG DATOS**

A. Paglalagom ng Natuklasan

**Talahanayan 1: Resulta ng mga Paunang Pagsusulit sa Gramatika.**

Kompetensi	Mean	SD	Interpretasyon
Nagagamit nang wasto ang pokus ng pandiwa (tagaganap, layon, pinaglalaanan at kagamitan)	4.90	1.55	Mababa
Nagagamit ang angkop na mga piling pang-ugnay sa pagsasalaysay	6.54	1.16	Katamtaman
Nagagamit ang angkop na mga pahayag sa pagbibigay ng sariling pananaw.	6.50	1.53	Katamtaman
Nagagamit ang angkop na mga hudyat sa pagsusunod-sunod ng mga pangyayari	6.17	1.87	Katamtaman
Nagagamit ang angkop na mga panghalip bilang panuring sa mga tauhan	7.02	1.78	Mataas
Nagagamit ang angkop na mga panghalip bilang panuring sa mga tauhan	7.02	1.78	Mataas

**Weighted Mean-6.23**

**Overall SD-1.91**

**Interpretasyon-Katamtamang antas**



Ang Talahanayan I ay resulta ng mga isinagawang pagsusulit sa gramatika sa unang markahan. Batay sa isinagawang pagsusulit nasa katamtaman ang antas ng pag-unawa ng mga mag-aaral batay sa resulta ng mga isinagawang pagsusulit sa gramatika sa unang markahan na may weighted mean na 6.23 at overall SD na 1.91 na may berbal na interpretasyon na katamtamang nauunawaan ng mga mag-aaral ang mga aralin sa gramatika sa unang markahan. Sa kompetensiyang “nagagamit nang wasto ang pokus ng pandiwa (tagaganap, layon, pinaglalaanan at kagamitan)” mababa ang antas ng kakayahan ng mga mag-aaral, na may mean na 4.90 at SD na 1.55 nagpapakita ito na hindi gaanong nauunawaan ng mga mag-aaral ang aralin sa gramatika sa kompetensiyang ito. Ang kompetensiyang “nagagamit ang angkop na mga piling pang-ugnay sa pagsasalaysay” ay may mean na 6.54 at SD na 1.16 may katamtamang antas at nagpapakita na nasa katamtaman ang antas ng pag-unawa ng mga mag-aaral. Sa kompetensiyang “nagagamit ang angkop na mga pahayag sa pagbibigay ng sariling pananaw” lumabas na katamtaman ang antas ng kakayahang ng mga mag-aaral ang sa gramatika na may mean na 6.50 at SD na 1.53. Pinakikita naman ng kompetensiyang “nagagamit ang angkop na mga hudyat sa pagsusunod-sunod ng mga pangyayari” na may katamtamang kakayahan ang mga mag-aaral at may katamtamang pag-unawa na may mean na 6.17 at SD na 1.87. Ang may panghuling kompetensiyang nagagamit ang angkop na mga panghalip bilang panuring sa mga tauhan ay nagpapakita na may mataas na kakayahan ang mga mag-aaral na may mean na 7.01 at SD na 1.78 ito ay may berbal na interpretasyon na nauunawan ng mga mag-aaral ang gramatika aralin sa sa kompetensiyang ito.

**Talahanayan 2. Sarbey sa antas ng kahirapan ng mga mag-aaral sa mga aralin sa Gramatika**

Kompetensi	Mean	SD	Interpretasyon
Nagagamit nang wasto ang pokus ng pandiwa (tagaganap, layon, pinaglalaanan at kagamitan)	2.04	1.65	Mababa
Nagagamit ang angkop na mga piling pang-ugnay sa pagsasalaysay	3.52	1.65	Katamtaman
Nagagamit ang angkop na mga pahayag sa pagbibigay ng sariling pananaw.	2.98	1.65	Katamtaman
Nagagamit ang angkop na mga hudyat sa pagsusunod-sunod ng mga pangyayari	3.67	1.65	Katamtaman
Nagagamit ang angkop na mga panghalip bilang panuring sa mga tauhan	3.88	1.65	Nadadalian

**Weighted Mean-3.13**

**Overall SD-0.98**

**Interpretasyon-Katamtamang antas**

**Ang talahanayan 2 ay ang resulta ng sarbey na isinagawa hinggil sa antas ng kahirapan ng mga mag-aaral sa mga aralin sa gramatika.**

Sa pokus ng pandiwa lumabas na nahihirapan ang mga mag-aaral sa mga aralin sa gramatika na may mean na 2.04 at SD na 1.65. Lumabas na sa limang kompetensi ito ang kompetensiyang may pinakamaraming nahihirapan. Nasa katamtamang antas naman ang kompetensiyang “Nagagamit ang angkop na mga piling pang-ugnay sa pagsasalaysay” na may mean na 3.52 at SD na 1.65. Gayundin ang kompetensiyang “nagagamit ang angkop na mga hudyat sa pagkakasunud-sunod ng mga pangyayari” na may 3.67 at SD na 1.65 na may katamtamang antas. Samantalang nadadalian naman ang mga mag-aaral sa kompetensiyang “nagagamit ang angkop na panghalip bilang panuring sa mga tauhan” na may mean na 3.88 at SD na 1.65. Sa kabuuan, lumalabas na nasa katamtaman ang antas ng kahirapan ng gramatika na may weighted mean na 3.13 at overall SD na 0.98. Nagpapakihati lamang ito na nasa katamtamang antas ang pag-unawa sa gramatika ng mga mag-aaral sa ikasampung baitang ng pangkat Aguineldo.





**Talahanayan 3**

**Resulta ng Pagsusulit Gamit ang GramaFil App**

Kompetensi	Mean	SD	Interpretasyon
Nagagamit nang wasto ang pokus ng pandiwa (tagaganap, layon, pinaglalaanan at kagamitan)	6.94	1.02	Mataas
Nagagamit ang angkop na mga piling pang-ugnay sa pagsasalaysay	7.00	1.17	Mataas
Nagagamit ang angkop na mga pahayag sa pagbibigay ng sariling pananaw.	7.63	1.02	Mataas
Nagagamit ang angkop na mga hudyat sa pagsusunod-sunod ng mga pangyayari	6.90	1.28	Mataas
Nagagamit ang angkop na mga panghalip bilang panuring sa mga tauhan	8.18	1.08	Mataas

**Weighted Mean-3.13**

**Overall SD-0.98**

**Interpretasyon-Katamtamang antas**

Ang talahanayan 3 ay ang resulta ng sarbey na isinagawa hinggil sa antas ng kahirapan ng mga mag-aaral sa mga aralin sa gramatika. Sa kompetensi tungkol sa pokus ng pandiwa lumabas na mataas ang iskor ng mga mag-aaral na may mean na 6.94 at SD na 1.02. Nasa mataas na antas ang kompetensing "Nagagamit ang angkop na mga piling pang-ugnay sa pagsasalaysay" na may mean na 7.00 at SD na 1.17. Sa pagbibigay ng sariling pananaw ay may mean na 7.63 at SD na 1.02. Gayundin ang kompetensing "nagagamit ang angkop na mga hudyat sa pagkakasunud-sunod ng mga pangyayari" na may mean na 6.90 at SD na 1.28 na may mataas na antas. Sa kompetensing "nagagamit ang angkop na panghalip bilang panuring sa mga tauhan" na mag mean na 8.18 at SD na 1.08 may mataas na antas.

Sa kabuuan, lumalabas na umangat ang antas ng kakayahang panggramatika ng mga mag-aaral pagkatapos gamitin ang GramaFil App na may weighted mean na 7.33 at overall SD na 1.21 na may deskripsyong mataas. Nagpapahiwatig lamang ito mas nauunawaan ng mga mag-aaral ng pangkat Aguineldo ang gramatika gamit ang GramaFil App.

Resulta ng Sarbey sa Pagtataya ng Disenyo at Kalidad ng App		
	Mean	SD
Madaling idownload at iinstall ang App	4.43	0.69
Mabilis at madaling gamitin ang aplikasyon	4.28	0.69
May orihinal at malikhaing disenyo	4.22	0.76
Gumagana ang lahat ng mga bahagi ng App	4.13	0.81
Maayos at mahusay ang mga tunog na ginamit	4.11	0.71
Madaling nagagamit ang application sa mahusay na pag-unawa ng mga tanong	4.67	0.97
Malinaw at madaling nababasa ang mga salita	4.20	0.75
Nakahahamon ang pagsagot ng mga tanong	4.07	0.77
Madaling mabatid kung tama o mali ang sagot	4.13	0.75
Naliliang ang mabilis na pag-iisip dahil sa mga nakalahad na clues	4.09	0.76
<b>Weighted Mean/SD</b>	<b>4.2326</b>	<b>0.75</b>



**Talahanayan 4**

Antas ng kakayahang panggramatika ng mga mag-aaral sa paunang pagsusulit at pagsusulit gamit ang GramaFil App.

	Resulta ng Paunang Pagsusulit sa Gramatika sa Bawat Kompetensi		Resulta ng Pagsusulit sa Gramatika sa Bawat Kompetensi Gamit ang GramaFil App	
	Mean	SD	Mean	SD
Nagagamit nang wasto ang pokus ng pandiwa (tagaganap, layon, pinaglalaanan at kagamitan)	4.90	1.55	8.10	1.29
Nagagamit ang angkop na mga piling pang-ugnay sa pagsasalaysay	6.54	2.16	9.31	1.68
Nagagamit ang angkop na mga pahayag sa pagbibigay ng sariling pananaw	6.50	1.53	8.60	0.84
Nagagamit ang angkop na mga hudyat sa pagsusunod-sunod ng mga pangyayari	6.16	1.87	8.67	1.15
Nagagamit ang angkop na mga panghalip bilang panuring sa mga tauhan	7.02	1.78	8.46	0.97
<b>Weighted Mean at SD</b>	6.23	1.92	8.63	1.27
<b>T Test</b>	0.0007	May makabuluhang pagkakaiba sa antas 0.05		

Ang talahanayan 4 ay ang resulta ng sarbey na isinagawa hinggil s. Sa kompetensi tungkol sa pokus ng pandiwa lumabas na mataas ang iskor ng mga mag-aaral na may mean na 6.94 at SD na 1.02. Nasa mataas na antas ang kompetensing” Nagagamit ang angkop na mga piling pang-ugnay sa pagsasalaysay’ na may mean na 7.00 at SD na 1.17. Sa pagbibigay ng sariling pananaw ay may mean na 7.63 at SD na 1.02. Gayundin ang kompetensing “nagagamit ang angkop na mga hudyat sa pagkakasunud-sunod ng mga pangyayari” na may mean na 6.90 at SD na 1.28 na may mataas na antas . Sa kompetensing “nagagamit ang angkop na panghalip bilang panuring sa mga tauhan” na may mean na 8.18 at SD na 1.08 may mataas na antas.

Sa kabuuan , lumalabas na umangat ang antas ng kakayahang panggramatika ng mga mag-aaral pagkatapos gamitin ang GramaFil App na may weighted mean na 7.33 at overall SD na 1.21 na may deskripsiyong mataas . Nagpapahiwatig lamang ito mas nauunawaan ng mga mag-aaral ng pangkat Aguinaldo ang gramatika gamit ang GramaFil App.

**Talahanayan 5**

**Makabuluhang pagkakaiba sa kakayahang panggramatika ng mga mag-aaral sa mga paat pagsusulit gamit ang GramaFil App**

Pagsusulit	Mean	Computed t value	P value	Analysis
Paunang resulta ng Pagsusulit	6.23	8.012	0.013	Makabuluhan
Resulta ng pagsusulit gamit ang GramaFil App	8.63			

**Konklusyon**

Matapos ang masusing pagsusuri sa naging resulta ng pag-aaral na ito, masasabing nalinang ang kakayahang panggramatika sa Filipino ng mga mag-aaral sa ikasampung baitang pangkat Aguinaldo dahil sa mataas iskor nila sa mga isinagawang pagsusulit gamit ang GramaFil App. Mula sa paunang pagsusulit na mababa ay umangat ito sa mataas gamit ang GramaFil App.

**Rekomendasyon**

Mula sa kinalabasan ng pag-aaral iminumungkahi ng mananaliksik na patuloy na gamitin ang GramaFil App bilang interbensyon upang mapaangat ang antas ng kakayahang ng mga mag-aaral sa gramatikang Filipino . Sa isinagawang pag-aaral ng mananaliksik ay nakita ang kapakinabangan ng aplikasyong ito sa mga mag-aaral lalo na ngayong panahon na napakahalaga ng digital



literasi. Nagiging madali ang pagbukas ng mga mga-aaral ang mga araling tatalakayin sa bawat linggo at nahihikayat pagsusulit na isasagawa sa pamamagitan ng laro. Hinihikayat din ng mananaliksik na ang mga guro ay patuloy pang gumawa ng mga na makatutulong sa mga mag-aaral na maitaas ng antas ng kakayahan sa gramatikang Filipino. Minumungkahi ng mananaliksik na ipagpatuloy ang paggamit ng GramaFil App hindi lamang bilang interbensyon kundi bilang kagamitang pampagtuturo sa Filipino sa ikalawa at ikatlong markahan ng taong panuruan 2022-2023.

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## **ANFIS MODEL FOR BARAK RIVER SYSTEM**

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### **ABSTRACT**

*In a flood affected region quick and accurate flood forecasting is essential to save life and property of inhabitants by issuing prior warning. Model for flood forecasting has been developed using Adaptive network based fuzzy inference system (ANFIS) for multiple inflows in a river network. Fuzzy logic toolbox of Matlab is the software used for this purpose. The root mean square error (RMSE) is used to evaluate the adequacy of the model. Concurrent hourly discharge data from 3 input and 1 output stations of Barak river network were collected and used to develop Sugeno model for flood forecasting at a downstream location. The forecasting model developed was used to predict flood discharge at the downstream point using flood flows measured at 3 upstream stations. The result obtained is compared with the observed discharge and model performances were evaluated using statistical measures, co-efficient of efficiency and difference in peak time and peak discharge. Performance measures evaluated indicate satisfactory model performance. Results obtained shows that predicted discharge at the outflow station and time to peak for two flood events used in the study match closely with the observed values.*

**KEYWORDS-** *Flood, Forecasting, Model, Fuzzy, Matlab, Performance. Predicted.*

### **1. INTRODUCTION**

Flood is an unsteady flow in a river reach where inflow, outflow, and reach storage change continuously with time. The storage in the river reach comes back to its initial state at the end of the flood. Flood is devastating. The impact of flood could be reduced but couldn't be eliminated totally.

### **2. OBJECTIVES**

Different flood control measures are adopted to reduce the impact of flood. These are, Structural and Non-structural flood control measure.

Structural measure require huge fund and involves construction of reservoirs, diversions, levees' or marginal bund and channel improvement. It may also cause environmental degradation and ecological change on-structural measures involve prediction of flood, so that habitants could get sufficient time to save their life and property. It also involves modification of damage susceptibility of the socio-economic system and environment to flood. Flood forecasting method reduces the damage caused by flood. Forecasting is done in advance and issues warning to the habitants likely to be affected by flood. This method is important and relatively inexpensive. The correct and advanced flood warning is essential for evacuation of life and property of people of flood affected region.

Based on system analysis, the flood forecasting models in a channel is of two major types, Conceptually based model and Empirical model.

In conceptually based model, flood propagation process is usually described by Saint Venant equation comprising partial differential equation of continuity and momentum. These equations are not responsive to analytical solution. It requires a large number of data (e.g. characteristic of terrain and river network, rainfall and runoff) for calibration. In many occasions, these datas may not be available or it may be expensive and time consuming to collect data.

Empirical models are based on evidence of relationships maintained in historical records of input and output without analyzing the internal structure of the physical process.

Objective of the present study - It is observed from study that ANFIS model for single inflow –single outflow problem has been studied, but so far there is no attempt in modelling multiple inflow problems using ANFIS.



The objective of the present study is to develop a flood forecasting model using ANFIS that can be used to predict downstream flow using multiple inflows in a river network.

### 3. METHODOLOGY

Adaptive Neuro Fuzzy Inference System (ANFIS)

Jang (1993) introduced architecture and learning procedure for the FIS that uses a neural network learning algorithm for constructing a set of fuzzy if-then rules with appropriate Membership functions from the specified input–output pairs. This procedure of developing a FIS using the framework of adaptive neural network is called adaptive neuro-fuzzy inference system.

The basic structure of ANFIS is a model that maps input characteristics to input membership functions, input membership functions to rules, rules to a set of output characteristics, output characteristics to output membership functions and output membership function to a single valued output or a decision associated with the output.

There are two methods that ANFIS learning employs for updating MF parameters (1) Back propagation for all parameters and (2) Hybrid method consisting of back propagation for the parameters associated with the input MF and least square estimation for the parameter associated with the output MF. As a result training error decreases, at least locally throughout the learning process. Therefore, the more the initial MF resembling the optimal ones, the easier it will be for the model parameter training to converge. Human expertise about the target system to be modeled may aid in setting up these initial MF parameters in FIS structure.

Fuzzy rule base models - Fuzzy rule base models are of two types (1) Additive rule model and (2) Non- additive rule model. Additive rule model is of two types (a) Sugeno model and (b) Kosoko’s model. Non-additive rule model is Mamdani model.

Sugeno model

Sugeno or Takagi-sugeno-Kang model is simple and the no. of rule is less. The main feature of this model is that the output MF is either linear or constant. ANFIS is a graphical network representation of Sugeno type fuzzy model.

A typical Sugeno model has the form,

$$\text{Output} = Z = ax + by + c, \text{ where, Input 1} = x \text{ and Input 2} = y.$$

For a zero order Sugeno model, the output level Z is a constant (a=b=0).

For the first order Sugeno fuzzy model a typical rule set with two fuzzy If-then rule can be expressed as,

Rule 1. If x is  $A_1$  and y is  $B_1$ , then,  $f_1 = p_1x + q_1y + r_1$ .

Rule 2. If x is  $A_2$  and y is  $B_2$ , then,  $f_2 = p_2x + q_2y + r_2$ .

Where,  $A_1, A_2$  and  $B_1, B_2$  are Input parameters for input x and y respectively.  $p_1, q_1, r_1$  and  $p_2, q_2, r_2$  are the parameters of the output function. The functioning of the ANFIS is described as,

Layer 1. Every node in this layer produces MF grades of an input parameter. The node  $O_1$  is explained by,

$$O_{1,i} = \mu_{A_i}(x) \text{ for, } i = 1, 2 \qquad O_{1,i} = \mu_{B_i}(y) \text{ for, } i = 1, 2.$$

Where x (or y) is the input to the node I,  $A_i$  (or  $B_i$ ) is a linguistic fuzzy set associated with the node  $O_{1,i}$ , is the membership function grade of a fuzzy set and it specifies the degree to which the given input x (or y) satisfies the quantities.

MFs can be any functions that are Gaussian, Generalized bell shaped, Triangular, Trapezoidal shaped function.

A generalized bell shaped function can be selected within this membership function and described as,

$$\mu_{A_i}(x) = \frac{1}{1 + \left| \frac{x - c_i}{a_i} \right|^{2b_i}}$$

Where (  $a_i, b_i, c_i$  ) are the parameter set which changes the shape of membership degree with maximum value equal to 1 and minimum 0.

Layer 2. Every node in this layer is a fixed node labeled  $\pi$ , whose output is the product of all incoming signals.

$$O_{2,i} = w_i = \mu_{A_i}(x) \cdot \mu_{B_i}(y), \text{ for, } i = 1, 2 \text{ -----}$$



Layer 3. The  $i$ th node of this layer labeled  $N$ , calculates the normalized firing strength as,

$$O_{3i} = \bar{w}_i = \frac{w_i}{w_1 + w_2} \quad \text{Where, } i=1, 2, 3 \text{ -----}$$

Layer 4. Every node in this layer is an adaptive node with a node function,

$$O_{4i} = \bar{w}_i f_i = \bar{w}_i (p_i x + q_i y + r_i)$$

Where,  $\bar{w}_i$  is the output of layer 3 and  $\{p_i, q_i, r_i\}$  is the parameter set of this node.

Layer 5. The single node in this layer is a fixed node labeled  $\sum$  which computes the overall output as the summation of all incoming signals.

$$\text{Overall output} = O_{5i} = \sum \bar{w}_i f_i = \frac{\sum w_i f_i}{\sum w_i}$$

Evaluation criteria for model performance:-

The performance of the model resulting from training, testing and validation is evaluated by RMSE (Root mean square error) and Nash-Sutcliffe co-efficient of efficiency using the following formulas,

$$\text{RMSE} = \sqrt{\frac{\sum_{i=1}^n [Q_i^o - Q_i^p]^2}{n}}$$

$$\text{C.E} = \text{Nash-Sutcliffe co-efficient of efficiency,} = 1 - \frac{\sum_{i=1}^n [Q_i^o - Q_i^p]^2}{\sum_{i=1}^n [Q_i^o - \bar{Q}_i^o]^2}$$

Where,  $Q_i^o$  = Measured discharge or, Discharge obtained from data.

$Q_i^p$  = Predicted discharge.

$\bar{Q}_i^o = \frac{\sum Q_i^o}{\text{No. of data pairs}}$  = Mean value of measured discharge.

$n$  = Total no. of data pairs considered.

RMSE furnishes a quantitative indication of the model error in units of the variable with the characteristics that larger error receives greater attention than smaller ones. The quantitative evaluation of model performance is made in terms of co-efficient of efficiency between the measured and simulated data.

Discharge and time difference of two major peaks are also obtained.

#### 4. GEOGRAPHICAL AREA

The Multiple inflow Barak river is considered here for analysis. The river Barak originates from the state of Nagaland (India) and traverses through Manipur, Mizoram and Assam in India before entering into neighbouring country Bangladesh. The catchment of the river system is approximately 26,139 Sq. Km. in India through its main channel.

For the present study, data from four gauging stations has been collected. Three stations, namely, Fulertol, Tulargram and Matijuri are considered as input stations and Badarpurghat as output station. The approximate distances of the stations from Badarpurghat are, Fulertol 90 Km., Tulargram 50 Km. and Matijuri 15 Km.

#### 5. DATA MINING

Concurrent hourly recorded river stage data pairs from all the four stations of the flood events during 2002 and 2003 have been collected from Central water commission.

A total number of 6775 stage data have been collected and converted to discharge data by regression analysis. Out of these data, 4000 data have been used for the purpose of training, checking and testing.

#### 6. DIVISION OF DATA

In this study the data are divided into three sets, training, checking and testing as per Sahin as follows, Out of 4000 data 75% (3000) data are kept for training, 25% (1000) data used for checking. The training data are further divided into 2/3 (2000) for training set and 1/3 (1000) for the testing set.

7. Results - Fuzzy logic toolbox of MATLAB is the software used for modeling. In general a higher no. of categories will provide higher accuracy, but with the disadvantage of longer rule base as well as more computation time. For example, with 5 fuzzy



categories for each of the 3 variables, would involve a set of  $5^3=125$  rules, which is too much to allow pattern to be easily discerned. The parameters from premises and consequences are increased significantly and the computation time is rather long, while the performance might only be improved slightly. A testing set is adopted in order to overcome overfitting. By trial and error method appropriate no. of variables categories are selected. The no. of parameters increases remarkably from 2 to 5 categories, while the training time increases significantly from 10 to 25 secs. Although more subspaces for the anfis model will generally results in better performance. Cautious treatment has been made to avoid overfitting. When both the computation time and RMSE testing are considered, an optimal no. of categories of 3 (Low, Medium and High) is adopted with their fuzzy membership function as shown in figure.

By trial and error method different parameters are selected as follows,

1. FIS is generated using the default Grid partitioning method.
2. Optimization method considered here is Hybrid.
3. Error tolerance is considered as zero.
4. No. of Input membership function(MF) ,Type of Input membership function and Type of Output membership functions are selected from a chart as shown below,

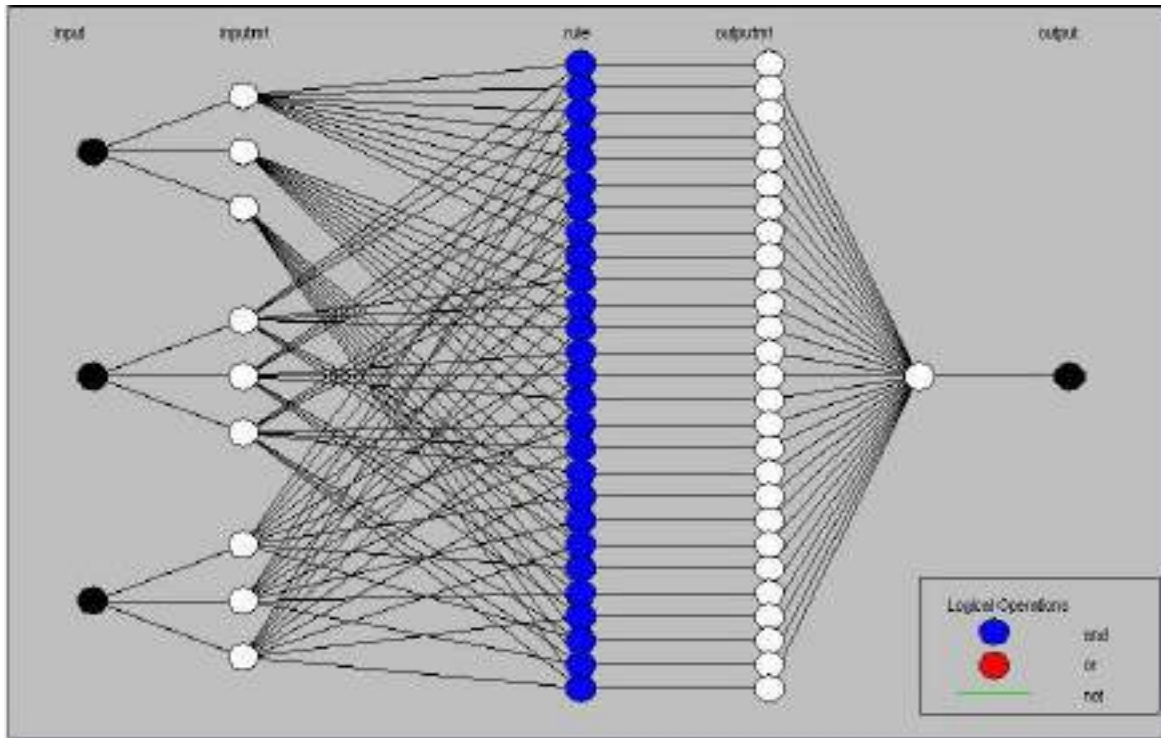
No. of input MF	Type of input MF	Type of output MF	Epochs	RMSE			Difference of RMSE between	
				Training	Checking	Testing	Training & Checking	Training & Testing
3 3 3	Triangular	Constant	3	205.82	229.45	232.05	<b>23.63</b>	<b>26.23</b>
4 4 4	Triangular	Constant	3	166.9	396.95	477.29	203.05	310.39
5 5 5	Triangular	Constant	3	153.56	698.47	324.17	544.91	170.61
6 6 6	Triangular	Constant	3	139.2	787.25	398.5	648.05	259.3
No. of Input MF selected is 3 3 3,for input MF type, consider the following,								
3 3 3	Trapezoidal	Constant	3	335.17	410.49	497.19	75.32	162.02
3 3 3	Gbell	Constant	3	191.98	182.97	370.64	9.01	178.66
3 3 3	Gauss	Constant	3	185.41	222.27	382.31	36.86	196.9
3 3 3	Gauss2	Constant	3	311.4	354.0	414.42	42.6	103.02
3 3 3	Pi	Constant	3	409.53	464.89	492.78	55.36	83.25
3 3 3	Dsig	Constant	3	222.16	203.36	279.68	18.8	57.52
3 3 3	Psig	Constant	3	222.08	210.2	281.86	11.88	59.78
Triangular MF selected, corresponding to minimum error. For Output MF,consider the following,								
3 3 3	Triangular	Linear	3	165.76	27595.2	361.95	27233.2	196.19
Constant type Output MF selected. For no. of epochs, the following parameters has been selected for trial,								
3 3 3	Triangular	Constant	4	205.82	229.45	232.05	23.63	26.23
3 3 3	Triangular	Constant	6	205.82	229.45	232.06	23.63	26.24
3 3 3	Triangular	Constant	20	205.82	229.47	232.09	23.65	26.27

From the table above, corresponding to minimum difference between the errors the following parameters are selected,

1. No. of Input MF =3.
2. Type of Input MF , Triangular.
3. Type of Output MF , Constant.
4. Epochs =3.

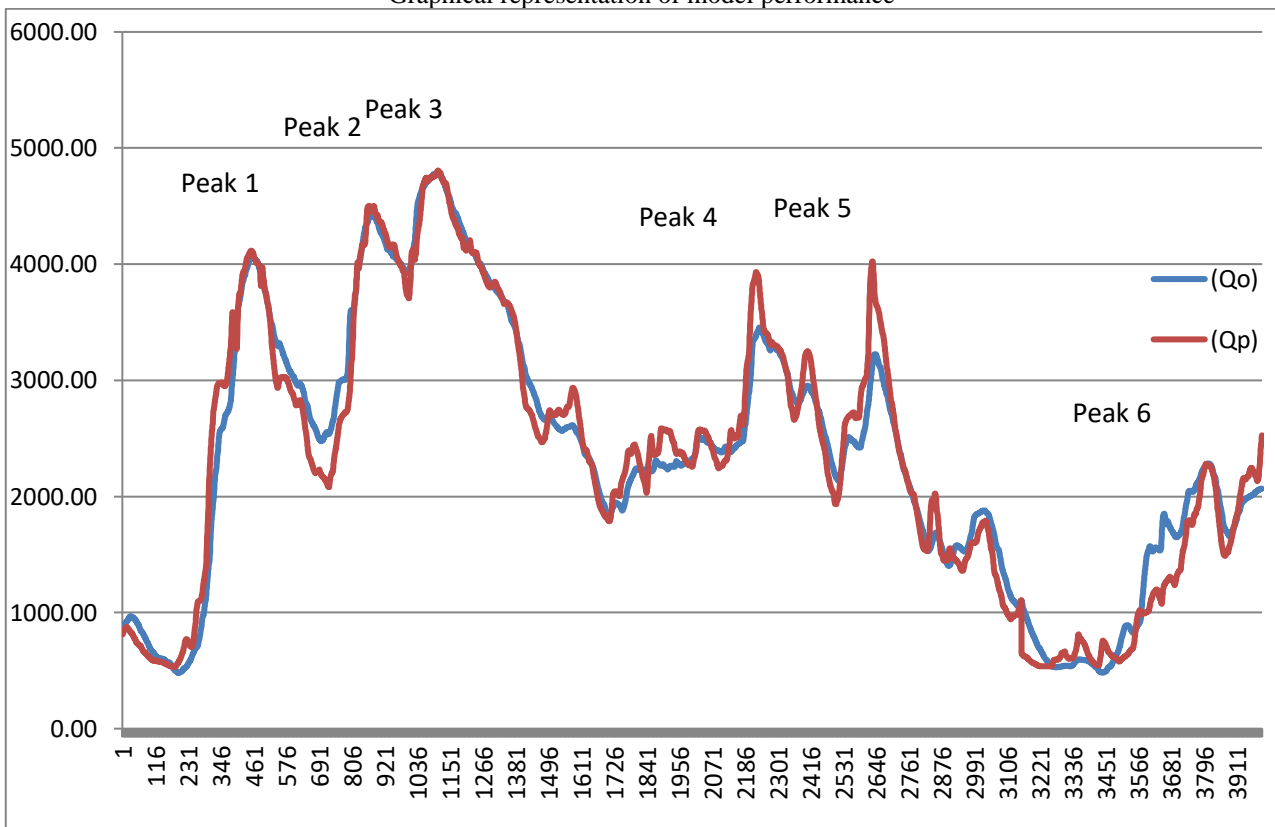
Model has been developed using all the above parameters. The root mean square error for training, checking and testing are found out respectively as, 205.82, 229.45 and 232.05. Crisp output is obtained by defuzzification method using 4000 input data.

Nash-Sutcliffe co-eff. of efficiency=0.96.



Configuration of the ANFIS model

Graphical representation of model performance



$Q_o$  = Observed output discharge.  $Q_p$  = Predicted output discharge.





Determination of Discharge difference and Difference of time between 6 peak discharges:-From the graph the Discharge difference and Time lag between the Observed and Predicted discharge is found out as shown in chart below,

No. of peak	1	2	3	4	5	6
Discharge difference ( $Q_0 \sim Q_p$ )( $m^3/sec.$ )	22	14	62	95	121	38
Difference of time ( $T_0 \sim T_p$ ) (Hours.).	1	3	2	6	5	2

## 8. SUGGESTION

In the present study ANFIS model has been developed for multiple inflow, single outflow problem. The forecasting model can be used to predict common downstream flow using multiple upstream flows. Flow prediction with different forecast lead time can be obtained using the model. The result obtained show that the predicted output discharge matches the observed discharge closely.

## 9. CONCLUSION

ANFIS has been found to be very useful tool for flood discharge prediction of multiple inflow, single outflow river system.

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# FOOD PRESERVATION IN CONTROLLING FOOD SCARCITY UNDER ECONOMIC MELTDOWN IN NIGERIA

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## ABSTRACT

*Nigeria is a developing country that has its development of the nation rests on availability of food commodities throughout the year, there is therefore the need for food preservation as all food is liable. In time, to deterioration and decay the rate at which this happens depends upon the type of food and conditions under which it is kept. The aim in preserving is to preserve food stuffs at their most nutritious state so that they may be used when food is not available in the farm or market. This paper, therefore is concerned with how to do this effectively.*

## INTRODUCTION

Economic meltdown can be defined as a situation when the economy is in a bad shape, inflation is high, so in unemployment, property values drop, company go under, causing recession or depression.

Economic meltdown is characterized by

- Reduction in the people
- Reduction in food supply to the market
- Loss of job, unemployment
- Increase in poverty level
- Foreign reserve reduction due to exchange rate of foreign currencies to the naira
- Reduction in deposits and saving in Bank

There is more concentration on the implication of the economic meltdown on food scarcity if foods are not preserved to meet market demand.

Since no food would keep definitely in its natural form, because as a living cell, they are subjected to micro-organism and bacteria which cause decay and spoilage and they help in process of ripening, therefore the idea of preservation was introduced to avoid wastage of foodstuffs when they are in season, and also to retain their nutrients, taste and colour. These living organisms need water, air, warmth and suitable condition for their survival. In the absence of these conditions they will not survive. So these foodstuffs are changed from their natural states to another permanent stage to spoilage by these micro-organisms.

In the olden days, our parents have been preserving their food in different ways such as salting, smoking and so on but the nutritive value and colour are altered due to over-smoking. Therefore, our foodstuffs throughout the year.

## OBJECTIVES OF STUDY

- (i) The objective of this paper is to retain as far as possible the original value of foods (ii) To maintain their nutritive value as much as possible

## CAUSES OF FOOD DECAY

- Microorganisms such as bacteria and mold are the most common causes of food spoilage.
- Insects, mites and rodents are also common causes of food spoilage and they may also serve as carriers in transmitting diseases
- Metabolic change within the food itself is another cause of food spoilage in most raw foods. For example, meat and fruits contain enzymes that will cause the breakdown of tissues unless they are inactivated.
- Oxidation, causes fats to become rancid and produced off-colors and off-flavors in other foods.



- Contamination is also responsible for food decay

### AIMS OF PRESERVATION

All the organisms causing decay to food need warmth and moisture if they are to multiply. If they are deprived of these essentials they will not grow. Heat will destroy them, and coldness retards their growth.

- (1) To destroy the organisms by heat, or to maintain conditions which will render them inactive-cold
- (2) To prevent any fresh organisms reaching the food by sealing it immediately after treatment.
- (3) To render the organisms inactive by removing and prevent warmth.

### METHOD OF FOOD PRESERVATION

1. **By Deep freezing:** to exclude air and warmth which favours microorganisms as they will not survive in very cold temperature e.g meat and fish
2. **By Refrigeration:** - This condition will retard micro-organisms and bacteria growth, e.g fruit drinks and fruits meat etc.
3. **By Dehydration:** - This is done by drying under the sun or dry by heat to remove water, and become dry to prevent bacterial and micro-organisms growth, since they can survive without moisture e.g Plantain, vegetables etc.
4. **By Adding Chemical:** - salt sugar, vinegar, bacteria cannot survive in high concentration of salt and sugar.
5. **By Bottling and Canning:** - No micro-organisms can survive in canned food. If they are canned immediately after preparation because air is already excluded e.g. sardine, and tomatoes.
6. **By Smoking:** - it is done by putting the foodstuff on fire and covering until water is removed and foods become dry and tough e.g meat and fish.

### IMPORTANCE OF FOOD PRESERVATION

1. Food preservation adds variety to the food. For example, in the absence of fresh beans during the rainy season, canned or dehydrated beans may be made use of.
2. Food preservation increased the shelf life of food. Pineapples, oranges and other fruits and vegetables may be preserved by different method for long periods of time.
3. Food preservation increases the food supply
4. Food preservation decrease the wastage of food. Excess foods which would have otherwise been wasted when processed and preserved add to the existing supplies, thus also decreasing the wastage of food.
5. Food preservation decreases dietary inadequacies. Variety in diet is brought about with the help of preserved foods. For examples some Africa countries do not grow any vegetables due to arid soil conditions; this shortcoming is overcome through the importation of fresh and preserved fruit and vegetables.

### RECOMMENDATIONS

1. Foodstuffs should be preserved in the correct form or place immediately it is bought
2. Dried food must be dried and keep in dry place, either by smoking dehydration, heating or canning to exclude air, warmth and water.

### CONCLUSION

Preservation is a very important aspect in food preservation or meal planning so as to balance our food consumption throughout the year.

It's a useful exercise especially when foods are in season or left over food so as to avoid wastage.

The aforementioned methods are more than the refined imported foods that their nutrient values are very low.

The food personally preserved will be more hygienic because some are not done under a good hygienic condition or environment e.g Igbemo rice is more nutritious than imported polished rice that we use take. Not because it is personally preserved but because it does not undergo chemical process like the canned fish known as geisha that was very popular in the 1980s.

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# **ASSESSMENT ON THE QUALITY OF SERVICE OF DFA REGIONAL CONSULAR OFFICE SAN PABLO RELATIVE TO ITS CITIZEN'S CHARTER**

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## **ABSTRACT**

*The Department of Foreign Affairs opened its five additional Regional Consular Offices in 2018 including RCO San Pablo. The new Consular Offices would help provide additional slots for passport applications in Southern Luzon and help decongest the Department of Foreign Affairs' existing offices in Metro Manila.*

*Service quality and customer satisfaction are important concepts to every government agency. The study was conducted to assess the compliance of the Department of Foreign Affairs Regional Consular Office – San Pablo to its citizens charter thru the perception and level of satisfaction of the passport applicants in from the quality of the services delivered by the said office in 2023. Primarily, it has three passport services which are passport processing, passport encoding and passport releasing.*

*The study used a descriptive quantitative approach which generated a total of 153 random passport applicants as respondents. After determining the level of satisfaction thru promptness of service, courteousness of the employees, accuracy and efficiency of public workers and quality of the facilities and area, the study found out that the DFA Regional Consular Office – San Pablo is in compliance with its citizen's charter as reflected by a high rate of satisfaction level as reflected from the passport applicants.*

**KEYWORDS :** *Service Quality, Customer Satisfaction, Citizen's Charter, Passport Applicants*

## **INTRODUCTION**

One of the executive branches of the Philippine government is the Department of Foreign Affairs (DFA) which is responsible for contributing to enhance national security, national sovereignty and the protection of territorial integrity. It is also tasked with participating in the national effort of sustaining development, rights protection, and promoting the welfare of Filipinos living abroad, as well as mobilizing them as partners in national development and increasing international understanding the culture of the Philippines for mutually beneficial relations with other countries.

The Department of Foreign Affairs has a highly responsive system that ensures effectivity of services to the public. It also pursues the development of personal, professional development and career development of every employee. It is bounded by the principles of excellence, integrity and patriotism in the pursuit of its objectives and organizational goals (Jeannifer Villanueva, 2013).

According to the official website of the Department of Foreign Affairs, the jurisdiction of passport offices in the Philippines are under the Office of Consular Affairs (OCA) of the Department of Foreign Affairs (DFA). These are also known as Passport Extension Offices (field offices of DFA-OCA) which were officially declared and called as "DFA Consular Offices"; these offices process passport applications and release at the same time iin select regional malls across the country "apostille" / "red ribbon" service (but not all consular offices have this type of service). In intercommunication and coordination with the Philippine Foreign Service posts the consular offices also provide assistance-to-nationals (ATN) services to Filipinos and are also accepting applications for delayed registration of (ROB) reports of birth, (ROM) reports of marriage, or death abroad and other civil registry documents.

Passport offices in the Philippines were divided into Satellite Offices (SO) in Metro Manila and Regional Consular Offices (RCO) in other areas. These passport offices were restructured under the direction of the Assistant Secretary of the DFA Office of Consular Affairs and formally renamed DFA Regional Consular Offices (RCO) in 2017 under Executive Order No. 45. A Philippine Foreign Service Officer (FSO) and a Philippine Foreign Service Staff Officer (FSSO) now oversee each passport office.

The purpose of this study is to perform an assessment that will satisfy its applicants, since the Department of Foreign Affairs is one of the country's government agencies, and serving the public effectively is one of the most essential factors to consider.



### OBJECTIVES OF THE STUDY

1. Determine the demographic profile of passport applicants in DFA Consular Office San Pablo.
2. Determine the passport applicants' level of satisfaction with the Passport Processing services rendered by the DFA Regional Consular Office (RCO) – San Pablo.
3. Determine the passport applicants' level of satisfaction with the Passport Encoding services rendered by the DFA Regional Consular Office (RCO) – San Pablo.
4. Determine the passport applicants' level of satisfaction with the Passport Releasing services rendered by the DFA Regional Consular Office (RCO) – San Pablo.
5. Determine the significant relationship between the passport applicants' demographic profile and the level of their satisfaction.
6. Determine the significant difference between the passport applicants' level of satisfaction in the three different passport services – processing, encoding and releasing as compliance to its citizen's charter.

### MATERIALS AND METHODS

The researcher employed qualitative-descriptive research and purposive sampling techniques, as well as a questionnaire and collected data from 153 random individual passport applicants from San Pablo City and other locations (nearby areas). Grimes & Schulz (2017) mentioned that descriptive studies are frequently the first scientific toes in new areas of inquiry. A clear, specific, and measurable definition of the disease or condition in question is an essential component of descriptive research.

The main instrument for this study was a collection of structured questionnaires. A questionnaire is a quantitative data collecting technique that is widely used in construction research because it is an excellent research instrument for gathering standardized data and drawing conclusions. (Taherdoost,2016). Survey questionnaire was distributed to the target respondents and also personally retrieved the whole survey questionnaire, after which the findings were tallied, tabulated, analyzed, and interpreted. The researcher was only allowed to deliver 5 survey questionnaires each day so that office activities would not be disrupted. The questionnaire was divided into three parts; the first part is on the demographic profile of the respondents and type of the passport services that they had.

The researcher used a 4-point likert scale which is a psychometric response scale primarily used in questionnaires to obtain participant's preferences or degree of agreement with a statement or set of statements. According to Likert (1994), a 4-point (or other even numbered) scale, is used to construct an ipsative (forced choice) measure when no indifferent alternative is provided. Each level on the scale is assigned a number value or coding, which typically begins at 1 and increases by one for each level.

Likert scales are a noncomparative scaling approach that is unidimensional (measures only one characteristic). Respondents are asked to use an ordinal scale to indicate their degree of agreement with a specific statement. In social science research, one of the most used data-gathering strategies is the questionnaire. In research, the fundamental purpose of a questionnaire is to collect crucial information in the most exact and valid manner feasible. Brewerton et.al,(2002). The correctness and consistency of survey or questionnaire responses are crucial features of research procedure called as validity and reliability.

### RESULTS AND DISCUSSIONS

Demographic profile of the respondents.

**Table 1. Age range of Passport Applicants in DFA San Pablo.**

Age	F	%
17 & BELOW	10	6.54%
18-30	57	37.25%
31-60	69	45.10%
61 & above	17	11.11%
<b>TOTAL</b>	<b>153</b>	<b>100.00%</b>

Table 1 shows the different age range of the passport applicants of DFA Regional Consular Office – San Pablo. Majority of the applicants' age ranged from 31-60 years old at 45.10 %, followed by the 18-30years old at 37.25%, then 61 years old and above at 11.11% and the least number of passport applicants' age ranged from 17 years old and below at 6.54%. Most passport applicants are between the ages of 31 and 60 and the majority of them are Overseas Filipino Workers (OFWs), who are really required to obtain a passport by their nature of work in order for them to go to other countries.



**Table 2. Gender of Passport Applicants in DFA San Pablo**

Gender	<i>F</i>	%
Male	70	45.75%
Female	75	49.02%
LGBT	8	5.23%
<b>TOTAL</b>	<b>153</b>	<b>100.00%</b>

Table 2 shows the gender of the passport applicants of DFA Regional Consular Office – San Pablo. It shows that majority of the applicants were females (49.02%) , followed by males with (45.75%) and LGBT with (5.23%) .

**Table 3. Address of Passport Applicants in DFA San Pablo.**

Address	<i>F</i>	%
Abra De Ilog	2	1.31%
Alaminos Laguna	9	5.88%
Batangas City	1	0.65%
Bay Laguna	1	0.65%
Binan Laguna	1	0.65%
Cabuyao Laguna	2	1.31%
Calamba City	8	5.23%
Calapan Or Mdo	1	0.65%
Calauan Laguna	4	2.61%
Candelaria Quezon	2	1.31%
Dasmaringas Cavite	2	1.31%
Dolores Quezon	4	2.61%
Famy Laguna	2	1.31%
Lemery Batangas	2	1.31%
Liliw Laguna	5	3.27%
Lipa City	3	1.96%
Los Banos Laguna	2	1.31%
Magdalena Laguna	1	0.65%
Muntinlupa City	2	1.31%
Nagcarlan Laguna	6	3.92%
Naujan Or Mdo	1	0.65%
Paete Laguna	3	1.96%
Pagsanjan Laguna	2	1.31%
Pakil Laguna	1	0.65%
Pampanga	1	0.65%
Pangil Laguna	2	1.31%
Rizal Laguna	4	2.61%
San Antonio Quezon	1	0.65%



San Pablo City	56	36.60%
Sariaya Quezon	1	0.65%
Silang Cavite	1	0.65%
Sta Cruz Laguna	3	2.61%
Sta Rosa City	2	1.31%
Sto Tomas City	2	1.31%
Taal Batangas	2	1.31%
Tanauan City	5	3.27%
Tiaong Quezon	4	2.61%
Victoria Laguna	1	0.65%
<b>TOTAL</b>	<b>153</b>	<b>100.00%</b>

Table 3 shows the address of the passport applicants of DFA Regional Consular Office – San Pablo. Passport applicants were from different locations and the majority of them were from San Pablo City at 36.60%; followed by Alaminos Laguna at 5.88%; Calamba City at 5.23%; Nagcarlan Laguna at 3.92%; Liliw Laguna and Tanauan City at 3.27%; Calauan Laguna, Dolores Quezon, Rizal Laguna, Sta. Cruz Laguna and Tiaong Quezon at 2.61%; Paete Laguna at 1.96%; Abra de Ilog, Cabuyao Laguna, Candelaria Quezon, Dasmaringas Cavite, Famy Laguna, Lemery Batangas, Los Banos Laguna, Muntinlupa City, Pagsanjan Laguna, Pangil Laguna, Sta Rosa City, Sto Tomas City, Taal Batangas at 1.31% and the rest with 0.65%.

**Table 4. Marital Status of Passport Applicants in DFA San Pablo**

Marital status	F	%
Married	57	37.25%
Single	87	56.86%
Widowed/Widower	9	5.88%
<b>TOTAL</b>	<b>153</b>	<b>100.00%</b>

Table 4 shows the Marital Status of the passport applicants of DFA Regional Consular Office – San Pablo. Most applicants were single (56.86%), followed by married applicants (37.25%) and widowed / widower (5.88%).

**Table 5. Educational Attainment of Passport Applicants in DFA San Pablo**

Educational attainment	F	%
High School	29	18.95%
Senior Hs	5	3.27%
U.G- College	47	30.72%
Vocational	7	4.58%
College Grad	63	41.18%
Post-Graduate	2	1.31%
<b>TOTAL</b>	<b>153</b>	<b>100.00%</b>

Table 5 shows the Educational Attainment of the passport applicants of DFA Regional Consular Office – San Pablo. Most applicants were college graduates (41.18%), followed by college-undergraduates (30.72%), high school graduates (18.95%), vocational (4.57%), senior high school I (3.27%) and post-graduate (1.31%).



**Table 6. Employment Status of Passport Applicants in DFA San Pablo.**

Employment status	F	%
Employed	82	53.59%
Unemployed	50	32.68%
Businessman	5	3.27%
Self-Emp	2	1.31%
Student	9	5.88%
Retired	5	3.27%
<b>TOTAL</b>	<b>153</b>	<b>100.00%</b>

Table 6 shows the Employment Status of the passport applicants of DFA Regional Consular Office – San Pablo. Majority of the applicants were employed (53.59%), followed by unemployed (32.68%), students (5.88%), businessman (3.27%) and self-employed (1.31%).

**Passport Applicants’ Level of Satisfaction with the Processing Service**

**Table 7. Level of Passport Applicants’ Satisfaction in terms of Timeliness/ Promptness of Service in Processing**

Statement	Mean	SD	Verbal Interpretation
1. The office follows the stated time of the passport processing duration on citizen’s charter.	3.87	0.34	Very Ontime
2. The processing is easy and not time consuming.	3.89	0.32	Very Ontime
3. The DFA San Pablo’s processing staff / personnel give prompt service.	3.92	0.28	Very Ontime
4. The schedule time has been followed and finished on time.	3.85	0.36	Very Ontime
<b>Overall</b>	<b>3.88</b>	<b>0.22</b>	<b>Very Ontime</b>

**Note. N=61.**

*Legend:*

Rating Score	Rating Scale	Descriptions
4	3.51 - 4.00	Very Ontime
3	2.51 - 3.50	Ontime
2	1.51-2.50	Less Ontime
1	1.00 1.50	Not at all ontime

Table 7 shows the level of passport applicants’ satisfaction in terms of Timeliness/ Promptness of Service in Processing as such as employee’s manner in assisting the applicants by verifying the submitted documents, whether authentic or falsified, interviewing each applicant to check their identity and checking if there is any discrepancy on their submitted documents.

It resulted to its over-all mean of 3.88 which means and classified as *very on-time* by the respondents’ answers. This indicates that the passport applicants’ level of satisfaction is high with the service provided in terms of timeliness/promptness from Passport Processing.

Meanwhile the statement 4 ( $M=3.85$ ) got the lowest ranking. According to Hornik,1984 customers’ reactions to waiting are more strongly affected by perceived than by objective waiting time if they have a schedule to be followed.

The length of the waiting time is a significant component that will influence consumers' evaluation of the wait. It is necessary to distinguish between the real or timed waiting time and the perceived length. This would imply that perceived waiting time acts as a mediator. Thus, the effect of objective waiting time on the appraisal of the wait is mediated by the perceived waiting time.(Pruyn Ž et al.1993).





**Table 8. Level of Passport Applicants' Satisfaction in terms of DFA Employees' Courteousness in Processing**

Statement	Mean	SD	Verbal Interpretation
1. The processing staff / personnel were courteous.	3.95	0.22	Very Courteous
2. The processing staff / personnel shows fair and equal treatment to each applicants.	3.92	0.28	Very Courteous
3. The processing staff / personnel shows helpfulness to answer applicant's queries.	3.97	0.18	Very Courteous
4. The processing staff / personnel shows professionalism while having transactions with them and not sarcastic.	3.93	0.25	Very Courteous
<b>Overall</b>	<b>3.94</b>	<b>0.19</b>	<b>Very Courteous</b>

**Note. N=61.**

*Legend:*

Rating Score	Rating Scale	Descriptions
4	3.51 - 4.00	Very Courteous
3	2.51 - 3.50	Courteous
2	1.51-2.50	Less Courteous
1	1.00 1.50	Not at all Courteous

Table 8 shows the level of satisfaction of passport applicants in terms of Courteousness in Passport Processing, which is defined as the employee's manner in assisting the applicants by communicating with each applicant, providing information about their passport applications, explaining the passport process, and informing them if their passport release may be delayed without prior notice from the main office with patience and in good manners was resulted to an overall mean of 3.94 which considered and categorized as *very courteous* by the respondents' answers. This indicates that the passport applicants' level of satisfaction is high with the service provided in terms of courteousness from Passport Processing.

Meanwhile the statement 2 ( $M=3.92$ ) got the lowest ranking. According to Chebata et al., (2005), the perception of the people on equal distribution have a significant effect on their relationship with service providers. People seldom attempt to obtain the best services, but instead seek fair services and consistent treatment. Unfair treatment is a crucial factor leading to customer complaints (Ambrose et al., 2007). Perceived fairness influences customer loyalty to vendors in service recovery situations (Chebata and Slusarczyk, 2005). This suggests that consumers are more satisfied if they receive a service similar to what other customers receive.

**Table 9. Level of Passport Applicants' Satisfaction in terms of DFA Employees' Accuracy and Efficiency in Processing**

Statement	Mean	SD	Verbal Interpretation
1. The received information and other instructions are clear.	3.97	0.18	Very High
2. The processing staff/personnel are knowledgeable to perform such service.	3.89	0.32	Very High
3. The service in processing is of quality.	3.97	0.18	Very High
4. The processing staff / personnel provides an enough attention to the application and not gossiping with other co-workers.	3.93	0.25	Very High
<b>Overall</b>	<b>3.94</b>	<b>0.20</b>	<b>Very High</b>

**Note. N=61.**

*Legend:*

Rating Score	Rating Scale	Descriptions
4	3.51 - 4.00	Very High
3	2.51 - 3.50	High
2	1.51-2.50	Low
1	1.00 1.50	Very Low



Table 9 shows the level of satisfaction of passport applicants in terms of Accuracy and Efficiency of Public Workers in Processing, which is defined as the employee's manner in delivering information and explaining to the passport applicants the process of passport application. The staff also professionally answer applicants' inquiries concerning requirements and provide explanations if there is a contradiction in the applicant's documents.

It resulted in an overall mean of 3.94, which was evaluated and rated as *very high* by the respondents' answers. This indicates that the passport applicants' level of satisfaction is high with the service provided in terms of accuracy & efficiency of the public workers in Passport Processing.

Meanwhile the statement 2 ( $M=3.89$ ) got the lowest ranking. According to De Geus 1997, along with the increased emphasis on knowledge comes a growing perception of the importance of individuals who work with knowledge. Knowledge is defined as a justified belief that increases an entity's capability for effective action (Huber,1991). In order to provide good service in any organization, the employees must maximize the use of their knowledge because knowledge is the most important firm-specific intangible asset.

**Table 10. Level of Passport Applicants' Satisfaction in terms Quality of Facilities and Processing Area**

Statement	Mean	SD	Verbal Interpretation
1. The area is accessibly located.	3.88	0.52	Very Good Quality
2. The processing area is comfortable and clean.	3.94	0.24	Very Good Quality
3. The processing area of DFA San Pablo has modern equipment.	3.86	0.53	Very Good Quality
4. The facilities such as machine, chairs, computers, scanners, cameras etc. are sufficient.	3.94	0.24	Very Good Quality
<b>Overall</b>	<b>3.91</b>	<b>0.27</b>	<b>Very Good Quality</b>

*Note. N=61.*

*Legend:*

Rating Score	Rating Scale	Descriptions
4	3.51 - 4:00	Very Good Quality
3	2.51 - 3.50	Good Quality
2	1.51-2.50	Bad Quality
1	1.00 1.50	Very Bad Quality

Table 10 shows the level of passport applicants' satisfaction in terms of the quality of the facilities and area in Passport Processing. It resulted in an over-all mean of 3.91 which categorized and classified as *very high quality* by the respondents' answers. This indicates that the passport applicants' level of satisfaction is high.

Meanwhile, statement 3 ( $M=3.86$ ) got the lowest ranking. According to a study, changes have been taking place in all facets of human life including the office equipments and this is as a result of technological advancement (Osuala,2005). Every office in today's business world, be it government, industry or other human endeavours needs a modern equipments. The office worker expects certain support from the organization into which he/she is employed. This support can be technological (machines and equipment) and human (Harinder et al., 2015).

**Passport Applicants' Level of Satisfaction with the Encoding Service**

**Table 11. Level of Passport Applicants' Satisfaction in terms of Encoding Timeliness/ Promptness**

Statement	Mean	SD	Verbal Interpretation
1. The office follows the stated time of the passport encoding duration on citizen's charter.	3.86	0.35	Very Ontime
2. The encoding is easy and not time consuming.	3.90	0.51	Very Ontime
3. The DFA San Pablo's encoding staff / personnel give prompt service.	3.88	0.33	Very Ontime
4. The schedule time has been followed and finished on time.	3.88	0.33	Very Ontime
<b>Overall</b>	<b>3.88</b>	<b>0.26</b>	<b>Very Ontime</b>



**Note. N=61.**

*Legend:*

<i>Rating Score</i>	<i>Rating Scale</i>	<i>Descriptions</i>
4	3.51 - 4:00	Very Ontime
3	2.51 - 3.50	Ontime
2	1.51-2.50	Less Ontime
1	1.00 1.50	Not at all ontime

Table 11 shows the level of passport applicants' satisfaction in terms of Timeliness/ Promptness of Service in Encoding as such as employee's manner in assisting the applicants by the overall duration of scanning the application forms and all the submitted requirements, scanning of biometrics, taking the picture for their passports, resulting to an over-all mean of 3.88 which means and classified as *very on-time* by the respondents' answers. This indicates that the passport applicants' level of satisfaction is high with the service provided in terms of timeliness/promptness from Passport Encoding.

Meanwhile, statement 1 ( $M=3.86$ ) got the lowest ranking. According to the study of Kumar et al.,(1997), duration time guarantee is a commitment from a firm to serve its customers within a specified period of time. If the firm fails to meet this commitment for some customers then it compensates them for the delay. A large number of firms in a variety of industries such as fast food, banking, government and other private institutions offer such time guarantees to their customers (Babad et al., 1995).

Levin et al. (2014) proved that perceived duration of the wait will have a greater impact on the cognitive component of the appraisal because estimating a time span in terms of minutes is more closely related to a long or short judgment than to the emotional response that may result.

Moreover, if clients witness service times that are longer than expected, their satisfaction often decreases then their satisfaction typically declines at the beginning of the wait but increases toward the end of the wait . (Bearden, 2009).

**Table 12. Level of Passport Applicants' Satisfaction in terms of DFA Employees' Courteousness in Encoding**

Statement	Mean	SD	Verbal Interpretation
1. The encoding staff / personnel were courteous.	3.88	0.33	Very Courteous
2. The encoding staff / personnel shows fair and equal treatment to each applicants.	3.92	0.27	Very Courteous
3. The encoding staff / personnel shows helpfulness to answer applicant's queries.	3.94	0.24	Very Courteous
4. The encoding staff / personnel shows professionalism while having transactions with them and not sarcastic.	3.96	0.20	Very Courteous
<b>Overall</b>	<b>3.93</b>	<b>0.18</b>	<b>Very Courteous</b>

*Note. N=61.*

*Legend:*

<i>Rating Score</i>	<i>Rating Scale</i>	<i>Descriptions</i>
4	3.51 - 4:00	Very Courteous
3	2.51 - 3.50	Courteous
2	1.51-2.50	Less Courteous
1	1.00 1.50	Not at all Courteous

Table 12 indicates the level of satisfaction of passport applicants in terms of Courteousness in Passport Encoding, which includes the employee's way in communicating appropriately and professionally in addressing all applicants' inquiries concerning the encoding of their passport information upon encoding. The respondents' responses resulted in an overall mean of 3.93, which was categorized and defined as *very courteous*. This indicates that the level of satisfaction of passport applicants with the service provided in terms of courteousness from Passport Encoding is high.

Meanwhile, statement 1 ( $M=3.88$ ) got the lowest ranking. According to a study, courteous service communication may indirectly influence customer discretionary behavior. It was defined as any behavior a customer voluntarily performs, beyond purchasing products or services, which may be helpful or harmful to an organization (Ford,1995).



Moreover, courteous service would influence customer evaluations and mood, which, in turn, would influence customer's perception. Courtesy also explained relatively little variation overall in outcome variables. Therefore, efforts to improve customer outcomes should extend beyond improving the courtesy of service and behavior towards the perceived service (Austin et al., 2008).

**Table 13. Level of Passport Applicants' Satisfaction in terms of DFA Employees' Accuracy and Efficiency in Encoding**

Statement	Mean	SD	Verbal Interpretation
1. The received information and other instructions are clear.	3.98	0.14	Very High
2. The encoding staff/personnel are knowledgeable to perform such service.	3.92	0.27	Very High
3. The service in encoding is of quality.	3.96	0.20	Very High
4. The encoding staff / personnel provides an enough attention to the application and not gossiping with other co-workers.	4.00	0.00	Very High
<b>Overall</b>	<b>3.97</b>	<b>0.12</b>	<b>Very High</b>

Note. N=61.

Legend:

Rating Score	Rating Scale	Descriptions
4	3.51 - 4:00	Very High
3	2.51 - 3.50	High
2	1.51-2.50	Low
1	1.00 1.50	Very Low

Table 13 shows the level of satisfaction of passport applicants in terms of Accuracy and Efficiency of Public Workers in Passport Encoding, which includes the employee's manner in giving instructions and assisting passport applicants on what is the proper hand position for biometrics, as well as explaining what is not allowed, such as accessories, make-up, and clothing that is subject to the quality control of passport printing. The respondents' responses resulted in an overall mean of 3.97, which was categorized and defined as *very high*. This indicates that the level of satisfaction of passport applicants with the service provided in terms of courteousness from Passport Encoding is high.

Meanwhile, statement 2 ( $M=3.92$ ) got the lowest ranking. According to a study, knowledge and action have a reciprocal relationship. Goal directed action guides the selection of information from the environment and its organization for the task at hand (Stewart, 1997).

Moreover, Nonaka (1991) focuses on the creation of knowledge and in particular the interrelations between explicit and tacit knowledge. Explicit knowledge is that which can be transmitted to others through formal, systematic language (Polyani, 1966). In contrast, tacit knowledge refers to knowledge that is embedded in individual experience and, as a result, is difficult to communicate to others. Polyani (1966, p.4) defines the essence of tacit knowledge with his observation that "We know so we can tell."

**Table 14. Level of Passport Applicants' Satisfaction in Terms of the Quality of Facilities in Encoding Area**

Statement	Mean	SD	Verbal Interpretation
1. The area is accessibly located.	3.88	0.52	Very Good Quality
2. The encoding area is comfortable and clean.	3.80	0.24	Very Good Quality
3. The encoding area of DFA San Pablo has modern equipment.	3.86	0.53	Very Good Quality
4. The facilities such as machine, chairs, computers, scanners, cameras etc. are sufficient.	3.94	0.24	Very Good Quality
<b>Overall</b>	<b>3.91</b>	<b>0.27</b>	<b>Very Good Quality</b>

Note. N=61.



*Legend:*

<i>Rating Score</i>	<i>Rating Scale</i>	<i>Descriptions</i>
4	3.51 - 4:00	Very Good Quality
3	2.51 - 3.50	Good Quality
2	1.51 - 2.50	Bad Quality
1	1.00 - 1.50	Very Bad Quality

Table 14 shows the level of passport applicants' satisfaction in terms of the quality of the facilities and area in Passport Encoding. This includes the comfort in the area, facilities such as computers, biometrics and documents scanners, cameras and updated passport system. The respondents' responses to Comfort and cleanliness of the Encoding area got the lowest mean of 3.80.

According to Horrevorts et al., (2018), it is found that a higher objective cleanliness correlates significantly with a higher perceived satisfaction of customers in office environments. A higher measured cleanliness also correlates significantly with a higher work satisfaction level of customers in working in office environments.

**Level Passport Applicants' Satisfaction with the Releasing Service**

**Table 15. Level of Passport Applicants' Satisfaction in terms of Releasing Timeliness/ Promptness**

Statement	Mean	SD	Verbal Interpretation
1. The office follows the stated time of the passport releasing duration on citizen's charter.	3.85	0.36	Very Ontime
2. The releasing flow is fast and not time consuming.	3.95	0.22	Very Ontime
3. The DFA San Pablo's releasing staff / personnel give prompt service.	3.90	0.30	Very Ontime
4. The schedule time has been followed and finished on time.	3.84	0.35	Very Ontime
<b>Overall</b>	<b>3.89</b>	<b>0.21</b>	<b>Very Ontime</b>

**Note. N=61**

*Legend:*

<i>Rating Score</i>	<i>Rating Scale</i>	<i>Descriptions</i>
4	3.51 - 4:00	Very Ontime
3	2.51 - 3.50	Ontime
2	1.51 - 2.50	Less Ontime
1	1.00 - 1.50	Not at all ontime

Table 15 shows the level of passport applicants' satisfaction in terms of Timeliness/ Promptness of Service in Releasing as such as employee's manner in assisting the applicants by the overall duration of a gathering of the receipt, searching the DFA portal for the applicant's record, checking the actual passport and release to the applicants. The statement followed the schedule on time got the lowest mean of 3.84.

Meanwhile, the statement 4 ( $M=3.84$ ) got the lowest ranking. According to the study of Zairi (2000), customers are satisfied when their schedule followed on time, but this is when the customers are served in order of their arrival.

Thus this is, in a sense, the "fairest" queue discipline. This does not, of course, mean that other procedures may not be justified when different criteria are taken into account. It is usual in the theory of queues to assume that customers are served in the order of their arrival to follow their schedule.



**Table 16. Level of Passport Applicants' Satisfaction in Terms of Courteousness in Releasing**

Statement	Mean	SD	Verbal Interpretation
1. The releasing staff / personnel was courteous.	3.93	0.26	Very Courteous
2. The releasing staff / personnel shows fair and equal treatment to each applicants.	3.90	0.30	Very Courteous
3. The releasing staff / personnel shows helpfulness to answer applicant's queries.	3.90	0.30	Very Courteous
4. The releasing staff / personnel shows professionalism while having transactions with them and not sarcastic.	3.89	0.29	Very Courteous
<b>Overall</b>	<b>3.91</b>	<b>0.25</b>	<b>Very Courteous</b>

Note. N=61.

Legend:

Rating Score	Rating Scale	Descriptions
4	3.51 - 4.00	Very Courteous
3	2.51 - 3.50	Courteous
2	1.51-2.50	Less Courteous
1	1.00 1.50	Not at all Courteous

Table 16 indicates the level of satisfaction of passport applicants in terms of Courteousness in Passport Releasing, which includes the employee's way of communicating appropriately and professionally in addressing all applicants' inquiries concerning their actual passport information especially when there are wrong entries or wrong spelling on their names. The respondents' responses resulted in an overall mean of 3.93, which was categorized and defined as *very courteous*. This indicates that the level of satisfaction of passport applicants with the service provided in terms of courteousness from Passport Releasing is high.

Meanwhile, the statement 4 ( $M=3.89$ ) got the lowest ranking. According to Halliday (1987), professionalism necessitates that professionals be worthy of their clients' confidence, prioritize confidentiality, and refrain from using their expertise for dishonest objectives. Some professionals are rewarded with power, preferential benefits, and high position in exchange for their expertise in customer dealings.

**Table 17. Level of Passport Applicants' Satisfaction in Terms of DFA Employees' Accuracy and Efficiency of in Releasing**

Statement	Mean	SD	Verbal Interpretation
1. The received information and other instructions are clear.	3.93	0.26	Very High
2. The releasing staff/personnel are knowledgeable to perform such service.	3.90	0.30	Very High
3. The service in releasing is of quality.	3.93	0.26	Very High
4. The releasing staff / personnel provides an enough attention to the application and not gossiping with other co-workers.	3.93	0.26	Very High
<b>Overall</b>	<b>3.72</b>	<b>0.24</b>	<b>Very High</b>

Note. N=61.

Legend:

Rating Score	Rating Scale	Descriptions
4	3.51 - 4.00	Very High
3	2.51 - 3.50	High
2	1.51-2.50	Low
1	1.00 1.50	Very Low



Table 17 shows the level of satisfaction of passport applicants in terms of Accuracy and Efficiency of Public Workers in Passport Releasing, which includes the employee's manner in explaining about the “do’s and don’ts” on the passport, proper safe keeping of passport and the explanation about “unclaimed” passports.

The respondents' response resulted in an overall mean of 3.72, which was categorized and defined as *very high*. This indicates that the level of satisfaction of passport applicants with the service provided in terms of courteousness from Passport Releasing is high.

Meanwhile, the statement 2 ( $M=3.90$ ) got the lowest ranking. In order to give good service, employees must be knowledgeable about its work and its organization. According to Nonaka (1991), Organized knowledge in turn guides goal-directed action. In any segment of action, these two processes occur in parallel, but they can be separated analytically into moments when one or the other dominates.

**Table 18 Level of Passport Applicants’ Satisfaction in Terms of the Quality of Facilities and Releasing Area**

Statement	Mean	SD	Verbal Interpretation
1. The area is accessibly located.	3.95	0.22	Very Good Quality
2. The releasing area is comfortable and clean.	3.93	0.26	Very Good Quality
3. The releasing area of DFA San Pablo has modern equipment.	3.93	0.26	Very Good Quality
4. The facilities such as machine, chairs, computers, scanners, cameras etc. are sufficient.	3.90	0.30	Very Good Quality
<b>Overall</b>	<b>3.93</b>	<b>0.19</b>	<b>Very Good Quality</b>

**Note. N=61.**

*Legend:*

Rating Score	Rating Scale	Descriptions
4	3.51 - 4:00	Very Good Quality
3	2.51 - 3.50	Good Quality
2	1.51-2.50	Bad Quality
1	1.00 1.50	Very Bad Quality

Table 18 shows the level of passport applicants’ satisfaction in terms of the quality of the facilities and area in Passport Releasing. This includes the comfort in the area, facilities such as computers, scanners and the passport releasing system. It resulted in an overall mean of 3.93 which was categorized and classified as *very high quality* by the respondents’ answers and this simply indicates that the passport applicants’ level of satisfaction is high.

Meanwhile, the statement 4 ( $M=3.90$ ) got the lowest ranking. According to the study of Groen et al. (2019), satisfaction with the facilities had a significant influence on the assessed productivity support from the service of the employees. Many studies in Facilities Management investigate aspects of performance measurement, in which Ventovuori et al., (2007) found that around 18 percent of empirical-based publications in the improvement of facilities focus on performance-related issues. Management of facilities can be defined as the management of premises and services required to accommodate and support the core business activities of a client organization, while constantly adding value to the stakeholders (Mudrak, et al., 2004). It is therefore a key function in managing facility resources, support services and the working environment to support the core business of an organisation in both the long and short term.

Furthermore, Tucker and Smith (2008) emphasized the importance of gaining customer perceptions through performance measurement in order to add value to an organization's service delivery; however, methods of gaining customer satisfaction within facilities tend to be quantitative in nature (Sarshar and Pitt, 2009), focusing on customer satisfaction surveys and potentially missing important issues.



**The significant correlation of the profile of the respondents and level of their satisfaction on service received**

**Table 19. Relationship Matrix Between Profile and Level of Satisfaction**

Profile	Level of satisfaction			
	Timeliness	Courteousness	Accuracy	Quality
Age	$r_s=.042$ $p=.607$	$r_s=.042$ $p=.607$	$r_s=.042$ $p=.607$	$r_s=.042$ $p=.607$
Gender	$F=1.202$ $p=.303$	$F=0.218$ $p=.805$	$F=1.128^a$ $p=.339$	$F=1.135$ $p=.324$
Address	$F=0.525$ $p=.988$	$F=0.549$ $p=.982$	$F=0.402$ $p=.999$	$F=0.680$ $p=.913$
Marital status	$F=1.104$ $p=.334$	$F=0.194$ $p=.824$	$F=0.379$ $p=.685$	$F=1.126$ $p=.327$
Educational attainment	$r_s=.046$ $p=.573$	$r_s=-.004$ $p=.963$	$r_s=-.044$ $p=.590$	$r_s=.018$ $p=.827$
Employment status	$F=1.09$ $p=.367$	$F=4.30$ $p=.001$	$F=2.83$ $p=.218$	$F=2.24$ $p=.053$

Note. Each cell contains the statistic to measure relationship and corresponding *p* value.  $r_s$ =Spearman's rank-order correlation coefficient. Relationships with Gender and Civil Status were tested using ANOVA since they are both nominal variables with 3 levels. A general regression technique was used with Address and Employment Status since they are nominal variables with many levels and cannot meet some assumptions of ANOVA.

<sup>a</sup>Welch's ANOVA was used due to violation of normality assumption.

Table 19 shows that there is no significant relationship between the respondent's demographic profile such as gender, address, marital status and educational attainment to the level of satisfaction in terms of timeliness, courteousness, accuracy and quality of facilities.

However, employment status have statistically significant relationships with Courteousness,  $F=4.30$ ,  $p=.001$ . Gopinath (2016) concluded a significant difference between Satisfaction factors related with courtesy and there is a positive relationship exists between the factors of service satisfaction.

Moreover, according to Khan and Nemati (2011) job involvement is the psychological perception of an individual about the work or significance of work in the individual's self-image. They believe in what they call "Why are you not like me syndrome". People who are working (employed) tend to compare themselves to other workers (Lubakaya, 2014).

**The significant difference in the levels of satisfaction among the three different passport services**

**Table 20. Level of Passport Applicants' Satisfaction on the three Passport Services**

Satisfaction variable	Type of service						<i>F</i>	<i>p</i>	Analysis
	Processing		Encoding		Releasing				
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Timeliness	3.88	0.22	3.88	0.26	3.89	0.21	0.03	.974	Not Significant
Courteousness	3.94	0.19	3.93	0.18	3.91	0.25	0.24	.784	Not Significant
Accuracy	3.94	0.20	3.97	0.12	3.92	0.25	0.62	.541	Not Significant
Quality	3.92	0.21	3.91	0.27	3.93	0.19	0.17	.844	Not Significant

Table 20 shows that it was found out that there were no significant differences between the applicants' level of satisfaction with regard to the three passport services such as Processing, Encoding and Releasing in terms of Timeliness, Courteousness, Accuracy and Efficiency of Public workers and Quality of Facilities and Area. There is no sufficient evidence that the computed *F* values were significant. All *p* values are not less than .05.





Moreover, services that meet customer preferences and expectations are considered to be of high quality. With regards to the timeliness / promptness of the service, the study of Levin et.al. (2014) proved that perceived duration of the wait will have a greater impact on the cognitive component of the appraisal.

The quality of every service also depends on the ability of their staff to act like professionals and with courtesy. Courteous behavior is directly related to showing respect.

## CONCLUSIONS AND RECOMMENDATIONS

The passport applicants in DFA Regional Consular Office San Pablo were dominated by ages 31 to 60 years old at 45.10% of the total respondents of the study; the majority of the applicants were female at 49.02% of the total respondents of the study. The passport applicants in DFA Regional Consular Office San Pablo were mostly from different municipalities and cities in Laguna province where the RCO San Pablo is located. 80.38% of the total respondents of the study were from the province of Laguna.

The majority of the passport applicants in DFA Regional Consular Office San Pablo were single at 56.86% ; were mostly college graduates at 41.18 and employed at 53.59% of the total respondents of the study.

The demographic profile of the respondents does not affect their level of satisfaction. As long as the people get the best service from a government agency, the level of satisfaction would be high regardless of their demographic profile. There is no statistically significant difference between the level of satisfaction and the three passport services, which are Passport Processing, Passport Encoding, and Passport Releasing. Passport applicants commended all the passport services.

As DFA Regional Consular Office – San Pablo got the highest rates from its passport applicants in Timeliness/Promptness of Service, Courteousness of the Employees, Efficiency and Accuracy of the Employees and Quality of the Facilities & Area it is highly recommended to share to other DFA Consular and Satellite Offices their best practice and also to other government agencies.

The Department of Foreign Affairs Regional Consular Office – San Pablo got a high overall result on the level of satisfaction from the respondents, therefore they are in compliance with its citizen's charter. On the other hand, regardless of the overall high results, there would be always room for improvements from the lowest ranking statements in Processing, Encoding & Releasing Services such as following of schedule on time, equal and fair treatment to the applicant, knowledge of work and the quality of facilities must be considered to improve its service. The Department of Foreign Affairs Regional Consular Office – San Pablo must anticipate the number of applicants to be accepted so the appointment schedule can still be followed on time and make it even faster.

Based on the given results, the researcher recommends the following:

- To maintain the good quality of the service, communication training, courtesy training and other customer service training and program must be attended by the employees. Customer service workshop also is recommended for the enhancement of their services.
- The DFA RCO San Pablo staff/personnel should also treat every applicant with the same service - the way they speak, tone of the voice and also facial expressions must also be observed since most of the time, people misinterpret it and generate confusion and erroneous connotation.
- Courteousness of employees must always be observed. It was mandated by the Civil Service Commission that government employees must possess courtesy while dealing with the public.
- In regards to knowledge that possess by employees towards work, they must also attend passport service trainings and retooling seminars to keep their expertise current and relevant.
- Other low ranking such as improvement of facilities and equipment must be highlighted and proposed for upgrade to be included on the allotted budget for the succeeding fiscal year to serve the public better. System maintenance must constantly be performed in the mean time to minimize and avoid system crashes, which can also affect the duration time of application once interrupted.
- The DFA Regional Consular Office - San Pablo's applicants had a positive view of its passporting services, the office is likely ready to take other services such as authentication services in addition to passport services.

One of the challenges for future researchers is determining whether the DFA Regional Consular Office – San Pablo can give authentication services because most people have inquired about it. Currently, the nearest DFA Office that provides authentication services is DFA NCR-South, which is located in Muntinlupa City.

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Level of Passport Applicants' Satisfaction in terms of Processing Timeliness/Promptness

8 Level of Passport Applicants' Satisfaction in terms of DFA Employees' Courteousness in Processing

9 Level of Passport Applicants' Satisfaction in terms of DFA Employees' Accuracy and Efficiency in Processing

10 Level of Passport Applicants' Satisfaction in terms Quality of Facilities and Processing Area

11 Level of Passport Applicants' Satisfaction in terms of Encoding Timeliness/ Promptness

12 Level of Passport Applicants' Satisfaction in terms of DFA Employees' Courteousness in Encoding

13 Level of Passport Applicants' Satisfaction in terms of DFA Employees' Accuracy and Efficiency in Encoding

14 Level of Passport Applicants' Satisfaction in terms Quality of Facilities and Encoding Area

15 Level of Passport Applicants' Satisfaction in terms of Releasing Timeliness/Promptness

16 Level of Passport Applicants' Satisfaction in terms of DFA Employees' Courteousness in Releasing

17 Level of Passport Applicants' Satisfaction in terms of DFA Employees' Accuracy and Efficiency in Releasing

18 Level of Passport Applicants' Satisfaction in terms Quality of Facilities and Releasing Area

19 Relationship Matrix Between Respondents' Profile and Level of Satisfaction

19 Level of Passport Applicants' Satisfaction on the three Passport Services



# WATER QUALITY INDEX EVALUATION FOR MONITORING WATER QUALITY OF RIVER BARAK

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## ABSTRACT

Water of River Barak that runs through densely populated Silchar city of Assam was taken for evaluation of Water Quality Index (WQI). Water Quality Index is a grade used to represent water quality at particular station at that particular time based on several water quality parameters. The idea is to turn complex water quality into a number that is understandable and usable by all. Important parameters such as pH, Turbidity, Conductivity, Total Dissolved Solids (TDS), Dissolved Oxygen (DO), Residual Chlorine, Chloride and Temperature are taken for the purpose. The study was conducted utilizing a single water sampling method with 7 sampling stations along a stretch of 25 Km as Sonabarighat, Kanakpur, Badrighat, Sadarghat, Karatigram, Annapurnaghat, and Masughat. Weekly data for a period of 3 months was used. The study reveals that Water Quality Index of all stations is in the range of 20 to 40 which indicates water is not polluted and is harmless but turbidity of water is more due to sediment flow.

**KEYWORDS:** WQI, River Barak, Water testing.

## 1. INTRODUCTION

Water is a vital natural resource and is becoming increasingly scarce. Rivers serve a vital significance as a substantial supply of water. Unfortunately, rivers are polluted as a result of indiscriminate sewage and industrial waste disposal, affecting their physiochemical and microbiological properties. Water quality has deteriorated in recent years as a result of the increasing human population, intensive agricultural practices industrialisation and the discharge of large amount of wastewater into the river.

Due to the impurities present in global water resources, only a few portion of the world's water is available for human consumption. It is important to know the concentration of different parameters of a given sample of the river water and to compare with permissible limits set by regulatory bodies.

Water quality monitoring focuses on the physical, chemical, and biological activities of the water. The Water Quality Parameters (WQP) related to Water Quality Index (WQI) are pH, Conductivity, Turbidity, Total Dissolved Solids (TDS), Dissolved Oxygen and Temperature,.

## 2. OBJECTIVE

The objective of the study is to find the relationship between physicochemical parameters of water as Water Quality Index (WQI) of Barak river flowing through Silchar city area of Assam.

## 3. METHODOLOGY

Water quality encompasses everything and anything that it may have picked up along the way, whether colloidal, dissolved, or suspended. For a layperson, the vast amount of data involved in water quality evaluation and monitoring might seem overwhelming. A novel approach has been developed to incorporate the data pool in the form of simple numbers called water quality indexes in an attempt to communicate the information in a more precise and understandable way. Horton (1965) was the first to create this concept in Germany, and since then, several other attempts have been made to develop an acceptable index for evaluating water quality in various regions as well as for global use.

Step 1: In this step, each of the parameters has been assigned a weight (AW<sub>i</sub>) ranging from 1-4 depending on collective expert opinions taken from the previous studies.

Step 2: In this, the relative weight (RW) was calculated by using the following equation

$$RW = \frac{AW_i}{\sum_{i=1}^n AW_i}$$

Step 3: The quality rating scale (Q<sub>i</sub>) for all the parameters except for pH and DO was assigned by dividing its concentration in each water sample by its own standard according to the drinking water guidelines and the result was multiplied by 100.



$$Q_i = \left[ \frac{C_i}{S_i} \right] \times 100$$

While the quality rating for pH or DO was calculated on the basis of

$$Q(p, DO) = \left[ \frac{C_i - V_i}{S_i - V_i} \right] \times 100$$

$V_i$  = the ideal value which is considered as 7.0 for pH and 14.6 for DO

$C_i$  = value of water quality parameter subindices from sample analysis.

Step 4: The subindices ( $S_i$ ) were calculated first for each parameter and used to compute WQI.

$$S_i = R_w \times Q_i \quad WQI = \sum_{i=1}^n S_i$$

The computed WQI values could be classified as

<50= Excellent

50-100 = Good

100-200 = Poor

200-300 = Very poor

>300 = Unsuitable

#### 4. DATA COLLECTION

Sampling was done before sunrise using brown bottle so that it should not affect the water quality parameters. Samples were collected in plastic bottles of 0.5 litre capacity. The bottles were filled upto the top, leaving no space for air, and then sealed to prevent leakage. The name of the places were clearly marked on each bottle and sent to laboratory for testing.

#### 5. STUDY AREA

The study area considered in the present work is Barak river basin. Barak river is one of the major rivers of South Assam. The 564 kilometers long river is part of the Surma-Meghna river System. It originates in the hill of Manipur where it is the biggest and most important river. After Manipur, it flows through Assam. It later enters Bangladesh where it forks into Surma and Kushiya rivers. The Sub-basin of Barak River covers the state of Assam, Nagaland, Manipur, Mizoram, Tripura and Meghalaya with an area of about 27,659 sq. km. There are 7 stations selected along a stretch of 25 Km. starting from Sonabarighat, Kanakpur, Badrighat, Sadarghat, Karatigram, Annapurnaghat, and Masughat.

#### 6. RESULTS

Parameters	R1	R2	R3	Mean value	Standards
Residual Chlorine	1	1	1	1	0.2
E conductivity	4	5	2	3.666667	500
pH	1	4	4	3	6.5 – 8.5
Hardness	1	1	1	1	300
Chlorine	4	3	4	3.666667	250
DO	4	5	4	4.333333	5
TDS	4	2	2	2.666667	500

R1 – Relative weight of parameters taken from reference paper Dwivedi and Pathak .

R2 – Relative weight of parameters taken from reference paper Psece and Wunderlin.

R3 - Relative weight of parameters taken from reference paper Pathak and Banerjee.

Station wise WQI Calculation.

#### SONABARIGHAT

Parameter	Weights	Relative weights	Standards	Mean concentration	Quality ratings(Si)	Sub index level(SILi)	WQI
Residual Cl	1	0.051722354	0.2	0	0	0	53.32
EC	3.667	0.189665874	500	85	17	3.224319851	
Ph	3	0.155167063	6.5	9	138.4615385	21.48467029	
hardness	1	0.051722354	300	35	11.66666667	0.603427468	
chloride	3.667	0.189665874	250	10	4	0.758663494	
TDS	4.334	0.224164684	500	54	10.8	2.420978587	
DO	2.667	0.137943519	5	9	180	24.82983345	



KANAKPUR							
Parameter	Weights	Relative weights	Standards	Mean concentration	Quality ratings(Si)	Sub index level(SILi)	WQI
Residual Cl	1	0.051722354	0.2	0.1	50	2.58611772	55.35
EC	3.667	0.189665874	500	77	15.4	2.920854453	
Ph	3	0.155167063	6.5	8.8	135.3846154	21.00723317	
hardness	1	0.051722354	300	42	14	0.724112962	
chloride	3.667	0.189665874	250	50	20	3.793317472	
TDS	4.334	0.224164684	500	50	10	2.24164684	
DO	2.667	0.137943519	5	8	160	22.07096307	

BADRIGHAT							
Parameter	Weights	Relative weights	Standards	Mean concentration	Quality ratings(Si)	Sub index level(SILi)	WQI
Residual Cl	1	0.051722354	0.2	0	0	0	50.67
EC	3.667	0.189665874	500	94	18.8	3.565718424	
Ph	3	0.155167063	6.5	8.4	129.2307692	20.05235894	
hardness	1	0.051722354	300	44	14.66666667	0.758594531	
chloride	3.667	0.189665874	250	20	8	1.517326989	
TDS	4.334	0.224164684	500	61	12.2	2.734809145	
DO	2.667	0.137943519	5	8	160	22.07096307	

SADARGHAT							
Parameter	Weights	Relative weights	Standards	Mean concentration	Quality ratings(Si)	Sub index level(SILi)	WQI
Residual Cl	1	0.051722354	0.2	0.35	175	9.05141202	57.001
EC	3.667	0.189665874	500	104.5	20.9	3.964016758	
Ph	3	0.155167063	6.5	6.65	102.3076923	15.87478416	
hardness	1	0.051722354	300	53.65	17.88333333	0.924968105	
chloride	3.667	0.189665874	250	24	9.6	1.820792386	
TDS	4.334	0.224164684	500	67.5	13.5	3.026223234	
DO	2.667	0.137943519	5	8.1	162	22.34685011	

KARATIGRAM RONGPUR							
Parameter	Weights	Relative weights	Standards	Mean concentration	Quality ratings(Si)	Sub index level(SILi)	WQI
Residual Cl	1	0.051722354	0.2	0.04	20	1.034447088	51.15815091
EC	3.667	0.189665874	500	103.5	20.7	3.926083583	
Ph	3	0.155167063	6.5	6.09	93.69230769	14.53796023	
hardness	1	0.051722354	300	49.1	16.36666667	0.846522534	
chloride	3.667	0.189665874	250	32	12.8	2.427723182	
TDS	4.334	0.224164684	500	67	13.4	3.003806765	
DO	2.667	0.137943519	5	9.2	184	25.38160753	

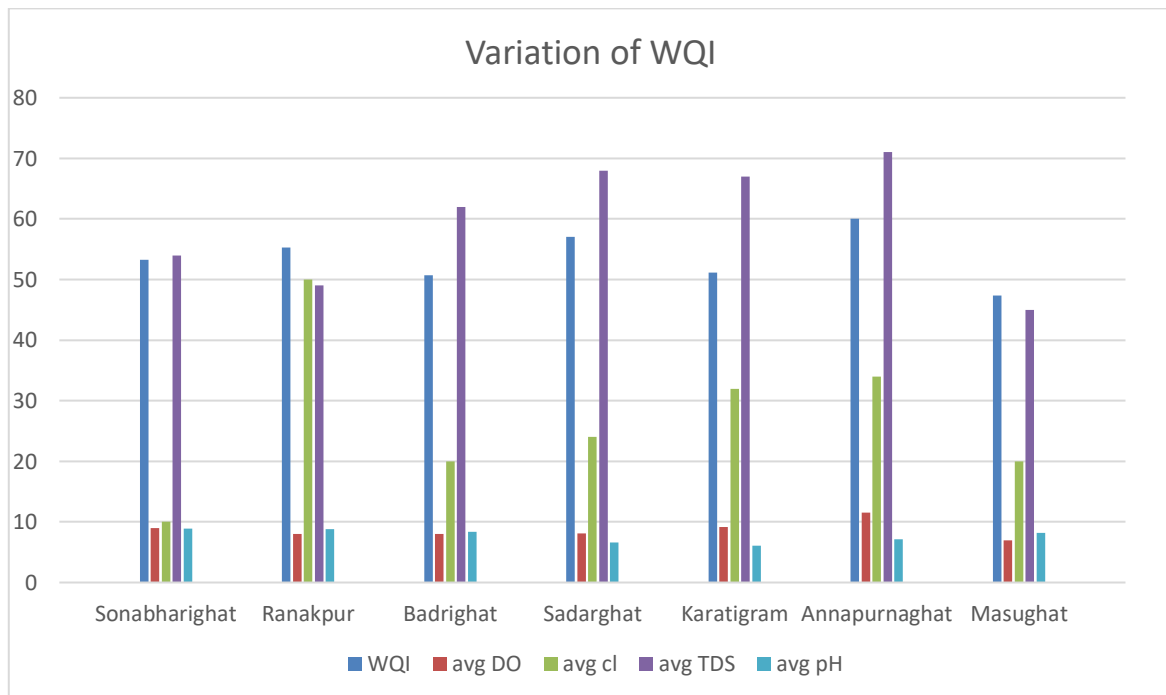


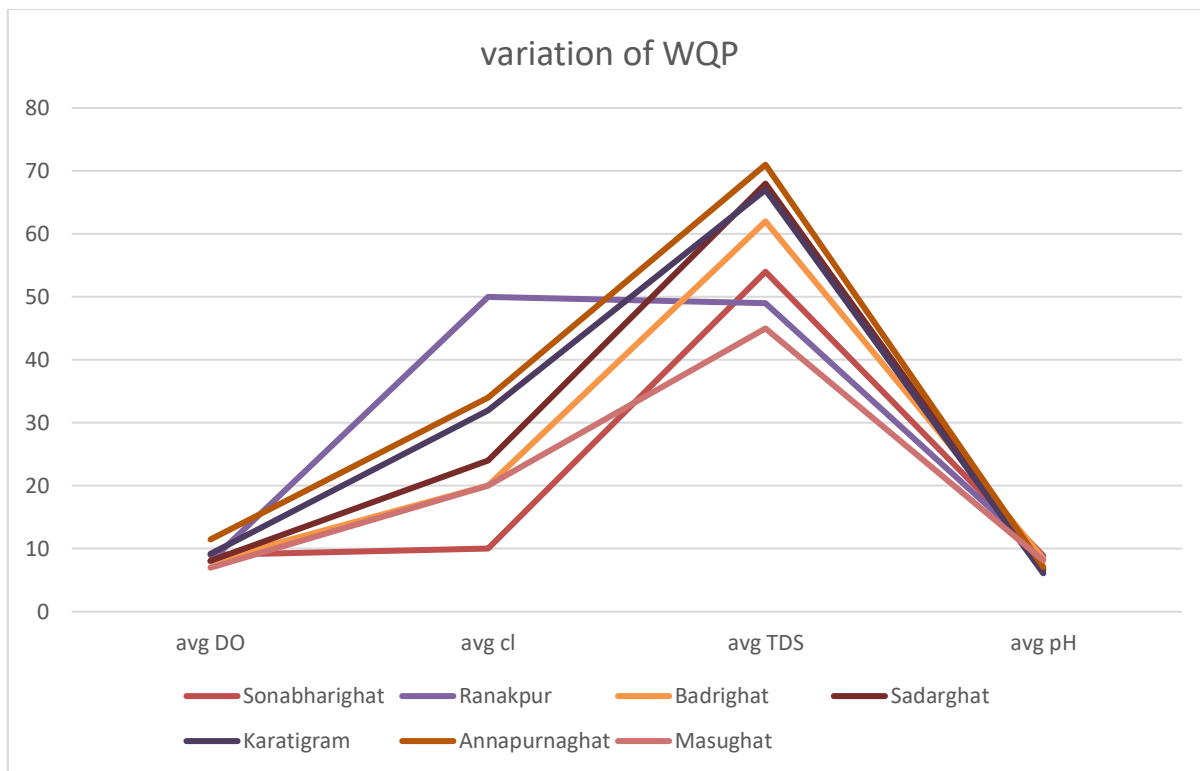
**ANNAPURNAGHAT**

Parameter	Weights	Relative weights	Standards	Mean Concentration	Quality ratings(Si)	Sub index level(SILi)	WQI
Cl	1	0.051722354	0.2	0.01	5	0.258611772	59.47
EC	3.667	0.189665874	500	105.8	21.16	4.013329885	
Ph	3	0.155167063	6.5	7.1	109.2307692	16.94901767	
hardness	1	0.051722354	300	44.7	14.9	0.770663081	
chloride	3.667	0.189665874	250	34	13.6	2.579455881	
TDS	4.334	0.224164684	500	70.9	14.18	3.178655219	
DO	2.667	0.137943519	5	11.5	230	31.72700941	

**MASUGHAT**

Parameter	Weights	Relative weights	Standards	Mean Concentration	Quality ratings(Si)	Sub index level(SILi)	WQI
Residual Cl	1	0.051722354	0.2	0	0	0	47.35
EC	3.667	0.189665874	500	91	18.2	3.451918899	
Ph	3	0.155167063	6.5	8.2	126.1538462	19.57492182	
hardness	1	0.051722354	300	48	16	0.82755767	
chloride	3.667	0.189665874	250	20	8	1.517326989	
TDS	4.334	0.224164684	500	59	11.8	2.645143271	
DO	2.667	0.137943519	5	7	140	19.31209269	





## 7. SUGGESTION

The river is not much polluted but sediment flow is much and due to turbidity the water cannot be used directly for drinking purposes without primary conventional treatment.

## 8. CONCLUSION

From the study it is observed that stations Karatigram and Sonabarighat showed excellent water quality and all other stations Kanakpur, Badrighat, Sadarghat, Annapurnaghat and Machughat showed good water quality index.

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## DEVELOP A TOMATO IRRIGATION SCHEDULE

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### ABSTRACT

*Under greenhouse conditions, tomato plants were irrigated using drippers based on FAO's CropWAT program [1]. The effect of soil salinity, dug and un-dug indicator, seedling placement scheme, light duration and temperature on the productivity and water consumption of tomato plants was studied.*

**KEYWORDS:** *Irrigation schedule, excavated greenhouse, soil salinity, density of seedlings.*

### INTRODUCTION

One of the important issues in the steady growth of the population of the Republic of Uzbekistan, ensuring food security and increasing the country's export potential is the development of greenhouses[2,3]. The role of greenhouses in meeting the demand for vegetable products in rural areas, even in the cold winter days, and in the production of quality tomato plants for consumption, which are low in heavy metals, nitrates and other harmful substances is a comparison.

### MATERIALS AND METHODS

The studies were conducted in a greenhouse and laboratory setting. In particular, the Uzbek Institute for Vegetable, Melon and Potato Research (ITI), Irrigation and Water Problems (ITI), statistical analysis was performed using MathCAD and Microsoft Yessel programs to study the impact of greenhouse indicators on productivity. Irrigation regime for greenhouse conditions was developed using CropWAT 7.0 program[1,6,8].

### RESULTS AND DISCUSSION

With a soil salinity of 4 ds / m, the plant was required to provide more water. As a result of irrigation water, the salts in the soil gradually fell to the lower layers. In greenhouses under excavated conditions, less evaporation was observed than in non-excavated conditions, which in turn reflects the plant's demand for water. Irrigation water supplied to the tomato plant under excavated conditions was used 180-220 m<sup>3</sup> less than under non-excavated conditions.

Month	Min Temp	Max Temp	Humidity	Wind	Sun	Rain	ETo
January	11.1	16.1	75	17	23	159	116
February	13.1	18.1	74	20	26	164	120
March	15.1	21.7	70	16.6	4.2	124	213
April	19.1	23.5	60	10.6	6.9	106	262
May	23.1	31.1	56	14.7	6.8	25.4	427
June	24.1	31.7	50	14.7	11.1	21.1	470
July	24.1	31.1	52	17.2	11.5	21.2	457
August	14.1	25.4	59	16.4	10.3	22.7	350
September	12.1	21.7	65	10.5	10.7	150	410
October	13.1	18.1	75	20	10	125	108
November	13.1	18.1	85	10	4.7	10	100
December	13.1	18.1	77	10	10	10	100
Average	18.7	24.8	65	10	7.8	111.8	328

Figure 3.1.1. Climate Index (CropWAT)

Month	Rain	ETo (mm)
January	0.0	0.0
February	0.0	0.0
March	0.0	0.0
April	0.0	0.0
May	0.0	0.0
June	0.0	0.0
July	0.0	0.0
August	0.0	0.0
September	0.0	0.0
October	0.0	0.0
November	0.0	0.0
December	0.0	0.0
Total	0.0	0.0

Figure 3.1.2. precipitation (CropWAT)

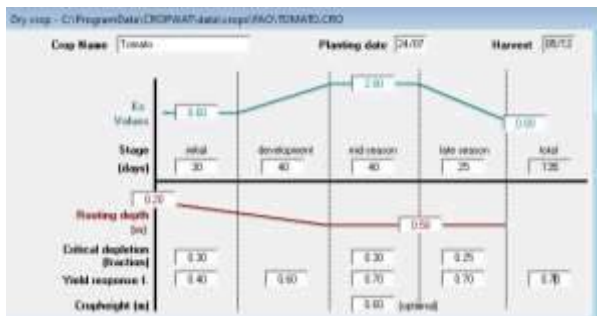


Figure 3.1.3. Development (CropWAT) Figure



3.1.4. Soil structure (CropWAT)



Figure 3.1.5. Water Demand (CropWAT)

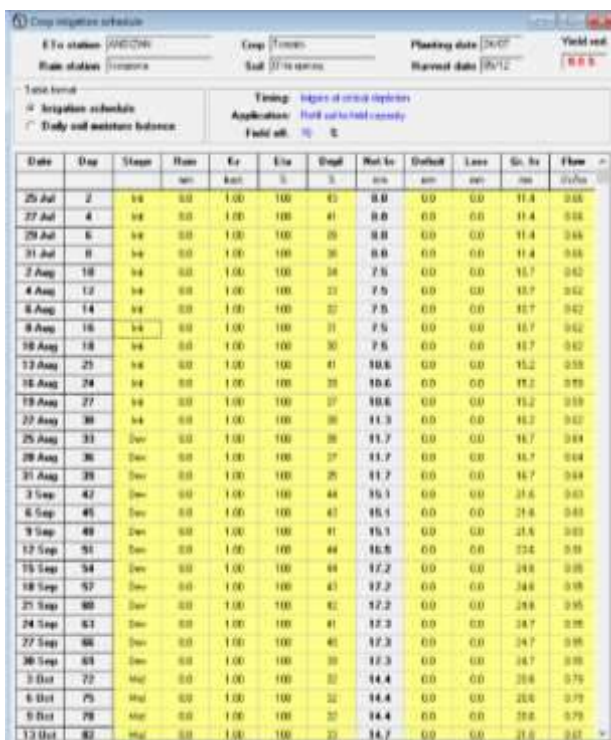
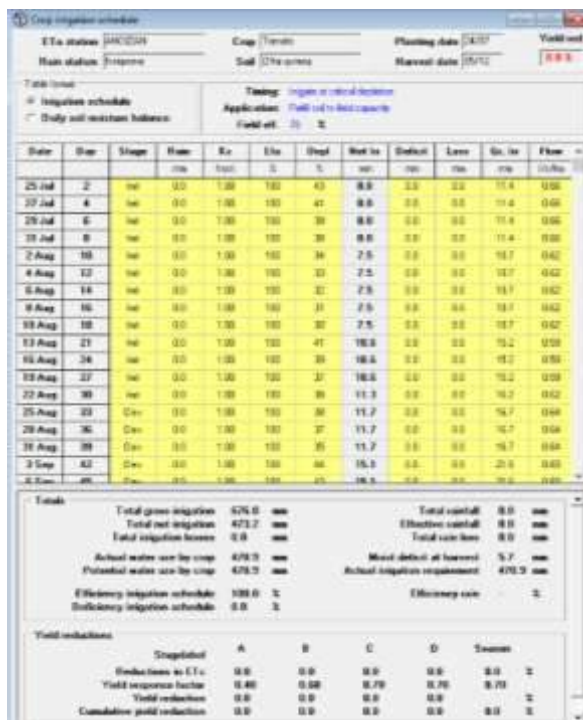
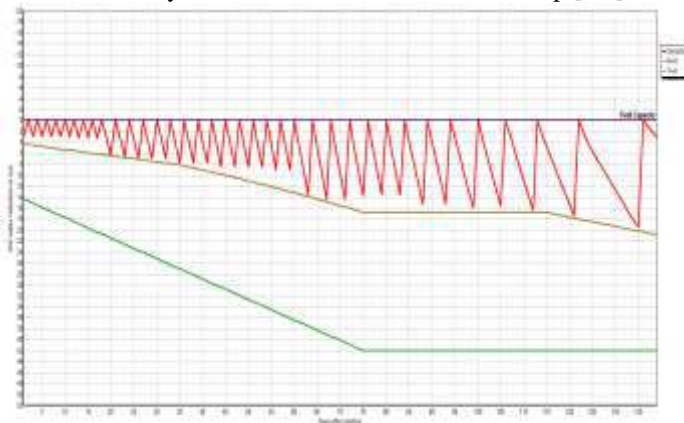


Figure 3.1.7. Crop irrigation schedule CropWAT



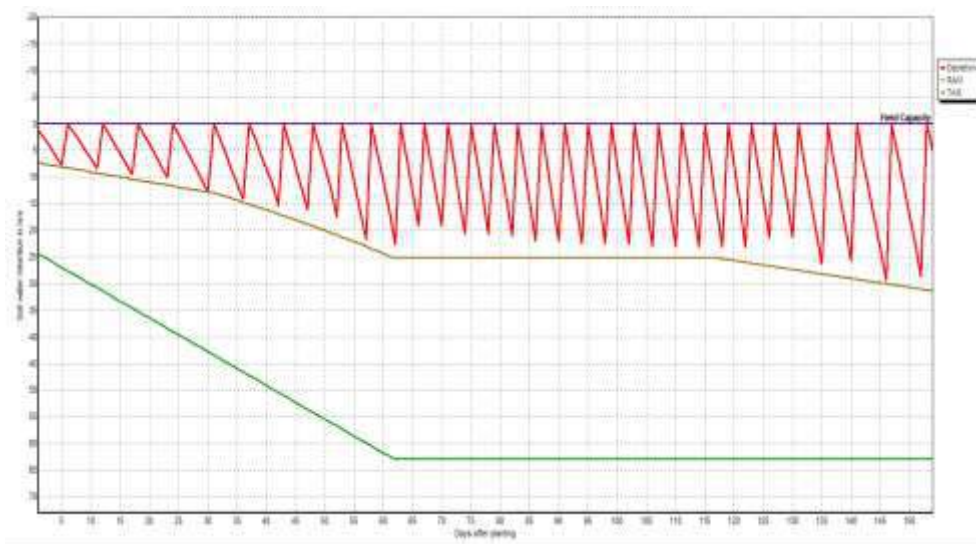
Irrigation of tomato plants in the initial (pre-flowering), development (flowering period), middle (harvesting), and late (ripening) phases was carried out in accordance with the CropWAT program. In the initial (pre-flowering) period, the topsoil was kept moist for 25 days. During the development (flowering) period, moisture in the 0.40 m layer was provided by watering every 3-5 days for 35 days. Irrigated for 35 days during the medium (harvest) period. During the last (harvest) period, 0.4-0.5 m of soil layer was

provided with moisture and irrigated for 8-12 days to cook and harvest the entire crop [4,5].



**Figure 3.1.8. Irrigation regime of tomato plants in uncultivated conditions (2018-2019 yy.)**

Under excavated conditions, in the initial phase, the top 0-0.2 m layer of soil is provided with moisture every 3-5 days for 25 days, while in the development phase, the 0.4 m layer is provided with moisture for 35 days. irrigated. In the middle (harvest) phase, it was watered every 4-5 days to provide 0.4 m of moisture. In the final (ripening) phase, the crop was irrigated for 6-8 days to cook and harvest everything. The FAO method was used to develop the irrigation scheme [7].



**Figure 3.1.9. Irrigation regime of tomato plants under excavated conditions (2018-2019 yy.)**

The dynamics of moisture change during the improvement process were determined based on the formulas described in Section 3.1. The dynamics of root development of tomato plants was determined in accordance with Chapter 3[5].

Soil moisture was determined using the following formulas:

3 points (0.2h, 0.6h and 0.8h):

$$W_{\check{y}P} = \frac{W_{0,2h} + 2W_{0,6h} + W_{0,8h}}{3}; \tag{3.1.1}$$

5 points (0,07h, 0,2h, 0,6h, 0,8h va 0,93h):

$$W_{\check{y}P} = \frac{W_{0,07h} + 3W_{0,2h} + 3W_{0,6h} + 2W_{0,8h} + W_{0,93h}}{5}; \tag{3.1.2}$$

In this case;  $W_i - W_i$  is the moisture in the layer.

**Conclusion:** Based on the CropWAT program of FAO, the production capacity is 0.75-1 m. Seasonal irrigation does not decrease from 4500-5000 m<sup>3</sup>/ha to 3500-4000 m<sup>3</sup>/ha. 4510-5012 m<sup>3</sup>/ha of water was consumed in the traditional method, while 3510-4015 m<sup>3</sup>/ha of water was consumed as a result of fractional production. Irrigation water was saved by 20-22%.

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# ASSESSMENT ON THE OPERATIONS OF SINILOAN WATER DISTRICT'S DIVISIONS: BASIS FOR THE PROPOSED REENGINEERING AND RATIONALIZATION OF SINILOAN WATER DISTRICT

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## ABSTRACT

*This study aimed to evaluate and assess the current state and conditions of the operational and administrative processes in the administrative and finance, commercial services, and engineering operations divisions of Siniloan Water District (SIWADI), and to determine if the status would be improved if the characteristics of a good process are exhibited by the processes in the three divisions mentioned. Analysis revealed that there are processes in all of the three divisions that can be greatly improved in terms of their robustness, cost-efficiency, being controlled and error-proofed, and being communicated, by adopting computerization, as most of them are still being executed manually. Although adopting the cloud computing technology is not rational at this time due to its expensive price because of the current business settings and market environment of the area of operations of Siniloan Water District (SIWADI), clearly define and document standard operating procedures (SOPs) for all critical processes. This ensures consistency and reduces the chances of errors caused by ambiguity or misinterpretation. Create a flowchart for all of the processes within the agency. By mapping out the steps involved in each process and visualizing them in a flowchart. It is recommended that all stakeholders be involved in the process to ensure accuracy and to receive feedback that could significantly benefit the agency and streamline the operations. Additionally, the agency should subscribe to cloud computing when it has become available at an affordable price.*

**KEYWORDS:** *Assessment of operations, Reengineering, Business Process Improvement*

## INTRODUCTION

Presidential Decree No. 198, also known as the “Provincial Water Utilities Act of 1973” declared by then President Marcos Sr., is the National Policy that favors and authorizes the local control of operation of a water system through the establishment and administration of water districts particularly to advance the water utility services in each locality. It was later amended by Presidential Decree No. 768, No. 1479, and Republic Act 9286.

Although Siniloan Water District (SIWADI) started without functioning infrastructure, offices, and employees after it was turned over to the Municipal Government of Siniloan by the National Waterworks and Sewerage Authority as a failed water supply system, it was able to establish itself as a water district through the Sangguniang Bayan Resolution (No. 19) in January of 1989. The management was then able to improve and expand its operations over the years by implementing Interim Improvement Project (IIP) through the assistance of the Local Water Utilities Administration (LWUA).

After decades of operation, SIWADI is have served thousands of concessionaires from over 200 service connections since 1989. The water district now also owns its office and no longer renting. Came with this improvement and expansion are processes that, as stated by Grint and Willcocks (2007), are successful during the past operations of the business, but may no longer suitable to the current times.

The primary purpose of this study is to assess the operational and administrative processes of the three (3) divisions of SIWADI. The processes were evaluated to determine if they are simple, robust, documented, controlled, communicated, and error-proofed. According to Piatt (2012), these characteristics constitute a desirable process. Afterwards, the evaluation will then form part of the proposal for reengineering and rationalization of SIWADI



## MATERIALS AND METHODS

This research was conducted based on the Business Process Improvement (BPI) methodologies. These are management approach that enabled the researcher to analyze and identify parts of the processes that can be improved or removed to streamline the operations and enhance the overall operational performance of Siniloan Water District (SiWaDi).

The Business Process Management (BPM) methodology was employed by the researcher. This type of process improvement methodology helped the researcher analyze the current operations of Siniloan Water District and identified processes that are causing delays or inefficiencies in, or that can be improved to enhance the overall business performance (Laoyan, 2021) of SIWADI.

Each process was evaluated based on any or all of the following eight characteristics: simple; robust; documented; controlled; communicated; error-proofed, that defines a good process (Piatt, 2012), cost-efficient, and customer-centric.

The evaluation conducted was particular to the following processes:

1. Administrative and Finance:
  - 1.1 Issuance of Service Connection Materials
  - 1.2 Request for Employee Records
  - 1.3 Application for Leave of Absence
  - 1.4 Request for Monetization of Leave Credits
  - 1.5 Disbursements
  - 1.6 Request to Cash Advance from Petty Cash Fund
  - 1.7 Reimbursement of Expenses from Petty Cash Fund
  - 1.8 Purchase Request for Goods (Items, Supplies and Materials) Through Public Bidding
  - 1.9 Purchase Request for Goods (Items, Supplies and Materials) Through Open Canvass
  - 1.10 Request and Issuance of Inventory Items
2. Commercial Services:
  - 2.1 Paying Off Water Bill and Connection Arrears
  - 2.2 Paying Off Water Bill and Connection to GCash
  - 2.3 Request for Change of Account Name
  - 2.4 Applying for Senior Citizen (Sc) Discount
3. Engineering and Operations:
  - 3.1 Applying for New Service Connection
  - 3.2 Applying for Service Reconnection
  - 3.3 Request for Repair
  - 3.4 Request for Transfer of Service Line and Water Meter

## RESULTS AND DISCUSSIONS

### Process Status

**Table 1. Summary of Status**

Division	Process									
	A	B	C	D	E	F	G	H	I	J
Administrative & Finance	3.31	3.60	3.63	3.23	3.11	3.31	3.37	3.20	3.34	3.06
Commercial Services	4.40	3.74	4.37	4.66	-	-	-	-	-	-
Engineering & Operations	3.50	3.57	3.61	3.89	-	-	-	-	-	-

The Administrative and Finance Process A (“Issuance of Service Connection Materials”) process’ status achieved an overall mean of 3.31 which means “Neither agree nor disagree”. Based on the data, the areas that can be improved on are in the updating of records in real-time, and the reduction of the execution time. Adopting computerization and similar technology will greatly improve these aspects of the process and will significantly reduce the execution time of the process (Rivers, 2014; Munday, 2019).

Process B or the Request for Employee Records of the Administrative and Finance division had an overall process mean of 3.60, “Agree”. This indicates that the respondents agreed that in general, the process is good. However, based on the data, the execution



time of the process needs to be improved as this aspect received low ratings from the respondents. Adopting the use of technology will make this process much better in terms of efficiency (BEM, 216; Indeed, 2021).

The Administrative and Finance Process A (“Request for Leave of Absence”) has an overall process mean of 3.63 which also means “Agree”. Although this indicates that the respondents agreed that in general, the process displays the characteristics of a good process, the data show that the execution time of this process is somewhat too long and must be improved. In view of this, and based on the response from the respondents, automation through computerization will enhance the recordkeeping aspect of this process, and significantly reduce its execution time. Longer execution time causes additional time and cost to the company, so it must be improved in terms of cost-efficiency (Saunders, 2016; Kiisel, 2016).

The Administrative and Finance Process D (“Request for Monetization of Leave of Credits”) on the other hand, had an overall process mean of 3.23, which was equivalent to “Neither/Nor Agree”. The data show there are several aspects of this process that can be improved to elevate its status. The main step that can be taken is computerization. This process is not automated based on the answers of the respondents. Utilizing the use of computers and making the system automated will help in the full utilization of employees since the number of employees that will be required to execute or perform this process will be reduced significantly. Records will be able to be updated real-time, and the execution time will be reduced to minimum (Breedon & Howe, 2019; Saunders, 2016).

The Administrative and Finance Process E or Disbursements, also had an interpretation of “Neither/Nor Agree” for its overall process mean of 3.11. The data show this process has a very short execution time. The areas for improvement are in process automation since this process is not automated, updating of records in real-time, and clarity on the level of who are needed to be involved in this process as the responses from the respondents suggest these aspects are not clear. As can be seen from the data, computerization of the disbursement process will increase the accuracy or the process (Rivers, 2014; Munday, 2019).

Similarly, Process F (“Request Cash Advance from Petty Cash Funds”) of the Administrative and Finance division achieved an overall process mean of 3.31 equivalent to “Neither/Nor Agree”. There are also several areas of this process that can be improved to elevate its status. As with the previous processes, automation through computerization will result to significant improvement in the process. Accuracy of the calculation and recordkeeping are two of the important aspects that will benefit, the number of employees and other resources will be greatly reduced when a computerized system is adopted (Rivers, 2014; Munday, 2019).

The Administrative and Finance Process G or the “Reimbursement of Expenses from Petty Cash Funds” process, had achieved an overall process mean of 3.37 which means “Neither/Nor Agree”. The data showed that this process is taking longer time to be processed. The respondents also indicated that this process is not automated. Again, computerization will improve the process’ record keeping and execution time significantly. These are the areas that will elevate the status of this process when improved (Indeed, 2022; York, 2022).

The Administrative and Finance Process H or the “Requests for Goods (Items, Supplies, Materials) Through Public Bidding” process also achieved an interpretation of “Neither/Nor Agree” for its overall process mean of 3.20. The aspects that can be improved to elevate the status of this process are process automation, the number of employees needed to execute this process, and the creation and dissemination of the process flow chart to make employees aware of the steps required to perform this process. Computerization will greatly improve these aspects. Since the company has an existing website, it can be utilized in the conduct of public bidding, electronic bidding makes it secure, accurate, and fast (Industrial Trainer, n.d.; Anderson & Vreeland, 2013).

Process I or the “Purchase Requests for Goods (Items, Supplies, Materials) Through Open Canvass” process of the Administrative and Finance division also achieved an interpretation of “Neither/Nor Agree” for its overall process mean of 3.34. It is very apparent based on the data gathered from the respondents’ answers that computerization is a very important factor I the improvement of this and other processes. The number of employees to execute this process is part of the aspects that can be improved. If the process is computerized, it will be partially or fully automated and information about the process can be easily accessible to any employee that may be required to execute this process (Tallyfy, n.d.; Brinto, 2020).

The Administrative and Finance Process J (“Request for Issuance of Inventory Items”) also has an interpretation of “Neither/Nor Agree” for its overall process mean of 3.06. The data revealed there are several areas that must be improved to elevate the status of this process. The primary area that must be worked on is automation. Computerizing this process will provide the authorized personnel easy access to related information and records pertaining to this process. An existing inventory management system may be adopted to significantly improve this process (Gaines, 2020; Were, 2021).

Process A or the “Paying of Water Bill and Connection Arrears” process of the Commercial Services division had an overall process mean 4.40 which was equivalent to “Strongly Agree”. The data gathered indicate that this process displays the characteristics of a good process. This process does not improvement at the moment, although enhancement to the existing system will still result to a more efficient process (D’Heur, 2018; Munday, 2019).

The Commercial Services Process B (“Paying of Water Bill and Connection Arrears to GCash”) on the other hand achieved an overall process mean of 3.74 that had an interpretation of “Agree”. One area for improvement in this process is in updating the records



since in real-time since the payments are received from third party (GCash). Improvement on the execution time is also beneficial for the elevation of the status of this process (Schiesser, 2012; Riant Data, 2021).

The Commercial Services Process C or the “Request for Change of Account Name” process had an overall process mean of 4.37 equivalent to “Strongly Agree”. In view of this process, the data show that this process is good, except for a low mean (3.60) for the statement about automation. This process can be automated through computerization (Rivers, 2014; Munday, 2019).

Commercial services Process D (“Application for Senior Citizen Discount”) achieved an overall process mean of 4.66 which has an interpretation of “Strongly Agree”. Based on the data gathered, the aspect that can be improved is the execution time since the respondents agree that the execution time of this process is long (Rivers, 2014; Munday, 2019).

Process A or the Applying for New Service Connection process of the Engineering and Operations division achieved an overall process mean of 3.50 which is equivalent to “Agree”. Data of the findings indicate the areas of updating records in real-time, process automation, and the number of employees required to perform this process, as the areas where improvement can be beneficial to the overall status of the process (Indeed, 2021; BEM, 2016).

Engineering and Operations Process B (“Applying for Service Reconnection”) has an overall process mean of 3.57 which also means “Agree”. Similar to the previous process, some areas can be improved to elevate the status of this process. The particular areas that can be improved are real-time updating of records, number of employees required for execution, and in automation (Kiisel, 2016; Talbert, 2020; Porteous, 2019).

Engineering and Operations Process C or the “Request for Repair” process has an overall process mean of 3.61, also means “Agree”. Process automation is an area where improvement can be made that will significantly help the process. Making the records digitized will enable them to be maintained properly and for a longer period of time (Boyle, 2020; Spratling, n.d.).

Engineering and Operations Process D or the “Request for Transfer of Service Line and Water Meter” process with an overall process mean of 3.89 also means “Agree”. The overall mean and the mean of each statement show that the status of the process is currently good (Donaldson, 2022; Piatt, 2012).

**Table 2. Summary of Process (Administrative and Finance Division)**

*Summary of Process Characteristics for Admin & Finance Division*

Process	Characteristic							
	Simplicity	Cost-Efficiency	Customer-centricness	Robustness	Documentation	Control	Communication	Error-proof
A	3.47	4.00	4.00	3.27	2.80	3.67	3.20	2.67
B	3.47	3.07	-	3.20	3.07	3.60	3.27	3.40
C	3.53	2.47	-	1.87	2.53	4.00	3.33	2.90
D	3.20	2.33	-	1.87	3.53	3.87	3.50	2.53
E	3.47	3.33	-	3.60	3.47	3.53	3.20	3.20
F	4.00	3.33	--	2.93	3.60	3.60	3.80	3.47
G	4.00	3.33	-	3.53	3.73	3.20	3.20	3.20
H	3.87	4.13	-	2.93	3.60	3.33	3.00	3.60
I	3.67	2.53	-	3.20	3.87	3.73	2.80	3.33
J	3.47	3.20	-	2.40	3.67	3.60	3.80	3.40

Among the processes in the administrative and finance division, only processes B & C (Request for Employee Records and Request for Leave of Absence) got the mean value interpretation of “Agree”, indicating that the rest of the ten processes have the most improvements needed to elevate the level of their status to being good, as not all of the characteristics of a good process are exhibited fully. The primary areas that can be improved are process execution (which is mostly manual), process execution time, and the number of manpower required to execute the process; this is because based on the answers of the respondents, the number of employees in executing certain processes is uncertain.





Simplicity, control, and customer-centricity are the primary characteristics exhibited by the processes in this division in terms of status. These processes require improvements in order for the other characteristics to be exhibited fully.

**Table 4. Summary of Process (Commercial Services Division)**  
*Summary of Process Characteristics for Commercial Services Division*

Process	Characteristic							
	Simplicity	Cost-Efficiency	Customer-centeredness	Robustness	Documentation	Control	Communication	Error-proof
A	4.73	4.00	4.70	4.67	5.00	3.87	4.80	4.20
B	4.00	3.67	3.95	4.60	4.60	4.47	4.13	3.93
C	4.60	4.60	4.65	3.60	4.60	3.93	4.67	3.80
D	4.53	4.50	0.00	3.87	4.73	4.47	4.80	4.80

The findings that the only process that requires improvement to elevate the status of the processes in the commercial services division is “Paying of Water Bill and Connection Arrears to GCash”. This is in the area of execution time, which is somehow taking longer period of time since the payment pass through a third party that SIWADI does not have control over the system. Although the rest of the processes have achieved higher mean values, there are still areas or aspects that can be improved particularly the mode of process execution since some, if not most, of the processes are performed manually and can be improved by computerization.

Based on the data gathered from the answers of the respondents, all of the processes in this division exhibit the characteristics of a good process, as each of the characteristic achieved a mean value interpretation of “Agree”. This is because most, if not all, of the processes are partially or fully computerized

**Table 5. Summary of Process (Engineering & Operations Division)**  
*Summary of Process Characteristics for Engineering and Operations Division*

Process	Characteristic							
	Simplicity	Cost-Efficiency	Customer-centricity	Robustness	Documentation	Control	Communication	Error-proof
A	3.75	3.92	3.88	3.58	3.83	3.75	4.00	3.92
B	3.58	4.08	4.19	4.00	4.08	3.92	4.33	4.00
C	4.00	4.08	4.13	4.13	4.08	3.75	4.08	4.08
D	3.75	3.94	4.38	3.92	4.08	4.08	4.25	4.00

The data showed that although all of the divisions’ processes achieved a mean value of more than 3.40 (the minimum value to achieve a value interpretation of “Agree”), all of them require improvements in one or a couple of areas, and like in the other divisions, the aspects of improvement are in computerization and execution time.

Similar to the commercial services division, the processes of engineering & operations divisions are also exhibiting the characteristics of a good process, as they also achieved a mean value interpretation of “Agree” indicating that most, if not all of the processes are also computerized.



**Table 6. Correlation of Process Characteristics with Status**

Characteristic	R	P	Strength of correlation
Simplicity	.57	<.001	Moderate
Cost-efficiency	.60	<.001	Moderate
Customer-centricity	.62	<.001	Moderate
Robustness	.50	<.001	Moderate
Documentation	.71	<.001	High
Controlled	.62	<.001	Moderate
Communicated	.76	<.001	High
Error-proofness	.65	<.001	Moderate

*Note. No assumption violation of bivariate normality was found, Pearson r was used. Rows were extracted from the different processes of every division.*

All the correlation coefficients are statistically significant at 05 level of significance. Also, all correlation coefficients are positive implying that as each level of process characteristic increases (the process is exhibited), there is an improvement in the status of the process.

The simplicity of the process is moderately correlated with its status and this correlation is statistically significant,  $r=.57$ ,  $p<.001$ . The cost-efficiency of the process is moderately correlated with its status and this correlation is statistically significant,  $r=.60$ ,  $p<.001$ . The customer-centricity of the process is moderately correlated with its status and this correlation is statistically significant,  $r=.62$ ,  $p<.001$ . The robustness of the process is moderately correlated with its status and this correlation is statistically significant,  $r=.50$ ,  $p<.001$ . The documentation of the process is highly correlated with its status and this correlation is statistically significant,  $r=.71$ ,  $p<.001$ . The process being controlled is moderately correlated with its status and this correlation is statistically significant,  $r=.62$ ,  $p<.001$ . The process being communicated is highly correlated with its status and this correlation is statistically significant,  $r=.76$ ,  $p<.001$ . The process being error-proofed is moderately correlated with its status and this correlation is statistically significant,  $r=.65$ ,  $p<.001$ .

After all these findings, it can be clearly inferred that improving the processes to exhibit the characteristics of a good process will elevate the status of the processes in each of the administrative and finance, commercial services, and the operations and engineering divisions. Conversely, improving the status will improve the characteristics of the processes.

## CONCLUSIONS

It can be concluded that the current administrative and operational processes of the three divisions of Siniloan Water District (SIWADI) have not yet adapted fully to the use of technological tools available to businesses today, as many of the said processes are still performed manually.

It was also shown that computerization of most of the processes will highly enhance the company's operations. Cloud computing is the best solution to add robustness to the operation, while automation will ensure proper and safe record keeping of the processes' information and will keep the system running smoothly 24/7.

It can be concluded that as each level of process characteristic increases, the status of the process improves. This suggests that the process characteristics are important factors that contribute to the overall performance of the process.

## RECOMMENDATIONS

Siniloan Water District has already received proposals for adapting to the cloud computing technology. However, the expense-to-benefit ratio of the proposal showed that the expense will outweigh the benefits at this time since this technology is still expensive in this area as there is not much competition among providers of similar services, and because most of the businesses in Siniloan have not adapted yet to the said technology. These reasons therefore make it irrational to adapt to such technology given the current business settings and market situation in SIWADI's area of operation.

Thus, it is recommended:

1. That SIWADI may consider using email as a primary mode of communication. Email offers a number of benefits, including speed, efficiency, and the ability to document and track communication. Additionally, email can be accessed remotely, making it a useful tool for remote work or distributed teams. The use of email in work has been shown to increase productivity, reduce misunderstandings, and facilitate collaboration. Therefore, SIWADI can provide training to employees on how to effectively use email as a communication tool, and establish guidelines on when email is appropriate to use.



2. That administrative can connect all their computers to a local network (LAN) that will interconnect the divisions with specific privileges for each access, thereby making the transfer of documents instantaneous, secure, and without human intervention. Removing human intervention as much as possible will reduce or totally avoid the possibility of tampering.
3. For operations that require real-time updates, a simple program may be developed with a sole purpose of sending reports to a particular mobile number through the use of an inexpensive DATA SIM Card and mobile device that can be easily carried by hand. This is particularly useful in disconnection operations so the list of accounts for disconnection is always updated.
4. The office's operations maybe benchmarked against industry best practices and comparable organizations. They have to identify the areas where they may be falling behind and then implement relevant strategies to improve cost efficiency. Networking with peers and participating in industry forums can provide valuable insights and ideas.
5. That the standard operating procedures (SOPs) for all critical processes be clearly defined and documented. This ensures consistency and reduces the chances of errors caused by ambiguity or misinterpretation. A flowchart for all of the processes within the agency should be created and the steps involved in each process and should be mapped out in the flowchart. It is recommended that all stakeholders be involved in the process to ensure accuracy and to receive feedback that could significantly benefit the agency and streamline the operations.
6. Afterwards, training or lectures should be made for implementation and dissemination of the procedures and flow of the process to create much communicated processes.
7. Consider engaging external consultants or experts with experience in process optimization and simplification within the water industry. They can provide fresh perspectives and valuable insights to identify areas of improvement and recommend specific strategies to simplify complex processes.

The foregoing are initial recommendations. It is possible that if adopted, better ways of improvement will show up and prices may become cheaper in the future. It is therefore advised to expect such occurrence and adapt accordingly.

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# THE PUBLIC EMPLOYMENT SERVICE OFFICE (PESO) IN THE CITY OF BIÑAN: AN ASSESSMENT

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## ABSTRACT

*This paper entitled: The Public Employment Service Office (PESO) in the City of Biñan: An Assessment aimed in evaluating the services offered by PESO of City of Biñan that helps in curving the employment in their locality. This study is participated by two hundred twenty (220) respondents both the officials or the PESO Personnel of City of Biñan and clients as for self-made questionnaires was provided to them. By utilizing a descriptive correlational method and quantitative approach in analyzing the data the researcher proved that services offered by PESO of Biñan as to their referral and placement, labor market information, employment coaching and counseling, and job fair program are all significant to the respondents. The following findings were drawn: as to the profile of the respondents, majority were coming from ages 18 – 25 years old, female, high school graduate and single by civil status. With regard to the services offered by PESO Binan, majority of the respondents were interpreted as “highly evident”. As to the level of satisfaction, majority were respondents with “satisfied” rating. As to the level of services efficiency, all indicators was noted to have an “efficient” interpretation. With regard to the level of efficiency, “highly evident” was noted as assessed by the majority of respondents. No significant difference was noted between the level of service efficiency and the efficacy of officials. Thus, hypothesis 1 was accepted. Significant difference was noted on the clients’ level of satisfaction towards the services offered by PESO City of Binan when group according to profile. Thus, the hypothesis 2 was rejected. Lastly, significant relationship was noted between the services offered by PESO City of Binan and the level of service efficiency hereby rejecting the null hypothesis.*

## INTRODUCTION

Employment rate in a certain locale remains to be a perennial challenge to any local government. Despite of greater job opportunities offer to a wider market an access to those job opportunities for job placement remains low for most of the people. In the report of Philippine Statistic Authority published last August 8, 2002, the country’s rate of employment on the month of June year 2022 and May of the same year was similar as it took 94.0 percent for 2 consecutive months as it depleted from April which was higher to 92.3 percent. Overviewing the report also provided data for Labor force participation rate (LFPR). This implied that in June 2022 that 49.58 million Filipinos were either employed or unemployed as it yielded 64.8 percent. In comparison to the same period of year 2021 at 65.1 percent was interpreted lower. On June of 2022 the LFPR was higher than January (60.5%), February (63.8%), April (63.4%), May (64.0%) but less high that March (65.4 %) of year 2022.

## OBJECTIVES OF THE STUDY

A perennial problem that is encountered by different countries is the unemployment of their citizens. The Public Employment Service Office was established to provide services to job seekers to properly address unemployment. With this, the study aimed to evaluate and assess the services offered by the Public Employment Service Office of the City of Biñan, Laguna. The assessment serves as reference for a highly efficient implementation of Public Employment Service Office (PESO) programs, projects, and activities within their jurisdiction. The findings of the study will serve as a basis to enhance the operations in providing adequate employment opportunities to all job-seekers. The results of this study may serve as a point of reflection for the service providers of the office in order to assess their performance and determine points for improvement and opportunities for developing stronger dedication for their employment by the agency.



## MATERIALS AND METHODS

Bhattacharya (2017) stated that “quantitative research as a systematic investigation of phenomena by gathering quantifiable data and performing statistical, mathematical, or computational techniques”. This data gathering method is effective in particular if measurement of cause-and-effect relationships will be a subject for analyzation in between pre-selected and discreet variables. This will also avoid the subjectivity in collecting and identifying information that describes those experiences being carried in the study. Primary and secondary data sources make use of books, journals, and answers from semi-structured interview.

Best and Kahn (2003) discussed that the descriptive method typically employs a survey or an assessment approach for its purpose was to collect information that permits one to discuss the characteristics of a person and their perceptions. It presents facts concerning nature and status of the study. It was concerned with conditions or relationships that exist, processes that are going on and effects that were felt and trends that are developing.

## POPULATION AND SAMPLING TECHNIQUE

There were two selected groups of respondents for the study, and these were clients or constituents residing in the City of Biñan, Laguna and PESO personnel. As to the quantitative aspect of the study, the respondents were composed of a mix of PESO personnel of the Local City Government of Biñan and the clientele it serves. A random sampling of forty-one (41) PESO Personnel and one hundred seventy-nine (179) clients was done to provide the needed data for the study.

## DATA COLLECTION PROCEDURES

Before the actual data gathering, a permission request was sought from the department head of the Public Employment Services Office (PESO) in the City of Biñan. Then, the researcher requested and acquired the list of clients and personnel from the PESO Biñan. After the letter was approved, the researcher personally administered the survey questionnaires to the participants.

At first, the researcher introduced herself to the participants and informed them about the study. Then verbal consent was obtained, allowing them to answer the questionnaires. The researcher explained the procedures for answering questionnaires and guaranteed confidentiality. The gathered data were tallied, tabulated, analyzed, and interpreted.

Since the research involves the assessment of PESO City of Biñan, Laguna, it was deemed important that the respondents know the objectives of the study and the procedures used in the data collection. The researcher obtained the permission of the participants for answering the survey questionnaires. They assured that the information would be disclosed and taken with utmost confidentiality and was strictly ethical standards in research.

## RESULTS AND DISCUSSION

### Results and Discussion Demographic Profile of the Clients at PESO City of Biñan

The demographic profile of the clients pertains to their age, sex, age, and educational attainment.

**Table 1. Demographic Profile of the Respondents**

Demographic Profile	Frequency	Percentage
<i>Age (in years)</i>		
18 - 25	100	57.14%
26 - 33	65	37.14%
34 - 41	10	5.71%
<i>Sex</i>		
Male	61	34.86%
Female	114	65.14%
<i>Marital Status</i>		
Single	160	91.43%
Married	14	8.00%
Legally Separated	1	0.57%
<i>Educational Attainment</i>		
Secondary	102	58.29%
Vocational	37	21.12%
College Level	35	20.00%
Post Graduate	1	0.57%



The clients of PESO in the City of Biñan were mostly young, with ages that ranged from 18 to 25 years old (57.14%) or 26 to 33 years old (37.14%). A very small percentage of the clients has age that ranged from 34 to 41 years old (5.71%). Based on the age of the clients, at the young age of 18, they start to look for available jobs. As the majority of the clients are in their young adulthood, they play a role in the big proportion of the workforce in the province of Laguna.

In terms of sex, more than half of the clients were female (65.14%), and the rest were male (34.86%). This demographic reflects the information provided by the International Labour Organization (2017), which suggests that the shift of job seekers and job opportunities was lent to women as they provide financial capacity to their family. With regard to the marital status of the clients, almost all were single (91.43%) during the time of the study. Censky (2012) affirmed that single people tend not to be picky in choosing job in comparison to those who are married, which appears to be dependent on their partner once they lose their job.

More than half of the clients had attained the secondary level of education (58.29%), while only a small percentage of them had reached the college level (20.00%). This is similar to the report of Torpey & Watson (2014) that almost 39% around the globe seek job opportunities and enter the labor workforce once they receive their secondary or high school diploma. With sound reasoning, populations are seeking for financial capabilities in supporting their needs.

**Respondents' Perceptions Towards the Services Offered by the PESO City of Biñan**

The level of respondents' perceptions on the services offered by the PESO City of Biñan pertains to referral and placement, labor market information, employment coaching and career counseling, and job fair program.

In terms of respondents' perception towards Services Offered by the PESO City of Biñan as to Referral and Placement the following outcome was obtained.

**Table 2. Respondents' Perceptions Towards the Services Offered by the PESO City of Biñan in terms of Referral and Placement**

The PESO City of Biñan ...	Service Provider			Client		
	Mean	SD	VI	Mean	SD	VI
makes sure that qualifications of applicants match the job opening.	4.81	0.40	HE	4.63	0.71	HE
provides assistance to applicants until they go onboard the job.	4.81	0.40	HE	4.62	0.59	HE
provides quick placement process.	4.81	0.40	HE	4.61	0.59	HE
ensures that all needed requirements are available before deployment.	4.88	0.34	HE	4.64	0.57	HE
ensures that referral time is quick and responsive.	4.88	0.34	HE	4.67	0.57	HE
<b>Overall Mean</b>	<b>4.84 Highly Evident</b>			<b>4.63 Highly Evident</b>		

Legend: 4.20 - 5.00 Highly Evident (HE) 3.40 - 4.19 Evident (E) 2.60 - 3.39 Moderately Evident (ME) 1.80 - 2.59 Less Evident (LE) 1.00 - 1.79 Not at all Evident (NAE)

The PESO personnel perceived that the provision of services as to referral and placement was *highly evident* based on matching qualifications, providing assistance to clients, providing a quick referral and placement process, and ensuring that all requirements are available before deployment. The overall mean of 4.84 indicates that the PESO personnel believed that referral and placement system was in place and was *highly evident*. Similarly, the clients disclosed that referral and placement system was *highly evident* as shown by the overall mean of 4.63. The two groups of respondents strongly agreed that referral and placement services were carried out at PESO City of Biñan. However, the computed standard deviations revealed that the clients gave more varied responses in each of the indicative statements about referral and placement services than the personnel. This means that the public employment services office provides services to the clients that are somehow visible and evident to their needs in finding a job.

To give insights pertaining to services offered by the PESO City of Biñan as to Labor Market Information the following indicators are given to respondents as it bears the result shown below.





**Table 3. Respondents' Perceptions Towards the Services Offered by the PESO City of Biñan in terms of Labor Market Information**

The PESO City of Biñan ...	Service Provider			Client		
	Mean	SD	VI	Mean	SD	VI
provides timely labor market information to the public.	4.81	0.40	HE	4.63	0.55	HE
makes access to labor market information easy for the constituents.	4.88	0.34	HE	4.59	0.61	HE
provides a wide pool of labor market information for the constituents.	4.81	0.40	HE	4.57	0.66	HE
regularly updates available labor market information	4.81	0.40	HE	4.62	0.67	HE
provides detailed labor market information	4.88	0.34	HE	4.59	0.59	HE
<b>Overall Mean</b>	<b>4.84 Highly Evident</b>			<b>4.60 Highly Evident</b>		

Legend: 4.20 - 5.00 Highly Evident (HE) 3.40 - 4.19 Evident (E) 2.60 - 3.39 Moderately Evident (ME) 1.80 - 2.59 Less Evident (LE) 1.00 - 1.79 Not at all Evident (NAE)

The PESO personnel view that provision of services offered with reference to its labor market information is *highly evident* according to providing timely labor market information, easy access to labor market information, providing a variety of labor market information, updating available labor market information and in providing detailed labor market information. The overall means of 4.60 as proved by the client as *highly evident*. Same with the 4.84 overall mean of service provider interpreted as *highly evident*. A more variation of responses was observed in the client's data that is provided by their standard deviation in comparison to PESO personnel. With this, it can be deduced that the service provided by the PESO office, in perception of both clients and personnel, is noticeable in concerning the labor market information.

In order to analyze the perception on the services offered by the PESO City of Biñan as to Employment Coaching and Career Counseling, the following data was obtained.

**Table 4. Respondents' Perceptions Towards the Services Offered by the PESO City of Biñan in terms of Employment Coaching and Career Counseling**

The PESO City of Biñan ...	Service Provider			Client		
	Mean	SD	VI	Mean	SD	VI
provides coaching and career services especially to those who are new workers.	4.88	0.34	HE	4.59	0.64	HE
regularly/occasionally checks on deployed workers.	4.75	0.45	HE	4.55	0.68	HE
provides mechanisms for addressing job mismatch.	4.88	0.34	HE	4.54	0.64	HE
provides comprehensive employment guidance to its clientele.	4.88	0.34	HE	4.61	0.61	HE
has adequate career coaching and counseling staff.	4.94	0.25	HE	4.62	0.61	HE
<b>Overall Mean</b>	<b>4.86 Highly Evident</b>			<b>4.58 Highly Evident</b>		

Legend: 4.20 - 5.00 Highly Evident (HE) 3.40 - 4.19 Evident (E) 2.60 - 3.39 Moderately Evident (ME) 1.80 - 2.59 Less Evident (LE) 1.00 - 1.79 Not at all Evident (NAE)

Table 4, showed the employment coach and career counseling as a service offered by the PESO City of Biñan that simplify as *highly evident*. With indicators such as providing coaching and career services to new workers, checking on deployed workers on a regular or occasional basis, giving mechanisms in addressing job mismatch, imparting comprehensive or complete guidance to its clientele, and having adequate career coaching and counseling staff. The service provider or PESO personnel believes that those procedures are *highly evident* as it gives an overall mean of 4.86. On a similar note, the client also gives an interpretation of *highly evident* in with 4.58 overall mean. In conclusion, employment coaching and career counseling as one prime service offered by PESO City of Biñan can be perceived as somehow apparent for both the clientele and to PESO personnel.



**Respondents' Perceptions Towards the Services Offered by the PESO City of Biñan in terms of Job Fair Program**

A survey was analyzed in accordance with both clientele and PESO personnel of City of Biñan that aims to know their perceptions about the services offered by the PESO City of Biñan as to their Job Fair Program.

**Table 5. Respondents' Perceptions Towards the Services Offered by the PESO City of Biñan in terms of Job Fair Program**

The PESO City of Biñan ...	Service Provider			Client		
	Mean	SD	VI	Mean	SD	VI
provides information about the job fair program.	4.88	0.34	HE	3.54	0.54	HE
helps the applicants to meet potential employers.	4.81	0.40	HE	4.68	0.58	HE
matches the job to the qualification of applicants.	4.75	0.45	HE	4.65	0.58	HE
reduces the time, cost, and effort on the part of the applicants.	4.81	0.40	HE	4.59	0.59	HE
helps the applicants get hired immediately.	4.94	0.25	HE	4.61	0.60	HE
<b>Overall Mean</b>	<b>4.84</b>		<b>Highly Evident</b>	<b>4.4</b>		<b>Highly Evident</b>

*Legend:* 4.20 - 5.00 Highly Evident (HE) 3.40 - 4.19 Evident (E) 2.60 - 3.39 Moderately Evident (ME) 1.80 - 2.59 Less Evident (LE) 1.00 - 1.79 Not at all Evident (NAE)

The PESO personnel view that service offered by PESO City of Biñan as indicated by their job fair program, that includes the disseminating information about the job fair program, helping the applicants in meeting potential employers, reducing time, cost, and effort on behalf of the applicants and in helping applicants for their immediate hiring resulted, as *highly evident* with 4.84 overall mean. The same interpretation was given to the data of clientele as it gives 4.4 overall means and *highly evident* as well. Both the clientele and personnel of PESO agreed via their results that the job fair program of PESO in the City of Biñan is obvious as referred to the results. According to Beam (2016), job fairs, employment counseling, job or work referrals, and information dissemination are all essential intervention in encouraging individuals to make them move to labor world prior to conveying the information for labor market situations.

**CONCLUSION AND RECOMMENDATION**

**Conclusions**

Based on the findings of the study conclusions were drawn:

The demographic profile in this study is dominated by the population of aged 18 to 25 years old. It is also visible in the shift of women empowerment in their willingness to participate in the labor workforce, as they have large number. High school graduates are in question about whether they are work-ready and single as to their civil status. Since respondents perceived services offered by PESO City of Biñan are highly evident, it might also be taken into account that the different livelihood programs are actively manifested in Biñan City. Since most of the respondents are satisfied with the PESO City of Biñan in terms of the services it offers, there should be a personal reflection among respondents on their employability status. The service provided by PESO City of Biñan, as perceived by respondents is efficient. This implies that service caters the needs of its clientele. Likewise, they perform their duties in accordance with the observed instruments. Officials of the PESO City of Biñan perform their job in a highly effective manner. This implied that good working atmosphere, administration and leadership are provided in the program. This will put a challenge to its neighboring PESO office to model this leadership and administration. No significant difference was noted between the level of service efficiency and the efficacy of officials. Thus, hypothesis 1 was accepted. Significant difference was noted on the clients' level of satisfaction towards the service offered by PESO City of Biñan when group according to profile. Thus, the hypothesis 2 was rejected. Lastly, significant relationship was noted between the services offered by PESO City of Biñan and the level of service efficiency hereby rejecting the null hypothesis.

**Recommendations**

The following recommendations are based on the findings and conclusions of this study:

1. In light of the best practices of PESO City of Biñan, it is recommended that they share their best practices among other local government units (LGUs) in Laguna in implementing the PESO program. An active involvement of youth is also needed to curve the unemployment issue and work with different activities that will be participated in by youth that are inclined toward the skills needed by a workforce society. The PESO City of Biñan was proven effective in providing services to its clientele. It is recommended that they help those local government units (LGUs) to institutionalize a PESO. Moreover, it is expected that PESO City of Biñan will generate numerous clients. It is recommended for them to allocate a greater amount of budget to different project opportunities awaiting them. Since the services offered by PESO City of Biñan is perceived by the respondents as effective, it is recommended for them to maintain



their utmost devotion and dedication to the service. It can also be viewed to have different program that can address the issue of work in behalf of gender. It is recommended to create program that deals with employment in concerning the gender of the applicants. For future researchers, it is also a challenge to study the digitalization of the program and develop an assessment of it as a goal toward improvement.

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# **EXTENT OF IDENTIFICATION OF POOR HOUSEHOLDS AND LEVEL OF ASSURANCE OF LISTAHANAN IN MAUBAN, QUEZON**

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## **ABSTRACT**

*This research was conducted to measure the extent of identification of poor households by Listahanan, a targeting system used to identify low-income households in Mauban, Quezon. The research measured the relationships between the extent of identification of poor households in terms of assessment, program management and validation, and the level of assurance in the data collected by the Department of Social Welfare and Development (DSWD), as perceived by 150 randomly sampled respondents. It also measured the relationship between the extent of identification and the level of Listahanan being used by the Local Government Unit (LGU).*

*Quantitative questionnaires and in-person interviews were the main data gathering methods employed in this study. Personal interviews and an online survey were used to acquire the data in Mauban, Quezon. To address every question in this research, the researcher employed questionnaires that were created based on the statement of the problem.*

*The researcher acquired the required information and data using the appropriate questionnaire to the study's goals. The researcher made sure that the respondents could understand the queries. A Tagalog version of the questionnaire was developed for the respondents who opted to answer the questions in Tagalog. In order to generate responses to the study questions, the researcher organized and examined the findings. Additionally, the researcher computed the mean and standard deviation using the Statistical Package for the Social Sciences (SPSS) for the gathered data.*

*The results suggested that Listahanan provided a high level of assurance in the credibility. The Proxy Means Test (PMT) used by Listahanan was deemed an effective tool in identifying interviewed poor households, with no inclusion errors observed. Furthermore, Listahanan data is very useful in selecting beneficiaries for social protection programs and services as baseline data. It is very easy and fast to access, hence, through Listahanan, disadvantaged households were given priority in the government's programs and services for the poor.*

*Likewise, the use of Listahanan data used a systematic process in identifying list of poor households and averted the claims that the list was politically influenced and that only their relatives and friends were often selected during selection process.*

**KEYWORDS** - *Assessment, Validation, Poor Households, Targeting System, Social Protection Database*

## **INTRODUCTION**

The Listahanan is a nationwide system of poverty targeting used by the Philippine government to identify poor households in the country. The system was developed by the Department of Social Welfare and Development (DSWD) and is used to target beneficiaries of national programs and services, such as the Pantawid Pamilyang Pilipino Program (4Ps).

The system uses a combination of socio-economic indicators to identify households that are most in need, allowing the government to prioritize their resource and better target their poverty-reduction efforts.

The Listahanan is an important tool for the government to identify and prioritize households that are in need of social protection programs. It helps the government to make more efficient and effective use of the resources allocated for social protection programs. It also provides valuable data that assists in the planning, design and implementation of social protection programs.

The purpose why DSWD conducts a Listahanan assessment and validation in a locality is to identify the poorest households in the area and to provide them with access to social protection programs and other government assistance. Listahanan helps the government to accurately determine the number of poor families in an area so that it can direct resources to them. This also helps to ensure that resources are properly allocated, during planning and budgeting process, to the most vulnerable households and that government assistance is reaching those who need it most [1].

The National Household Targeting System for Poverty Reduction (NHTS-PR), later on rebranded as Listahanan, was established in 2009 identify poor households and determine their eligibility for social protection programs. It uses Proxy Means



Test (PMT) to estimate the income of households based on the socio-economic characteristics. This can help local officials, head of agencies and program implementers to identify vulnerable populations, target resources towards them, and better understand the needs of their communities. It can also help local officials to create more effective policies and programs, as they will have more data-driven information to guide their decisions [2].

The pandemic had created big impact on the economy that highlights the critical need for government assistance for afflicted families, particularly the most vulnerable groups. Ramos (2020) stated that COVID-19's effects policy to urgent solutions in keeping the economy abrupt making the people continue their work and income. However, selection of beneficiaries became a great deal to most of the affected areas.

In the Philippines, many issues have been raised during the distribution of ayuda (financial assistance), including the Social Amelioration Program (SAP). Some government officials have been tagged as corrupt or being selective in identifying beneficiaries [3].

A study made by Reference [4], suggests that there should be a program for the identification of the least advantaged during times of crisis like the COVID-19 pandemic. It is implied that the distribution of financial support as brought by lockdown should acquire a system that is in great priority as ayuda is distributed.

The DSWD used a rostered system that reduced poverty as a process identification of beneficiaries of programs for social protection and services, that is the Listahanan. It identifies poor households and the lists are readily available to agencies of the government in the national and local level and also, to other social agency stakeholders' relative in identifying needy families.

As the leader in social protection and the implementer of key government social assistance programs, it is the DSWD's duty to implement policies and programs in the most effective and efficient manner. Having a targeting system which is derived from a scientific, objective, and standard set of criteria to identify the poor is important to achieve the Department's goal and mandate.

As DSWD cannot be considered as a data collection agency, the credibility and reliability of its data is assisted by the (PSA) through development of its data collection tool and enhancement of its enumerators' manual. The variables being used by Listahanan to identify the poor are generated from surveys, censuses of the family income and expenditure, labor force and population which are conducted by PSA. Prior to its operations, Listahanan also implements an accountability structure to ensure that information collected and stored in its database are correct and fraud-free. Stringent data collection and supervision, random interviews, spot checks at various phases of the implementation, and citizen's feedback are just some of the mechanisms that have been put in place to ensure that the information in the database are valid and of high quality.

In 2022, Listahanan (Version) 3 database identified 5,599,091 poor households from the assessed family of 15,487,655 (DSWD, 2022). There are LGUs who have faith in the Listahanan's accuracy and credibility in the selection of programs and services for the poor. The DSWD has been continuously advocating the utilization of the database to all internal and external stakeholders hoping most of them will enter into an agreement and make use of the data [5].

In Mauban, 3,046 was identified poor during the Listahanan's 2<sup>nd</sup> round of assessment conducted in 2014. Meanwhile in the latest version of Listahanan, 4,508 households were identified as poor.

This study was conducted in Mauban, because they are one of the two LGUs who uses Listahanan data in the selection of program beneficiaries. This study concludes the usefulness and assurance of the data collected as perceived by the respondents.

This research reviews the processes and mechanisms of Listahanan to determine if it produces reliable and credible data, as well as how the data is shared and how useful it has been for local government units.

Targeting system used for program assessment, management and validation as "The most commonly used targeting system is socio-economic targeting, which includes individual and/or household-level variables such as asset ownership, age, and type of household to identify the poor. Other targeting approaches used are geographic targeting, labor market targeting, and computer-generated targeting. Targeting criteria vary across countries and may include a combination of approaches." [6].

Targeting the poor is a necessary tool to ensure that government resources are efficiently used and that the benefits of government policies reach those who need them the most. He argued that targeting is an efficient way to reduce poverty and to use resources efficiently. He concluded that with careful design and implementation, targeting the poor can be an effective way to reduce poverty [7].

Better coordination between barangays and LGUs is also advised in order to enhance the targeted system. This makes it possible for barangays and LGUs to react to changes on the list more rapidly. The information can be used to identify regions that were missed by the first tranche and provide guidance on how to give them priority in the second phase. [8].

Reference [9] argues that targeting systems for poor households should prioritize households that are in greatest need and ensure that resources are allocated equitably by using transparent and objective criteria. He also suggests that targeting should be done in a way that is cost-effective and relatively easy to administer. Finally, Reference [9] emphasizes the importance of designing and implementing targeting systems that are sensitive to changes in household circumstances and that can be updated regularly to ensure that those in need of assistance are accurately identified.

The LGUs perform a vital role in ensuring the success of Listahanan's operations for all of the activities of the program, from preparatory to



reports generation phase, are coordinated with them. Coordination and orientations were done to ensure that the LGUs know and understand the ins and outs of the project [1].

The targeting system of poor households should be improved to include using better data, such as income, assets, and other indicators of poverty, to identify who is in need of assistance and how much assistance is needed. It was recommended increasing the use of information and communication technologies, such as mobile phones, to ensure that government programs are reaching those who are in need [10].

## **OBJECTIVES OF THE STUDY**

This study aimed to determine if the data collected by the DSWD are credible and useful, particularly in Mauban, Quezon. The results of this study help the DSWD in advocating the use of Listahanan data in the selection of program beneficiaries at the national and local level.

This study seeks to explore the credibility and effectiveness of the Listahanan in identifying potential beneficiaries such as 4Ps and those who should exit the program. It will provide great benefits to a number of organizations such as the National Household Targeting Office (NHTO), who can use the results as reference to retain Listahanan as the sole DSWD targeting system; the DSWD, who will receive evidence-based results to clarify issues on the data and improve systems and policies; City/Municipal Social Welfare and Development Officers (C/MSWDOs), who can use the results to justify accessing the Listahanan database; and Local Government Units, who can attest to the reliability and accuracy of Listahanan data. It will also inform and influence other stakeholders, such as academe, and civil society organizations, to use the Listahanan database.

## **MATERIALS AND METHODS**

This study used quantitative approach to examine the usefulness and credibility of Listahanan, as well as to determine ways to further enhance its implementation. A sample of 150 respondents was chosen from the municipality of Mauban, Quezon, which included local implementers, LGU beneficiaries, and random community members. A descriptive correlation design was used to measure the awareness and usefulness of Listahanan data and the relationship between research variables.

### **Research Instrument**

Questionnaires that were created based on the statement of the problem were used to collect the responses and gain information from the identified respondents. Included in the survey were participants age 18 and older and are involved in the program implementation. The questionnaires comprised 13 questions which were distributed to three sections, namely demographic profile, level of awareness and general proposal on the community involvement. The process for data collection was carried out in a four-week schedule.

The questionnaire, which took about 30 minutes to complete, contains a variety of items dealing with Listahanan. Permission from participants was obtained prior to the administration of the questionnaire regarding their willingness to complete the questionnaires. The participants were ensured of their right to anonymity and confidentiality.

In-person interviews were the main data gathering methods employed in this study. Personal interviews and an online survey were used to acquire the data in Mauban, Quezon.

The researcher made sure that the respondents could understand the queries. A Tagalog version of the questionnaire was developed for the respondents who opted to answer the questions in Tagalog.

In order to generate responses to the study questions, the researcher organized and examined the findings. Additionally, the researcher computed the mean and standard deviation using the Statistical Package for the Social Sciences (SPSS) for the gathered data.

### **Population and Sampling Technique**

Community sampling is an important method for obtaining a representative sample of the population in order to gain meaningful insights into community-level dynamics and health outcomes [11].

Female respondents make up the largest percentage followed by the male respondents. While the lowest number of respondents belongs to those who preferred not to reveal their gender.

According to Social Role Theory, men and women have different social roles. Women are more likely to engage in social behaviors, including responding to surveys, than men because they are more likely to identify with their community and have greater sense of social responsibility ([12].

### **Statistical Treatment**

To determine the extent of identification of poor households and the level of assurance as perceived by the respondents, Likert scale was used to measure responses to a question or statement. The responses are categorized into 5 levels, ranging from very good effect to no effect. The numerical intervals for each level are 4.50-5.00 for very good effect, 3.50-4.49 for good effect, 2.50-3.49 for moderate effect, 1.50-2.49 for low effect, and 1.00-1.49 for no effect.



**Table 1: The following scale was used to measure the responses**

Scale	Interval	Verbal Interpretation
5	4.50 – 5.00	Very Good Effect
4	3.50 – 4.49	Good Effect
3	2.50 – 3.49	Moderate Effect
2	1.50 – 2.49	Low Effect
1	1.00 – 1.49	No Effect

To determine the level of assurance between the level of knowledge as to Listahanan, the following Likert Scale was used:

**Table 2: Interpretation of the Likert Scale was Used to Measure the Responses**

Scale	Interval	Verbal Interpretation
5	4.50 – 5.00	Very High
4	3.50 – 4.49	High
3	2.50 – 3.49	Moderate
2	1.50 – 2.49	Low
1	1.00 – 1.49	Very Low

For the purpose of this study, MS Excel was used to enter data and perform statistical computations with ease. The results from the questionnaires were analyzed to determine respondents' views in relation to the study objectives and research questions. The analysis assisted the researcher to interpret results by comparing it with existing literature. The purpose of conducting qualitative study is to produce findings. Data collected through an interview was transcribed and analyzed to establish relationships of variables and what should be improved on the system.

A narrative report was written to provide an account of the findings which was compared with the results of the questionnaires.

The data collected from the respondents were classified and tabulated for further analysis using Frequency and Percentage Distribution, Weighted Mean, Ranking and Pearson Correlation "R" test.

To determine the demographic characteristics of the respondents, *Frequency Mean* and *Percentage Distribution*. To determine the extent of role in identification of poor households and knowing the level of assurance on the collected data by the DSWD, *Frequency Mean* and *Standard Deviation* were used. These tools were also used to determine the extent of Listahanan being used by the LGU and other known service providers in their programs and service.

To test for the relationship between the extent of the role in identification of poor households and the level of assurance on the collected by the DSWD, Pearson r was used. The "r" value refers to the Pearson correlation coefficient, which is a measure of the strength and direction of a linear relationship between two variables. The table indicates that the lower the "r" value, the weaker the relationship between the two variables, and the higher the "r" value, the stronger the relationship between the two variables.

## RESULT AND DISCUSSION

This study provides an analysis and interpretation of data collected in this research. The data has been collected and analyzed using a variety of scientific methods and tools, and this presentation will help to demonstrate some of the findings from this research. The data presentation, analysis, and interpretation used a variety of software tools and statistical methods in order to provide an accurate and comprehensive understanding of the research data. The implications of the data were discussed and provided recommendations for further research work.

The descriptive statistics used to describe the basic features of the data in this study were *Frequency Mean*, and *Standard Deviation*. It was used to simply describe what the data indicates in a more general sense and in a more manageable form. The Mean is used to describe the central tendency of the collected data. As the questionnaire scale ranged from 1 (low) to 5 (high), a higher mean score reflects responses that indicate higher attributions of the leadership characteristics, and vice versa. The Standard Deviation used to show the relation that a set of responses has to be mean of the sample and serves as a statistical measure of variation in this data distribution.

The *frequency means* and verbal interpretation in relation to the respondents' ability to identify poor families as shown in Table 3 demonstrates that Listahanan is a useful evaluation technique for locating poor households.



**Table 3: Summary of the Extent of Identification of Poor Households as Perceived by the Respondents**

Role in identification of poor households as perceived by the respondents	Overall Mean	SD	Verbal Interpretation
1. As to Assessment of households	4.44	4.98	Good Effect
2. As to Program Management	4.48	5.55	Good Effect
3. As to validation of poor households.	4.47	8.32	Good Effect
<b>Overall Mean</b>	<b>4.46</b>		<b>Good Effect</b>

**Legend:**

4.50 – 5.00 (Very Good Effect)

3.50 – 4.49 (Good Effect)

2.50 – 3.49 (Moderate Effect)

1.50 – 2.49 (Low Effect)

1.00 – 1.49 (No Effect)

Results showed that the extent of identification of poor households as perceived by the respondents with overall *mean* of 4.46 that indicates a verbal interpretation of good effect. Among the three sub-variables, the Program Management has the highest score ( $M=4.48$ ), Validation ranks second ( $M=4.47$ ) and Assessment ranks third ( $M=4.44$ ). The respondents agree that Program Management, Assessment and Validation have a big role in the process of selection of poor households.

The standard deviation scores of 4.96, 5.55, and 8.32, respectively, for the variables Assessment of households, Program Management, and Validation of poor households indicated that there is a broad range in the data set for each of these variables. This suggests that different people may have different opinions on the procedures for assessment, program management, and the validation of poor households. The larger standard deviations of 8.32 for validation and 5.55 for program management indicates that there may be significant discrepancies in the opinions held about each of these topics.

Effective program management is essential for the successful implementation of projects. It emphasizes the importance of having a clear vision and a well-defined set of objectives for the project, as well as the need for good communication and collaboration between all stakeholders.

Additionally, it suggests that program managers should be well-versed in project methodology and have the ability to effectively manage risks and resources. Finally, it emphasizes the importance of monitoring the project's progress and making any necessary adjustments along the way [13].

As to the level of assurance on the collected data by the DSWD as perceived by the respondents in terms of credibility, the findings demonstrated that the homes classified as poor are, in fact, poor and that inclusion errors had not occurred. When choosing beneficiaries for social protection programs and services, the baseline data should be the recognized poor. With an overall mean of 4.47, it was discovered





**Table 4: Level of Assurance on the Collected Data as Perceived by the Respondents in terms of Credibility**

Indicative Statement	Mean	SD	Verbal Interpretation
<i>I agree that</i>			
1. systematic procedures and properly execution of Listahanan in assessing and generating the list of poor households was strictly followed a systematic procedure.	4.47	0.80554	High
2. assessment of households handled by skilled and knowledgeable Listahanan personnel.	4.40	0.97297	High
3. shows the result of the Listahanan that the households who have been identified as poor are actually poor and no inclusion error has been made.	4.43	0.92676	High
4. released the results of Listahanan based on reliable data.	4.45	0.88383	High
5. identified poor should be the baseline data in selecting beneficiaries for social protection programs and services.	4.49	0.80612	High
<b>Weighted Frequency Mean</b>	<b>4.47</b>		<b>High</b>

Table 4 shows that the Listahanan employed a methodological process to identify and generate a list of low-income households with weighted mean of 4.47. The assessment was handled by knowledgeable and skilled staff (M=4.40). High weighted mean was also achieved on the questions whether the Listahanan data has actually identified the real poor and no inclusion error has been made (M=4.43); has released the results with reliable data (M=4.45); and believed that poor household should be the baseline data in selecting beneficiaries for programs and services (M=4.49).

With the limited government resources, it is important that the identified and real poor should be given priority in the provision of programs and services. Inclusions errors sometimes occur in the targeting system of government programs and services; however, inclusion errors are very minimal or most unlikely to happen in Listahanan. Most of the grievances received in the validation phase were exclusion errors where households claimed that they are actually poor but not included in the list of poor households.



**Table 5: Level of Assurance on the Collected Data as Perceived by the Respondents in terms of Usefulness of the Data**

Indicative Statement <i>I agree that.....</i>	Mean	SD	Verbal Interpretation
1. the list of poor households was accepted and utilized by the LGUs.	4.49	0.83854	High
2. relevance of the data in selecting the list of beneficiaries.	4.42	0.95408	High
3. shortened the process in selecting beneficiaries through the Listahanan data.	4.49	0.7894	High
4. no bias in selecting beneficiaries nor involvement of politics.	4.42	0.95408	High
5. prioritized the poor households in the programs and projects of the government.	4.44	0.95219	High
<b>Weighted Frequency Mean</b>	<b>4.44</b>		<b>High</b>

**Legend:**

- 4.50 – 5.00 (Very High)
- 3.50 – 4.49 (High)
- 2.50 – 3.49 (Moderate)
- 1.50 – 2.49 (Low)
- 1.00 – 1.49 (Very Low)

Table 5 shows that the LGUs accepted and used the Listahanan data in choosing beneficiaries with weighted mean of 4.49. The data is relevant in selecting the list of beneficiaries (M=4.42), no bias or political influence in selecting beneficiaries (M=4.42) and the process in selecting beneficiaries became fast with Listahanan (M=4.49). In government projects and programs, the disadvantaged households were given priority (M=4.44). A general weighted frequency mean of 4.44 was revealed.

**Table 6: Level of Assurance on the Collected Data by the DSWD**

Level of assurance in the collected data as to....	Overall Mean	SD	Verbal Interpretation
1. Credibility of Data	4.44	9.94	High
2. Usefulness of Data	4.48	12.3	High
<b>Overall Mean</b>	<b>4.45</b>		<b>High</b>

**Legend:**

- 4.50 – 5.00 (Very High)
- 3.50 – 4.49 (High)
- 2.50 – 3.49 (Moderate)
- 1.50 – 2.49 (Low)
- 1.00 – 1.49 (Very Low)

The frequency mean and verbal interpretation of the level of assurance on the DSWD-collected with 4.44 weighted mean and the level of assurance that the data is useful with overall mean of 4.48 which both indicate data is High. It demonstrates that in government programs, low-income households were given priority given that the Listahanan data is credible and being used to provide social protection programs and services.



**Table 7: The Extent of Knowledge that Listahanan is being used by the LGU and other known Service Providers in their Programs and Services**

Indicative Statement <i>I am aware that</i>	Mean	SD	Verbal Interpretation
1. Listahanan is all about and how it is being used.	4.53	0.80578	Very High
2. understanding the processes of identifying the poor households under Listahanan.	4.52	0.83841	Very High
3. identifying the list of poor households are known by the LGU and other organizations	4.50	0.9	Very High
4. familiarity on the system that DSWD Listahanan is the lead in identifying the poor households and not the local officials.	4.47	0.94302	High
5. sharing of Listahanan data with DSWD is fast and easy.	4.49	0.8999	High
<b>Weighted Frequency Mean</b>	<b>4.52</b>		<b>Very High</b>

**Legend:**

4.50 – 5.00 (Very High)

3.50 – 4.49 (High)

2.50 – 3.49 (Moderate)

1.50 – 2.49 (Low)

1.00 – 1.49 (Very Low)

Table 7 shows that the respondents had a very high level of knowledge in terms of Listahanan being used by the LGU and other known service providers in their programs and services, with a weighted frequency *mean* of 4.52. This indicates that the respondents were aware of what Listahanan is all about, understood the processes of identifying the poor households, were familiar with the system that DSWD Listahanan is the lead in identifying the poor households, and had knowledge that the sharing of Listahanan data with DSWD was fast and easy (Weighted Frequency *Mean* = 4.52, Very High).

**Table 8: Relationships Between the Extent of Identification of Poor Households and the Credibility and Usefulness of the Data**

Variables	P-Value	R-Value	Analysis	Importance	Decision
Extent of Assessment, Program Management and Validation	p < 0.05	0.3788	Moderate	Significant	Reject H0
<b>VS</b>					
Level of assurance					
<i>At 0.05 Level of Significance</i>					

Table 8 shows that the relationships between the extent of roles in identification of poor households and the credibility and usefulness of the data as perceived by the respondents were found to be moderate ( $r=0.3788, 0.5357$ ) and high ( $r=-0.9572, 0.9481$ ), level of roles in identification of poor households and the credibility of the data as perceived by the respondents was statistically significant ( $p < 0.05$ ).

The results also indicates that the Listahanan program's coordination and advocacy efforts with the LGU were successful and had a positive impact on the usefulness of the data.



**Table 9: Relationship Between the Extent of Identification of Poor Households and the Knowledge on the Use of Listahanan**

Variables	P-Value	R-Value	Analysis	Importance	Decision
Extent of Assessment, Program Management and Validation	p < 0.05	+0.7644	High	Significant	Reject HO
VS Knowledge on the use of Listahanan					

*At 0.05 Level of Significance*

Overall, the statistical interpretation of these variables is that there is a high to very high correlation between the extent in identification of poor households and the knowledge on the use of Listahanan by program implementers, as indicated by the correlation coefficients as shown in Table 18. This indicates that the higher the role of the program implementers in identification of poor households, the more knowledge they have about the use of Listahanan. This correlation is statistically significant, as indicated by the p-value being lower than 0.05.

Reference [14] found that the Validation of the National Household Targeting System for Poverty Reduction (Listahanan) in the Philippines was successful in identifying the poorest households in the country. The study found that Listahanan was able to accurately differentiate between households in poverty and those that were not, and this was largely due to the fact that the survey incorporated the use of a variety of data sources. The authors concluded that Listahanan was a reliable and effective tool for targeting poverty reduction efforts in the Philippines.

In summary, the Listahanan program from the DSWD has been successful in collecting data, managing resources, and validating lists of poor households. The data collected is used to effectively target those households in need of support and those households believe it is accurate. Additionally, the program is well coordinated with local authorities and is seen to prevent claims of political intervention as well as establishing a baseline of data for other social protection programs and services.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the findings, the following conclusions were made:

1. The Listahanan is a DSWD effort that aims to locate and identify the impoverished or poor households in the Philippines, particularly in Mauban, Quezon. It accomplishes this by collecting information from the households through interviews and surveys. Based on a set of criteria, a list of households that are deemed to be poor is subsequently generated using this data. The Listahanan is crucial because it enables more focused and effective social welfare initiatives by assisting the DSWD and other government agencies in determining which societal segments and places require the most support. Additionally, it facilitates the agency's access to its target industries and provides details on how to use these services
2. The results of the survey conducted in Mauban Quezon indicate that the respondents identify themselves as part of the poorest members of the community. The survey was conducted by the DSWD and the results provide an indication of how effective the DSWD's data collection, program management, and validation of Listahanan was perceived to be by the respondents. The mean value for each characteristic was more than 4.00, which indicates that the answers to the characteristics were generally perceived to be "very effective". This suggests that the DSWD's efforts to collect, manage, and validate data about the poorest members of the community were seen in a positive light by the respondents.
3. A systematic approach was used by Listahanan to find and generate a list of low-income households. The results demonstrated that the residences identified as poor were actually poor and that there had not been any inclusion errors. The PMT being used by Listahanan has been an effective tool in identifying the interviewed poor households. Likewise, the field staff who were hired to conduct the assessment phase were trained and well-equipped in their duties to find and interview the potential poor households. It is therefore concluded that the selection of poor households was not influenced by any political affiliations and that selection was not made by any local official, employees or organization. The list of poor households was generated by a credible targeting system.
4. DSWD-Listahanan engaged LGUs and barangays in the usage of data by distributing a list of poor households which is a good indication that the Listahanan program management is efficient in coordinating with the local authorities before and after the conduct of household assessment. This also popularizes the use of Listahanan data with other LGUs and stakeholders.



5. The Listahanan data is very useful in selecting beneficiaries for social protection programs and services as baseline data. It is very easy and fast to access, hence, through Listahanan, disadvantaged households were given priority in the government's programs and services for the poor. Likewise, the use of Listahanan data prevents the claims that there were political interventions in the selection of beneficiaries and that only their relatives and friends were often selected during selection process.
6. The alternative hypothesis was accepted that "There is a significant relationship between the role in identification of poor households and assurance in the data collected by the DSWD as perceived by the respondents".

The following are the recommendations based on the findings and conclusions:

1. The DSWD to continue using Listahanan as an assessment tool to identify who will be the potential beneficiaries of social protection and projects. Listahanan is the only reliable targeting system that can identify poor households. It is quick, simple to use, and completely free for those who want to use the data. The DSWD to establish a grievance mechanism to address the complaints on the "possible" exclusion errors

From the Focused-Group Discussions made with the program implementers and local authorities, it is also highly recommended for DSWD to share the latest Listahanan data with other LGUs, national and regional government agencies and other partners to utilize the data.

The National Household Targeting Office and its regional counterparts should strengthen the marketing and communication strategies in advocating the utilization of Listahanan data to all LGUs and other stakeholders.

Philippine Statistics Authority and DSWD, through its The National Household Targeting Office, should continuously improve the targeting system by ensuring that all data collected is 100 percent accurate and that all poor households will be included in the lists and no one will be left

## APPENDIX

A – Copy of the questionnaire (English and Tagalog Version)

B – Demographic profile of respondents

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**APPENDIX A**  
**Survey Questionnaire**

**TAGALOG VERSION**

**LAWAK NG PAGKILALA SA MGA MAHIHIRAP NA SAMBAHAY AT ANTAS NG PAGSIGURO NG LISTAHANAN**

Maaari lamang po pakisagutan ang mga susunod na mga katanungan.

**Part I. Impormasyon ng Respondent**

<b>TANONG</b>	<b>Response</b> (Piliin ang sagot)
Pangalan ng LGU/Opisina	
Panagalan ng respondent:	
Edad:	
Kasarian:	<input type="radio"/> Lalake <input type="radio"/> Babae <input type="radio"/> Mas gusto na huwag sabihin
Pinakamataas na Paaralan na pinasukan	<input type="radio"/> Elementarya <input type="radio"/> High school <input type="radio"/> College <input type="radio"/> Vocational <input type="radio"/> Post graduate <input type="radio"/> Walang natapos
Posisyon sa Trabaho/Katayuan sa komunidad:	<input type="radio"/> MSWDO/Staff <input type="radio"/> Local Official <input type="radio"/> Barangay Official <input type="radio"/> DSWD personnel <input type="radio"/> Benepisyaryo ng isang programa <input type="radio"/> Simpleng mamamayan <input type="radio"/> Others: _____

**Part II.** Ang lawak ng pagkakakilanlan ng mga mahihirap na sambahayan ayon sa pananaw ng mga respondente

**Direksyon:** Lagyan ng tsek (✓) ang hanay na pinakamahasay na naglalarawan sa iyong tugon, alinsunod sa sumusunod na sukat ng rating.

- |                            |                                  |
|----------------------------|----------------------------------|
| 5 – Lubos na Sumasaangayon | 2 – Hindi Sumasang-ayon          |
| 4 – Sumasang-ayon          | 1 – Lubos na Hindi Sumasang-ayon |
| 3 – Katamtaman             |                                  |

<b>MGA PAHAYAG</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>A. ASSESSMENT</b>					
1. Ako ay nainterview noong 2019-2021 ng Listahanan					
2. Ang aming sambahayan ay itinuturing na mahirap					
3. Ang aming sambahayan ay natukoy ng Listahanan na mahirap					
4. Naitala ang aming sambahayan sa listahan ng mahihirap ng Listahanan					
5. Naendorso ang listahan ng mga mahihirap sa mga nagpapatupad ng programa					
<b>B. PAMAMAHALA NG PROGRAM</b>					
1. Ang impormasyon tungkol sa Listahanan ay ibinabahagi sa LGU at sa pangkalahatang publiko					
2. Ang pagpapakalat ng listahan ng mahihirap ay ginawa ng DSWD-Listahanan sa mga barangay at LGU					
3. Tinanggap ng mga lokal na opisyal ang listahan ng mahihirap na sambahayan					



4. Ang listahan ng mahihirap ay katanggap tanggap sa pagitan ng DSWD at ng LGU/Barangay					
5. Nakilahok sa paggamit ng Listahanan data para sa mga programa at serbisyo.					
<b>C. VALIDATION/PAGPAPATUNAY</b>					
1. Nakapanayam ang mga kabahayan na hindi nakalista na mahirap sa Listahanan					
2. Nasuri ang kita ng mga potensyal na mahihirap na sambahayan					
3. Naging parte sa pagpapatunay ng mahihirap na sambahayan					
4. Napatunayan na ang mahihirap na sambahayan ay tunay na mahirap					
5. Alinsunod sa validation ng mahihirap na sambahayan					

**Part III.** Antas ng katiyakan sa mga nakalap na datos ng DSWD ayon sa pananaw ng mga respondent.

**Direksyon:** Lagyan ng tsek (✓) ang hanay na pinakamahasay na naglalarawan sa iyong tugon, alinsunod sa sumusunod na sukat ng rating.

- 5 – Lubos na Sumasaangayon
- 4 – Sumasang-ayon
- 3 – Katamtaman
- 2 – Hindi Sumasang-ayon
- 1 – Lubos na Hindi Sumasang-ayon

<b>MGA PAHAYAG</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b>A. KREDIBILIDAD NG MGA DATOS</b>					
1. Ang pamamaraan at maayos na pagpapatupad ng Listahanan sa pagtatasa at pagbuo ng listahan ng mga mahihirap ay mahigpit na sinusunod sa isang sistematikong pamamaraan.					
2. Ang pagsusuri sa mga sambahayan ay ginagawa ng mga may kasanayan at may kaalamang tauhan ng Listahanan					
3. Ang mga sambahayan na natukoy na mahirap sa Listahanan ay talagang mahirap at walang pagkakamali sa pagpili nito.					
4. Inilabas ang mga resulta ng Listahanan batay sa maaasahang datos.					
5. Ang natukoy na mahihirap ay dapat na maging basehan sa pagpili ng mga benepisyaryo para sa mga programa at serbisyo ng gobyerno.					
<b>B. MAGAGAMIT ANG LISTAHAN NG MAHIHIRAP</b>					
1. Ang listahan ng mga mahihirap ay tinanggap at ginagamit ng gobyerno					
2. Ang listahan ng mahirap ay may kaugnayan sa pagpili ng mga benepisyaryo ng programang pangmahirap					
3. Pinaikli ang proseso sa pagpili ng mga benepisyaryo sa pamamagitan ng Listahanan data					
4. Walang pagkiling sa pagpili ng mga benepisyaryo o pakikisangkot sa pulitika					
5. Inuna ang mga mahihirap na sambahayan sa mga programa at proyekto ng pamahalaan					

**Part IV.** Antas ng lawak ng Listahanan na ginagamit ito ng LGU at iba pang kilalang service provider sa kanilang mga programa, proyekto at serbisyo.

**Direksyon:** Lagyan ng tsek (✓) ang hanay na pinakamahasay na naglalarawan sa iyong tugon, alinsunod sa sumusunod na sukat ng rating.

- 5 – Lubos na Sumasaangayon
- 4 – Sumasang-ayon
- 3 – Katamtaman
- 2 – Hindi Sumasang-ayon
- 1 – Lubos na Hindi Sumasang-ayon



MGA PAHAYAG	5	4	3	2	1
<b>A. KAALAMAN</b>					
1. Alam kung ano ang Listahanan at kung paano ito ginagamit					
2. Naunawaan ang mga proseso ng pagtukoy sa mga sambahayang mahihirap sa ilalim ng Listahanan					
3. Ang listahan ng mahihirap ay kinikilala ng LGU at iba pang organisasyon					
4. Pamilyar sa sistema na Listahanan na ito ay pinangungunahan ng DSWD at hindi ang local government					
5. Mabilis at madali ang pagbabahagi ng Listahanan data sa DSWD					

**PART V. Mga Rekomendasyon**

Ano ang maaari kong imungkahi upang mapabuti ang Listahanan data at ang sistema ng pagtukoy sa sambahayang mahihirap?

**APPENDIX B  
Profile of the Respondents**

**Table 1: Frequency and Percentage Distribution of Respondents by Age Group**

Age Range	n	%
30 - 34	43	28.67
35 - 39	48	32
40 - 44	33	22
45 - 49	23	15.33
50 & above	3	2

N=150

Table 1 shows that the respondents make up the largest percentage of the population, with 32% belonging to age range of 35–39, followed by the ages of 30–34 with 28.67%, the ages of 40–44 with 22%, and the ages of 45–49 with a total percentage of 15.33%. While the lowest number of respondents, with 2% belonging to age ranges 50 and above.

Age has consistently been one of the strongest predictors of survey response. Older adults are more likely to respond to surveys than younger adults. This may be because older adults have more free time, are more likely to be at home during the day, or have a greater sense of civic duty. Alternatively, younger adults may be more difficult to reach because they are more likely to be working or more active social lives.

**Table 2: Frequency and Percentage Distribution of Respondents by Gender**

Gender	N	%
Female	78	52
Male	61	40.67
Preferred not to say	11	7.33

N=150

Table 2 shows the profile of the respondents as to their revealed gender. A total of 78 female participants (52%), 61 male participants (40.67%), and 11 other participants (7.33%) participated in the survey. Female respondents make up the largest percentage followed by the male respondents. While the lowest number of respondents belongs to those who preferred not to reveal their gender.





According to Social Role Theory, men and women have different social roles. Women are more likely to engage in social behaviors, including responding to surveys, than men because they are more likely to identify with their community and have greater sense of social responsibility (Wood and Eagly, 2012).

**Table 3: Frequency and Percentage Distribution of Respondents According to Highest School Attended**

Highest School Attended	<i>n</i>	Percentage
Elementary	13	8.67
High School	38	25.33
College	20	13.33
Vocational	27	18
Post Graduate	21	14
None	31	20.67

*N*=150

Table 3 shows the profile of the respondents as to their highest school attended based on the six categories under the participant’s educational attainment. Respondents make up the largest percentage of the population, with 25.33% having gone to high school, followed by respondents with no educational attainment, respondents who took vocational training, post-graduates and respondents who have been to college. While the lowest number of percentages, 8.67%, belongs to the respondents who have been to elementary school.

Educational attainment is a key predictor of responses to surveys, as it is associated with differences in life experiences and public opinions (Brody, 2013). Those with higher educational attainment levels are more likely to express opinions that are informed by personal experience, knowledge, or research. Therefore, educational attainment is a significant factor in making sure surveys accurately capture the perspectives of a population.

**Table 4: Frequency and Percentage Distribution of Respondents Profile According to Employment Positions / Status in the Community**

Employment Position	<i>n</i>	%
MSDWO / Staff	10	6.67
Local Officials	0	0
Barangay Officials	11	7.33
DSWD Personnel	0	0
Program Beneficiary	99	66
Local Citizen	0	0
Others	30	20

*N*=150

Table 4 shows the employment status or status in the community of the respondents from Mauban, Quezon. It shows that 66% of the respondents are Program Beneficiaries, and 20% of the respondents are Others or randomly selected respondents, the MSDWO/Staff has a percentage of 6.67%, and Barangay Officials has 7.33%. While the Local Officials, and Local Citizen has 0% of the respondents.



## **GENDER APPROACH IN EDUCATION: LOOKING AT THE PROBLEM**

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### **ANNOTATION**

*The article reveals the definitions of the concepts of "gender", "gender approach" from the points of view of representatives of various scientific areas: philosophy, psychology, pedagogy. The importance of the implementation of the gender approach for the modern education system is revealed, which allows us to think about the need to apply the gender approach as an integral element of the organization of the learning process.*

**KEY WORDS:** *gender, gender approach, learning process, functional asymmetry of the cerebral hemispheres, gender characteristics, psychophysiological characteristics.*

The attention of representatives of various fields of scientific knowledge: philosophy, sociology, economics, demography, history, anthropology, psychology, political science, philology, sociolinguistics, semiotics, ethnography, cultural studies, as well as pedagogy, given to the cycle of scientific ideas, united by the concept of "gender", contributes to the emergence general problem field for interdisciplinary research of gender.

In the conditions of significant changes in socio-cultural life, there is a general trend of transformation of cultural stereotypes of masculinity and femininity, the basis of which is the individuality of a person, the freedom to choose ways of self-realization, regardless of gender. Numerous studies (O.A. Voronina, I.S. Kon, D.V. Kolesov, L.V. Popova, T.A. Repina, L.L. Rybtsova, A.G. Khripkova, T.P. Khrizman, L.V. Shtylyova, L. Tittle, RK Under) show that high femininity in women and masculinity in men in modern society are not a guarantee of social and mental well-being.

The special interest of pedagogical science in the gender issue is due to the existence of new opportunities for improving teaching and educational work through the introduction of gender knowledge. To date, there is no unambiguous definition of the term "gender". The work of the American psychologist R. Stoller, which appeared in 1968, "Sex and gender: towards the development of masculinity and femininity" pointed to the sociocultural aspect of gender, separating it from the biological one, defining this term, which was previously only a narrow philological one, as a set of norms of behavior associated with male and female representatives.

The concept of "gender", which entered the categorical apparatus of social philosophy at the turn of the 20th-21st centuries, is interpreted as "a system of relations between men and women, including ideas, informal and formal rules and norms defined in accordance with the place, goals and position of the sexes in society, institutions, behavior and social interactions that are prescribed in accordance with gender", a certain set of "gender contracts"[ 1 ].

From the point of view of representatives of psychological science, "with a certain degree of convention" psychological sex and gender can be called synonyms, defining gender as the socio-psychological sex of a person, the totality of his psychological characteristics and features of social behavior, manifested in communication and interaction" [ 2 ].

According to pedagogical practice, the concept of "gender", including gender differences, "focuses attention on a wide range of manifestations characteristic of boys and girls, boys and girls, men and women, which are somehow



related to their gender and age status, ethical and religious and socio - cultural belonging." In other words, gender is "a structured concept of social sex, synthesizing the cultural and biological in a person"[ 3 ].

The problems of gender education are of concern to many researchers today. The interest is due to the fact that the modern requirements of an individual approach to the formation of personality cannot ignore the sexual characteristics of the child, since these are bio - socio-cultural characteristics. At present, modern priorities in the upbringing of boys and girls are not in fixing strict standards of masculinity and femininity , but in exploring the potential of partnerships, educating the human in a woman and a man; variability in mastering the gender repertoire; in sincerity, mutual understanding , complementarity [ 4 ] .

The gender approach, which takes into account the individual characteristics of the child in accordance with his gender, involves determining the content, forms and methods of training and education aimed at creating a gender-friendly environment that promotes the development of the individual in accordance with the natural potential. At the same time, the purpose of the gender approach is to change the traditional cultural restrictions on the development of the individual depending on gender, which is directly related to the creation of conditions for the maximum disclosure of the abilities of boys and girls. Achieving the goal requires not only changing the traditional, but also developing new ways of learning that differ in quality, ways of organizing the educational process and pace from the existing ones.

A gender approach can be implemented through a number of areas, including the creation of a special organization of the learning process, which involves the choice of forms, methods, teaching methods, taking into account the gender characteristics of students, changing the content of education and creating educational and methodological literature of a new type, compiling assignments taking into account the psychophysiological characteristics of students, creating various types of schools and classes focused on the practical application of a gender approach, namely, the introduction of separate education.

Considering the implementation of the gender approach, scientists pay special attention to the reasons for the existence of gender differences among members of the opposite sex. Researchers in various fields of scientific knowledge (neuropsychology, psychology, medicine, pedagogy) state differences in the pace of intellectual development, motivation and assessment of the results of activities, the behavior of representatives of different sexes, the main cause of which is a biological factor, i.e. those features that are laid down even before the birth of the child, consisting in the functional specialization of the cerebral hemispheres. At the same time, the existence of intellectual differences between boys and girls, which persist for a certain time, has been reliably established.

The predominance of verbal abilities in female representatives has been experimentally confirmed. Girls and women have better developed abilities for articulation (3–8 years old), imitation (3–4 years old), more vocabulary (18–21 years old), better developed speech skills, girls are more capable of decoding speech, building correct visual -motor and auditory -vocal associations, semantic understanding of speech, they are endowed with great psycholinguistic abilities, verbal intelligence, are distinguished by a greater development of reading skills (6–7 years), greater erudition (5 and 7 years), reading speed (7–13 years) , reading comprehension (4–13 years, 9–11 years), make fewer reading errors (9–11 years) [5] . Boys have more developed mathematical and visual-spatial abilities.

The founders of neuropedagogy (T.P. Hriz man , V.D. Eremeeva), noting the dependence of the cause of these differences on the characteristics of the cerebral cortex , they emphasize that only one difference in the electrophysiological parameters of the brain of newborns of different sexes makes it possible to determine the sex of the child. Researchers distinguish three main types of functional asymmetry of the cerebral hemispheres: left hemisphere, right hemisphere and equal hemisphere .

The left hemisphere type is characterized by the dominance of the left hemisphere, which determines the verbal-logical nature of cognitive processes, the tendency to abstract and generalize. The right hemispheric type is characterized by the predominance of the right hemisphere, which determines the propensity for concrete-figurative thinking, creativity, and the development of the imagination. The last type of functional asymmetry of the cerebral hemispheres



is characterized by the absence of pronounced dominance of one of them<sup>6</sup>. According to most researchers, the first type of functional asymmetry prevails in girls, the second - in boys.

The brain of boys is a differentiated system, since one of the hemispheres of the brain is predominant. At the same time, the ability of the centers of the cortex of the right and left hemispheres to enter into interhemispheric contacts is significantly lower than in girls. According to a number of researchers, a clear asymmetry in the activity of the cerebral hemispheres is the reason why it is more difficult for boys to compare information from the two hemispheres and it is easier to focus on one type of activity. The forebrain is especially active in boys, in particular, its frontal associative structures, which explains the high creative and search activity of this sex. In girls, the severity of the asymmetry of the cerebral hemispheres is less, but the posterior cortex and auditory regions of the left hemisphere are especially active.

The functions of the anterior and posterior sections of the cortex of the cerebral hemispheres are not the same in the implementation of the cognitive functions of representatives of both sexes. When comprehending words, girls use both hemispheres, while boys use only one, more often the right hemisphere of the brain [6].

However, the gender approach is based not only on the biological differences that exist between the sexes, but also on the sociocultural significance that society attaches to these differences. Genetically embedded features of brain activity can manifest themselves only under the influence of the environment, society, which contribute to the awareness and acceptance of stereotypes of male and female behavior. Thus, many researchers come to the conclusion that it is impossible to use the same methods when teaching representatives of two sexes of the same age, but different neuropsychological stock, since the characteristics of boys and girls are not taken into account when gender characteristics are not taken into account [7].

According to educators and psychologists, when implementing a gender approach in teaching boys, it is most preferable to alternate physical and cognitive activities, conduct classes of shorter duration with a high rate of presentation of material, use group forms of work with a leader, apply heuristic, research and problem methods, involve students into creative activity, solving spatial problems, “rediscovery of discoveries”, focusing on practical information, discussing the results of activities with a specific assessment. Lessons for girls should take place at a slower pace with a sufficient number of repetitions of the material, the use of standard tasks, involving a large amount of visualization, and a positive emotional coloring of the material being studied.

The gender approach in teaching places high demands on the selection of task types for students with right-hemispheric and left-hemispheric types of functional asymmetry of the brain. When compiling tasks for representatives of the right hemisphere type of thinking, it is necessary to apply: replacement of verbal explanation with pictures, diagrams, diagrams; visualization; dramatizations; illustrations; analogy; tasks for the use of practical skills in various activities; historical facts in the study of subjects of the mathematical cycle; tasks based on life situations that are emotionally close to children; activities for the acquisition of experimental experience in the joint solution of an educational problem when working in groups of 3-4 people.

For children of the left hemisphere type of thinking, researchers recommend using tasks that are logical and clearly structured, for example: sorting, grouping, classification; analogies; construction; invention; creative tasks; solving logical problems; concept analysis<sup>8</sup>. Teachers believe that the content of education, revealed through educational standards, curricula, programs, educational literature, assignments, is also subject to some change in accordance with the gender interests and characteristics of students, i.e. some freedom of choice for schoolchildren should be allowed in this matter.

Thus, the implementation of the gender approach contributes to taking into account the psychophysiological characteristics of students, promotes, with the correct organization of the learning process, the formation of acceptable gender roles, the harmonious development and maximum self-realization of the individual, helping the student to gain and maintain mental and physical health.



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# ANDROGEN RECEPTOR VALUES FOR PREDICTION OF SURVIVAL OF PATIENTS WITH THREE TIMES NEGATIVE BREAST CANCER

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## ABSTRACT

*Breast cancer retains its leading position in terms of the incidence of malignant neoplasms in women. Triple negative breast cancer (TNBC) accounts for 12–20% of the entire group of breast cancers (BC). TNBC is characterized by the absence of estrogen receptors (ER), progesterone receptors (PR) and HER-2/ neu expression. This study shows that the presence and detection of androgen receptors (AR) by IHC-expression of TN breast cancer cells opens up prospects for the development of targeted therapy for this type, taking into account the presence or absence of androgen receptors. To rationalize the therapy of TN in breast cancer, it is certainly necessary to summarize a large number of materials with a thorough analysis of all clinical and morphological parameters, taking into account survival rates and the options for chemotherapy regimens used. Thus, breast cancer TN is currently an unresolved scientific and practical problem in the field of oncology, requiring additional research both in terms of finding optimal approaches to the use of already available diagnostic and treatment options, and in searching for new treatment options, as well as fundamental research. in the field of studying the biological characteristics of the disease. The definition of AR is an important factor that plays a role in the prognosis of breast cancer in all molecular subtypes, especially in TN breast cancer, which can become a targeted target for planning targeted therapy. In the course of the study, informative and significant clinical, morphological and parameters were studied and determined on the basis of the prognosis model, allowing with a sufficient degree of probability to predict the outcome of the disease in patients with TN, including when determining a positive AR status, which determines a more favorable prognosis. The presence and detection of androgen receptors (AR) by TN breast cancer cells during IHC-expression opens up prospects for the development of targeted therapy for this type, taking into account the presence or absence of androgen receptors.*

*Thus, androgens, like estrogens, can act as stimulators of breast cancer cell proliferation, which requires study, which was carried out in this study.*

**KEYWORDS:** *triple negative breast cancer, androgen receptor (AR), prognosis.*

## INTRODUCTION

Currently, breast cancer is one of the five most common cancers in the world and is the leading cause of death for women under the age of 50. Detection of breast cancer during preventive examinations throughout the country remains low, and the rate of neglect IIIB - IV stage, which is the leading criterion for the quality of diagnosis, on the contrary, is high. The real way to improve the results of treatment of breast tumors is early, and in some cases, preclinical diagnosis [1,6].

These features of the tumor and the clinical course, as well as the limited therapeutic arsenal, cause an unfavorable prognosis of the disease, and, accordingly, a low survival rate of patients, even when treated in patients with early stages of the disease, especially in advanced processes. This requires the search for new approaches to treatment, as well as diagnostics, which was the main motive for this scientific study [3].

Determining the level of androgen receptors in the tumor in patients with breast cancer is a very relevant and promising direction in studying the prognosis of the disease and finding new additional approaches to the endocrine therapy of breast cancer, especially with a basal-like molecular subtype [2,4]. In domestic and foreign literature, there has recently been an increased interest in the study of androgen receptors (AR) in various molecular subtypes of breast cancer [5,7].

Thus, androgens, like estrogens, can act as stimulators of breast cancer cell proliferation, which requires study, which was carried out in this study.

## PURPOSE OF THE STUDY

The purpose of the study is to determine the presence of androgen receptors (AR) in triple-negative breast cancer cells by



immunohistochemistry and evaluate its role in the diagnosis and prognosis of the disease.

**MATERIALS AND METHODS .**

To solve the set tasks and achieve the goal of the study, pathomorphological, immunohistochemical and statistical methods were used. There were 126 patients with TNBC (T1-4N0-3M0), who received in 2015-2018. complex treatment in the department of oncomammology and chemotherapy of the Tashkent city branch of the Republican Specialized Scientific and Practical Medical Center of Oncology and Radiology. To determine the significance of RA and their role in the treatment of patients with TN breast cancer, an IHC study was conducted to determine the level of its expression. Immunohistochemical examination was carried out according to this technique on the basis of the diagnostic clinic Mediofarm Ltd. "PREMIUM DIAGNOSTICS". Androgen expression was assessed according to DAKOHercep criteria. Test™. Only the membrane reaction was taken into account. To control the quality of the immunohistochemical reaction, before assessing the degree of androgen expression according to the HercepTest criteria , normal mammary ducts were analyzed on the same section. In the absence of a reaction in them, the results of an immunohistochemical study were recognized as reliable.

**RESULTS AND THEIR DISCUSSION**

The evaluation of treatment results began with a statistical analysis of the prognostic value of the signs that affect the outcome of the disease. In patients in the study groups, the distribution of patients was as follows: among the group of patients with breast cancer with AR (-) status, patients aged 35-44 years prevailed - 41.5%, and with AR (+) status aged 45-64 years - 39, 3%, average age with AR (+) status among patients was higher than that of AR (-) (60.0±13 years and 57.1±12 years, respectively). No correlations were found between the levels of AR and the age of patients ( r = 0.01; p> 0.05), ( Table 1).

An analysis of the level of presence or absence of AR depending on menstrual status showed that the majority of patients with AR (-) menstruated - 35.4% or were in perimenopause - 32.3%, which cannot be said with AR (+) status, in which a large some patients were in menopause - 47.5% ( r = 0.03; p > 0.05). The distribution of patients according to the stages of the tumor process depending on AR showed that with AR (+) status, the bulk of patients were in stages IIb - IIIa , which amounted to 29.2% and 20.0%, respectively. With AR (-) status, the largest number of patients had stage IIIb - 34.4% ( r = 0.13; p > 0.05).

**Table 1.**  
**Characteristics of patients depending on AR status**

	Characteristics of the tumor process	AR status		Total patients (n=126)
		AR (-) (n=65)	AR (+) (n=61)	
Age group (n=126)	<35 years old	13 (20.0%)	11 (18.0%)	15 (11.9%)
	35-44 years old	27 (41.5%)	18 (29.5%)	45 (35.7%)
	45-64 years old	16 (24.6%)	24 (39.3%)	40 (31.7%)
	>65 years old	9 (13.8%)	8 (13.1%)	17 (13.5%)
Menst - royal status	Menstruating	23 (35.4%)	5 (8.2%)	28 (22.2%)
	perimenopause	21 (32.3%)	9 (14.8%)	30 (23.8%)
	menopause	12 (18.4%)	29 (47.5%)	41 (32.5%)
	postmenopause	9 (13.8%)	18 (29.5%)	27 (21.4%)
Stage	I (n=12)	9 (13.8%)	3 ( 4.9 %)	12 (9.5%)
	IIa (n=19)	13 ( 20.0 %)	6 ( 9.8 %)	19 (15.1%)
	IIb (n=28)	19 ( 29.2 %)	9 ( 14.8 %)	28 (22.2%)
	IIIa (n=27)	13 ( 20.0 %)	14 ( 23.0 %)	27 (21.4%)
	IIIb (n=31)	10 ( 15.4 %)	21 ( 34.4 %)	31 (24.6%)
	IV (n=9)	1 (1.5%)	8 ( 13.1 %)	9 (7.1%)
Histology	Invasive ductal carcinoma, (n=84)	43 (66.2%)	41 (67.2%)	84 (66.7)
	Lobular cancer , (n=14)	11 (16.9%)	3 (4.9%)	14 (11.2%)
	Medullary cancer , (n=19)	8 (12.3%)	11 (18.0%)	19 (15.1%)
	Apocrine cancer (n= 7)	1 (1.5%)	6 (9.8%)	7(5.6%)
	Metaplastic . cancer , 0 (n=2)	2 (3.1%)	-	2 (1.6%)
G	III degree (n= 0)	-	-	-
	II degree (n=57)	14 (21.5%)	43 (70.5%)	57(45.2%)
	I degree (n=69)	51 (78.5%)	18 (29.5%)	69(54.8%)



Evaluation of the degree of breast cancer depending on AR status showed that with AR (-) the largest number of patients had G -3 – 78.5%, and with AR (+) – G -2 – 70.5% ( $r = 0.13$ ;  $p > 0.05$ ) of the disease stage. According to the histological forms of breast cancer in AR (-), as well as in AR (+), the largest number of patients had invasive ductal cancer, which amounted to 66.2% and 67.2%, respectively. With AR (-), lobular cancer had a significant advantage, which occurred in 16.9% of cases, and with AR (+) medullary cancer was relatively common – 18.0% ( $r = -0.09$ ;  $p > 0.05$ ).

**Table 2**  
**AR expression level on a 3-point scale**

AR, points	Total patients (n=126)
0	59 (46.8%)
1	6 (4.8%)
2	13 (10.3%)
3	48 (38.1%)

As can be seen from Table 2, in most cases, the severity of AR corresponded to 3 points (38.1%). In the absence of the severity of AR in all patients, a non-specific form of breast cancer with II or III degree was verified. In patients in the study groups, the distribution of patients was as follows: in 61 (48.4%) - positive expression of AR (+) was found, in 65 (51.6%) - AR (-) negative. The histological grade of malignancy in AR(-) was higher than in patients with AR(+) tumors.

## CONCLUSIONS

This study shows that the presence and detection of androgen receptors (AR) by IHC-expression of TN breast cancer cells opens up prospects for the development of targeted therapy for this type, taking into account the presence or absence of androgen receptors. In conclusion, it can be concluded that the lack of AR expression in breast cancer patients determines the worst prognosis, despite the more favorable molecular subtype of the tumor.

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# ASSESSMENT OF RESEARCH MANAGEMENT PRACTICES OF THE HALAL GOAT PROJECT OF SKSU

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*Assessment of Research Management Practices of The Halal Goat Project of SKSU.*

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## ABSTRACT

*The study focused on the Assessment of Research Management Practices of the Halal Goat Project of SKSU. The following objective is to assess the research management practices of the Halal goat project of SKSU.*

*In this study, a descriptive research design was used. Non-probability sampling, precisely, purposive sampling technique, was used for the analysis, given the technicalities and relevance of the information required to answer the research questions, seven (6) respondents from the team of halal goats was answer the survey questionnaire.*

*The study on the understanding of halal during Inception shows that the meeting is the most important part of the study knowledge of halal. It should not only concern the holiness among Muslims, but it also concerns the cleanliness and absence of chemicals. Halal production of Goat will improve the profit as to the marketing process. Regular Monitoring of the clientele will boost the interest and enthusiasm of the goat farmers to improve their performance production.*

## INTRODUCTION

Halal food and products are now gaining worldwide attention and have been part of international discussions due to their recognition as an alternative benchmark for food safety, hygiene, and quality assurance (Ambali and Bakar, 2014). Goat meat is now one of the imported and exported Halal goods. Time-honored Halal meat goat, production facilities are common in Islamic countries like Malaysia, Indonesia, Pakistan, and Saudi Arabia (E-Halal Organization, 2010).

Halal goat production in the Philippines is one of the enterprises that is getting an economically doable option, particularly in SOCCSKSARGEN (Region XII). As of 2005 (BAS, 2005), there are 254,109 goats in the Region, or 7.25 percent of the overall population of the nation. Although Muslims only consume 0.21 kg of Halal goats per person annually, they frequently offer them as sacrifices to honor their religion. This is especially true during holy days like Kanduli, Aqiqah, Ramadan, Eid al-Fitr, and Eid al-Adha, when local demand for this product rises. The production of halal goats in the region is still in its early stages, and farmers are unfamiliar with many of its nuances.

In a report for the Organization for Economic Co-Operation and Development (OECD), Helen Connell attempts to "analyze institutional responses to challenges arising from the implications of the changing educational environment on research management, and draw together findings and ideas from recent experience." The report discusses the issue of "research management" in higher education.

There is a need to address research management concerns, including the RD&E of state universities, for better research management. The halal goat research project is one of the successful projects of the SKSU RD&E, which also has to assess how they manage their research project.

## OBJECTIVES

The overall objective of this study is:

1. To assess the research management practices of the Halal goat project of SKSU.

## RELATED LITERATURE

Research management and administration have a relatively short history. It can strongly be linked to the increased requirements of research funding agencies in the field of reporting, and regulation (Campbell, 2010) and demonstrating the impact of state-funded research.

Schützenmeister (2010) highlighted that new roles are emerging in research management necessitating heterogeneous skills converge that are essential for successful research. Moreover, many research managers developed indispensable expertise about the vast number of potential funding sources and the manifold requirements of many of them. These requirements include the need for partners, an interdisciplinary research design, the inclusion of stakeholders, and the integration of international partners. According to Schützenmeister, bright and well-connected manager-scientists are gems for research institutions, and are frequently irreplaceable.

According to Schützenmeister (2010), there are three primary trends that make efficient research management necessary: a lack of funding for research, the complexity of scientific challenges and programs, and the need for complicated infrastructures.

The specific duty of the research administrator, according to Tauginiene (2009), is to advance academic research. Research administrators play a crucial role in the university research culture, collaborating both directly and informally with the faculties.



Shelley (2010) emphasizes that RMAs now play a crucial role in the research process, with the more junior ones primarily responsible for data collection and information discovery and the most senior ones supporting the coordination and direction of their university's research policies.

Schützenmeister (2010) provides a brief summary of research management and administration: firstly, it differs from the traditional university administration since in many cases RMAs participate in both the planning (pre-grant) and implementation (post-grant) phases of research initiatives. Second, RMAs deal with the social, organizational and political context of research and work always in complex project. As regards the role of RMAs, Schützenmeister differentiates between two important developments at US universities: the first is the growing interest of university administrations in research planning and specialization to improve the research profile of universities and to focus on potential subjects that may provide cash, reputation, and competitive advantages. The second originates from external funding sources, collaborations, and resources that need to be managed at different levels at universities.

Three main developments necessitating effective research management are also described by Schützenmeister which include the scarcity of resources for research, the complexity of scientific problems and projects, as well as the necessity of complex infrastructures.

Green and Langley (2009) established that universities require research managers for the development and implementation of successful research projects after conducting extensive interviews at UK institutions.

Wedekind and Philby (2018) show the present relevance of research management and administration by pointing out that EU-funded research and innovation awards are frequently oversubscribed, and EU funding are only allocated to the best with the greatest levels of quality.

The challenge of ensuring the long-term preservation of and access to the outputs of scientific research, especially data sets produced by publicly funded research projects, has become a prominent topic in the United States. The University of North Texas launched the two-year DataRes Project in 2011 to document perceptions and responses to this emerging challenge in US higher education, as well as to investigate how the library and information science (LIS) profession could best respond to the need for better research data management in universities.

Research Data Management (RDM) is a rising topic of research (Tenopir et al., 2011; Zhang and Eichmann-Kalwara, 2019), and RDM skills are increasingly required across all disciplines as researchers take on additional duties to fulfill the demand for open and reusable data (Borghi et al., 2021). Higman et al. (2019, p. 1) defined data management as "the stewardship of data from conception onwards," emphasizing the topic's scope. Indeed, since funding agencies and publishers mandate data management and data sharing in their policies (cf. Chawinga & Zinn, 2019; European Commission, 2016; De Waard, 2016), such thorough stewardship is becoming increasingly crucial.

Empirical research literature never fails to point out that RMA as a profession lacks visibility and, in many cases, acknowledgment, particularly among researchers and other elements of the institutions in which they operate. Even in the Anglo-Saxon world, issues emerge because RMAs believe their work to be demanding, with little appreciation from their non-administrative colleagues to whom they provide a service (Shambrook & Roberts, 2011).

RMA roles, duties, and powers vary widely and are heavily influenced by institutional structure and hierarchy (Tauginiene, 2009; Shelley, 2010). Green and Langley (2009) and Schützenmeister (2010) affirm the diversity of research managers' roles as well as disparities in their impact and responsibilities among businesses, despite the fact that their career pathways are unclear, and in some cases non-existent. The literature unambiguously indicates that research managers and administrators must possess a wide variety of skills and expertise in order to provide high-quality research assistance (Green & Langley, 2009). Professionals that are multi-talented and mission-driven are more likely to succeed (Shambrook & Roberts, 2009).

Tauginiene (2009) distinguishes three main qualities and skills that a research manager and administrator should have: 1) generation, interpretation, and dissemination of information: being aware of the most recent information, understanding and forwarding the information in all phases of grant preparation and management; 2) communication at many levels: between researchers, between researchers and RMAs, between RMAs, and between other stakeholders; and 3) problem solving with high levels of sophistication.

As it has already been referred to in the previous section, the increased competition for research funding, and the emergence of new challenges and opportunities have another effect on the RMA profession on which recently published papers agree: this is the necessity to accommodate continuous change (Shelley, 2010) and align the competences to reflect these changes (Tauginiene, 2009).

As a result, it is important to recognize that core research management ideas developed in the past no longer meet the changing research environment of today. These changes are influenced by social, political, and economic variables that impact higher education's ideals and aims. As a result, changes must reflect the fundamental principles of research management (Tauginiene, 2009).

Regarding this issue, Green and Langley (2009) also confirmed the continuous change that RMAs have to face but they pointed out that it is a result of raising expectations from the academics as well as funding bodies. This phenomenon is backed by the increased complexity of the contract, ethical issues, legal issues, and the efficient coordination of projects with international partners. Empirical investigations also underline this phenomenon: an online survey (Davis-Hamilton, 2016) carried out at the beginning of 2016 revealed that according to respondents, research administration is constantly changing (86%), demanding, challenging, and complex (81%).

Furthermore, the advent of new problems and possibilities has another influence on the RMA profession that studies agree on: the need to accept continual change (Shelley, 2010) and align abilities to reflect these changes (Tauginiene, 2009).

Thus it must be noted that fundamental research management principles formulated in the past no longer satisfy the changing research environment of today. These changes are the result of social, political, and economic variables that impact higher education's ideals and aims. As a result, changes must reflect the fundamental principles of research management (Tauginiene, 2009).

Still up to now, apart from the Anglo-Saxon world, there is a huge lack of educational programs for RMAs (Shelley, 2010). Existing available programs are for post-graduates or for professionals already working in the field, whereas it is almost impossible to graduate as RMA.



Research management and administration have a relatively short history. It can strongly be linked to the increased requirements of research funding agencies in the field of reporting, and regulation (Campbell, 2010) and demonstrating the impact of state-funded research.

Shelley (2010) also discusses the variety of job backgrounds of newly hired research managers. Some had previously worked in business or industry and brought with their flavors of those work cultures. Others have previously worked in government research, financing councils, or accounting. There were also disillusioned contract research scholars looking for a more stable future. Others with more than a decade of research support experience, on the other hand, had advanced to higher positions by changing universities, while others considered the function as one of the pathways in university management.

## METHODOLOGY

### Research design

In this study, a descriptive research design was used. Non-probability sampling, precisely, purposive sampling technique, was used for the analysis; given the technicalities and relevance of the information required to answer the research questions, seven (6) respondents from the team of halal goats answered the survey questionnaire.

### Data Gathering Procedure

In gathering the desired data and information for this study, the researcher has listed all staff/members of the halal goat project. She asked for the approval of the Project leader to survey the project members—furthermore, the approval of concerned members of the project also allowed the recorded and the documented.

### Data Analysis

Descriptive statistics like frequency and ranking were used to summarize the data.

### Data to be gathered

How effective are the research management practices in the following areas of concern:

- a. Planning of research projects
- b. Staffing
- c. Operation
- d. Implementation of research projects
- e. Monitoring and evaluation

## RESULTS & DISCUSSION

This chapter presents the analysis and interprets the results of the statistical procedures on the data gathered.

### Part I. Planning of research projects

**Table 1. Frequency Distributions of the objectives of the research projects.**

Objectives	Frequency	Ranking
Roll out the technology	5	1st
To train the goat farmers	4	2nd
Awareness of Halal Goat	3	3rd
<b>Total</b>	<b>12</b>	

This table shows that the objective to roll out the technology ranks 1<sup>st</sup> before training the goat farmers and awareness. This explains that the transfer of technology to goat farmers on Halal production is a new knowledge among goat raisers considering the demand among Muslim consumers globally. This technology is something new to farmers. It means an additional burden from free range to confinement, but if successful, this will result in a further gain in profit for widespread sale globally, not only to Muslim consumers regarding cleanliness or non-chemical use of feeding.

**Table 2. Frequency Distributions of knowledge of the research projects.**

Items	Frequency	Ranking
Technical	5	1st
Degree	1	2nd
<b>Total</b>	<b>6</b>	

As indicated in this table, technical knowledge ranks 1st as the degree of knowledge. Implies that researchers had special and scientific knowledge related to Halalness following the process or stages

**Table 3. Frequency Distributions of managing to identify and develop the topic**

Item	Frequency	Ranking
Recommendation	4	1st
Proposal	4	1st
<b>Total</b>	<b>8</b>	



This table shows that development and identification of the topic through recommendation and proposal were considered. This explains that the proposal for this project was the primary tool in the identification of a topic as a recommendation by an institution based on their plan of the program.

**Table 4. Frequency Distributions of manage to locate your clients**

Item	Frequency	Ranking
Conduct survey	2	2nd
LGU	5	1st
Visits	2	2nd
<b>Total</b>	<b>9</b>	

As shown in this table, in locating client goat farmers, the LGU ranks 1<sup>st</sup>. It implies that the farmers were closely coordinating with the DA workers for technical assistance. The conduct of surveys and farm visits served as a follow-up.

**Table 5. Frequency Distributions of manage to search for information on halal goat marketing**

Sources of Information	Frequency	Ranking
LGU-DA	3	1st
Online research	1	2nd
Online Market research	3	1st
DTI	1	2nd
<b>Total</b>	<b>8</b>	

Table 5 shows that LGU DA ranks 1st as a source of information among researchers regarding Halal Goat Marketing and Online Market survey. This explains that advanced global technology in communication does help much in this project. Local and online market research survey is a secondary data as sources of information.

**Part II. Staffing**

**Table 6. Frequency Distributions of selecting the research staff members in the research projects**

Selection Process	Frequency	Ranking
Skill experience	4	1st
Physical % mental aspect	2	2nd
Specialization	1	3rd
<b>Total</b>	<b>7</b>	

As seen in this table, the Skill experience of staff selection was very much considered. The physical and mental aspect was next, and specialization was considered. It means that one's ability and knowledge were more effective in execution or performance than with a good physique and mind and with specialization without skill.

**Table 7. Frequency Distributions of qualifications need to work in halal research**

Type of Objectives	Frequency	Ranking
Skill	4	1st
Specialization	4	1st
Religion	2	2nd
Relationship	1	3rd
<b>Total</b>	<b>11</b>	

Table 7 shows that in terms of qualifications that need to work on this research must be skillful with the specialization, which ranks 1. Religion ranks Second, meaning researchers of halal don't need to be Muslim. As long as you are knowledgeable of the word Halal and Haram, he will qualify for this research project.

**Table 8. Frequency Distributions of qualification should a research assistant**

Type of Objectives	Frequency	Ranking
Specialization	4	1st
Bachelor degree	4	1st
Skills	2	2nd
<b>Total</b>	<b>10</b>	

It indicates in this table that a qualification of a research assistant must be a graduate of four years or a bachelor's degree with a specialization rank of 1. It implies that education as a degree holder matters in forms of communication and writing research whereas skills rank 2.



**Part III. Operation**

**Table 9. Frequency Distributions of starting the research planning**

Type of Objectives	Frequency	Ranking
Inception Meeting	1	2nd
Workshop	5	1st
Training	1	2nd
<b>Total</b>	<b>7</b>	

Table 9, In this table, the Planning on this halal research started with a workshop for the staff, which ranks first, followed by the inception meeting and training with farmers. It implies that orientation among the respondents has started with classifying the term halal or haram.

**Table 10. Frequency Distributions of Identifying the Stakeholder**

Item	Frequency	Ranking
LGU-DA	5	1st
Conduct survey	2	2nd
<b>Total</b>	<b>7</b>	

This table shows that the identification of stakeholders is in coordination with Local Governments Unit (LGU - DA). It explains that LGU farmer's consultation is the effective and easiest way of knowing and finding the stakeholders in this project

**Table 11. Frequency Distributions of obtaining the funding**

Type of Objectives	Frequency	Ranking
Submit proposal	2	2nd
Institution	3	1st
Application	1	3rd
<b>Total</b>	<b>6</b>	

As seen in this table, in obtaining funding for this research project, this was funded by an institution with the requirement of writing a project proposal for applying for funding from in status on get was channeled by the national government.

**Part IV. Implementation**

**Table 12. Frequency Distributions of managing to implement the research project**

Implementation Process	Frequency	Ranking
Conduct survey	3	1st
Confer in LGU agencies	3	1st
Interviews	2	2nd
<b>Total</b>	<b>8</b>	

Table 12 As to the management on the implementation of the project, it was stated in this table that the conduct of the survey and coordination with LGU rank 1 followed up with interviews, which implies that the conduct of the survey and coordination with LGU, both determined the success of the project implementation.

**Table 13. Frequency Distributions of methods of assessing the organization in support of the program.**

Type of Objectives	Frequency	Ranking
Workshop	2	2nd
Training	2	2nd
Inception meeting	3	1st
<b>Total</b>	<b>7</b>	

As shown in this table, the method of assisting the organization to support the program inception meeting with respondents ranks first, followed by training and workshops. It explains that any research activity should start with understanding what you are doing.

**Table 14. Frequency Distributions of project implementation**

Item	Frequency	Ranking
Workshop	1	3rd
Training	5	1st
Inception meeting	4	2nd
<b>Total</b>	<b>10</b>	

As shown in this table, training ranks first in implementing the project from the staff to the clientele. This explains that awareness from the knowledge of Halal production was done for the successful implementation. There can be no successful



implementation without workshops and training and, from time to time, inception meetings for more comprehension of the project objective and goals.

**Part V. Monitoring and Evaluation**

**Table 15. Frequency Distributions of managing and tracking the results of interventions throughout the program**

Tracking Results	Frequency	Ranking
Evaluation form	3	1st
Visiting	3	1st
Interview	2	2nd
Conduct survey	1	3rd
<b>Total</b>	<b>9</b>	

Table 15 shows the management on tracking the results of the intervention throughout the program. Those visiting and evaluating rank 1<sup>st</sup> in obtaining the results. Interview ranks 2<sup>nd</sup> explain that regular visiting is effective for tracking results.

**Table 16. Frequency Distributions of managing the result of the project to ensure its improvement**

Type of Objectives	Frequency	Ranking
Project team meeting	4	1st
Monitoring	4	1st
Conduct survey	1	2nd
<b>Total</b>	<b>9</b>	

It was indicated in this table that monitoring and Project team meeting ranks 1<sup>st</sup> in their activity of ensuring the result of project improvement. It explains that regular Monitoring and conduct of meetings regularly will ensure the progress of the project. Face-to-face was observed as a successful strategy.

**Table 17. Frequency Distributions of how often the Monitoring of the project**

Item	Frequency	Ranking
Every 1 week	3	1st
Monthly	2	2nd
Every 2 weeks	1	3rd
<b>Total</b>	<b>6</b>	

Table 17 shows that Monitoring of the project was done weekly by the researchers, then monthly Monitoring every two weeks. This explains that weekly Monitoring led to the success of the said project. Manifestation of their success was funding a second round of study research that pertains to marketing their output (meat) locally and internationally in market outlets.

**Table 18. Frequency Distributions of the method of assessing the clients**

Methods of Assessing	Frequency	Ranking
Evaluation form	4	2nd
Interview	5	1st
Conduct survey	1	3rd
<b>Total</b>	<b>12</b>	

This table shows that the best method of assessing the clientele is through interviews. This implies that through the interview, the clientele was formally consulted and evaluated based on their qualifications. In that case, information was obtained formally from them. Evaluation form rank 2<sup>nd</sup> in obtaining information wherein the clientele comfortably answers the query

**Table 19. Frequency Distributions of managing the performance of the projects clientele**

Instrument	Frequency	Percentage
Interview	3	2nd
On visit Monitoring	4	1st
Evaluation form	2	3rd
<b>Total</b>	<b>12</b>	

As indicated in this table, On Visit monitoring as a tool for the management of the clientele's performance ranks 1<sup>st</sup>. It explains that this instrument was successful, considering the immediate answers to the day-to-day problems encountered in the production. Any problems with their project will be resolved by utilizing tools.

**Table 20. Frequency Distributions of the Monitoring and evaluating the project**

Type of Objectives	Frequency	Percentage
Interview	3	2nd
Visiting	6	1st
Evaluation form	2	2nd
Conduct survey	1	1st
<b>Total</b>	<b>12</b>	

This shows that both the objective of evaluation and form and conduct survey got the 1<sup>st</sup> rank. This was followed by interview and evaluation rank as 2nd. This explains that through visiting and conducting a survey, the project was formally monitored and evaluated.

## SUMMARY

Among the objectives of planning a research project to roll out the technology ranks first. One of the stages of planning activity is the introduction of the research project. Technical knowledge emphasizes the transfer of technology. Developing the topic proposal and recommendation was highly used by the researchers. As to locating clients, the most helpful is through the LGU DA at the same time as sources of information on halal goat marketing. On the management of hiring staff to join the project. Preferably Skill experience with specialization and a graduate bachelor's degree was considered in terms of operation, as to the operation of the halal goat project. It has always started with workshop training and inception meeting to ensure the readiness of the staff and clients. The funding institution known as PCARD, which funded the project, has required SKSU researchers to accomplish all requirements needed for funding as the recipient together with a partner university in Region Mindanao. As to the implementation of the project, coordination of LGU agencies was indeed considered after the conduct of the survey and interview. The system and implementation of the project inception meeting rank one before the series of surveys and interviews. Results of the project for improvement were done every week with a project team for improvement. The interview with farmers during visits of the project Team was seen as effective in monitoring their performance.

## CONCLUSION

Based on the result of the project, the following conclusion is drawn.

1. The study on the understanding of halal during Inception. The meeting is the most important part of the study knowledge of halal. It should not only concern the holiness among Muslims, but it also concerns the cleanliness and absence of chemicals.
2. Halal production of Goat will improve the profit as to the marketing process.
3. Regular Monitoring of the clientele will boost the interest and enthusiasm of the goat farmers to improve their performance production.

## RECOMMENDATION

Based on the findings and the conclusion of the study, the following recommendations are proposed.

1. Halal production should not be introduced only to goat farmers. It should include fowl animals.
2. Staff selection should include not only an Arabic teacher or Imam but to include any practicing Muslim in Islam religion either male or female who knows of research work activity.
3. Inception should always start with the knowledge of the word halal or what is not (Haram).

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# FORMULATION DEVELOPMENT AND CHARACTERIZATION OF AZOLE DERIVATIVE LOADED ETHOSOME AND LIPOSOME: A COMPARATIVE ASSESSMENT REPORT

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## ABSTRACT

*Skin act as a major target as well as a principle barrier for transdermal drug delivery. Vesicular system is one of the most promising approaches for transdermal delivery of active substances. Liposomes are most commonly used vesicular delivery system. But it has certain limitations such as lesser stability, reduced encapsulation efficiency, etc led to formulation of ethosomes. In the present work we encapsulated various concentration of Miconazole Nitrate (an antifungal drug) within ethosome and liposome and made a comparative evaluation of their morphology, size, potential, stability and anti-fungal efficacy. Ethosomes showed better stability, encapsulation efficiency and anti-fungal activity as compared to liposome due to its ethanolic content. So ethosomal formulation may prove as a very promising option for transdermal delivery and has potential for new opportunities for topical application of Miconazole Nitrate in the fungal infections.*

**KEY WORDS:** *drug delivery, transdermal, encapsulation efficiency, topical, Miconazole Nitrate liposome, ethosome.*

## INTRODUCTION

Nanotechnology is a multidisciplinary field that covers a vast and diverse array of devices derived from engineering, physics, chemistry, and biology (Sahoo.S.K., et al, 2006). It is the technique of manipulating matter at the scale of atom and molecules (Drexler et al., 1986). In 1974 Norio Taniguchi used the phrase “nanotechnology” for the first time while describing an ion sputter machine. The term “nano” which means “dwarf” was originally derived from Greek word. Nanotechnology works with materials, devices, and other structures with at least one dimension sized from 1 to 100 nanometres. Nanometre is defined as one billionth of a metre that is equivalent to the length of ten hydrogen atoms. Now a day’s nanotechnology has a global interest. As mentioned in Environment and green nano the term nanotechnology embraces various fields and specialities including green nanotechnology, wet nanotechnology, nanoengineering, nanobiotechnology. Application of nanotechnology in commercial products like nanomedicine and green technology minimizes energy consumption and enhances the environmental sustainability of processes currently producing negative externalities, thus increasing the efficiency of energy production or quantum aged atoms (QCAs) (Robert A. Freitas Jr. 1999). Nanotechnology also has numerous potential application in the fields of consumer goods, providing with products with novel functions ranging from easy to clean to scratch-resistant (Neethirajan et.al., 2009) .

The structural and functional unit of nanotechnology is nanoparticle. It is defined as a small object that behaves as a whole unit with respect to its transport and properties. According to their diameter particles are further classified into three categories.(Grangvist et al., 1976).

- Coarse particles (10,000-2,500 nm)
- Fine particles (100-2500 nm)
- Ultrafine particles (1-100 nm)

Various types of nanoparticles are present which includes Nanosphere, Nanocapsule, Dendrimer, Polymeric micelles, Liposome and SLN (solid lipid nanoparticles). Nanosphere are considered as a matrix system in which matrix is uniformly dispersed. Beside of these spherical vesicular system is known as nanocapsules. In case of polymeric nanoparticles, the polymeric membrane surrounds the drug





in a matrix core. Mostly biodegradable polymers are used in polymer nanoparticles like polycyanoacrylate or poly (D, L-lactide) and related polymers like poly(lactic acid)PLA or poly(lactide-co-glycolide) etc. Dendrimers is a unique class of polymers which is highly branched macromolecules whose size and shape can be precisely controlled. Application of nanoparticles target drug delivery, drug bio-availability, detection of pathogen etc (Abhilash M., 2010).

Phospholipids are the major components of all cell membranes as they form lipid layers. Phospholipid is a class of lipid mainly consisting of diglyceride and phosphate group. The structure of the phospholipid molecule consists of hydrophobic tails and a hydrophilic head. Lecithin or phosphatidylcholine from egg yolk was the first identified phospholipid. Other common phospholipids are phosphatidic acid (phosphatidate), phosphatidylethanolamine (cephalin), phosphatidylcholine (lecithin), phosphatidylserine, phosphoinositides, etc. Phospholipid synthesis occurs in the cytosol adjacent to endoplasmic reticulum (ER) (E Fahy et al., 2009).

Lecithin (phosphatidylcholine) is generic term which is used to designate yellow brownish fatty substance present in animal or plant tissue composed of phospholipids, phosphoric acid, triglyceride, glycolipids, etc. Lecithin is easily extracted from sources such as soybeans, eggs, milk, marine sources, rapeseed, cottonseed and sunflower chemically by using hexane, ethanol, etc. Lecithin has emulsification and lubricant properties. Lecithin from soybean and egg play an important role in drug delivery.

Liposome is an artificial microscopic single vesicle consisting of an aqueous core enclosed in one or more phospholipid layers used to convey vaccines, drugs, enzymes, or other substances to target cells or organs (Lawrence D, 1986). Liposomes are a form of nanoparticle prepared from lecithin. They are microscopic, concentric bilayered vesicles. Here the aqueous volume is entirely enclosed by a membraneous lipid bi-layer composed of natural or synthetic phospholipids. The major types of liposomes are multilamellar vesicles, small unilamellar vesicles, large unilamellar and cochleate vesicles (Sharma.A and Sharma U.S, 1997). Liposomes increase the efficiency, bioavailability, absorption of certain entrapped dietary and nutritional supplements and are used as topical drug delivery system. (C.George et al., 1975). But liposomal drug delivery system has certain shortcomings like the need for modification for site specific or organ specific drug delivery, high production cost and leakage and fusion of encapsulated drug/molecule.

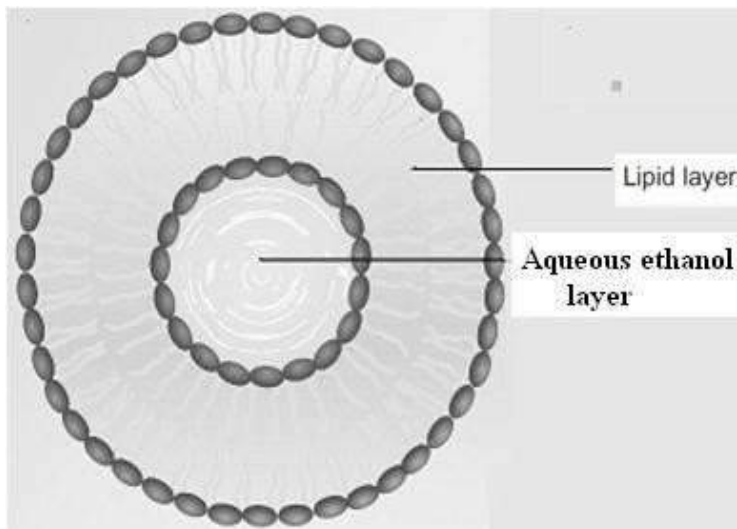
## **ETHOSOME**

Ethosomes were specially tailored novel vesicular carriers introduced by Touitou in the year 2000 (25). These are soft, flexible vesicle mainly composed of phospholipids, relatively high amounts of ethanol (20-45%) and water (Figure 6). The ethanolic vesicles differ from the conventional liposomes by a number of essential characteristics such as vesicle bilayer flexibility, its mechanism of enhanced skin permeation, easy method of preparation; stability and lack of toxicity. These systems have the capability to convey the drugs into the deeper skin layers to the extent of the systemic circulation. The high ethanol concentration (20-45%) imparts a negative surface charge to the vesicle which makes the size of the vesicles to decrease (26).

### **Advantages of Ethosomes**

Ethosomes as novel lipid carriers offer numerous advantages over the other vesicular systems (26, 27). These include

- Prepared with biodegradable and biocompatible components
- Contains non-toxic raw material in a formulation.
- Enhanced permeation of drug through the skin for transdermal drug delivery.
- Ethosomal drug delivery system can be applied widely in Pharmaceutical, Veterinary, Cosmetic fields.
- High patient compliance: The ethosomal drug is administered in semisolid form (gel or cream) hence producing high patient compliance.
- The simple method for drug delivery in comparison to Iontophoresis and Phonophoresis and other complicated methods.
- The Ethosomal technology is available for immediate commercialization.
- Capability to efficiently encapsulate a wide variety of drug molecules including water-soluble, lipophilic, amphiphilic and high molecular-weight compounds.
- Provides sustained and controlled delivery of drugs.
- Provide better accumulation of drug molecule in the deeper layers of the skin and acts as depot systems.
- Provides passive and non-invasive means of application.
- Improve the delivery of drug through skin under occlusive and nonocclusive conditions.
- Easy to scale up and vast market potential.



**Figure . Schematic presentation of ethosomes**

## PREPARATION AND CHARACTERIZATION

### ❖ Preparation of Ethosomes:

**Selection of Phospholipids:** Choose a suitable phospholipid(s) based on the desired characteristics and compatibility with the drug or active ingredient. Commonly used phospholipids include phosphatidylcholine, phosphatidylethanolamine, and phosphatidylserine.

**Solvent Selection:** Ethanol is the primary solvent used for ethosome preparation, as it enhances the flexibility and fluidity of the phospholipid bilayers. It also helps in solubilizing both hydrophilic and lipophilic drugs. Other solvents like propylene glycol or isopropyl alcohol can also be used in combination with ethanol to achieve the desired properties.

**Drug Loading:** Dissolve the drug or active ingredient in the appropriate solvent mixture containing ethanol. Ensure that the drug is completely solubilized or dispersed within the solvent.

**Preparation Method:** Several methods can be used to prepare ethosomes, including:

a. **Thin Film Hydration Method:** In this method, dissolve the appropriate amount of phospholipids in a suitable organic solvent mixture containing ethanol. Evaporate the solvent under reduced pressure to form a thin film of the lipid mixture on the walls of a round-bottom flask. Hydrate the lipid film with an aqueous solution, followed by sonication or vortexing to obtain the ethosomes.

b. **Hot Method:** Dissolve the phospholipids and the drug in a suitable organic solvent mixture containing ethanol. Heat the mixture to a temperature above the phase transition temperature of the phospholipids, followed by sonication or vortexing. Allow the mixture to cool to room temperature to obtain the ethosomes.

c. **Cold Method:** Dissolve the phospholipids and the drug in a suitable organic solvent mixture containing ethanol at room temperature. Place the mixture in an ice bath and subject it to sonication or vortexing until ethosomes are formed.

❖ **Characterization of Ethosomes:** Particle Size Analysis: Determine the size distribution of ethosomes using techniques such as dynamic light scattering (DLS), nanoparticle tracking analysis (NTA), or laser diffraction. These techniques can provide information about the mean particle size, polydispersity index, and zeta potential of the ethosomes.

**Morphology Analysis:** Use transmission electron microscopy (TEM) or scanning electron microscopy (SEM) to visualize the morphology of ethosomes. These techniques can reveal the shape, structure, and surface characteristics of the vesicles



**Encapsulation Efficiency:** Determine the amount of drug or active ingredient encapsulated within the ethosomes. This can be done by separating the unencapsulated drug from the ethosomes using techniques such as centrifugation or dialysis, followed by quantification of the drug concentration using suitable analytical methods.

**Stability Studies:** Assess the physical and chemical stability of ethosomes over time. Study factors such as particle size changes, drug leakage, and vesicle aggregation under different storage conditions (temperature, light, etc.) over a specified period.

**In vitro Drug Release Studies:** Evaluate the release profile of the drug from ethosomes using suitable dissolution methods. Measure the amount of drug released at different time intervals to understand the release kinetics and release mechanism.

## AIMS & OBJECTIVES

1. To prepare ethosomes and liposomes encapsulating Miconazole Nitrate in various concentrations.
2. To characterize the prepared ethosome and liposome.
3. To determine the efficacy of prepared ethosome and liposome against fungal pathogens.

## MATERIALS & METHODS

### I. MATERIALS

#### Chemicals Required

The drug Miconazole Nitrate was obtained from local pharmaceutical store under the brand name Monistat. Lecithin (Trade name-Leciva- S70) containing not less than 98% phosphatidyl- choline was received as a kind gift from VAV LIFE SCIENCES Pvt. Ltd, Mumbai, India. Ethanol and methanol was purchased from Hi-media Pvt. Ltd Mumbai, India. Distilled water and all other chemicals and solvents used in our work were of analytical grade and available in Department of Pharmaceutics, GRKIST PY, Jabalpur, M.P.

#### Instruments Used

The basic instruments used for the preparation and characterization of the samples like Weighing balance (Contech-CA223, 2008), Magnetic stirrer (Remi), Probe Sonicator (Plexiglas), Refrigerated centrifuge (Thermofisher), UV Spectrophotometer (Agilent technologies Cary 60, 2012), FT-IR (Agilent technologies Cary 630, 2012) was available in the Department of Pharmaceutics, GRKIST PY, Jabalpur, M.P.

For Specialised assessment like Scanning Electron Microscopy, Atomic Force Microscopy and Particle Size Analyzer samples were sent to Diya labs Mumbai and STIC Cochin.

### II. PREPARATION OF STOCK SOLUTION OF MICONAZOLE NITRATE

Miconazole Nitrate stock solution was prepared by dissolving 1mg drug in 10 ml ethanol according to the manufacturer's instruction. Working solutions of different concentrations ranging from 0.3125 µg/ml to 30 µg/ml were prepared from the stock solution. When water was used to dissolve the drug, it resulted in immediate precipitation of the drug, so the ethanol was chosen as a solvent

### PREPARATION OF ETHOSOME AND LIPOSOME

#### Preparation of blank ethosomal particle

Ethosome was prepared by solvent dispersion method as described by Touitou et.al. 2000. Briefly Lecithin (up to 2-3%), was dissolved in (30-40%) of 90% ethanol by use of magnetic stirrer (Remi Motors Mumbai) for 20 minutes at 100 rpm. To this mixture warm distilled water was slowly added in a fine stream by syringe and the whole system was stirred for 30 minutes at 700 rpm. The resulting preparation was sonicated for 3 cycles of 5 minute each with 5 minute rest between the cycles.

#### Preparation of drug (Miconazole Nitrate) encapsulated ethosomes

Miconazole Nitrate (drug) encapsulated ethosomes were also prepared by solvent dispersion method following the protocol by Touitou et.al, 2000. Lecithin (2-3%) and Miconazole Nitrate was dissolved in (30-40%) of 90% ethanol by use of magnetic stirrer (Remi Motors Mumbai) for 20 minutes at 100 rpm. Then warm distilled water was added slowly in a fine stream to the ethanolic drug mixture solution and the mixture was stirred for 30 minutes at 700 rpm in a closed vessel. The resulting preparation was sonicated for 3 cycles of 5 minute each with 5 minute rest between the cycles. This method was repeated several times but by varying the drug concentration each time.



### Preparation of blank liposomal particle

Liposomes were prepared by classic dispersion method as described by Touitou et.al. 2000 with certain modifications. Lecithin (2-3%) was dissolved in 6 ml distilled water. This mix was heated to 30C in a water bath. To this mixture warm distilled water was added slowly in a fine stream with continuous stirring at 700 rpm in close vessel. The resulting vesicles were sonicated for 3 cycles of 5 minute each with 5 minute rest between the cycles.

### Preparation of drug (Miconazole Nitrate) encapsulated liposomes:-

Miconazole Nitrate (drug) encapsulated liposomes were prepared as described by Touitou et.al, 2000 with little modification of the classic dispersion method. Briefly lecithin (2-3%) and drug solution was taken and dissolved in 6 ml distilled water and this mix was heated to 30C in a water bath. Warm distilled water was added slowly in a fine stream to the drug-lipid suspension with continuous stirring at 700 rpm in a closed vessel. The resulting vesicles weresonicated for 3 cycles of 5 minute each with 5 minute rest between the cycles.

## RESULTS

The various formulations of liposomes and ethosomes were characterized and their results shown below.

### Vesicle Morphology

The various drug loaded formulations of ethosomes and liposomes (including the blank particles) appeared more or less spherical when observed by SEM (Fig. 1).

### Particle size and particle size distribution

The particle size, zeta potential and size distribution of the various suspensions are shown in Table 4.1. The zeta potential of all the ethosomal vesicles was of higher magnitude than liposomal vesicles (measured in millivolts). The poly index measured in PDI and particle size measured in nanometre.

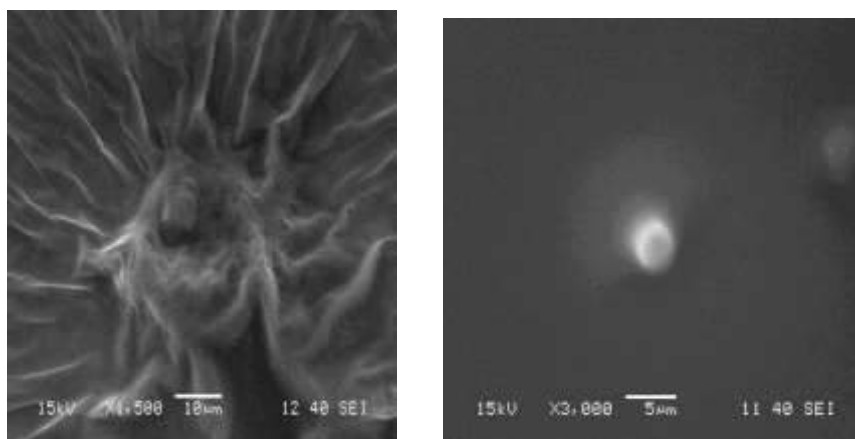
### Drug Entrapment Efficiency

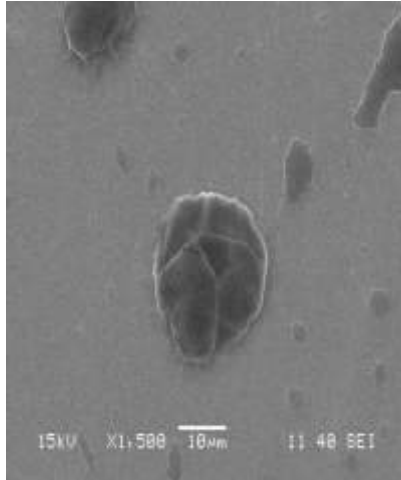
The entrapment efficiency was calculated as mentioned in Chapter 3. The quantity of drug entrapped is more in case of ethosome as compared to liposome. Among the various formulations when drug concentration is around 20-30 µg/ml, the quantity of drug entrapped is more. The high ethanol concentration favoured better encapsulation. The values of encapsulation efficiency is shown in Table 4.4.

### Antifungal Studies

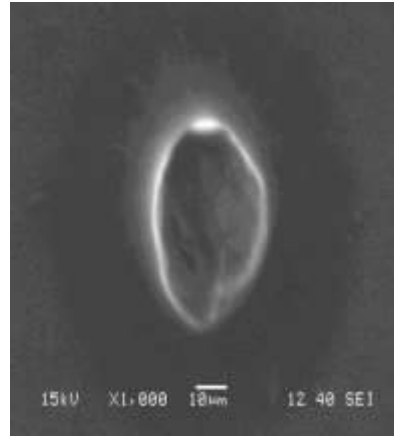
The in-vitro antifungal studies qualitatively showed the better efficacy of drug loaded ethosomes against the drug loaded liposomes. The blank formulations did not show any activity against the fungal pathogens. The results are shown in Fig.4.13.

**Fig 4.1. Concentration of drug 5µg/ml**





Liposome



Ethosome

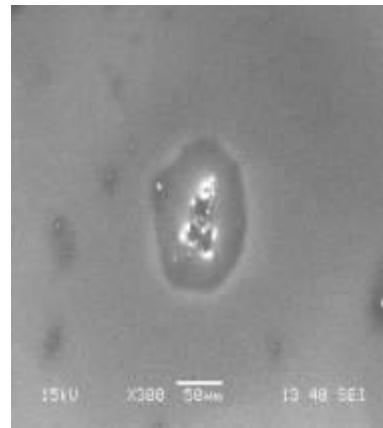
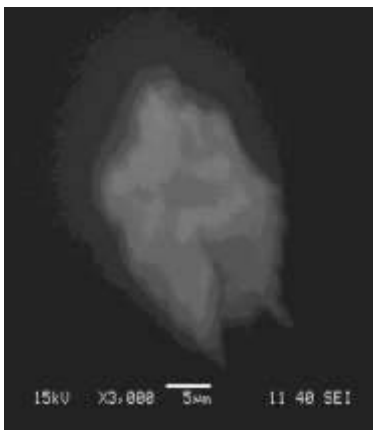
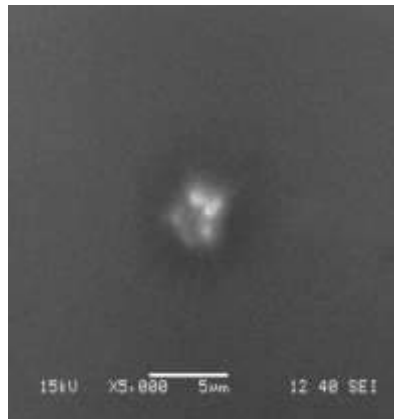


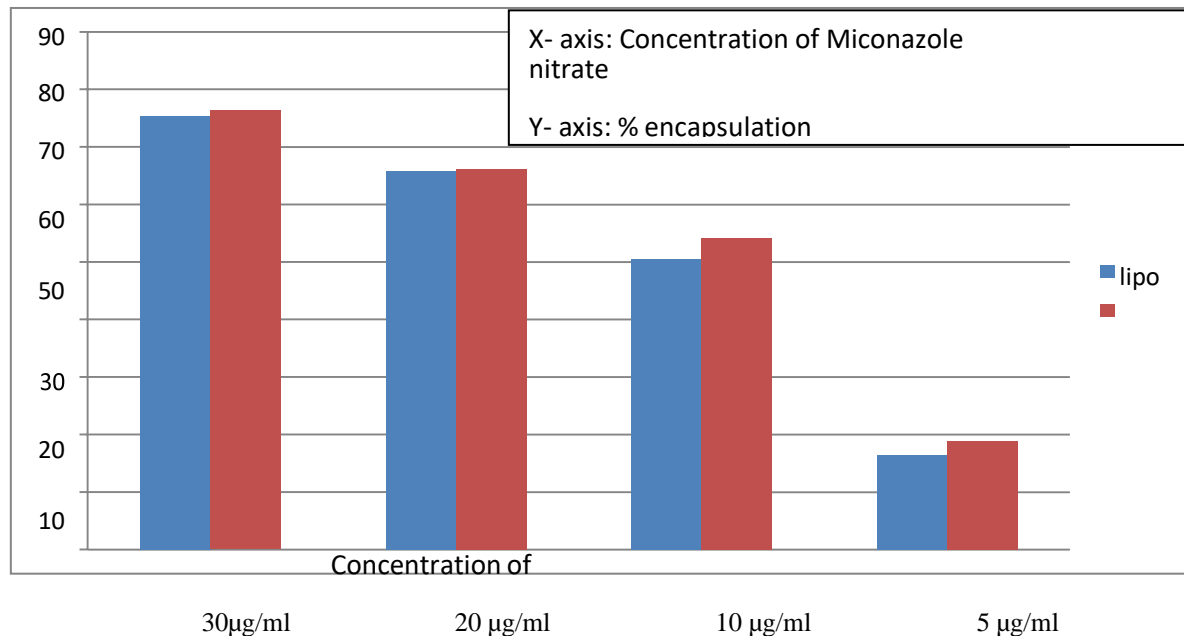
Fig 4.2. Concentration of drug 10µg/ml

Fig 4.4. Concentration of drug 30µg/ml

Fig 4.3. Concentration of drug 20µg/ml



**Fig 4.15. Graph showing comparative encapsulation efficiency of ethosome and liposome at various drug concentrations**



### DISCUSSION & SUMMARY

Development of novel drug delivery carriers are a necessity to deliver the drugs to target site at a faster rate to overcome the drawbacks of multi-dose therapy and increase patient compliance and improve their safety. For drug delivery via dermal and transdermal routes ethosomes have emerged as a non-invasive mean.

### CONCLUSION

The ethosomal formulations were more spherical with stable zeta potential and mono- disperse with no clumping. Although the liposomes showed spherical morphology but were less stable and usually poly-dispersed in nature. The antifungal activity of liposome was less as compared to ethosomes.

So from the study it was confirmed that ethosomal formulation of Miconazole Nitrate showed a good entrapment efficiency and better stability profile as compared to liposomes. Thus it is concluded that ethosomal formulation is a very promising option for transdermal delivery and has potential for new opportunities for topical application of Miconazole Nitrate in the fungal infections.



## **EVALUATION OF PERCEPTION OF EXTEROCEPTIVE SENSATIONS IN PRETERM NEONATES-A PILOT STUDY**

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### **ABSTRACT**

**Aim:** Preterm infant is deprived of various in-utero sensory experiences which have been documented as risk factor for prevalence of broad range of neurodevelopmental impairment in preterm infants. The present study evaluates the pain processing pattern in preterm neonates with and without known abnormalities using the Premature Infant Pain Profile (PIPP) - a 7 indicator pain measure that include three behavioural (facial actions: brow bulge, eye squeeze and nasolabial furrow), two physiological (heart rate and oxygen saturation), and two contextual (gestational age and behavioural state).

**Method:** Neonates were randomly observed for receiving one of the following procedures: Dry cotton swab for simple touch (T), Cold and warm water wet cotton swabs for recording temperature perceptions (Tp), venous puncture in the back of the hand (P), considered as a painful stimulus; or alcohol swab friction on the back of the hand (F), considered as a distressing but not painful stimulus. A neonatologist evaluated physiologic and behavioral pain parameters. The evaluation of the perception includes utilizing Neonatal Infant Pain Scale (NIPS) and PIPP.

**Results:** The mean pain score is 8.04 which is considered as moderate as per PIPP table. The standard deviation is 3.517. The probability distribution of pain is normal.

**Conclusion:** The pain perception according to the recorded score is moderate in the premature neonates and the perception score is comparatively high in preterm neonates with known abnormalities. The infants born at 29–31 weeks of gestational age group showed greatest changes in the hemodynamic patterns during exteroceptive painful stimulation.

**KEY WORDS:** premature, neonates, Premature Infant Pain Profile, PIPP, Neonatal Infant Pain Scale, NIPS, preterm birth.

### **INTRODUCTION**

Preterm infant is deprived of various in-utero sensory experiences which have been documented as a risk factor for prevalence of a broad range of neurodevelopmental impairment in preterm infants.<sup>1</sup> The spectrum of neurodevelopmental disabilities includes cerebral palsy, mental retardation, visual and hearing impairments and more subtle disorders of central nervous system function.<sup>2</sup>

The Neonatal Intensive Care Unit [NICU] is one of the most commonly used clinical interventions in the stabilization and providing a multimodal sensory experience for normal growth and development of a preterm infant. In two decades, many pain assessment tools have been established to measure pain in infants in the NICU.<sup>3-7</sup> Regrettably, the developed scales has not been upheld to



perform complete psychometric testing. Furthermore, many studies have not used appropriate theoretical models to determine the developmentally relevant, relatively specific pain indicators in this population.

According to Jonsdottir et al,<sup>8</sup> the need for a pain measure is a clinically important issue for substantiating a therapeutic decision and evaluating the effectiveness of a particular intervention. This is especially true as professionals are becoming increasingly aware of the immediate and long-term effects of pain in preterm and term infants. The management of pain in infants at the NICU has improved over the last decade in response to advancements in the understandings of pain and pain relief although much is still to be learned.<sup>9,10</sup> One of the major challenges is assessing the degree of experienced pain in the absence of verbal expression.<sup>9</sup> The assessment of pain in the neonates needs more than a single indicator because nociception have much more complex nature in infants. There are two familiar indicators used for the pain assessment, One of which is the Premature Infant Pain Profile (PIPP). This is an indicator in English in 1990s and got to light in 1996 by Stevens and colleagues. This scale helps researchers and clinical practitioners to assess acute pain in preterm and term neonates.<sup>11</sup> The present study evaluates the pain processing pattern in preterm neonates with and without known abnormalities. The study also establishes evidence on gender differences in pain perception and level of alertness in preterm neonates for understanding the pain perception.

## MATERIALS AND METHODS

This cross sectional study was conducted in the Neonatal Intensive Care Unit [NICU] & Paediatrics department of MGM Medical College, Navi Mumbai. A study population of 125 premature neonates was selected based on convenient sampling technique (admitted into neonatal ICU) and were separated into two groups based on the complications they possess. First group contained only preterm neonates without any known complication & the second observed group of preterm neonates possessed any known or observed birth complications such as gross or physiological defects.

Normal neonates were analyzed for any significant difference with the premature neonates. After written maternal consent prior to enrollment, healthy neonates admitted to rooming-in with their mothers, with post-natal age greater than 24 hours. At this time their stress response to delivery is attenuated; newborn preterm infants with late non-hemolytic jaundice and indication for venous puncture for bilirubin dosage by the clinical staff were selected and 30 to 45 minutes interval was given between last feeding and recorded observations in order to have a calm and reactive patient to observe.

The infants whose mothers had used any opioid during pregnancy, labor or delivery, were excluded in the study since these drugs can cross the placenta and affect fetus and newborn infant pain perception. Also with mothers who had general anesthesia during delivery were excluded, as anesthetics can readily cross the placenta and interfere with neonatal nociception; Infants at high risk due to major malformation or neurological abnormalities were also excluded from the study.

All the study population was exposed to various exteroceptive sensations like simple touch, pressure, pain, temperature and reaction of the neonates during exteroceptive sensation perception was noted.

After patient enrollment, the following neonatal data was registered: birth weight in grams, gestational age, gender, relationship between birth weight and gestational age, post-natal age in hours, and minutes after the last feeding.

Neonates were randomly observed for receiving one of the following procedures: Dry cotton swab for simple touch (T), Cold and warm water wet cotton swabs for recording temperature perceptions (Tp), venous puncture in the back of the hand (P), considered as a painful stimulus; or alcohol swab friction on the back of the hand (F), considered as a distressing but not painful stimulus.<sup>(3)</sup> A neonatologist was assigned to evaluate the physiologic and behavioral pain parameters and the same was done.

After identification, the recruited infant, it was ensured that the subject has completely settled with the environment. A pulse-oximeter was connected to neonates of which the probe was placed on the foot. The neonates were then allowed to rest for five minutes prior to procedure. After completion of procedure, the subjects were observed for 10 minutes.

All the parameters were measured before (PRE) the procedure, and was repeated during (T0) the procedure. The assessment was also done after one minute (T1), three minutes (T3), five minutes (T5) and ten (T10) minutes of the procedure. The evaluation of the perception includes utilizing NIPS<sup>12</sup> [Neonatal Infant Pain Scale] the Premature Infant Pain Profile [PIPP] <sup>11</sup>scales for identifying the variability.

## RESULTS

Out of 125 participating neonates, 73 were born vaginally and 52 with caesarian section. The normal group in contrast to preterm neonates showed minimal pain perception. The mean gestational age was 31.4 weeks (26-38) and the mean birth weight 1.541gms.





Modes of oxygenation include CPAP, Oxygenation by hood and Ventilator. The percentages of neonates depending on different modes of oxygenation are represented in Graph-1. Table-1 shows the descriptive statistics of birth weight for neonates.

The preterm neonates based on gestational week born, were grouped into 5 groups (Table-2) with a class interval of two starting from 26 weeks and the maximum frequency distribution is seen in the age group 26-28 weeks. In the following table the frequency distribution of male and female neonates also can be seen, maximum being female neonates with an age group of 26-28 weeks.

The premature infants were grouped into Group-1, PMB (Premature neonate without any known complications) and Group-2, PMB+AB (Premature neonate with known complications). The following tables (Table-3), shows the frequency distribution of the neonates and their percentages in correlation with gestational age group.

The lying position of the neonate observed shows 100% babies of age group 26-28 lie in supine resting position, 50% in side lying and 50% are in supine position in age group 29-31, 12.5% in prone position and 87.5% in supine position in age group 32-34, 100% supine in age group 35-37 weeks, 100% supine in 38-40 weeks.

The average heart rate throughout data collection period is shown in table-4. Within the group of PMB, in male neonate the average heart rate 155 bpm whereas female neonate shows an average of 152.3bpm. In PMB+AB group, female average heart rate was 154.4 bpm, whereas in males it was reported as 160.7 bpm.

The average respiratory rate (Male-52, Female -51.41 and total 51.72) is shown in the following table and the percentage of oxygen saturation (Male-96.6%, Female -96.4% and total 96.5%) is shown in the following table with differences in both groups of neonates (Table-4).

The average arousal state of the neonate on non painful stimulus including, simple touch, pressure and temperature is recorded highest as deep sleep(72%).

The status of the preterm neonate with the instrument connected during the intervention as per gestational age group is as follows. (Graph: 2)

The total average pain score taken at different intervals is as follows (table-5). The mean pain score is which is considered as moderate as per PIPP table. The standard deviation is 3.517. The descriptive statistics for the total pain score is given in table-5. The likelihood dispersal of pain is typical.

The averages of hemodynamic changes recorded during the painful stimulus shows the following features such as in Heart rate, Respiratory rate and Breathing pattern (Table- 6.1, 6.2, 6.3). The changes which can't be recorded are not mentioned in the table for calculation. The average alert state score is 1.84 for the babies during the intervention.

## DISCUSSION

When it comes to the scenario of recording or measuring of pain, most of the researchers and clinicians had depended the responses of behavioral and physiological aspects which were considered as alternative measures for pain.<sup>13</sup> Preterm infants are known to show a small magnitude behavioral and physiological responses to acutely painful stimuli, especially when they at younger gestational ages.<sup>13-16</sup> In addition, preterm infants at earlier gestational ages may display different pain behaviors from those born at later gestational ages<sup>17</sup>; therefore, these behaviors may not be captured by pain scales based on pain cues observed in full-term infants. These complexities concluded to recommend a most reliable pain scales for preterm infants must be associated with developmentally pertinent pain indicators<sup>18</sup>.

To evaluate the pain processing pattern in preterm neonates at NICU, and to study the hemodynamic changes in response to painful and tactile stimuli, the following study is compared with similar studies which were comprehended by Beatriz Oliveira Valeri et al.<sup>19</sup> Out of the Six studies which we referred, investigated differences in clinical pain responses during the neonatal phase in different genders of the neonates, four studies found no significant sex differences.<sup>20-22</sup> Only two studies found differences between male and female preterm newborns showing more pronounced pain responses in males than in females.<sup>23,24</sup>

In a cross-sectional study, Bartocci et al.,<sup>23</sup> found sex differences in infants during a painful venipuncture procedure for blood collection. The male preterm infants had shown a greater response over female preterm neonates born at 28–36 weeks of gestational age. Males expressed a significant increase in bilateral cortical activation compared with females, and they exhibited a left hemisphere dominance.



In a cross-over study, Holsti et al.,<sup>21</sup> compared two groups of preterm infants with different gestational ages (<30 weeks vs. >30 weeks; gestational age, 24–32 weeks) during sessions of painful (i.e., heel lance) and stressful (i.e., clustered care) procedures. Data collection was done at two levels, clustered care after rest and clustered care after pain. Male neonates exhibited sustained behavioral responses to stress cues into the recovery phase of the clustered care after pain (i.e., the heel lance procedure) which was assessed by the Newborn Individualized Developmental Care and Assessment Program (NIDCAP). Our study has shown that the pain perceptions in preterm neonates of male and female categories are not statistically different.

The present study correlated with the following study by Gibbins et al.,<sup>22</sup> less mature showed fewer changes in total facial activity responses from baseline when the blood collection procedure was done. Infants in the early premature group had lower value of oxygen saturation levels. When these researchers had done a comparison of mean oxygen saturation and heart rate differences between baseline value and lance phase values, the 28–31 weeks of gestational age group exhibited the greatest changes which in line with the present study.

Results of the studies of experimental pain showed that the pain threshold is varied according to the gestational age at birth. This also affects the sensitivity to pain in the teenage period. It was shown an association between a lower gestational and lower pain thresholds and higher pain sensitivity. The longitudinal studies of Goffaux et al., and Hermann et al., demonstrated<sup>25,26</sup> that gestational age is an important factor in physiological pain responses during pain experiences later in childhood. In case of thermal perceptual sensitization, the premature children exhibited higher scores of pain threshold assessments when compared to full-term children. Preterm children at 11 years of age were more sensitive to the identification of thermal changes than full-term children.<sup>27</sup> These results highlight the importance of not only comparing children born preterm and full-term but also examining gestational age.

## CONCLUSIONS

The pain perception according to the recorded score is moderate in the premature neonates and the perception score is comparatively high in preterm neonates with known abnormalities. The pain perception did not show any statistical difference in male and female preterm neonates. The infants born at 29–31 weeks of gestational age group showed greatest changes in the hemodynamic patterns during exteroceptive painful stimulation. The lowest gestational age group of preterm neonates showed high state of alertness during stimulation.

### Tables and Graphs

**Table-1: Descriptive statistics of birth weight for neonates.**

<b>Table-3: Present wt (in gms/kgs)</b>	
Mean	1.541
Standard Error	0.121697
Median	1.5
Mode	0.85
Standard Deviation	0.608483
Sample Variance	0.370252
Kurtosis	-1.2655
Skewness	0.146925
Range	1.94
Minimum	0.66
Maximum	2.6
Sum	38.525
Count	125
Largest(1)	2.6
Smallest(1)	0.66
Confidence Level(95.0%)	0.25117



**Table-2: Frequency distribution of gestational week and sex of the neonate**

Table-2: Frequency distribution of gestational week and sex of the neonate				
Sr No	Age Group	Female	Male	Total
1	26-28	19	16	35
2	29-31	8	4	12
3	32-34	14	14	28
4	35-37	13	16	29
5	38-40	10	11	21
	<b>Total</b>	<b>61</b>	<b>64</b>	<b>125</b>

**Table-3 Frequency distribution of preterm neonates**

Table-3: Frequency distribution of two groups of preterm neonates			
Age Group	PMB	PMB+AB	Total
26-28	16	19	35
29-31	7	5	12
32-34	15	13	28
35-37	15	14	29
38-40	11	10	21
<b>Total</b>	<b>64</b>	<b>61</b>	<b>125</b>

**Table-4: Average respiratory rate, oxygen saturation and heart rate in preterm neonates in comparison with gender**

Average respiratory rate				Percentage of oxygen saturation			Average heart rate		
Respiratory Rate	Female	Male	Total	Female	Male	Total	Female	Male	Total Average
<b>PMB</b>	<b>51.62</b>	<b>50.66</b>	<b>51.21</b>	<b>97.1%</b>	<b>96.5%</b>	<b>96.9%</b>	<b>152.3</b>	<b>155.0</b>	<b>153.4</b>
26-28	45.33	46	45.5	97.7%	94.0%	96.8%	144.7	176.0	152.5
29-31	48	42	45	96.0%	100.0%	98.0%	148.0	142.0	145.0
32-34	60	58	59	96.3%	96.3%	96.3%	162.7	156.7	159.7
35-37	49	48	49	99.0%	99.0%	99.0%	148.0	148.0	148.0
38-40	42	42	42	96.0%	96.0%	96.0%	142.0	142.0	142.0
<b>PMB +AB</b>	<b>52.6</b>	<b>52.16</b>	<b>52.36</b>	<b>95.8%</b>	<b>96.3%</b>	<b>96.1%</b>	<b>154.4</b>	<b>160.7</b>	<b>157.8</b>
26-28	44.5	56.33333	51.6	95.5%	97.7%	96.8%	147.0	161.3	155.6
29-31	48	42	45	96.0%	100.0%	98.0%	148.0	142.0	145.0
32-34	85	42	63.5	96.0%	96.0%	96.0%	192.0	148.0	170.0
35-37	44.5	51	47.75	96.0%	94.5%	95.3%	143.0	166.0	154.5
38-40	42	42	42	96.0%	96.0%	96.0%	142.0	142.0	142.0
<b>Total</b>	<b>52</b>	<b>51.41</b>	<b>51.72</b>	<b>96.6%</b>	<b>96.4%</b>	<b>96.5%</b>	<b>153.1</b>	<b>157.8</b>	<b>155.4</b>



**Table-5. Descriptive Statistics for Pain Score**

Table-5. Descriptive Statistics for Pain Score	
Mean	8.04
Standard Error	0.703515
Median	9
Mode	12
Standard Deviation	3.517575
Sample Variance	12.37333
Kurtosis	-0.69022
Skewness	-0.46684
Range	13
Minimum	1
Maximum	14
Sum	201
Count	125
Largest(1)	14
Smallest(1)	1
Confidence Level(95.0%)	1.451984

**Table-6: The averages of hemodynamic changes recorded during the painful stimulus shows the Heart rate, Respiratory rate and Breathing pattern**

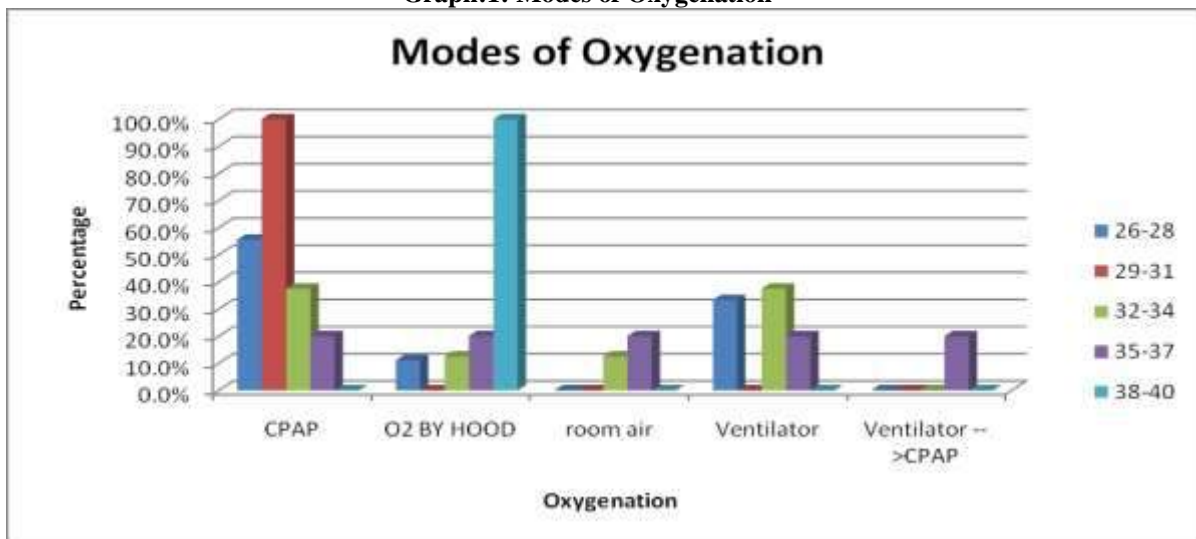
	Maximal heart rate	Breathing status	Maximal oxygen saturation
<b>PMB</b>	<b>0.5</b>	<b>0.5</b>	<b>0.16</b>
26-28	0.25	1.00	0.10
29-31	1.50	0.50	0.14
32-34	0.33	0.64	0.17
35-37	1.20	0.52	0.16
38-40	0.40	1.00	0.14
<b>PMB +AB</b>	<b>1</b>	<b>0.33</b>	<b>0.37</b>
26-28	1.20	0.24	0.32
29-31	1.20	0.33	0.54
32-34	1.00	0.35	0.36
35-37	1.20	0.34	0.35
38-40	1.04	0.35	0.37
<b>Total</b>	<b>0.7</b>	<b>0.4</b>	<b>0.25</b>



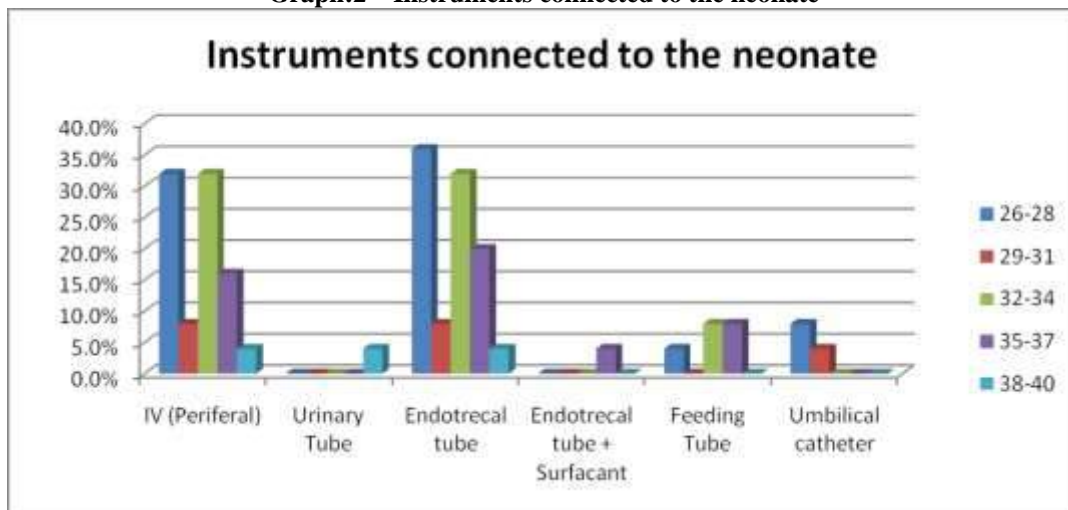
**Table-7: Average pain score for different age groups**

		Table-12: Average pain score for different age groups				
Age group	PMB			PMB+ AB		
	Female	Male	Total	Female	Male	Total
26-28	9.0	8.0	8.5	11.5	11.0	10.1
29-31	10.0	11.0	10.5	11.0	10.7	10.5
32-34	8.3	9.0	8.5	12.0	4.0	8.5
35-37	3.0	3.3	3.2	5.0	1.5	3.2
38-40	5.1	5.0	5.0	5.0	5.1	5.0
<b>Total</b>	<b>8.1</b>	<b>8.5</b>	<b>8.0</b>	<b>9.0</b>	<b>6.7</b>	<b>8.0</b>

**Graph:1: Modes of Oxygenation**



**Graph:2 – Instruments connected to the neonate**





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## FEATURES OF ADVERTISING LANGUAGE AND ITS STUDY

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### ABSTRACT

Today, advertising has become an important part of human life. At the same time, it should be noted that advertising has formed a culture creator in society and is seen as a force that increases the demand of customers for products. Of course, the main influence of advertising, whether it is oral or written, is the language and its internal capabilities. Advertising texts in Uzbek, as in other languages, differ sharply from other types of texts with their specific characteristics and methods of expression. In turn, several types of advertising texts are classified. This article provides information about advertising texts and their types, as well as the importance of language tools in these types of texts. Language is such a powerful tool that the power of hidden meaning expressed in it can influence society's perception, behavior, attitude and point of view.

**KEY WORDS:** power of language, advertising, text, the type of advertising

## Reklama tilining xususiyatlari va uning o'rganilishi

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**Annotatsiya.** Bugungi kunda reklama insoniyat hayotining muhim qismiga aylandi. Shu bilan bir qatorda ta'kidlash kerakki, reklama jamiyatda madaniyat yaratuvchisini shakllantirdi va xaridorlarni mahsulotga bo'lgan talabini oshiruvchi kuch sifatida qarab kelinmoqda. Albatta, reklama xoh og'zaki, xoh yozma bo'lsin uning asosiy ta'sir vositasi bu til va uning ichki imkoniyatlari sanaladi. Boshqa tillarda bo'lgani kabi o'zbek tilida ham reklama matnlari o'ziga xos xususiyatlari va ifoda usullari bilan boshqa matn turlaridan keskin farq qiladi. O'z navbatida reklama matnlarining ham bir qancha turlari tasnif qilinadi. Ushbu maqola reklama matnlari va uning turlari, shuningdek, bu xildagi matnlarda til vositalarining ahamiyati haqida ma'lumot beradi. Til shu qadar kuchli vositaki, unda ifodalangan yashirin ma'no kuchi jamiyat idroki, xulq-atvori, munosabati va nuqtayi nazariga ta'sir qilishi mumkin.

**Kalit so'zlar:** til kuchi, reklama, matn, reklama turlari

Reklama - bu mahsulot, xizmatni targ'ib qilishni o'z ichiga olgan marketing taktikasidir. Reklamanning maqsadi – kompaniyaning mahsuloti yoki xizmatlari uchun pul to'lashga tayyor insonlarni jalb qilish va sotib olishga undashdir. Shu sababdan ham bu turdagi matnlarda tilning barcha imkoniyatlaridan iloji bor qadar unumli foydalaniladi. Reklama sohasi e'tiborni jalb qilish va mahsulot iste'molini rag'batlantirish uchun so'zsiz og'zaki va yozma nutqqa tayanadi. Ular o'zlarining maqsadlariga mos keladigan tilni yaratish uchun muloqot turlarining deyarli barcha usullaridan keng foydalanishadi. Bu o'rinda alliteratsiya, qofiya va bir qancha vositalardan reklama tilini manipulyatsiya qilishda foydalanadilar.



Reklama matnlari oddiy matn emas, aksincha, ularni biz bir jarayon sifatida qabul qilishimiz mumkin, chunki uning asosiy vazifasi nutq bayon qiluvchi va retsepiyent o'rtasidagi maqsadli vaziyatga asoslanadi. Bu turdagi matnlar shuning uchun ham faqat tilshunoslikning o'zigina emas, balki uning psixologiya bilan to'qnashgan sohasi pragmatlingvistika yuzasidan o'rganilishi maqsadga muvofiq.

Matn tuzuvchi muayyan voqea-hodisa yoki narsa, shaxs haqida hikoya qilish, ularni tasvirlash yoki ular haqida muhokama yuritish kabi maqsadlarni ko'zda tutadi. O'zaro va tarkiban bog'langan gaplar ketma-ketligidan iborat yozma yoki og'zaki shakldagi yaxlit birlik matn sanaladi. Ma'lumki, "Matn" atamasi ilmiy adabiyotlarda turlicha talqin qilinadi. O'zbek tilining izohli lug'atida matn so'zining arabchadan o'zlashganligi, eskirgan kitobiy so'z ekanligi va aynan tekst so'zi anglatgan ma'noga tengligiga ishora qilinadi. Izohli lug'atning 156-betida "tekst" so'ziga quyidagicha ta'rif beriladi: 1. Yozilgan, ko'chirilgan yoki bosilgan ijodiy, ilmiy asar, nutq, hujjat va shu kabilar yoki ularning bir parchasi; matn. Maqolaning teksti. 2. Muzika asariga, masalan, biror kuyga, opera, romans va shu kabilarga asos bo'lgan she'r, so'z. 3. Poligrafiyada yirik shriftlardan birining nomi [6]. Bu ta'rifda matnning asosiy xususiyatlari to'g'ri ko'rsatilgan. Ammo bizningcha, bu fikrlar bilan biz reklama matnlarini to'liq izohlay olmaymiz. Reklama matnlari oddiy matnlarga nisbatan kengroq tushuncha. Biz faqat axborot-kommunikatsiya vositalarining taraqqiy etishi natijasida matn (tekst) so'zi anglatadigan ma'no yanada ortganligini ko'rishimiz mumkin. Kompyuterda terilgan matn formati Word, RTF matn, oddiy matn, formatlangan matn, gipermatn kabilar ham iste'molda faollashdi. *Ifoda maqsadiga va mazmuniga ko'ra* matnni quyidagi turlarga bo'lib chiqish mumkin: 1. Hikoya mazmunli matn. 2. Tasviriy matn. 3. Izoh mazmunli matn. 4. Didaktik matn. 5. Xabar mazmunli matn. 6. Buyruq mazmunli matn. 7. Hissiy ifoda mazmunli matn. Matnning bu kabi turlarga ajratilishiga asoslanib biz reklama matnlarini xabar mazmunli matnlar sirasiga kiradi, deb aytishimiz mumkin, lekin reklamalarning asosiy vazifasi nafaqat xabar berish, balki tinglovchiga ta'sir o'tkazishdan ham iborat. Agar biz bu matnlarni xabar mazmunli matnlar sirasiga kirgizsak, reklama, e'lon va afishalarning farqi deyarli sezilmay qoladi.

Biz [uz.warbletoncouncil.org](http://uz.warbletoncouncil.org) saytida keltirilgan ma'lumotlarga qo'shilgan holda matnlarni quyidagicha tasniflashni lozim topdik:

1. Hikoya matni.
2. Tasviriy matn.
3. Izohli matn
4. Argumentativ matn.
5. Direktiv matn.
6. Ilmiy matnlar
7. Huquqiy matnlar.
8. Ma'muriy matnlar.
9. Badiiy matnlar.
10. Gumanistik matnlar.
11. Reklama matnlari.
12. Gazeta matnlari.
13. Raqamli matnlar.

Yangi texnologiyalar bizning aloqa usulimizni o'zgartirishga imkon berdi. Ushbu o'zgarish raqamli dunyoda katta kuchga ega bo'lgan matnlarga ham ta'sir ko'rsatdi. Bugungi kunda matn turlarining aniq chegaralari belgilanmaydi. Hayotiy jarayonimizdagi o'zgaruvchan muloqot holatlari, shuningdek, fan va texnologiya rivoji yangi matn turlarining yaratilishiga zamin bo'lmoqda. Veb – chatlarda va ommaviy axborot vositalarida yozma va og'zaki tilning hissiy holatlarini ifodalovchi turli xil belgi va qisqarmalardan foydalanila boshlandi. Matnli xabarlar va onlayn til yangidan yangi lingvistik amaliyotlarni vujudga keltirmoqda.





Kuzatganimizdek, jahon tilshunosligida reklama matnlari matnning alohida turini tashkil qiladi. Chunki uning vazifasi, tuzilishi va boshqa ko'plab jihatlari matnning qolgan turlaridan keskin farq qiladi. Reklama — bevosita yoki bilvosita foyda (daromad) olish maqsadida yuridik yoki jismoniy shaxslar, mahsulot, shu jumladan, tovar belgisi, xizmat ko'rsatish belgisi va texnologiyalar to'g'risida har qanday shaklda va har qanday vositalar yordamida qonun hujjatlariga muvofiq tarqatiladigan maxsus axborot [1].

A.Ustinov reklamaning pragmatik xususiyatlarini aks ettirgan holda shunday fikr bildirgan: “Reklama – bu reklama beruvchiga kerakli tanlov va xatti-harakatga undash maqsadida iste'molchilarning ommaviy va individual ongiga psixologik ta'sir ko'rsatadigan mahsulotlar, xizmatlar, g'oyalar haqidagi reklama beruvchi tomonidan to'plangan axborotga to'la ta'sirchan bir yo'nalishli noshaxsiy xarakterga ega matnlar yaratiladigan va tarqatiladigan ommaviy matbuotning shakllaridan biridir” [8].

Reklama matnlari tahlili bo'yicha turli olimlar tomonidan izlanishlar olib borilmoqda. G'arb va rus tilshunosligida D.Ogilvi, D.E.Rozental, N.N.Koxtev, K.Garri, X. Kaftandjiyev, K.Bove, U.Arens, I.Y.Rashkov, T.B.Kolishkina, E.V.Medvedeva, E.D.Farbi, E.V.Bulatova, G.Litvinova, E.Anasimova, L.Mayevskaya, Y.Pirogova, N.Gurskaya, S.Martinova, D.Zarlikova va boshqa ko'plab olimlarning tadqiqotlarida reklama matnining nazariy va amaliy masalalari, lingvistik jihatlari ma'lum darajada o'rganilgan.

Ye.V.Medvedeva o'zining “Reklama aloqalari” kitobida quyidagicha yondashadi: “Reklama - bu ommaviy yo'naltirishning bir turi bo'lib, unda bir yo'nalishga ega va shaxsiy bo'lmagan ma'lumotli, majoziy, ekspressiv taklif qiluvchi matnlar yaratiladi va tarqatiladi, reklama beruvchi tomonidan moliyalashtiriladi va odamlar guruhlariga yuboriladi. Reklama beruvchining tanlovi va xatti-harakati munosib baholanadi” [7]. Ushbu ta'rif barcha reklama turlari (tijorat, ijtimoiy va siyosiy, hatto reklama maqolalari va jamoat munosabatlari) ga xos matnlarni qamrab olgan bo'lib, reklamaning maqsadga muvofiqligi, ya'ni reklamaning shaxsga ma'lum shartlar yoki muayyan harakatlar uchun turtki yaratish maqsadidagi ta'siri haqida fikr yuritadi. Reklama matnidagi taklifning maqsadi iste'molchi his-tuyg'ulariga va ular orqali shaxsning irodasi va ongiga ta'sir qilishdir.

O'zbek tilshunosligida bu borada O.Jumayevning ishlari alohida ahamiyatga ega. “O'zbek tili va adabiyoti” jurnalining bir qancha sonlarida e'lon qilingan maqolalari o'zbek reklama lingvistikasining rivojiga sezilarli darajada o'z hissasini qo'shgan mubolag'a emas. Olim reklama matnlarida lingvistik va nolingvistik vositalarning o'rni, vizual (ko'ruv) reklamalarining lisoniy xususiyatlari, reklama matnlarida neologizmlarning o'rni, reklama matnlarida implisitlik kabi masalalarga alohida e'tibor qaratib o'tgan [2,3,4,5].

Bugungi kunda reklama matnlari tasnifi borasida olimlar tomonidan ko'plab tadqiqotlar olib borilishiga qaramasdan bu masala yuzasidan aniq to'xtamga kelinmagan, chunki axborotlashgan asrimiz o'zgaishlar qurshovida. Shunga qaramasdan bugungi kunda reklama matnlari tasnifining nisbatan mukammalrog'i sifatida quyidagini keltirib o'tishni joiz topdik:

1. Savdo belgisi reklamasi
2. Ulgurji va chakana reklama
3. Siyosiy reklama
4. Manzil-ma'lumotnoma reklama
5. Fikrlovchi reklama
6. Korporativ reklama
7. Biznesga oid reklama
8. Ijtimoiy reklama [9].

Reklamani turlarga ajratishda ko'plab to'siq yoki jumboqlarga duch kelindi. Ulardan biri – do'kon peshtoqiga ilingan, atab qo'yilgan nom. Bu nomlarni reklama o'rnida qabul qilish yoki qilmaslik masalasi o'rganildi va reklama so'zining asl ma'nosi, vazifalariga nazar solindi. Reklamaning vazifasi iste'molchiga mahsulot haqida xabar berish, maqtash va tanishtirishdir.



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## SOURCES OF FINANCING FOR NGOS

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### ABSTRACT

*A non-profit organization attracts various types of resources to ensure successful and effective work. The multidimensionality of funding sources allows non-profit organizations to remain independent of either the state or business. The article considers the whole range of funding sources, identifies the advantages and disadvantages of each of them and the degree of their availability.*

**KEYWORDS.** *non-profit organization, funding sources, charity, entrepreneurial activity.*

Non-profit organizations engaged in scientific research, education; providing analytical information, consulting; social work and education; publishing, advertising and information work; socio-political work, assistance to the development of LSG; improving the culture of citizens; organization of leisure; legal and legal assistance; charitable and humanitarian aid; work with youth; assistance in the treatment and rehabilitation of patients; promotion of entrepreneurship development; protection of the rights of citizens; issuance of certificates and examination; nature protection; helping people who find themselves in a difficult life situation; promoting the development of civil society; religious associations and associations.

Funding for NGOs is an important condition for the implementation of the activities of the non-profit sector. The legislation allows for a wide range of funding sources, the list of which is open, which is associated with the development of information technology, thanks to which new sources of funding appear every year.

Internal sources of financing.

All funding sources can be divided into two groups: internal and external.

Internal sources include regular and one-time receipts from the founders, members of the organization; proceeds from the sale of goods, services rendered; income received from securities and deposits.

Let's take a closer look at each of these funding sources:

The order of receipt of one-time or regular sums of money from the founders and members of the organization is determined by the constituent documents.

Proceeds from the sale of goods, services rendered can be defined as the implementation of entrepreneurial activities, which, in turn, must be enshrined in the constituent documents. The Charter should spell out specific types of activities that will be carried out on a reimbursable basis.

Income received from securities and deposits as a source of financing for NCOs is possible if a legal entity participates in a joint-stock company or if an organization establishes a joint-stock company. At the same time, the establishment of a society is delegated only to certain organizational and legal forms of NPOs, which include foundations, institutions, state corporations.

External funding sources for NGOs

External sources include: donations, subsidies, subventions, grants.

A donation is a donation of a thing or a right for generally useful purposes. If the donor determines the use of the donation for a specific purpose, then the organization has no right to use it otherwise. Otherwise, the donor, his heirs, legal successors have the right to demand the cancellation of the donation. Also, an important condition of the donation agreement is that the NCO, to which the property was donated, the use of which provides for a certain purpose, is obliged to keep records of the operations performed with it.

It is necessary to refer to some features of donations as sources of funding for NGOs on the example of political parties. Political parties have the right to receive donations in the form of cash and other property, which must be reflected in official documents. Donations in the form of cash can be transferred using cash and non-cash methods.

Another feature in relation to the transfer of donations to political parties is to limit the circle of donors, which cannot be:

Foreign states and foreign legal entities;

Foreign citizens;



Stateless persons;  
Citizens under the age of 18;  
International organizations and international social movements  
Foreign funding of NPOs  
Legislation allows foreign sources of funding.

Funds can be allocated:

Foreign non-profit organizations;  
Foreign commercial organizations;  
Foreign individuals.

NPOs are required to keep records of all funds received into their account and their expenditures. At the same time, the accounting of received and spent funds and other property from foreign sources should be kept separately.

In summary, it should be noted that NCOs have the right to receive funding from foreign sources.

Modern sources of fundraising

Fundraising

As mentioned earlier, the list of funding sources for the non-profit sector is open. The main thing is that it does not violate the current legislation.

Thus, one of the modern sources of raising funds for NGOs is fundraising.

Fundraising is a way to raise money and other funds for the implementation of socially significant projects related to such areas as: culture; ecology; education; healthcare; sport; social help.

The activities of specialists in the field of fundraising are related to such professional areas as marketing, management, advertising, and public relations. The main goal of fundraising is to attract as many funds as possible for the development of organizations, such funds can be expressed not only in increasing the financial base, but also in the emergence of new cooperation with professionals in various fields who are not indifferent to the topics of NGOs and are ready to attract their resources to achieve useful-significant goals of organizations.

There are several forms of fundraising:

- Appeals to donors and philanthropists by telephone;
- Contacting donors and philanthropists by sending them email messages;
- Conducting personal meetings with donors and philanthropists;
- Holding exhibitions, presentations, various events aimed at acquainting potential donors and philanthropists with the direction of the activities of NGOs.

Endowment

Another source of funding that has recently emerged is the endowment.

Endowment is a trust fund formed at the expense of funds on the basis of donation agreements or wills, which are spent for the purposes of the NGO. There is one feature of the endowment related to the fact that the funds of this fund are invested, and not spent on daily needs. This contributes to the formation of the financial base of organizations, which allows NGOs to remain autonomous and independent from constant and small donations from patrons.

Is it possible to create a trust fund for each organizational and legal form of an NPO, thanks to which the financial base of an NGO will be formed?

These organizations include: Funds, Autonomous non-profit organizations

Public organizations.

One of the most popular areas where endowment funds are spent is the educational sector.

Endowment funds are directed to:

Innovative technical projects;  
Improvement of the material and technical base;  
Improving the quality of education;  
Increasing the importance of higher education.  
NGOs and technology

In modern times, it is impossible to imagine an advanced NPO that does not use modern technologies in its activities. Innovative tools are needed not only to get acquainted with the topics and activities of organizations, but also to attract additional financial resources.

Financing with the help of modern technologies can be divided into the following areas:

Through online donation platforms;  
Raising funds through NGO websites.  
Online donation platforms  
Meet for Charity



A project that involves a personal meeting with a popular person for a certain donation, which is sent to one of the charitable foundations.

Celebrities participating in the auction are posted on the project website. Anyone who wants to choose a person with whom he would like to meet, makes his donation, and if this donation is the largest, then the person has the opportunity to get to know a famous person. After that, the money goes to charity.

"TO ALL" (BCEM)

QIWI has created a platform called " TO ALL", which hosts charitable foundations, to which every philanthropist can make a donation. The amount of money will be distributed equally among all funds.

"SberVmeste"

The online platform "SberVmeste" from Sberbank allows you to donate money to both individual charitable organizations and entire areas of activity of organizations. After donations are made, citizens receive email reports about where their money went, which improves the quality of such a platform.

Fundraising through NGO websites

Many NGOs create their own websites, which contain the goals of the organization, management bodies, events, as well as the procedure for sending donations.

The collection page should be designed clearly and conveniently for every citizen who wants to donate. Therefore, it is necessary to avoid registration, entering passport data, TIN, as this may seem unsafe in relation to the disclosure of one's personal data and may make a person change his mind about making donations.

Most often, experienced NPOs refuse this and make a separate web page where you can make donations online, after which an electronic receipt is sent to the person about the transfer made and information about where his funds were sent.

## CONCLUSION

In summary, it must be said that the role of NGOs in society is very significant, which is associated with the implementation of socially significant tasks by organizations, the resolution of social problems and the improvement of the lives of many citizens. However, without financial assistance, it is difficult for NGOs to carry out their activities; for this, the legislation fixes various sources of financing for NGOs, and technical development allows new sources of funding to appear, thanks to which NGOs continue to carry out their targeted activities.

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## A REVIEW ON GUNJA (ABRUS PRECATORIUS)

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### ABSTRACT

The Visha Dravya Gunja is mentioned in ancient Sanskrit texts like Samhitas. In Samhita, it is categorized under Sthavara Visha, while in Rasashastra texts, it is classified as an Upavisha. The history of poisons and poisoning can be traced back thousands of years. *Abrus precatorius*, a highly invasive plant found in warm temperate to tropical regions, has spread widely and is now distributed across the globe. It is estimated that poison, in some form or another, is responsible for over one million illnesses worldwide every year. Many cases of poisoning, particularly in developing countries, go unreported. India has the highest incidence of poisoning globally. The most common causes of poisoning in India are plant toxins, pesticides, chemicals, and household poisons. Ayurvedic texts also mention the purification process (Shodhana) of Gunja. This article provides a comprehensive and critical analysis of Gunja based on Ayurvedic and contemporary texts.

### INTRODUCTION

*Gunja* known as Indian liquorice, is reputed as one of the world's most deadly but most beautiful seed belonging to the family Fabaceae, characterised under *Upavisha* (semi-poisonous drugs) and used extensively in various Ayurvedic formulations with great therapeutic significance.

*Aacharya Charaka* mentioned this drug in *Vajikarana Adhyaya* and *Aacharya Sushruta* classified *Gunja* under *Moola Visha*. In *Bhavaprakasha Nighantu* it is mentioned under *Guduchyadi Varga*, *Yogaratnakara* and other *Rasashastra* text mentioned it under *Upavisha*. According to *Rasatarangini* *Gunja* is a member of *Mitrapanchak* or *Dravakagana* and used in extraction of metals and tests of *Bhasma*. *Susruta* mentioned it under *Mula visa* (root poisons). *Thakur Balvant singh* quotes that either *Abrus pulchellum* wall and *Cardiospermum halicabacum* Linn. As the two possible sources in the context of *Gunja* as *Mulavisa*. *Krishna gunja* is the synonym of the later plant. *Bhavamisra* described *sweta* and *Rakta* varieties of *Gunja* and included it under *Upavisas*. It is a perennial climber bearing pink to purplish white flowers. It is found through out India.

**Botanical name:** *Abrus precatorius* Linn.

**Family:** Fabaceae (Papilionaceae)

**Classical name:** *Gunja*

**Sanskrit names:**

*Vanavasini, Kakachinja, Rakthika, Krishnala, Durmeha, Bahurviryia*

**Regional names**

Hindi - Chanoti, Rotti, Ghunghachi

Beng- Kunja

Mar- Gunja

Mal- Kunni

Guj- Chamothi

Eng- Indian liquoric root, Crabes eye.

**Botanical description**

A deciduous dextrose climber, with slender flexible and tough branches, the stem attaining 4.5m height and 1.2cm diam. Leaves 5-10cm long, Paripinnate; rachis produced beyond the last pair of leaflets as a soft bristle. Leaflets 10-20 pairs, opposite, increasing



slightly in size from the base, 7.3-23 by 3.8-6mm, linear-oblong, thinly membranous, entire, rounded at both ends, glabrous above when mature, thinly appressed- silky beneath.

Flowers 1-1.25cm. long, pink, clustered on tubercles arranged along the rhachias of a one-sided, usually leaf- bearing, axillary, pedunculate raceme 5-10cm long.

Pod 2.5-4.3 by 1-1.25cm, turgid thinly pubescent, with a sharp deflexed beak. Seeds 3-6, ovoid, 7.5cm. long, scarlet with a black spot at the hilum.

#### **Flowering and fruiting time**

Autumn to winters

#### **Distribution-if there**

Found throughout the tropics; It is also planted.

#### **Chemical Composition**

Seeds contain toxic protein; astringent acid, glucoside; haemagglutinin, some urease, and glycine-like active abrin albuminoid. Seeds potency gets inerted when they are boiled. Roots contain glycyrrhizin 15 percent and glycerol B percent. Leaves contain glycyrrhizin 10 percent and abrin. Seeds coat contains a red colouring substance.

#### **Pharmacodynamics**

**Rasa:** Tikta, Kashaya,

**Guna:** Laghu, Ruksa, Tikshna

**Virya:** Usna

**Vipaka:** Katu

**Mula** (Roots); Madhura, Snigdha

**Doṣakarma:** Kaphavatasamaka

Traidosahara (Patra- leaves; Mula- Roots)

Vatapitta samaka.

#### **SHODHANA**

##### **Method 1**

**Reference:** Rasatarangini (24/443-444)

**Materials required:** Godugdha (Cows milk), Asudha gunja

**Apparatus required:** Dolayantra, Iron rod

##### **Pre operative procedure:**

1. After proper authentication, the *Gunja* is collected
2. The external impurities are removed by wash and dried.

##### **Procedure**

1. Make a *potalli* with *Gunja*.
2. Tie the the *potalli* in a iron rod
3. Place the Iron rod in the *Dolayantra* across.
4. Fill *godugdha* in the *dolayantra* till the *potalli* get immersed fully.
5. Heat it and boil it for 2 *yama* (6hrs)

##### **Post operative procedures:**

1. Collect the *Gunja* from the *potali*.
2. Wash and Dry it
3. Store it in airtight containers.

##### **Precautions:**

1. Follow proper aseptic precautions.
2. Quantity of *Godugdha* (Cows milk) should be enough to immerse the *Gunja*.
3. After *shodhana* (purification) Dry it properly in shade.



## Method 2

**Reference:** *Rasatarangini* (24/443-444) and *Rasamrita- Parishista*

**Materials required:** *Kanji*, (Sour gruel) *Asudha gunja*

**Apparatus required:** *Dolayantra*, Iron rod

### Pre operative procedure:

1. After proper authentication, the *Gunja* is collected
2. The external impurities are removed by wash and dried.
3. Keep the *Kanji* (Sour gruel) ready.

### Procedure:

1. Make a *potalli* with *Gunja*.
2. Tie the the *potalli* in a iron rod
3. Place the Iron rod in the *Dolayantra* across.
4. Fill the *Kanji* (Sour gruel) in the *dolayantra* till the *potalli* get immersed fully.
5. Heat it for 1 *yama* (3 hrs)

### Post operative procedures:

1. Collect the *Gunja* from the *potalli*.
2. Wash and Dry it
3. Store it in airtight containers.

### Precautions:

1. Follow proper aseptic precautions.
2. Quantity of *Kanji* (Sour gruel) should be enough to immerse the *Gunja*
3. After *shodhana* (purification) Dry it properly in shade.

**Shodhana Effects:** By boiling the seeds in water the toxicity is reduced.

**Antidote:** *Tanduliya Rasa* (*Amaranthus spinosa*) and sugar followed by milk

Both the varieties of *Gunja* are *kesya*, alleviates *vata* and *pitta*. Useful in *jwara*, *mukhasosha*, *bhrama*, *swasa*, *trushna*, *mada*, *netraroga*. It acts as *vrsya*, *balya*, *kandughna* and relieves *vrana* (Ulcers), *krimi indralupta* (Alopecia) and *kushta* (Skin disorders). The red variety gives handsome look for men. *Nadi uttejaka* (Nerve stimulant), *Balya* (Provide strength) *Madaka-Visakta*, *Garbhanirodhaka* (Abortifacient), *Snehana*, *Hrudayottajaka* (Stimulate heart), *Snehana-Kaphanihsaraka*, *Kushtaghna-Vedanasthapana*, *Vranaropana- Sothahara*, *Jwaraghna*, *Visa*, *Katupoustika*, *Kesya*

### Roga

*Vatavyadhi-Pakshaghata* (Paralysis), *Urustambha* (gripping of the thighs) *Kasa-svarabheda* (Cough), *Klaibya*, *Mutrakrcha* (UTI), *Kushta* (Skin disorders), *Jwara* (Fever), *Dourbalya, Arsa* (Piles), *Jirna vrana* (Chronic Ulcers), *Khalitya-Indralupt* (Alopecia), *Mukhapaka* (Mouth ulcers), *Sirashula* (Headache), *Vranasotha- vrana* (Infectious ulcers), *Kaphaja-Vtaja vikara* (Bija seeds), *Tridoshaja vikara*, *Kandu* (Itching), *Nadivrana* (Pilonidal sinus), *Arbuda* (Tumors), *Apaci* (Cervical lymphadenitis)

**Parts used:** Seeds, Roots, Leaves

**Dose :** Seed powder 1-3 grains, Roots powder 10-20 grains, Leaves decoction 50-100gm.

**Gana:** *Mulavisa* (*Susruta*), *Upavisha* (*Bhavaprakasha*)

**Formulations:** *Gunjabhadra Rasa*, *Gunjadi lepa*, *Gunjadi varti*, *Gunja taila*.

### Therapeutic uses

The purified seeds kindle sexuality. Seeds are useful in *Urustambha* (gripping of the thighs) and improve strength. The leaves have anti-inflammatory activity and useful in *Amavata* (rheumatoid arthritis). The root of this plant is sweet in taste, expels *Kapha*, clears sore throat, vomiting, cough, dysuria, act as an antidote to poisons and improves taste- perception and strength thus identical in properties to roots of *Yastimadhu* (*Glycyrrhiza glabra*). Hence it is used as a substitute to *Yastimadhu*. (*Glycyrrhiza glabra*).

In case of *Indralupta* (Alopecia) the area to be scraped and then the paste of *Gunja* (*Abrus precatorius*) is applied on the surface. During this treatment various *Rasayana* drugs may be administered. (*Susrutha samhitha, chikitsa* 20/25). The Oil processed with seeds of *Gunja* and the juice of *Bhringaraja* (*Eclipta alba*) relieves itching, dandruff and difficult disease related to the scalp. (*Vrindha Madhava* 57/75). In *Visarpa* (Herpes zoster), leaf paste of *Gunja* is applied externally. (*Harita Samhita* 3/33). In *Shiroroga* (Headache), Snuff (*nasya*) with roots of *Gunja*. (*Gadani-graha* 3<sup>rd</sup>)





In *Krimidanta*, Root of Gunja may be chewed to relieve pain. (RM). According to *Rasatarangini Gunja* is a member of *Mitrapanchak* or *Dravakagana* and used in extraction of metals and tests of *Bhasma*. Leaves of *Abrus precatorius* are laxative, expectorant and aphrodisiac medicines and are used in urticaria, eczema, stomatitis, conjunctivitis, alopecia areata, migraine, lymphomas/leukemia and dysmenorrhoea. It is used for internal administration to treat various diseases as *Kushta* (skin diseases) according to *Susruta Samhita* and *Bhavaprakasha*. In case of *Sandhishotha* (Swelling in joints) Juice of fresh leaves mixed with some bland oil can be applied. Seeds are rubbed with a little water into a paste and applied to contusions to reduce pain and swelling. It is also applied to the bare skin in alopecia, in sciatica, stiffness of the shoulder joint, paralysis and other nervous disease. *Siraprachanna* (can be done with *Gunja kalka* and in *Grudrasi Gunjakalka Lepa* can be applied externally to reduce pain.

Paste is also given orally as to cure abdominal pain, tumors and for abortion. In a snake bite freshly collected root is chewed. In bronchitis and hepatitis decoction of root is used. Paste of leaves and seeds is applied on scalp for treating graying of hair. Seeds powder is used to cure worm infestation. Various African tribes use seeds powder as oral contraceptives. Decoction of fresh root is advised orally as an anti-conversant and anti-malarial. Fresh leaves are chewed to cure mouth ulcers. In skin diseases the paste of leaves is applied twice daily for one week. Eyes are washed with decoction of leaves to cure the poor eyesight. Leaf juice is mixed with coconut oil and applied over the painful swellings of the body. Fresh leaf juice is taken 5 ml twice a day for 3 days to cure dry cough. Fresh root paste is applied on bite site in scorpion bite and swelling.

The seeds are poisonous, purgative, emetic, tonic and aphrodisiac; and they are used in nervous disorders. They are poisoning to cattle. The poultice of the seeds if used as a suppository in vagina brings about abortion. The roots are emetic and alexiteric. A paste of seeds *Gunja* and of the roots of *Chitraka* is made up with water and it is used as stimulant, dressing when applied over leukoderma freckles. The seeds known as jequetry (containing albrin and albric acid etc) are used as strong or drastic purgative and emetic drug only in small doses, but in large doses they become more poisonous than strychnine. The seeds are claimed to be useful as an oral contraceptive. The seeds powder boiled in milk are powerful tonic and aphrodisiac drug. A preserve of the decorticated powdered seeds is used as an anthelmintic drug. The roots, also known as Indian wild Liquorice. Is useful drug as an emetic, antidote and demulcent. An extract of the root is given orally for relief of obstinate coughs, sore throat and rheumatism. The roots are chewed or taken in other form in cough and throat infections.

## DISCUSSION AND CONCLUSION

Ayurvedic classical texts discuss two types of *Gunja*, namely Shweta *Gunja*, which is more toxic. Both varieties of *Gunja* are utilized for medicinal purposes, both internally and externally. The *Acharyas* have specified various purification methods for *Gunja*. Improper purification can lead to toxic effects, but the texts also provide information on its antidote. Due to synonymous terms, there is uncertainty in identifying the *Gunja* drug. According to some authors, the Sanskrit term "*Uchchata*," mentioned by *Acharya Charaka* in the context of *Vajikarana*, refers to *Gunja*. However, *Dalhana*, in his commentary, clarifies that *Uchchata* is actually a small plant. He also states that individuals who consume *Uchchata* along with *Godugdha* (cow's milk) will be able to engage in sexual intercourse with a hundred women. On the other hand, *Gunja* is a creeper and acts as a mild aphrodisiac. Therefore, the *Uchchata* mentioned by *Acharya Charaka* in the context of *Vajikarana* is not *Gunja*. According to the Anandashram editor, the synonym "*Kakadani*" is considered as *Gunja*, but this is not the case in *Dhanvantari Nighantu*. The *Dhanvantari Nighantukara* identifies *Chudamani*, which refers to bangles worn by Adivasis and hill tribes, as *Gunja*. Additionally, he considers Shweta *Kambhoji* as the white variety of *Gunja*, known as Shweta *Gunja*. The roots of *abrus* contain substances that resemble glycyrrhizin, and the leaves also yield glycyrrhizin. Therefore, *Gunja* roots are used as a substitute for glycyrrhiza. Despite being a toxic substance, if *Gunja* is purified according to classical texts and administered in appropriate therapeutic doses, it can effectively treat various

ailments.

## Research Updates

1. Alcoholic extract of seeds showed Parasympathomimetic effect on smooth muscle of guinea pig and rabbit, skeletal muscle of frog (J.Res.Indi. Med. 1971,6,139).
2. Aqueous extract of seeds showed anthelmintic activity which was absent in extract prepared by boiling seeds in water (J.Res.Indi. Med. 1975,10,138).
3. LD<sub>50</sub> of Abrin A and B in mice is found to be 10 and 15µ/kg respectively. Both fractions showed antitumour activity against Ehrlich ascites tumor cells (Int. J. Pept. Protein Res. 1978, 12, 311).
4. Seed extract (10mg/ml/day) showed antispermatic activity in rat. (Ind. Med. J. 1987,81,157)

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UDC-58

## BIOECOLOGICAL FEATURES OF MEDICINAL PLANTS

### *Mentha asiatica Boriss*

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#### ANNOTATION

*The bioecological properties of the medicinal plant *Mentha asiatica Boriss* have been studied. The dynamics of plant haloaccumulation by development phases was revealed. According to the content of water-soluble salts in the plant, Asian mint in the ecological niche manifests itself as a glycophyte.*

**KEY WORDS:** *plant, leaves, bioecology, mesophyte, development phase, soil, total salts, glycophyte.*

Asian mint - *Mentha asiatica Boriss.*, a species of plants of the genus Mint (*Mentha*) of the Lamiaceae family. It is widely distributed along the banks of collectors, lakes, canals, on wet meadow soils, in the valley and delta of the Amudarya. It occurs in Western Siberia, Central and East Asia, China, including on the territory of Karakalpakstan in the Republic of Uzbekistan.

Perennial herbaceous plant with a straight, branched, more or less densely gray tomentose stem 60-100 cm tall. The stems are mostly thin, obtusely tetrahedral.

Leaves on both sides are velvety or finely tomentose, lanceolate or oblong, acute, rounded or slightly heart-shaped at the base, greenish or bluish-green from short thin hairs, sessile or short-petiolate; along the edge, the leaves are thin and elongated-toothed; bracts subulate, longer than false whorls [1].

Inflorescences dense or loose; flowers on thin, densely pubescent pedicels, in few-flowered whorls; bracts subulate, almost equal to calyx; calyx bell-shaped or funnel-shaped, with linear teeth; the corolla is light purple, 3-4 mm long, the stamens exceed the corolla of the staminate flowers and are hidden in the corolla of the pistillate ones. In Karakalpakstan, it blooms in June-August, bears fruit in July-September, October [6].

Asian mint herb has antispasmodic, anti-inflammatory, diaphoretic, choleric, analgesic, appetite stimulating and other properties. The plant is rich in antioxidants that provide reliable protection against many diseases, including oncology. This plant helps the respiratory tract, it is especially effective in the treatment of asthma and bronchitis. It is also useful for disorders of the stomach and intestines, headaches [2,4]. Therefore, as a medicinal plant, it is used in folk medicine by local residents.

Mint herb contains a large amount of essential oil, the main constituents are menthol and various triterpenes. In addition, the leaves contain organic acids, tannins, flavonoids, carotene, betaine, trace elements (copper, manganese, strontium, etc.) and other chemical compounds [3].

Research on the introduction of this type of plant into the medical practice of Uzbekistan is relevant and requires a comprehensive study of the plant. Therefore, we decided to study the bioecological properties of Asian mint herb.

Mint grows on non-saline and slightly saline soils, mesophyte. We studied the content of water-soluble salts in plant leaves by development phases (Table 1).



The total amount of the content of water-soluble salts is on average -4.5%, bicarbonates on average -22.8 mg-eq, in the phase of seed ripening (26 mg-eq). In the leaves, chlorides are mainly in the free state: the content of bound bicarbonates, chlorides, sulfates are negligible.

The content of water-soluble salts in the plant and in the soil differs from each other. Thus, Asiatic mint, as expected, manifests itself as a glycophyte in the ecological niche.

**Table 1**  
**Chemical composition and content of water-soluble salts in the leaves of *Mentha asiaticum* Boriss by development phases (1-free, 2-bound) (in % and mg-eq per 100 g of absolutely dry plant mass)**

Development phase	Date Salt content	Total salt %	Ion content											
			HCO <sub>3</sub> <sup>-</sup>		CL <sup>-</sup>		SO <sub>4</sub> <sup>2-</sup>		Ca <sup>2+</sup>		Mg <sup>2+</sup>		Na <sup>+</sup> +K <sup>+</sup>	
			%	mg/eq	%	mg/eq	%	mg/eq	%	mg/eq	%	mg/eq	%	mg/eq
Intensive growth	1	5,1	1,34	22	1,3	39	0,99	20,6	0,48	24	0,36	30	0,63	27,6
	2	1,28	0,18	3	0,12	3,5	0,44	9,2	0,04	2	0,02	2	0,36	15,7
Budding	1	4,8	1,53	25	0,96	27	0,99	20,6	0,84	42	0,22	18	0,29	12,6
	2	1,33	0,12	2	0,24	7	0,52	10,9	0,08	4	0,09	8	0,22	9,9
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Bloom	1	3,9	1,2	20	0,43	12	1,5	33	0,75	12	0,3	44	0,35	9,0
	2	1,21	0,12	2	0,12	3,5	0,57	11,9	0,04	2	0,09	8	0,21	9,4
Fruiting	1	4,6	1,2	20	0,53	15	1,07	22,2	0,72	36	0,12	10	0,26	11,2
	2	1,03	0,12	2	0,12	3,5	0,43	9,07	0,04	2	0,07	6	0,19	8,57
Seed maturation	1	4,5	1,59	26	0,53	15	1,2	25	0,80	40	0,22	18	0,18	8
	2	0,93	0,12	2	0,12	3,5	0,33	7,02	0,04	2	0,02	2	0,24	10,5

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UDC 58

## **SOME BIOLOGICAL FEATURES AND SEED PRODUCTIVITY OF CATALPA SCOPOLI SPECIES UNDER VARIOUS SOIL SALINITY CONDITIONS IN KARAKALPAKSTAN**

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### **ANNOTATION**

*The article discusses some biological features and seed productivity of *Catalpa scopoli* species in various salinity conditions of the soil of Karakalpakstan.*

**KEY WORDS:** *Aral Sea, flora, introduction, salt, region, landscaping.*

The Republic of Karakalpakstan is located in the southwestern Aral Sea region and is part of the extra-arid zone of Central Asia. The climate is sharply continental, the soils are saline [5].

According to experts, as a result of the drying of the Aral Sea, from 12 to 75 million tons of various salts rise into the air every year [1]. As a result, the region has developed extremely difficult environmental conditions for the population. One of the most effective means of improving the environmental situation is planting greenery in settlements with tall, salinity-resistant, drought-resistant tree species with high sanitary and hygienic properties.

About 98 species of woody plants grow wild on the territory of Karakalpakstan, which is about 10% of the entire flora [10], according to the latest data, 118 species [7].

Most of the woody plants in this region are shrubs and shrubs. For the purpose of landscaping the flora of Karakalpakstan, introduced species of plants are used.

Such promising woody plants include species of the genus *Catalpa* - *catalpa* of the Bignoniaceae family. Of particular value to these plants give their beautiful flowers, collected in large inflorescences. On the territory of Karakalpakstan, it is necessary to use in landscaping plant species resistant to salinity, which include species of the genus *catalpa*.

*Catalpa* entered Central Asia in the 70-80s. 19th century In the Tashkent oasis, the biology and ecology of *catalpa* species was studied by N.F. Rusanov [9].

In Karakalpakstan in 1959 The Botanical Garden was organized. During the existence of the garden, more than 402 species, varieties and forms of tree, shrub and fruit crops belonging to 105 genera and 44 families have been introduced and tested [8].

*Catalpa bignonioides* was introduced into the Nukus Botanical Garden of the KO AS RU in the 1960s [6].

In the south of Karakalpakstan (Buston) in the Botanical Garden. A. Temur there are 3 types of *catalpa*: *C. bignonioides* Walt., *C. speciosa* Ward. and *C. ovata* G. Don., [3].

### **OBJECT AND SUBJECT OF RESEARCH**

The object of study is species of the genus *Catalpa*: *C. bignonioides* Walt., *C. speciosa* Ward., and *C. ovata* G. Don.



## RESEARCH METHODS

The morphogenesis of the studied objects was studied according to the method of I.G. Serebryakova (1952) [11], seed productivity was studied according to the method of O.A. Ashurmetov, H.K. Karshibaev (2002) [2].

Bignonium or common catalpa - *Catalpa bignonioides* Walt. Homeland - southeastern North America. Deciduous tree. On the streets of the city of Nukus, at the age of 8, it reached 6 m in height and a trunk diameter of 35 cm. rounded, curved or spherical crown. Its large leaves are remarkable, resembling lilac leaves in shape, but large (20 x 15 cm), shortly pointed at the top, the base of the leaf is heart-shaped or wedge-shaped, the edge is solid, sometimes there is one large tooth. Inflorescences are broad-pyramidal, many-flowered panicles or large loose racemes, up to 20-25 cm in length. The flowers are collected in panicles - up to 50 flowers in each. The fruit is a bivalve box up to 35 cm long and a box diameter of 2.5-2.9 cm, with a placenta in the center. Seeds elliptical or oblong-linear, narrow up to 2 cm long and 0.5-0.6 cm wide, with narrow beards of hairs at both ends and immature seed coats are white, mature gray-brown. In each box, an average of up to 104 seeds. Weight of 1000 seeds 35.7 g.

**Catalpa is magnificent or beautiful - *Catalpa speciosa* Warder ex Engelm.** A beautiful deciduous tree, on the streets of the city of Nukus at the age of 13-15 years, reached 11-12 m in height and 89 cm in diameter, in the Botanical Garden of the KCO AS RUz (Nukus) 15 cm in trunk diameter at a height of 2.5 m, and in the Botanical Garden of the Academy of Sciences of the Republic of Uzbekistan (Buston) 29 cm in diameter of the trunk at a height of 5 m. Tree up to 20-30 m in height, up to 1.5 m in diameter (according to N.F. Rusanov). It has straight trunks with a pyramidal crown. The bark is grey-brown, scaly and the young shoots are green and covered with short hairs. The leaf arrangement in the first year of life is opposite, then whorled. It has very large leaves (20 x 15 cm) on long petioles. Inflorescence almost bare panicle, relatively few-flowered, containing about 14, rarely up to 35 flowers. The fruit is a capsule, up to 30-35 cm long, 2.5-3 cm wide, long, cylindrical, cracking lengthwise into 2 valves. Seeds elliptical, up to 2.8 cm long and 0.7 cm wide, with broad barbules of hairs at both ends. Each box has up to 33-168 seeds. The weight of 1000 seeds is 36 g. In youth, it grows rapidly, giving an increase of up to one meter per year. More frost-resistant than other types of catalpas used in landscape gardening. Relatively drought tolerant. Катальпа яйцевидная — *Catalpa ovata* G. Don.

Native to Central China. Deciduous tree. The height in nature of this tree reaches up to 10-15 m in height. In the Botanical Garden of the Academy of Sciences of the Republic of Uzbekistan (Buston), at the age of 6, it reached 4 m in height and a trunk diameter of 28 cm. In the Botanical Garden of the Academy of Sciences of the Republic of Uzbekistan (Tashkent), at the age of 12, it reached 5-6, less often 8 N.F. Rusanova). In the second year of life, it reached 47 cm in height with moderately saline (Karauzyak) soil and with highly saline (Nukus) soil it reached up to 17 cm in height. It has curved trunks with a broadly branched crown. The bark is dark gray, smooth scaly and the young shoots are green and pubescent with short glandular hairs.

The arrangement of the leaves in the first year of life is opposite, then whorled. It has very large leaves up to 18 cm long and 16 cm wide on long petioles. In the second year of life, the length of the leaves reached 14.5 cm, with moderate salinity (Karauzyak) and with strong salinity (Nukus), the length of the leaves reached 4.7 cm. The apex of the leaves is sharp, with a heart-shaped base; This one is different from the leaves of *C. speciosa* and *C. bignonioides*. The shape of the leaves is broadly oval, on an adult plant often with two petals on the sides. From above, the leaves are almost naked, from below, densely pubescent with simple hairs. Inflorescence - panicle, many-flowered, containing about 70-90 flowers. The fruit is a thin spindle-shaped box up to 30, sometimes 40 cm long and about 1.5 cm wide. They are much shorter than in previous species of this genus, with thin walls. Seeds elliptical, greyish-brown, up to 1.3 cm long and 0.3 cm wide, with broad barbules of hairs at both ends. Each box contains up to 72-106 seeds. Weight of 1000 seeds 15 g.



The study of *C. bignonioides* was carried out in Tashkent (control, non-saline soils), Buston (Karakalpakstan, moderately saline soils, the content of water-soluble salts in the soil is Cl-0.040% of the dry soil weight of 0-30 cm layer) and in Nukus (Karakalpakstan, highly saline soils, Cl- 0.058%, SO<sub>4</sub> -0.058% in 25-50 cm layer).

The sizes of fruits and seeds were studied. It was established that under conditions of average, compared with the control, *C. bignonioides* fruit length significantly increases ( $41.5 \pm 1.69$  cm and  $50.0 \pm 1.68$  cm, respectively), but their width decreases ( $2.6 \pm 0.05$  cm and  $2.1 \pm 0.03$  cm), the dimensions are reduced ( $2.7 \pm 0.11$  cm x  $0.5 \pm 0.02$  cm and  $2.2 \pm 0.07$  x  $0.2 \pm 0.02$  cm). In conditions of strong soil salinity, the fruits are shorter than the control ( $31.4 \pm 1.74$  cm), but do not differ significantly in width ( $2.8 \pm 0.09$  cm). The seeds are shorter than in the control ( $2.1 \pm 0.15$  cm), but in width ( $0.5 \pm 0.03$  cm), fullness ( $94.3 \pm 0.68$  cm) and absolute weight ( $35.7$  g), no significant differences were found. Thus, the studied parameters are influenced not only by the degree of soil salinity, but also by the type of soil, for example, chloride in Buston and chloride-sulfate in Nukus.

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## THE FAUNA OF THE CARABIDA (COLOEPTERA) OF THE KYZYL KUM DESERT

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### ANNOTATION

The article discusses the features of the fauna of the beetle fauna (coloeptera: carabidae) of the Kyzylkum desert. Ground beetles are productive and numerous entomophages. They regularly destroy pests of agricultural crops, are intermediate hosts of trematodes and nematodes that parasitize domestic animals.

**KEY WORDS:** fauna, collection, trematode, nematode, Kyzyl kum, sample, family, genus.

There are more than 40,000 species of ground beetles in the world. The expediency of a comprehensive study of ground beetles, which are widespread in all natural and technogenic environments and effectively destroy pests of agricultural crops, is shown [1,2,3].

Ground beetle research was carried out in the Kyzylkum desert, one of the largest deserts in Central Asia, during 2020-2022.

In order to determine their fauna, sampling was carried out along designated routes and at designated locations. For this, samples were taken from the territory along the route in the direction of Nukus-Takhtakopyr, Nukus-Tortkul-Bukhara, Nukus-Uchkuduk, Nukus-Moinak-Orolkum, 5-10 km inside the routes.

The sampling of ground beetles was carried out by general entomological methods and methods developed for the genus Coleoptera.

Here, 43 species and subspecies belonging to 22 genera and 3 subfamilies of ground beetles have been identified. Among the studied species in all seasons, species of such genera as Calosoma, Calomera, Amara, Zabrus, Ophonus, Tachus dominate. In terms of species composition, our data are quite close to those of Davletshina (1979), except that some mesophilic species were not found and the number of desert and semidesert species increased.

**Table 1**

**Species composition of ground beetles of the Kyzylkum desert**

No	Subfamilies and subspecies	
<b>Subfamilies: Carabinae LATREILLE, 1802</b>		
1.	<i>Calosoma algiricum</i>	+
2.	<i>C. auropunctatum dzungaricum</i>	+
3.	<i>C. imbricatum deserticola</i>	+
4.	<i>C. olivieri</i>	+
5.	<i>C. reitteri</i>	+
<b>Subfamilies: Cicindelinae LATREILLE, 1802</b>		
6.	<i>Cicindela deserticola</i>	+
7.	<i>C. lacteola</i>	+
8.	<i>C. melancholica</i>	+
9.	<i>C. obliquefasciata</i>	+



10.	<i>C. sublacerata</i>	+
11.	<i>Megacephala euphratica armenica</i>	+
<b>Subfamilies: <i>Siagoninae</i> BONELLI, 1813</b>		
<b>Subfamilies: <i>Broscinae</i> Hope 1838</b>		
12.	<i>Dyshirius apicalis</i>	+
13.	<i>D. caspius</i>	+
14.	<i>D. cylinricus</i>	+
15.	<i>D. zimini</i>	+
16.	<i>Scarites angustus</i>	+
17.	<i>Scarites eurytus</i>	+
18.	<i>Broscus semistriat</i>	+
19.	<i>B. (Notaphocampa) niloticum</i>	+
20.	<i>Broscus punctatus</i> Dejean, 1828	+
21.	<i>B. Emphanes latiplaga</i>	+
22.	<i>B.(E) tenellum buchariplaga</i>	+
23.	<i>Pogonus virens</i>	+
24.	<i>Pogonistus syrdenus gravi</i>	+
25.	<i>Chlaenius (trichiochlaensius) steveni</i>	+
26.	<i>Ch. (Ch) spoliatus</i>	+
27.	<i>Pt. liosomus</i>	+
28.	<i>Agonium extensium</i>	+
29.	<i>Taphoxenus gracilis</i>	+
30.	<i>Amara aena</i>	+
31.	<i>A. ovate</i>	+
32.	<i>A. tescicola</i>	+
33.	<i>A. fedtschenkoi</i>	+
34.	<i>Zabrus morio</i>	+
35.	<i>Carenochirus titanus</i>	+
36.	<i>Ophonus griseus</i>	+
37.	<i>Dicheirotichus ustulatus</i>	+
38.	<i>Anisodactylus pseudoaeneus</i>	+
39.	<i>Lebia (Lebia) menetriesi</i>	+
40.	<i>Microlestes negrita</i>	+
41.	<i>Agatus flavipes</i>	+
42.	<i>Discoptera komarovi</i>	+
43.	<i>Zuphium testaceum</i>	+

According to scientific sources, Davletshina (1979) found 38 species of ground beetles distributed in the Southwestern Kyzylkum. This situation is explained by the large number and diversity of plant species in the study area. This, in turn, leads to the enrichment of the beetle fauna. Although the gravelly, sandy and gypsum deserts of Kyzylkum are similar, the ground beetle fauna is very different in species composition and abundance.





Thus, as a result of our scientific research, it was confirmed that 43 species of ground beetles belonging to 22 genera are common in the sandy deserts of Northwestern Uzbekistan.

It has been proven that the biotopic distribution of the identified desert beetles depends primarily on abiotic, hydroedaphic and biotic environmental factors, is very sensitive to landscape changes and can serve as a good indicator under these conditions. It is necessary to study the ecology of ground beetles in the context of regions, to determine the possibilities of their use in the practice of biological control of harmful species.

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UDC 564.48.01

## **POLYMERIC FRAMETERING FOR REDUCING THE FLAMMABILITY OF CELLULOSE MATERIALS**

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### **ABSTRACT**

*The article deals with some issues of creating new polymer flame-retardants for cellulosic materials. It has been established that the combustion of modified cellulose and nonwoven materials is accompanied by the formation of compounds that catalyze the dehydration reaction during pyrolysis and intensifies the formation of coke. The mechanisms of fire-retardant characteristics of new polymers are revealed.*

**KEY WORDS:** fire-retardant, polymer, flammability, cellulose, combustion, coke remainder, condensation, departure, recuperation.

Despite the rapid development of the production of synthetic polymer materials, plastics and composite materials, there is a shortage of functional materials with a complex of valuable properties, such as fire resistance, thermal stability, etc. The most promising high-molecular compounds of this type are polymers containing functional phosphorus-containing groups. In addition, in the chemistry of high-molecular compounds, works devoted to the synthesis and research of polymers containing ammonium groups have received some interest due to the possibility of their wide application in many areas of the national economy [1].

By analogy with these studies, we have attempted to develop a technology for producing phosphorus-containing polymers by similar methods, since it is known from the literature that tertiary phosphorus-containing compounds easily react with nucleophilic substitution with such negative centers as halogens, oxygen, sulfur. The latter predetermined the possibility to investigate the behavior of tertiary phosphorus-containing compounds obtained from local resources in nucleophilic substitution reactions with monomers containing in their structure both one negative center (allyl bromide, methacrylyl chloride, propargyl bromide) and two negative centers (epichlorohydrin) in order to obtain high-molecular compounds based on the products of these reactions [2].

To obtain phosphorus-containing polymers, triphenylphosphite (TFFIT) and sodium dihydrophosphate (NDGF) were selected as the most affordable, less toxic and widely used of trivalent phosphorus compounds. Preliminary studies have revealed that during the interaction of the above monomers with NDGF and TFFIT, instead of monomeric quaternary salts, high-molecular substances that do not contain free monomer molecules are released, i.e. spontaneous polymerization occurs.

With an excess of a halide-containing monomer, polymer formation stops simultaneously with the consumption of a nucleophilic agent (phosphate or phosphite), an unreacted monomer remains in the system. This indicates a close relationship between salt formation and polymerization and indicates that only molecules of halide-containing monomers that have entered into a quaternization reaction participate in polymerization. To clarify the nature of the interaction of TFF and TFFIT with the above monomers, UV and IR spectra of the initial and final products, as well as PMR spectra of the initial components were studied. It was found that in the IR spectrum of the polymer obtained on the basis of the interaction of TFF with ECG, the band corresponding to the valence vibrations of the P-Cl bond is shifted to the low-frequency region up to 1350 cm<sup>-1</sup>, compared with that in the TFF spectrum. The valence oscillation



of the C-SI bond (850-800 cm<sup>-1</sup>) belonging to the ECG group disappears due to the formation of a new chemical bond  $\nu_{\text{P-O-CI}}$  in the area of 1350 cm<sup>-1</sup>. At the same time, new intense absorption bands are also formed in the region of 1050-1100cm<sup>-1</sup>, related to asymmetric oscillations of the simple ether bond (-C-O-C-) due to the opening of the epoxigroup (1250, 930 cm<sup>-1</sup>) of the ECG during interaction with the TFF. The synthesized polymers are brown powders, resistant to long-term storage, and dissolve in many organic solvents.

Further, the study of phosphorus-containing polymers synthesized on the basis of the interaction of TFFIT and NGF with ECG and MAX as a retarder burning cellulose and nonwovens was of interest.

Samples of fire-proof cellulose and nonwovens were obtained by a known method [3]. Table 1 shows the main thermal parameters of fire-proof samples of cellulose and nonwovens. As can be seen from Table 1, the thermal stability of fire-proof samples increases with an increase in the amount of polymer flame retardant. At the same time, coke residue yields and oxygen index values also increase. During the thermal decomposition of fire-protected cellulose, an increase in the amount of released water, coke residue and a decrease in the yield of levoglucosan is observed. It should be noted that the resulting fire-proof cellulose and non-woven materials retain almost all the applied properties of the source material. Further, it was of interest to study the effect of polymer flame retardants and a low-molecular-weight analog on the physico-mechanical and other applied properties of modified cellulose and nonwovens. Studies of the flammability of modified cellulose and nonwovens by the "fire tube" method and the determination of the rate of ignition have shown that the polymer phosphorus-containing flame retardant has a higher flame retardant effect, contributing to the transfer of the combustible material to the group of difficult-to-burn. The charring observed in this case, characteristic of any organic substance, is limited by the area of action of the flame. Burning modified cellulose and nonwovens is accompanied by the formation of compounds that catalyze the dehydration reaction during pyrolysis and intensifies the formation of coke. At the same time, the coke yield and the smoke generation coefficient undergo a correlation change. The process of decomposition of modified tissue samples mainly proceeds in the condensed phase, which also explains the low smoke emission during their burning. Further decomposition of the flame retardant is accompanied by the release of inert incombustible gases that prevent flaming burning and smoldering protected material. Studies of the flammability of modified cellulose and nonwovens by the "fire tube" method and the determination of the rate of ignition have shown that the polymer phosphorus-containing flame retardant has a higher flame-retardant effect, contributing to the transfer of the combustible material to the group of difficult-to-burn. The charring observed in this case, characteristic of any organic substance, is limited by the area of action of the flame.

**Table 1.**  
**Some thermal parameters of fire-proof samples**

Samples	Antiren, %	The temperature of the beginning of decomposition, T, K.	The temperature of the beginning of intensive decomposition, T, K.	Amount of coke residue, %	KI, %
Cellulose	0	473	500	0	18,0
	HA-2,0	488	509	11	22,2
	ПА-0,5	493/495	510/512	13/15	20,6/21,0
	ПА-1,0	493/497	513/514	16/18	24,2/25,2
	ПА-2,0	493/497	523/525	19/21	30,4/32,6
	ПА-3,0	497/500	543/550	22/24	34,6/36,2
Non-woven fabric	0	453	493	0	17,5
	HA-2,0	478	501	14	22,6
	ПА-0,5	473/475	513/515	18/19	21,4/22,0
	ПА-1,0	497/499	518/521	20/21	26,4/27,0
	ПА-2,0	523/530	543/550	24/26	30,6/32,6
	ПА-3,0	547/552	573/578	28/31	32,4/34,0

**Note.** NA-low molecular weight flame retardant, PA-polymer flame retardant. In the denominator - data for the polymer based on TFFIT-MAX, in the numerator- data for the polymer TFFIT-ECG.

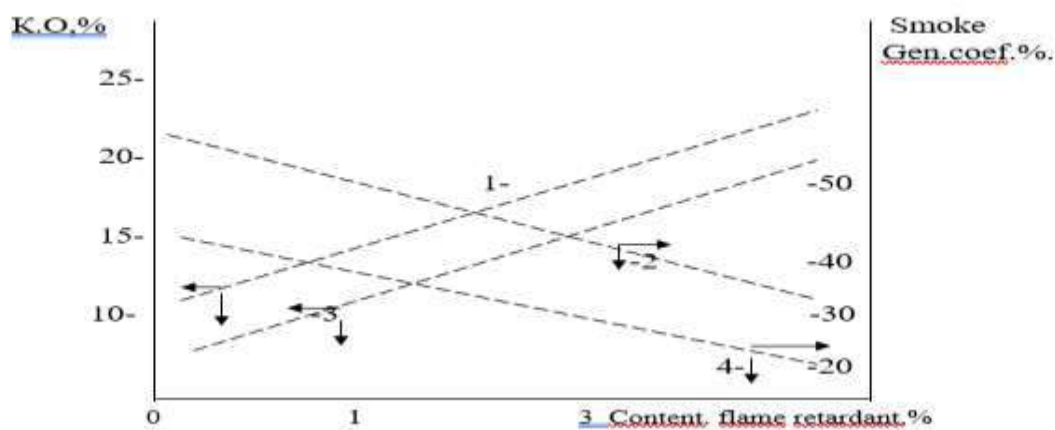


**Table 2**

**The effect of flame-retardant content on the parameters of thermal degradation of samples**

Samples	content. antipyrean, %.	The temperature of the beginning of decomposition, T, K	Temp-re of the max speed, T.K	Activation energy, KJ	Temp-re of flam-ty, T, K	K.I., %
Cellulose	0	550	593	160,9	673	18
	HA-2,0	525	564	164,6	713	21,6
	ΠA-1,0	540/544	578/585	163,5/164	900/930	24,2/25
	ΠA-3,0	520/530	538/552	188,4/192	949/962	24,6/25,6
non-woven fabric	0	473	503	94,8	979	17,5
	HA-2,0	466	499	97,4	995	22,4
	ΠA-1,0	453/460	493/495	96,4/98,4	1003/1009	26,2/27
	ΠA-3,0	450/465	487/499	108/111,6	1042/1056	28,4/29

Note. NA-low molecular weight flame retardant, PA-polymer flame retardant. In the denominator- data for the polymer based on FIRMS, in the numerator- data for the polymer NDGF-ECG.



**Fig. 1. The effect of a polymer flame retardant based on TFFIT: ECG for the output of coke residue and for the smoke generation coefficient: 1,3-modified cellulose material, 2,4-non-woven material.**

Flammability of the modified cellulose and nonwovens is accompanied by the formation of compounds that catalyze the dehydration reaction during pyrolysis and intensifies the formation of coke. At the same time, the coke yield and the smoke generation coefficient undergo a correlation change (Fig. 1). As is known, the presence of oxygen atoms in the structure of cellulose materials enriches volatile pyrolysis products with oxygen-containing substances. The source of additional oxygen release in the flame slows down the process of soot formation.

The study of the IR spectra of the obtained coke residues showed that all of them are characterized by the presence of a very intense absorption band in the region of 1235 - 1275 cm<sup>-1</sup>, which indicates the presence of a P = O bond in cokes. Characteristic absorption bands are observed in the regions of 1020-1030 cm<sup>-1</sup>, corresponding to the P-O-C group. The IR spectrum of coke formed as a result of combustion of samples modified with a polymer flame retardant shows a strong absorption in the region of 1714 cm<sup>-1</sup>, characteristic of the carbonyl group, absent in the IR



spectrum of samples modified with tricresyl phosphate. Burning Consequently, polymer flame retardant accelerates the carbonization process, i.e. soot burning during combustion of nonwovens, and the possibility of carbonation of the latter low-molecular flame retardant is excluded. The results obtained once again confirmed the effectiveness of polymer flame retardants over low molecular weight analogues.

Consequently, during pyrolysis of cellulose and nonwovens samples modified with phosphorus-containing polymer flame retardant, their propensity to capture electrons and form negative ions, the recombination of which with positive phosphonium ions in the flame by the nuclei of soot particles increases. In this regard, burning modified cellulose and nonwovens is characterized by a greater tendency to structuring and the formation of a significant amount of coke.

The process of decomposition of modified tissue samples mainly proceeds in the condensed phase, which also explains the low smoke emission during their burning. Further decomposition of the flame retardant is accompanied by the release of inert incombustible gases that prevent flaming burning and smoldering protected material. IR absorption spectra of coke residues confirmed this assumption.

IR absorption spectra of coke residues confirmed this assumption. The study of the IR spectra of the obtained coke residues showed that all of them are characterized by the presence of a very intense absorption band in the region of 1235 - 1275  $\text{cm}^{-1}$ , which indicates the presence of a P = O bond in cokes. Characteristic absorption bands are observed in the regions of 1020-1030  $\text{cm}^{-1}$ , corresponding to the P-O-C group. The IR spectrum of coke formed as a result of combustion of samples modified with polymer flame retardant shows enhanced absorption in the region of 1714  $\text{cm}^{-1}$ , characteristic of the carbonyl group, absent in the IR spectrum of samples modified with tricresyl phosphate. Burning Consequently, polymer flame retardant accelerates the carbonization process, i.e. soot formation during the combustion of nonwovens, and the possibility of carbonization of the latter with low-molecular-weight flame retardant is excluded. Burning The results obtained once again confirmed the effectiveness of polymer flame retardants over low molecular weight analogues.

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UDC 57

## **APPLICATION OF BIOLOGICAL METHODS IN FORENSIC MEDICAL EXAMINATION**

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### **ANNOTATION**

*The article discusses the features of the use of biological methods in forensic examination. In forensic examination, objects of biological nature include: tissues and secretions of humans, animals, birds, fish, insects, their traces, as well as fragments of plants and their metabolites.*

**KEYWORDS:** *detector, microbiology, dendrochronology, method, microbial flora, substances/*

At present, fundamentally new biological research methods are increasingly being used in expert practice: the biosensor method using detector dogs, the DNA analysis method, as well as entomological, microbiological methods, and the dendrochronology method.

The development of new biological methods causes the study of new objects of forensic examination (microbial flora, insects, sweat and blood substances that determine the individual smell of a person), the study of which will lead to the development of new types of examinations.

The need for practice to improve and apply more effective methods for identifying a criminal also determines the relevance of developing methodological principles for the use of biological methods in forensic examination.

Objects of biological nature are examined within the framework of forensic medical and forensic biological examinations in connection with the investigation of especially serious crimes, such as murder, rape, as well as traffic accidents, theft, etc.

Traces of blood, semen, hair, sweat (odorous) and other traces of human tissues and secretions make it possible to establish the scene of the crime and reproduce the circumstances of the incident. Often only these traces carry individualizing information about the identity of the offender.

Considering biological methods, it should be noted that objects of a biological nature have not only biological properties, but also a number of other properties, which makes it possible to study them by physicochemical methods (chromatographic, spectral).

In forensic examination, objects of biological nature include: tissues and secretions of humans, animals, birds, fish, insects, their traces, as well as fragments of plants and their metabolites. The microbial flora, although not included in the list of objects of forensic examination, is also of interest, since the inherent (resident) and introduced microflora of the human skin plays an important role in the study of the individualizing characteristics of a person. The resident flora of human skin is represented by staphylococci, micrococci, aerobic and anaerobic corynenform organisms (*Propionibacterium acnes*) and gram-negative bacteria (*Acinetobacter*).

Their growth and development depend on many factors: temperature, humidity, body area, age, sex and chronic diseases. The spectrum of bacteria on the surface of human skin depends on a number of reasons: on diseases, hereditary factors, taking medications (for example, antibiotics), on the living environment, etc., that is, it carries information about



the individualizing and group properties of a person. Therefore, the microbial flora should also be considered as an object of forensic examination.

It is shown that methods for studying objects of biological nature can be classified as methods using biological systems to study their biological properties, as well as other methods (biochemical, biophysical, physicochemical, etc.)

Biological methods can be conditionally divided into two groups: methods for studying the biological properties of objects and biological methods proper, based on the use of biological systems as detectors. Biological properties are inherent only in objects of biological nature and their study is possible only with the help of biological systems. For example, smell is analyzed using olfactory receptors, taste is analyzed using taste receptors, etc.

At the same time, biological systems can be used as detectors to analyze substances of various nature: those that determine the individual smell of a person, drugs, oil, and others. Biological methods can detect some substances at extremely low concentrations, often with amazingly high selectivity.

The principle of biological methods of analysis is to control the reaction of a biological system (cells, bacteria, plants and animals) to the determined trace component.

Organoleptic methods of preliminary examination of forensic objects are biological methods in which human olfactory, gustatory, visual and tactile receptors are used as detectors. A very sensitive detector of odorous substances is the human nose. Along with the definition of color, smell is one of the differentiating features of many objects of forensic examination (for example, petroleum products and fuels and lubricants).

The organoleptic determination of the taste of objects of forensic examination, although it is of great importance for their differentiation (for example, alcoholic beverages), is not used in the study in order to avoid possible accidental poisoning.

The data obtained with the help of organoleptic research are quite subjective and are used only for a preliminary assessment or detection of objects of expertise.

Currently, in various fields of science and technology, the sensory abilities of animals are used to study the molecular amounts of substances.

In expert studies, specially developed techniques are used that allow using biological methods to solve identification and diagnostic expert problems.

Proper biological methods, based on the study of the biological properties of objects using biological systems, are immunological methods, methods of molecular genetic or DNA analysis, and biological biosensor methods, which are increasingly used in science and forensic examination.

Thus, the methods of DNA analysis and the biosensor olfactory method are currently the only ones that allow identifying a person by his traces of biological nature: DNA analysis of cellular structures, olfactory method for studying traces of blood and sweat.

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## **THE EDUCATIONAL POTENTIAL OF THE FAMILY AS A NECESSARY CONDITION FOR THE SOCIAL ACTIVITY OF THE GROWING PERSONALITY**

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### **ANNOTATION**

*The article considers the educational potential of the family as a necessary condition for the social activity of the growing personality.*

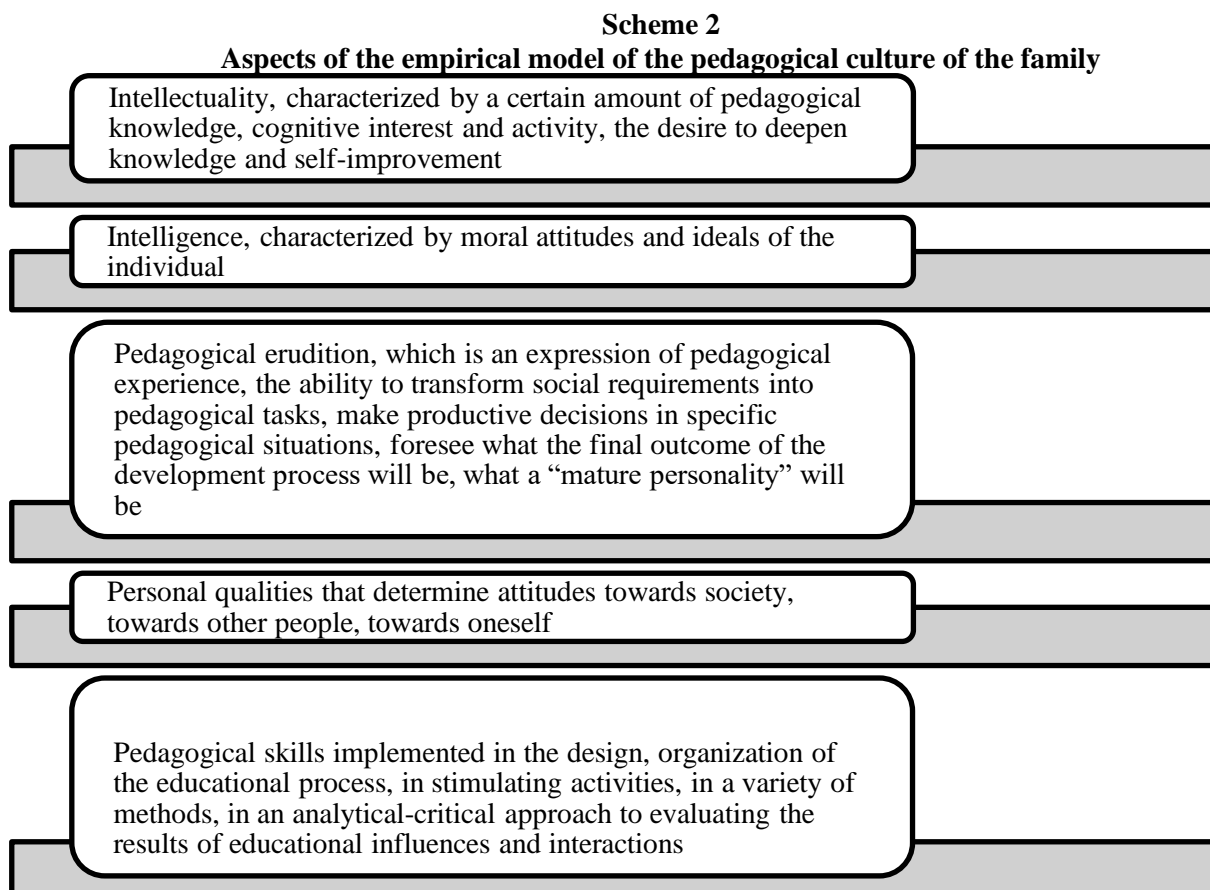
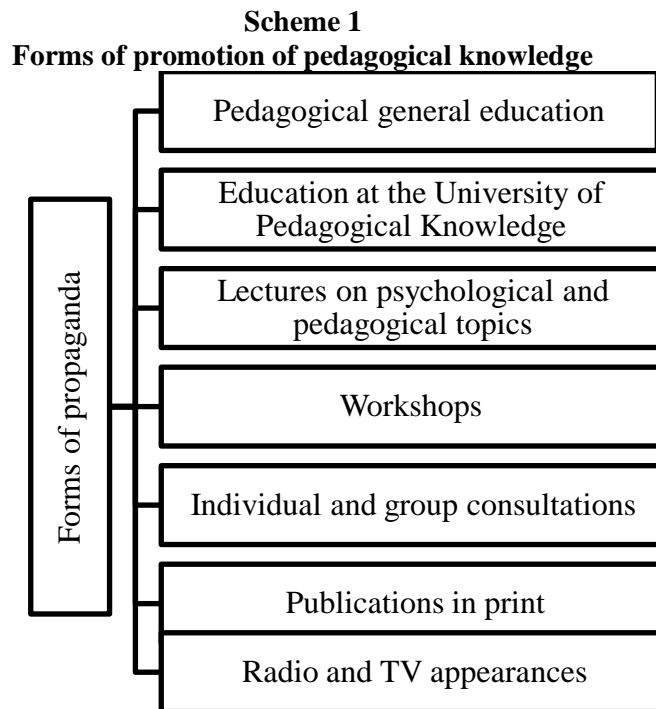
*An important characteristic in the family is parental authority. Parental authority refers to the influence of father and mother on children, because children rely on the opinion of their parents and try to imitate them.*

**KEY WORDS:** *authority, mother, father, children, family, pedagogy, model.*

An important characteristic in the family and a kind of category related to the social background of the family is parental authority. By parental authority, we mean the influence of father and mother on children, the extent to which children rely on the opinion of their parents and even try to imitate them. It is also important for the teacher to know whose authority - mother or father - is higher in the family, if any. This is required in order to adjust the programs and forms of work with a particular family in time. Forms of propaganda of pedagogical knowledge are presented in Scheme 1.

The key aspect of the study of the methods of the educator's activity is the development of some empirical model of the pedagogical culture of the family (Scheme 2.2).







In addition, certain difficulties often arise that are also associated with parental authority, and knowledge of these features of a particular family allows the teacher to form decisions on how to get out of this situation for the child in time.

The work on improving the pedagogical culture is one of the key in the field of interaction between teachers and parents, and has a serious impact on the formation of the micro-society of the school in the system "parents - student - teacher". One of the priorities of the social policy of any institution of general education is effective work with the family, since it is recognized that the family is the primary aspect of socialization.

A child entering school already has a certain formed arsenal of traditions, values and ideas about establishing contacts with the outside world, people around him and methods for solving emerging difficulties. The task of the class teacher and other teachers, school employees is to help direct and continue the positive elements in education, or to correct them in case of an unsatisfactory level of education.

Since, as discussed above, the differentiation of society has increased in our society, stratification in society is quite pronounced, this has a negative impact on all micro-societies, including the school. Many parents today are puzzled by issues of physical survival, and issues of spiritual development, as well as the emotional well-being of the child, may gradually fade into the background. Even realizing such actions, parents often simply have no choice, and in matters of upbringing they begin to act blindly, on an intuitive level. In addition, many parents show ignorance of the elementary pedagogical rules of upbringing, as a result of which children enter school with pedagogical neglect, since they do not have at least minimal knowledge about the age and individual characteristics of development at each specific age of human development.

All this almost never brings positive results, and the class teacher fails to establish contact in the "student - parent - school" system. In addition, the school environment, which also often consists of children from dysfunctional families, can become an authority for a student in a new environment for him. This contributes to child neglect and homelessness, and also develops such negative phenomena as deviant and delinquent behavior.

Thus, the educational process in educational institutions is the most important task and the real practical implementation of pedagogical resources in the field of interaction with the family. According to Kapralova, any school and class teachers should strive to promote effective communication and interaction between school representatives and the parents of the child, strive to get to know the character of the student and, if possible, get closer to his living conditions and the climate of the micro-society of the family. This will help in overcoming possible negative actions and problems associated with deviation.

In order for an effective form of cooperation between the school and the family of the student to arise, it is important in an educational institution to represent the school team as a whole, as a second family, in which not only new knowledge is acquired, but also interesting acquaintances, which lives an interesting full life. But this is possible only when the joint activity of teachers, children and parents is manifested. Therefore, in order to increase the effectiveness of interaction between students, parents and teachers, the latter need to come to some agreement, consensus in order to achieve the main goal of interaction without prejudice to the interests of other parties - to create conditions for self-development and self-realization of the student.

The experience of educational institutions, both basic and additional, shows that the most important role in this process is played by free creativity, which is produced on the basis of an independent choice of occupations. In addition to the fact that parents and teachers care about the health and emotional well-being of the student, it is also required to create an atmosphere and achieve well-being in the school environment. Unfortunately, parents do not always respond with joy and interest to the teacher's desire to create joint projects and be involved in the school life of their child. In this regard, such professional qualities as patience and purposeful search in the application of various pedagogical technologies will be important for the teacher.

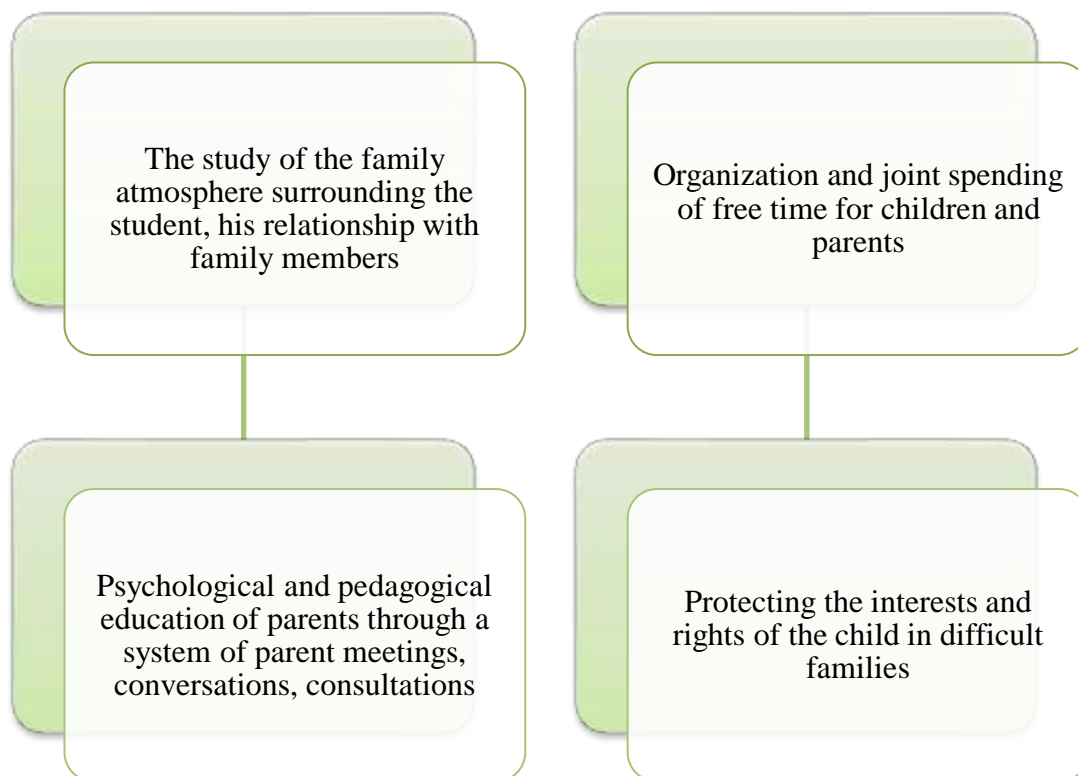


In order to enhance the role of the family, the teacher is required to consult in the field of knowledge of family law, in particular, the implementation of the right of children to education. Thus, the role of parents and families in the education of children is activated, and parents can gradually be involved in joint creative activities.

The life of an educational institution, therefore, is not only the acquisition and further reproduction of the acquired knowledge, but a full-fledged educational space where students are the central link. The teacher must attract and activate joint creativity and adults who educate the student.

As already mentioned, the above processes are influenced by the environment and lifestyle of the child himself. Material well-being is very important here, but some elements of the child's traditions and lifestyle are also important (diagram 3).

**Scheme 3**  
**Elements of the child's tradition and lifestyle**

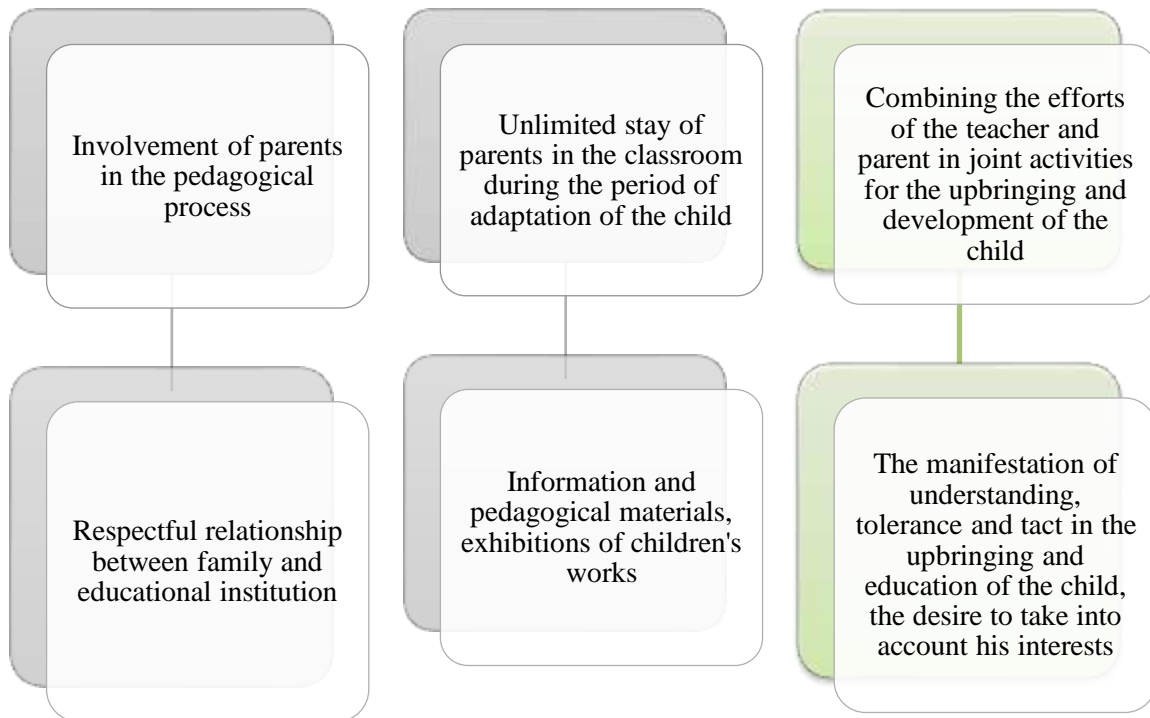


Thus, the role of the teacher is to directly and indirectly influence the educational process through the expression of his pedagogical position. The teacher can carry out not only information, but also an educational function, which is possible through the provision of competent qualified consultations, timely detection of learning difficulties and emotional state. The teacher can provide all possible assistance in organizing the mode of life and educational activities. In general, its task is to unite school workers and families of students into a single team.

The interaction between teachers and parents of children is carried out mainly through the following forms (Scheme 4).



**Scheme 4**  
**Forms of interaction between teachers and parents**



Thus, in the process of education, the subjects are not only students and teachers, but also parents (family) as an important link in the educational system.

Before proceeding to consider the interaction between the family and the general education school, let's define the concept of the family in the concept of those aspects that we are considering.

A family is a small social group based on marriage, consanguinity or the individual needs of people in union with each other. The family is distinguished by a single economic basis, common life, mutually dependent way of life of its older and younger members, a certain structure of roles and norms of interaction, emotional and moral ties, relationships of help, support and protection.

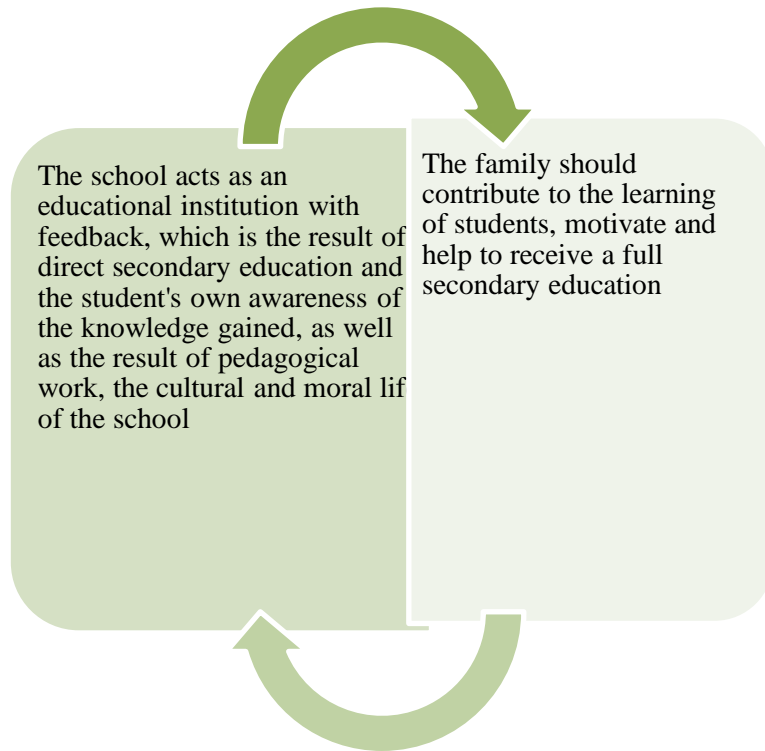
Interaction with the family is a complex, relevant work for both the school as a whole and for each teacher.

The learning process is a complex work of the school, the student and his family (diagram 5).



**Scheme 5**

**The system of interaction between the school, students and families**

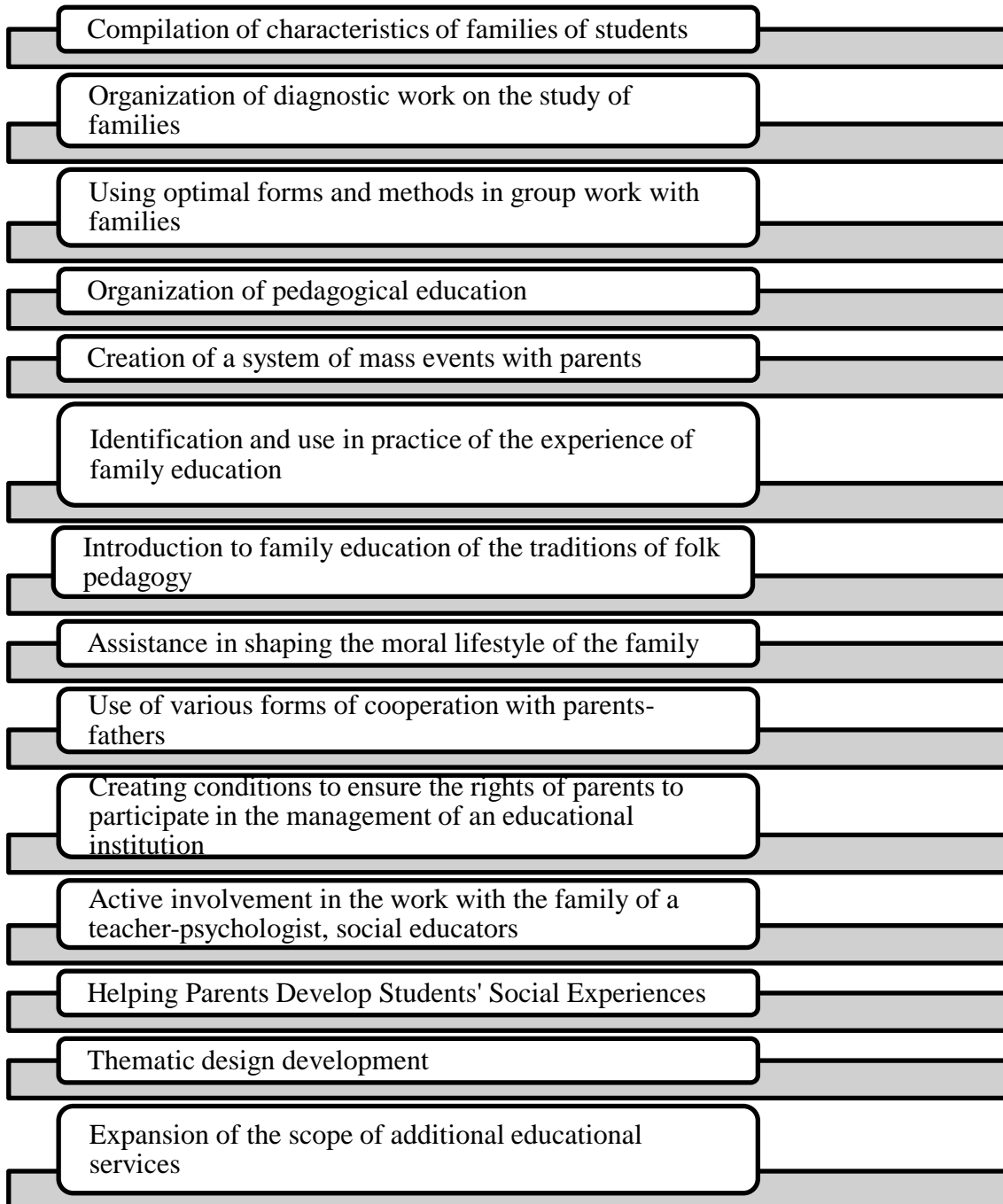


If we outline in more detail the directions of organizing work with the family, they will look like this (Scheme 6). The goals of any of these events are to involve the parents of students in public school life, to activate cohesion, to educate about the methods of educating students, to increase the pedagogical literacy and competence of parents.



**Scheme 6**

**Areas of work with the family of a student of a comprehensive school**





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UDC 338: 6P8 (575.172)

## **THEORETICAL AND PRACTICAL FOUNDATIONS FOR THE DEVELOPMENT OF THE FOOD INDUSTRY ENVIRONMENTAL PROBLEM**

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### **ANNOTATION**

*The article proposes the theoretical and practical foundations for the development of the food industry, taking into account the environmental problem.*

**KEY WORDS:** *food industry, environmental problem, population, industry, level of security.*

The food industry in the world is a vital sector of the economy for every country, the state and development of which determines the provision of the population with all the necessary food products in volumes and assortment sufficient to meet human needs. In this regard, the socially significant food industry and the level of its development are of great scientific and practical importance, as a factor directly affecting the level of food self-sufficiency of the country and its food independence.

One of the urgent problems of the development of the economy and society in the world is to provide the population with safe food. The size of food production depends on the standard of living of the population and the economic development of the region. Therefore, to ensure the development of the food industry, a new approach based on traditional resources is needed, primarily technological innovation, modernization and technical re-equipment of production, the introduction of new technologies and a high-quality management system, as well as the production of new products.

Recently, the food industry has been one of the most dynamically developing sectors of the economy in the Republic of Uzbekistan. A preliminary assessment of the modernization of the economy of the food industry confirms that many problems cannot be solved within the existing paradigm of managing the economic structure of the food industry. More and more necessary is the transition to a new control algorithm, which involves the formation of a qualitatively new infrastructure of systems and management models, which, in turn, ensure the development of the economy and social sphere of the region, and allow meeting the needs of the population in food products. In this regard, it becomes necessary to study the regional characteristics of the food industry in the Republic of Karakalpakstan, develop recommendations for improving the structure of the food industry in the context of economic modernization.

One of the most significant problems of the current stage of development of the economy and society is the problem of food security and providing the population with food products [1-5].

The objective need to saturate the food market with domestic products implies the effective functioning of food industry enterprises, because, ultimately, not only the standard of living of the population, but also the development of the economy as a whole depends on the volume of food production, their quality and price. Accordingly, a new approach





is needed to ensure the development of food industry enterprises in the context of mature market relations and growing competition in the domestic food market, based on the use of not only traditional resources, but, first of all, technological and organizational innovations [1-5].

The strategy of sustainable economic growth in the food industry is a guarantee of providing the country's population with high-quality and affordable food products. According to experts, the food industry, having a high potential for import substitution, is one of the growth points of the national economy of any state [2-4].

The strategy of sustainable economic growth in the food industry is the basis for guaranteed provision of the country's population with high-quality and affordable food products. According to experts, the food industry, having a high potential for import substitution, is one of the growth points of the national economy of any state [3-4].

The economic growth of the industry is a problem of its medium and long-term development, associated with the modernization of production and aimed at strengthening the competitive positions of enterprises in the domestic and world markets. The formation of competitive advantages and increasing the competitiveness of food industry sectors largely depend on the solution of the problem of economic growth [1-3].

The strategy of long-term and sustainable economic growth requires an answer to the question of the factors of economic growth, their interrelation, and the sources of a new quality of economic development. Of great importance is the study of the possibilities of using the internal potential of the food industry and external factors of economic growth [3-5].

According to scientists, the food industry is a strategically important sector of the national economy, on which the well-being of the people depends, and its expanded accelerated reproduction is one of the main prerequisites for overcoming the crisis and achieving sustainable economic growth of the country [5]. The special role of the food industry in the development of any country is determined by the social significance of products that are of paramount importance for human life and health. The food industry acts as an organizer and integrator of the agro-industrial complex, promotes the development of other industries as a participant in the agro-industrial market [1].

According to experts, the creation of the necessary conditions for the stable growth of the food industry is associated with the use of both old and new sources of economic growth [3]. Many problems of economic growth are debatable, in particular, the question of the significance of various factors at various stages of market transformations, as well as the correspondence of certain provisions of economic theory to modern realities. First of all, this refers to the interaction of economic growth factors.

The main source of growth in the food industry is the expansion of domestic demand. Institutional and structural factors are beginning to play an increasingly important role in ensuring sustainable economic growth. In matters of ensuring food security, not only the production of food products themselves plays an important role [2]. No less important is the production of modern food equipment, without which neither the production of new types of products nor the use of new technologies is possible. Experts note that the lack of domestic production of modern equipment for the food industry in many countries has led to the fact that food enterprises wishing to purchase expensive equipment could not do it in full [5]. The production capacities of existing enterprises and especially their technical level not only do not allow increasing the production of the most important types of food, but also lead to large losses of agricultural raw materials. In recent years, extremely limited investment resources have been attracted to the food industry [2].

Increasing the competitiveness of the food industry and strengthening its export potential is possible only through innovative development. It is necessary to modernize and technically re-equip production, introduce modern technologies and quality management systems, and introduce new types of products into production [3].

Research scientists have shown that the features of technological innovations in the food industry include: development, implementation of technologies, storage of agricultural products, which serves as a raw material for food production, which allows to increase the shelf life of food and in good quality; applying resource-saving technologies



that are characterized by a useful yield of products and a minimum of waste, based on the processing methods of current modern technologies; the use of technological processes to reduce the time of the production cycle and the development and implementation of our own packaging lines that meet the requirements of the products produced; improvement of containers, packaging and methods of transportation.

Food security is considered as a set of economic relations in society that arise to provide all its members with food with the appropriate quality and quantity standards, many experts believe that the state should guarantee the availability, stability and efficiency of food use.

Both definitions, which are different in presentation, nevertheless converge in one conclusion that for a healthy and productive life of a person, his social development, the state could guarantee free access to food to every person, thereby achieving national food security.

As the data of specialists showed, an important requirement for the food supply of the region is to ensure its security. The latter circumstance makes the problem of developing a food supply system with the definition of components from physiological norms and factors directly affecting the level of provision to threshold values, the decrease and excess of which is critical, relevant. It can be noted that, despite some studies, the problem under consideration of modernizing the food industry and providing regions and countries with food, or, in other words, “food security”, does not have a comprehensive solution for today. As the results of scientists show, in order to resolve the issue, it is necessary to single out a set of meaningful features of the food supply of the region: levels of income and consumption, volume and range of food

In this issue, it is very difficult to determine what is primarily the economic accessibility of all social groups to basic foodstuffs in the required quantity and quality, or physical accessibility, expressed in the volumes and proportions of their own production and food imports [1-3].

Providing the population with food is of exceptional social and political importance. The destinies of people depend on how uninterrupted and adequate supply of the population with basic foodstuffs is. The deterioration of the nutrition of the population entails irreversible demographic changes, increases social and interregional tension and creates a threat to the internal security of the state [3].

Currently, the agro-industrial complex of the CIS countries employs, on average, about 40% of all workers in the field of material production, more than a quarter of all production assets of each state are concentrated [4].

The production of basic types of foodstuffs and agricultural raw materials for processing decreased rapidly, investment in development and technical re-equipment decreased, and the use of production capacities deteriorated. As is known, the food and processing industry is one of the lowest developing parts of the agro-industrial complex as a result of the residual principle of formation and material and technical support of the industry. The level of development of these industries determines the livelihood of the population and is an important part of the food security of the state.

The role and importance of the food industry is determined by the fact that it produces a food product, food. From the point of view of human life, of all mankind and its civilization, all other branches should serve it and be, as it were, secondary. It is not for nothing that in the famous triad “well-fed, dressed, shod” even among the most necessary in the first place is the product of the food industry. But not only this, of course, determines the place and role of the food industry in the system of the national economy, industry and agro-industrial complex [2].

The introduction of innovations allows not only to increase the profitability of investments, but also to significantly improve the quality of goods and services provided, and contributes to the growth of the quality of life of the population. According to experts, the latter is especially relevant for industries such as the food industry, the sustainable functioning of which is the key to meeting the basic needs of the population and the food security of each country [3]. It must be admitted that during the radical economic reform, the food industry turned out to be one of the few industries that can adapt to new business conditions and actively implement new technological solutions [1].



Against the backdrop of rising costs for technological innovations and the relatively high innovative activity of industry enterprises, it should be noted that the vast majority of them are realized through imported technologies, equipment and raw materials while strengthening the national currency. All this leads to the actual curtailment of domestic industrial engineering, and sometimes agricultural production, posing a threat to the country's food security [1-5]. If the analysis included small processing shops of agricultural enterprises, then the level of innovation in the industry would be even lower, since such enterprises often use outdated technologies and equipment [1].

Improving the mechanisms for the effective development of sectors of the economic complex and individual enterprises plays an extremely important role in the modern market economy. Such complex and multi-structural processes require consistent management and regulation. As the researchers note, it is necessary to constantly study, systematize, generalize and evaluate the activities of individual elements of the national economic complex in order to correctly understand the development trend, identify real opportunities, as well as contradictions and difficulties, and, ultimately, develop an optimal strategy for modernization development to increase the efficiency of the entire national economy. the economy as a whole as a system [2].

Modern methods of modernization can be considered at several levels, because the use of the latest innovative technologies in the development of the food industry is primarily based on the formation of new ways to meet the needs of the population [7].

In the context of limited investment resources and an urgent need for a qualitative modernization of the production and technical potential of food and processing enterprises, along with direct budget support, preferential lending conditions, the improvement of the tax system by expanding its incentive functions can play a significant role in ensuring investment [4].

Modern conditions for the development of the agro-industrial complex and the domestic food industry necessitate the development of new theoretical approaches and principles for the organization of production, which should allow us to successfully solve the problems of ensuring food security.

The enterprise development strategy is based on a systematic approach, in which an industrial enterprise, as a control object, can be considered as a system that independently forms its goals in conditions of changes in the external environment in terms of output and inputs. This approach allows you to effectively implement the functions and achieve the desired goals, as well as take into account possible risks and uncertainties in the management process [7].

Given the above, we note that an industrial enterprise, developing in modern economic conditions, carrying out innovative activities, every day faces conditions of uncertainty and an increased level of risk, in connection with which risk management is an important component of the management process. When making a decision to produce new products, innovation risks arise. At food industry enterprises, there may be risks associated with the raw material market, depending on price and competition from suppliers [7].

At the same time, production and technological risks associated with non-compliance with the parameters of the production task or stopping the technological process may arise in production. When selling products, which depends on the level of competition in the product market, there may be marketing risks, such as marketing, advertising, competitive risk. When servicing production, there may be risks associated with untimely and poor-quality maintenance of the enterprise's activities, lack of information support for production [6].

Staffing risks may arise in the area of staffing the production process. There may be financial risks associated with the overall financial condition of the enterprise, as well as credit risk and the risk of the financial macro environment. When developing new products at food industry enterprises, there may be risks of the profitability of these products, the risk of demand for innovative products, which is currently the most relevant, as well as the risk of production opportunities, determined by the potential of the enterprise [6].



Thus, in order to meet the needs of the population of each state in food, it is necessary to increase its own production. The development of proposals for increasing domestic production should be closely linked with the substantiation of food needs in the region, the search for methods for their mobilization.

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UDC 504.75

## ANALYSIS OF GLOBAL ENVIRONMENTAL PROBLEMS

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### ABSTRACT

*The article describes the interaction between man and nature, the global nature of environmental problems and the conditions used to solve them. One of the important factors is to understand the natural realities, identify the causes of their origin, take a positive approach to the correction of negative situations, take into account the laws of nature, and solve environmental problems based on scientific and technical achievements.*

**KEY WORDS:** *ecology, environmental protection, environmental threat, air, atmosphere.*

Environmental problems are caused by the contradictions of social development, the dramatically increased scale of the impact of human activity on the world around us, and also the uneven socio-economic and scientific-technical development of countries and regions. Solving global environmental problems requires the development of international cooperation.

The term "ecology" was first used in 1866 by the biologist E. Haeckel. He gave the following definition in his book "General Morphology of Organisms": "Ecology is a body of knowledge related to the economy of nature - a science that studies the sum of organic and inorganic relations between animals and the environment, and primarily their friendly or hostile relations" [3].

In the national encyclopedia of Uzbekistan, ecology is expressed as follows: (Greek oikos - home, dwelling and ecology) - systems that are higher than organisms; population, biocenoses, biogeocenoses (ecosystems) and the structure of the biosphere, a set of biological sciences that study the processes occurring in them [4,164]. In this encyclopedia, the essence of ecological factors is recognized as a set of certain conditions and elements of the environment that have a specific effect on the activity of organisms.

Today, the classic definition sounds different, that is: ecology is the science of the relationship of living organisms with their environment. This term was consolidated in our life in the 70s of the 20th century.

The interaction between man and nature has always depended on the state of the surrounding natural habitat throughout the history of human evolutionary development. When it comes to the impact of natural factors on society, it is important to distinguish between the aspects that affect society, regardless of the need for development.

At the same time, it is necessary to take into account the deep processes that continue in the natural environment, have a diverse content and qualitative impact on human life, change it, change its character and view of the phenomena occurring in nature. As a result, the environment is subject to changes not only due to natural disasters, but also directly due to human activities, for example, green areas are not cut in a completely reasonable way, grass cover is destroyed without taking into account the measures of their restoration, which leads to environmental damage. leads to impoverishment. In addition, ineffective measures are being taken to fight against the improper disposal of domestic and industrial waste, wind and water erosion, desertification of arid lands, which leads to a decrease in soil fertility, soil and groundwater levels, and as a result, climate change in the relevant areas. will come

The most important modern global environmental problems facing mankind are:

- environmental pollution,



- Greenhouse Effect,
- Depletion Of the Ozone Layer,
- Acid Rain,
- Soil Degradation,
- Deforestation,
- Desertification,
- Waste Problems,
- Reduction of biosphere gene pool, etc. [2].

One of the main problems is atmospheric pollution and, accordingly, air pollution. Atmospheric air was the first to feel the effects of technological progress. Imagine that every hour of every day, tens of thousands of tons of harmful and toxic substances are released into the atmosphere. Many types of industries and sectors have an irreparable and shocking impact on the environment, for example, oil, metallurgy, food and other industries. As a result, a large amount of carbon dioxide is released into the atmosphere, which is why the planet is constantly warming. Despite the fact that temperature differences are insignificant, on a global scale it can seriously affect hydrological regimes, more precisely, their changes. In addition to all this, atmospheric pollution is reflected in weather conditions, which have already changed with the advent of technological progress.

Acid rain is now very common, it appears due to sulfur oxides entering the air. These rains have a negative effect on many things and damage trees, plants, lithosphere and the upper layer of the earth.

There are not enough financial and physical resources to overcome these environmental problems, so they are currently only in the development stage.

Growing industry is also affecting water quality. All types of substances that do not belong to the natural water environment are sent to water reservoirs through inappropriate wastewater treatment methods. Deterioration in water quality is caused by, among other things, the excessive use of fertilizers in agriculture and the emission of waste gases from land and water transport.

The problem of water pollution is especially common in African countries and some Asian countries. There is a huge shortage of drinking water because all available water bodies are highly polluted. This water cannot even be used for washing clothes, let alone for drinking. This is also related to the release of waste into the wastewater of many industrial enterprises.

To overcome this problem, first of all, it is necessary to improve the efficiency of wastewater treatment, which, unfortunately, is associated with high costs. Due to the growing demand for them, it is necessary to build new facilities of this type and modernize the existing ones. Monitoring water quality and striving for continuous improvement of future implemented solutions can lead to systemic improvement.

The greenhouse effect is a process that occurs when gases in the earth's atmosphere trap heat from the sun. This process makes the earth much hotter than the atmosphere. The greenhouse effect makes the earth a habitable place. Gases in the atmosphere, such as carbon dioxide, trap heat just like the glass roof of a greenhouse. They are called greenhouse gases. The whole process continues as follows: during the day, sunlight illuminates the atmosphere; the earth's surface is heated by the sun; at night, the earth's surface cools and returns heat to the air; some of the heat is stored by greenhouse gases in the atmosphere.

Human activity is changing the Earth's natural greenhouse effect. Burning fossil fuels such as coal and oil increases the amount of carbon dioxide in our atmosphere. As a result, climate zones can change, which leads to many natural disasters such as hurricanes, tornadoes and floods. At the same time, drought may occur in areas far from water bodies. Many species of plants and animals are in danger of extinction due to their inability to adapt to new



conditions. The greenhouse effect is also a real threat to humanity. According to experts, actions such as separating waste, using recyclable materials and reducing deforestation will reduce the amount of carbon dioxide in the air.

In order to reduce the negative consequences of negative impact on the environment, a number of activities were carried out at the international level, in which ways to solve environmental problems were determined:

- Drafting laws and concluding international agreements. In 1972, the Stockholm Declaration was adopted at the United Nations Environmental Conference. It approved 26 environmental principles that all countries should follow. Among them were principles related to the protection and rational use of non-renewable resources, the cessation or limitation of the release of toxic substances into the atmosphere;

- Allocation of funds for environmental restoration. The United Nations has declared 2021-2030 as the Decade of Ecosystem Restoration and Climate Action. One of the directions of this movement is to increase soil fertility. According to experts, more than 2 billion hectares of deforested and degraded land can be used for rehabilitation and agricultural purposes;

- Technology as a way to solve environmental problems. The use of new technologies, including improved treatment plants and power plants that work on energy from alternative sources (solar, wind, etc.), allows to minimize environmental pollution;

- Improvement of neighboring areas in settlements. This is done not only to make it look beautiful and pleasant from the window, but also to restore the microclimate, clean the air and increase the level of psychological comfort. To reduce the spread of harmful substances, it is important to plant seedlings around businesses and along roads.

The environmental problem is a social problem, although it is directly caused by technical means, it can find its comprehensive solution only as a result of fundamental social changes aimed at ensuring the implementation of the necessary economic, production, socio-cultural and axiological changes, and environmental can eliminate the risk.

In general, it is necessary to pay attention to the following when establishing international cooperation relations in solving global environmental problems:

- formation of an international cooperation system in the use and protection of nature, creation of natural, social, economic and political conditions;

- experience of cooperation in solving environmental problems, national main directions, increasing the importance of international organizations in environmental protection;

- development of agreements and programs of international cooperation in the field of environmental protection.

Therefore, the nature of the ecological problem can be revealed only on the basis of the unity of scientific and social approaches, and this means revealing the internal inconsistency of the relationship between society and nature. The global nature of environmental problems causes the interests of different social groups, social institutions, individual countries, regions, and socio-economic systems to collide in their solution. Therefore, it becomes the object of sharp political-ideological struggle, conflict of different ideological relations. It is not only about understanding the nature of the environmental problem and the ways to solve it, but also about what kind of future awaits humanity.

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## DIFFERENTIAL RESISTANCE TO ALTERNATING CURRENT DURING BREAKDOWN OF CURRENT IN DEEP LEVELS IN A SILICON P-N JUNCTION

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### SUMMARY

*The current-voltage characteristic, the dependence of the nonmonotonic temperature on the differential resistance, and the change in the sign of the temperature coefficient depend on the change in the breakdown voltage. The change in the sign of the temperature coefficient is associated with the charging of the space charge region in the p-n junction, which occurs in the deep level. Because of the avalanche breakdown in silicon, the charge change in the deep level has a strong effect on increasing and decreasing the probability of microplasma formation. Measuring the possibility of turning on microplasma without filling deep centers makes it possible to obtain information about the mechanism of creation of charge carriers in microplasma channels of the p-n junction.*

**KEY WORDS:** deep levels, avalanche breakdown, temperature coefficient

Recently, in [2], new interesting phenomena were described that are observed during the breakdown of electron-trained silicon p-n junctions. If the concentration of the deep center is low, then they affect the statistical delay in the breakdown of microplasmas [3]. It has been shown that, when the charge state of the deep center changes by a partial decrease in the voltage at the p-n junction, the statistical delay of microplasma breakdown makes it possible to estimate the energy spectrum of deep levels localized in the microplasma channel at their low concentration, when other methods are inapplicable [4]. When studying the nonmonotonic dependence of temperature on the differential resistance of the Rd microplasma, it turns out that the change in the sign of the temperature coefficient depends on the breakdown of the alternating current and the concentration  $U_p$ . The change in the temperature coefficient is explained by the authors in scientific papers [5]. In the p-n junction, the space charge is charged in deep layers. As a result of the growth of an infinitely thin layer at a constant temperature,  $R_t$  appears - a negative value of the temperature component of the resistance on the voltmeter characteristic [6].

In this approximation, the maximum field strength  $E_m$  after breakdown is constant ( $E_m = E_b = \text{const}$ ) and almost in the entire space charge region (SCR). If  $p=0$  ;  $n = \frac{j}{q \cdot v_n}$

$$\rho(x) = q \cdot |N - n - N_i \cdot f_n| \quad (1)$$

Где  $j$  – плотности тока,  $v_n$  - дрейфовая скорость электронов. Используя известное соотношение между  $U$  напряжения ,  $\rho$  и максимальная напряженность поля  $E_m$  для резкого перехода получим ВАХ после пробоя в виде





Where  $j$  is the current density, is the drift velocity of electrons. Using the known relationship between voltage  $U$ ,  $\rho$  and the maximum field strength  $E_m$  for a sharp transition, we obtain the CVC after breakdown in the form

$$U = U_{breakdown(o)} \frac{N}{N-n-N_t \cdot f_n} \quad (2)$$

The index 0 (zero) hereinafter refers to the values corresponding to the zero filling of the deep level. In the  $n$ th layer, the space charge region (SCR) can be recharged with a change in current or temperature only at a deep level located in the upper half of the charged band, for which, when the number of donors is greater than the number of acceptors

$$n_1 = \frac{a_n}{b_n} = N_e \cdot \exp\left(-\frac{E_i}{k \cdot T}\right) \quad (3)$$

$N_e$  is the effective density of states,  $E_i$  is the ionization energy of a deep level. The main role in the study of the functions of diodes of an avalanche diode [7] is played by a theoretical study of the variability of bulk breakdown in a p-n junction, and the differential resistance of a microplasma is expressed in terms of  $R_d$ . As is known [7], in general case, the value of the differential resistance of the microplasma  $R_D$  can be written as the sum

$$R_D = R_0 + R_c + R_t \quad (4)$$

where  $R_0$  is the spreading resistance,

$R_c$  - resistance (SCR) space charge region,

$R_t$  is the thermal component of the microplasma resistance.

According to [7], the value of  $R_0$  can be calculated by the formula:

$$R_0 = \frac{\sqrt{2} \cdot \rho}{\pi \cdot d_{mn}} \quad (5)$$

where  $\rho$  = - specific resistance of the base;

$\mu$  is the carrier mobility,

$d_{mp}$  - microplasma diameter,

$n$  is the concentration of free charge carriers.

the second resistance is the space charge region (SCR) in the p-n junction of silicon:

$$:R_c = R_{co} \left[ \frac{(1+\gamma) \cdot j + j_1}{\lambda \cdot j + j_1} \right]^2 \quad (6)$$

$$\text{In that } R_{co} = \frac{\omega_{bo}^2}{2 \cdot \varepsilon \cdot \varepsilon_0 \cdot \nu_n \cdot S} = \frac{\omega_{bo}^2}{2 \cdot \varepsilon \cdot \varepsilon_0 \cdot \nu_n \cdot \frac{\pi \cdot d_{mn}^2}{4}} = \frac{2 \omega_{bo}^2}{\pi \cdot \varepsilon \cdot \varepsilon_0 \cdot \nu_n \cdot d_{mn}^2}$$

- this  $U=U_{breakdown(o)}$  - the width of the space charge region.  $S$  is the cross-sectional area of the microplasma.

The value of  $R_t$ , taking into account the variability of heat release in the p - n junction, is determined as:

$$R_t = \frac{2 \cdot \beta \cdot \varphi_{mn}^2}{\pi \cdot \lambda \cdot d_{mn}^2 L} \cdot \left\{ \left( 1 - \frac{X_0}{L} \right) \left[ z \sqrt{z^2 + R_{mn}^2} + R_{mn} \cdot l_n \left( z + \sqrt{z^2 + R_{mn}^2} \right) - |z|z \right] - \frac{2}{3L} \left[ \left( z^2 + R_{mn}^2 \right)^{\frac{3}{2}} - |z|^3 \right] \right\}_{-X_0}^{L-X_0} \quad (7)$$

where: - - coefficient of thermal conductivity of the semiconductor,

$mp$  - microplasma breakdown voltage,

- temperature coefficient of breakdown voltage,



L is the length of microplasmas [8].

The temperature of the microplasma channel in comparison with the ambient temperature is determined by the expression:

$$\Delta T_0 = \Delta T_1 + \Delta T_2 = \frac{R_{T1} \cdot \Delta J}{\beta \cdot U_{МП}} + \frac{R_{T2} \cdot \Delta J}{\beta \cdot U_{МП}} \quad (8)$$

Where  $U_{МП}$  is the microplasma breakdown voltage;

$R_{T2}$ ,  $\Delta T_2$  - thermal component of the diode resistance and its heating as a whole;

$R_{T1}$ , and  $\Delta T_1$  are the corresponding values for the microplasma channel.

The value of  $\Delta T_0$  allows us to determine from  $\Delta T_0 = \Delta T_1 + \Delta T_2 = \frac{R_{T1} \cdot \Delta J}{\beta \cdot U_{МП}} + \frac{R_{T2} \cdot \Delta J}{\beta \cdot U_{МП}}$  temperature of the microplasma channel,  $R_{T2}$  is easily determined from the thermal resistance known from the experiment

$$R_{T2} = \beta U_m^2 r_{T2} \quad (9)$$

In the experiment, the value of the total series resistance is found, which, in addition to

$$R_T = R_{T1} + R_{T2} \quad (10)$$

includes the spreading resistance  $R_0$  and the SCR resistance  $R_c$ , and it is difficult to determine  $R_T$  experimentally.

In view of the nonmonotonic temperature dependence of the differential resistance of the microplasma  $R_d$ , at low temperatures  $T$  the differential resistance of the microplasma is calculated depending on the temperature  $T$  and the current density  $j$ .

The first is the corresponding values for the microplasma channel

$$R_{T1} = R_{co} \frac{j_t \cdot j_1}{(\lambda \cdot j + j_1)^2} \left[ 1 - \frac{j \cdot r_T \cdot U_{bo}}{T} \left( \frac{E_{KT}}{k \cdot T} + \frac{3}{2} \right) \right] \quad (11)$$

Second term

$$R_{T2} = R_{TO} \left[ \frac{(1+\gamma) \cdot j + j_1}{\lambda \cdot j + j_1} \right] \quad (12)$$

heating device.

Where  $R_{co} = \frac{\omega_{bo}^2}{2 \cdot \varepsilon \cdot \varepsilon_0 \cdot \nu_n \cdot S} = \frac{\omega_{bo}^2}{2 \cdot \varepsilon \cdot \varepsilon_0 \cdot \nu_n \cdot \frac{\pi \cdot d_{МП}^2}{4}} = \frac{2 \omega_{bo}^2}{\pi \cdot \varepsilon \cdot \varepsilon_0 \cdot \nu_n \cdot d_{МП}^2}$

$$j_1 = q \cdot \nu_n \cdot n_1 \quad j_t = q \cdot \nu_n \cdot N_t \quad \lambda = \left( 1 + \gamma - \frac{N}{N_t} \right)$$

$r_T$  - thermal resistance of the device

As the temperature rises, the GCs begin to empty,  $f_n$  strongly depends on  $T$  and  $j$ , so  $R_d$  sharply increases

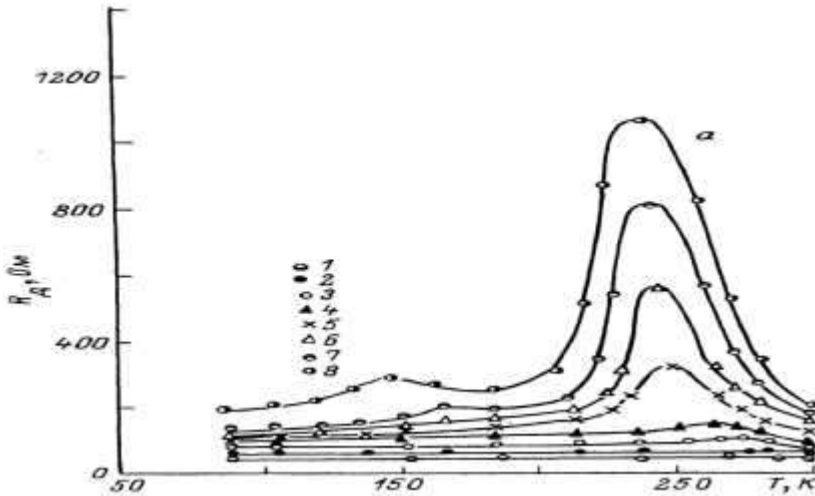
and reaches its maximum value.  $R_{dmax} = R_d(T) = R_{co} \frac{(1 + \gamma + \lambda)^2 + \lambda \cdot j_t / j}{4 \cdot \lambda^2} \quad (13)$

At a temperature

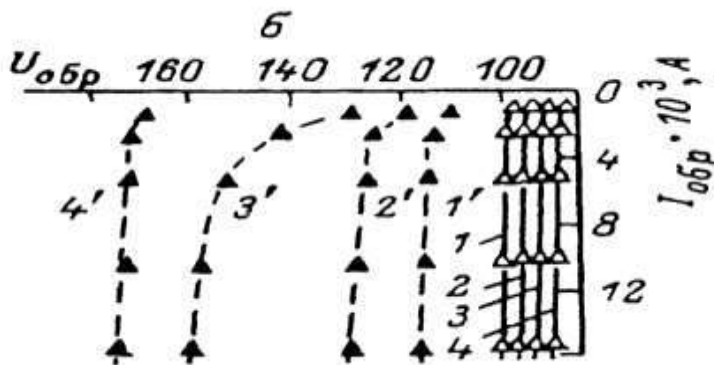
$$T = T_d = E_t \left[ k \cdot \ln \frac{q \cdot \nu_n \cdot N}{\lambda \cdot j} \right]^{-1} \quad (14)$$

При дальнейшем увеличении температуры скорость эмиссий намного превосходит скорость захвата, ГУ полностью опустошаются и  $R_d$  опять перерастает зависеть от  $j$  и  $T$  [9].

With a further increase in temperature, the emission rate far exceeds the capture rate, the BCs are completely emptied, and  $R_d$  again outgrows the dependence on  $j$  and  $T$  [9].



1-Fig. Temperature dependence of the differential resistance in the breakdown region of a silicon reverse p-n junction. Fluence radiation,  $\Phi$ , cm<sup>-2</sup>: 1 - up to radiation, 2 -  $5 \cdot 10^{15}$ , 3 -  $1 \cdot 10^{16}$ , 4 -  $2 \cdot 10^{16}$ , 5 -  $3 \cdot 10^{16}$ , 6 -  $5 \cdot 10^{16}$ , 7 -  $4 \cdot 10^{16}$ , 8 -  $6 \cdot 10^{16}$  [2].



2-Fig. VAX silicon p-n reverse junction [2].

- 1, 1' — 300 K;
- 2, 2' — 252 K;
- 3, 3' — 220 K;
- 4, 4' — 200 K.

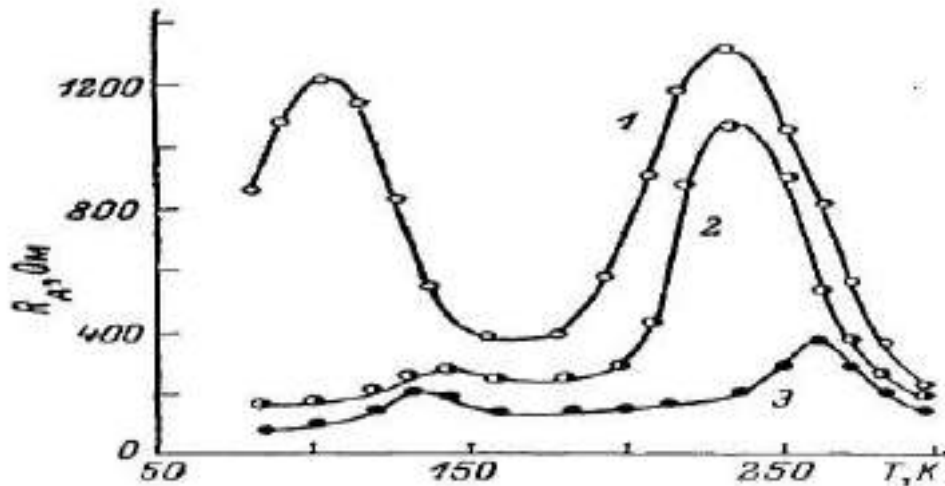
In the vicinity of  $T=T_{max}$ ,  $R_d$  strongly depends on the current and decreases with the value  $\lambda \cdot j \ll j_1$ , this decrease in  $R_d$  means “softening” of the CVC observed experimentally. Finally, at all temperatures and currents,  $R_d$  increases, and  $T$  decreases with increasing  $N_t$  in full accordance with the results of [2]. It is also interesting to note that at low temperatures and low currents, when the inequalities

$\lambda \cdot j < j_1 \ll j_t$  the presence of a GU can increase  $R_t$  much briefly even if. Speaking about the temperature dependence of  $U_b$ , we mean the voltage corresponding to a certain fixed value of the current, this dependence is fully described by the equations

$$\beta_t = \frac{1}{U} \cdot \frac{dU}{dT} = \beta_{T_0} - \frac{j \cdot j_1}{(\lambda \cdot j + j_1)[(1+\gamma) \cdot j + j_1]} \cdot \frac{N_t}{N} \cdot \left( \frac{E_t}{k \cdot T} + \frac{3}{2} \right) \cdot \frac{1}{T} \quad (15)$$



Where  $\beta_{To} = (1/U_{bo}) \cdot (dU_{bo}/dT)$  it is easy to make sure that at , an anomaly should be observed on the dependence, and the sign of  $\beta_T$  should even change if,  $1/(2 \cdot (1 + \lambda + \gamma)) \cdot N_t/N \cdot E_g/(k \cdot T) > \beta_{To} \cong 10^{-3}$



$K^{-1}$

3-Rice. Temperature dependence of differential resistance in silicon p-n junction at different temperatures [2].

In the non-isothermal case, a significant  $R_d$  is the thermal component  $RT_1$ , but in low-voltage devices, taking into account self-heating does not give anything qualitatively new compared to the above, in high-voltage devices, the most interesting effect of self-heating is a strong change in the large “trap” resistance  $R_t$ . From

$$R_{T1} = R_{co} \frac{j_t \cdot j_1}{(\lambda \cdot j + j_1)^2} \left[ 1 - \frac{j \cdot r_T \cdot U_{bo}}{T} \left( \frac{E_{KT}}{k \cdot T} + \frac{3}{2} \right) \right] \quad \text{видно, что при } j \cdot r_T \cdot U_{bo} > \frac{k \cdot T^2}{E_t}$$

the sign of  $R_t$  changes, therefore, in the vicinity of  $T = T_m$ , the  $R_d(T)$  dependence should show not a maximum, but a minimum. Moreover, if  $|R_t| > [R]_{T1} + R_{T2}$ , a section with negative differential resistance may form. This effect was observed earlier in [10-11] when studying high-voltage silicon p-n junctions. It is obvious that the presence of several types in the forbidden zone. GU, with different ionization energies should lead to the appearance of an appropriate number of maxima (or minima) in the dependence  $R_t(T)$  at

$$T = T_{\text{д}} = E_t \left[ k \cdot \ln \frac{q \cdot V_n \cdot N_{\epsilon}}{\lambda \cdot j} \right]^{-1}$$

temperatures, defined by the formula

However, it should be noted that the contribution of different BCs to  $R_d$  is additive only at  $Nt \ll N$ , since the thickness of the SCR  $\omega$ , on which  $R_d$  depends on the filling of all types of BCs.

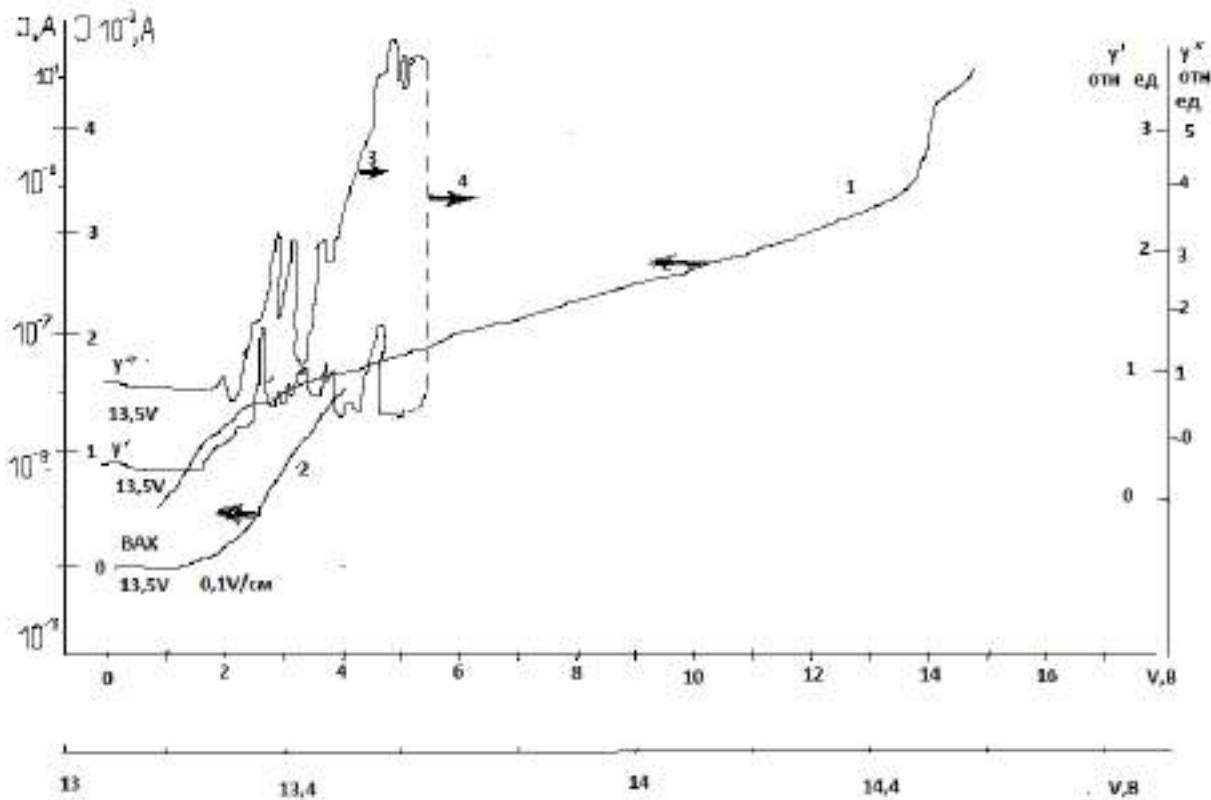
However, it should be noted that the contribution of different BCs to  $R_d$  is additive only at  $Nt \ll N$ , since the thickness of the SCR  $\omega$ , on which  $R_d$  depends on the filling of all types of BCs

Above, we did not explicitly assume that the quantities  $n_1 = \frac{a_n}{b_n} = N_e \cdot \exp\left(-\frac{E_i}{k \cdot T}\right)$  и  $\gamma = \frac{C_{nn}}{b_n}$  are constant throughout the SCR, and the equilibrium value was used for  $n_1$ . In fact, in a strong p-n junction near breakdown, the rate of thermal generation increases due to the Pool-Frenkel effect or thermally stimulated tunneling [12–13]. The main consequence of this is the dependence of effective ionization energies. GU Et from the field, and hence from the coordinate. Therefore, the recharging of even one type of GU will occur in different SCR currents at different temperatures. In addition, the field dependence will lead



$\gamma = \frac{C_{nn}}{b_n}$  (если  $\gamma \gg 1$ ) and non-uniformity of SCR temperature in high-voltage devices. Therefore, the width of the peaks in the  $R_d(T)$  dependence should be greater than what follows from the formula  $R_{T1} = R_{co} \frac{j_t \cdot j_1}{(\lambda \cdot j + j_1)^2} \left[ 1 - \frac{j \cdot r_T \cdot U_{bo}}{T} \left( \frac{E_{KT}}{k \cdot T} + \frac{3}{2} \right) \right]$  according to which  $T \equiv T_m(1 \pm 0,1)$ . This circumstance makes it difficult to use the  $R_d(T)$  dependence; the number of DLs in the device is too small to be able to use capacitance spectroscopy [14].

This greatly affects the breakdown of the current in silicon to deep levels; A change in the charge of deep levels can also lead to an increase or decrease in the probability of the appearance of microplasma.



6-Fig. Typical junctions obtained by the method of modulating BAX differentiation in a silicon p-n junction [15].

From this process one can explore the deep center. As the temperature rises, the mean free path decreases due to an increase in the phonon concentration. Therefore, the required energy requires a large critical field at a shorter distance. Therefore, when the diode is heated, the avalanche breakdown voltage increases. The above results show that the analysis of the time dependence of cooling at different delay times for the relaxation of the alternating perturbation current (avalanche breakdown) makes it possible to determine the main parameter of deep levels - the thermal ionization energy [16–17]. This makes it possible to reduce the disadvantages of this phenomenon (it can be called microplasma spectroscopy of deep levels) associated with the filling of deep channels with breakdown current pulses. Analytical expression - the duration of the statistical delay of microplasma infection, the distribution function of the main parameters of deep cells. A method has been developed for determining the parameters of a deep center using the measurement of the statistical delay of



microplasma recovery. Measuring the possibility of adding microplasma without filling deep centers allows obtaining information about the mechanism of creation of charge carriers in the microplasma channels of p-n junction silicon. Measurements at a voltage of 18-19V determine the tunneling mechanism for the entry of charge carriers into the microplasma channel.

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## IMPLEMENTATION OF DIGITAL TECHNOLOGIES IN FOREIGN LANGUAGE TEACHING

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### ABSTRACT

*This article touches the problem of the use of digital educational technologies in foreign language teaching and presents the educational possibilities of using these technologies in the process of learning and teaching various aspects of foreign language.*

**KEY WORDS:** *digital information technologies, foreign language, foreign language teaching.*

Digital learning technologies are a way of organising a modern learning environment based on digital technology.

Technology should support the 4 key components of the learning process: active participation, group work, interaction and expert feedback.

The choice of technology that can be used unfortunately often depends on the resources available to the teacher and the institution. A common situation is an interactive whiteboard, or a computer with a projector. If you are lucky, you may have a classroom equipped with laptops, netbooks or tablets. In both cases, you are likely to be using technology in every session. You may also have access to a computer lab, which needs to be booked in advance, or the use of which is on a first-come, first-served basis.

In the case of learners who are bored with traditional ways of learning a language, using computers during classes will increase their motivation. Students usually have smartphones or other mobile devices that they can use. And they will certainly appreciate their teacher's efforts if he or she shows them how to practice the language better using the device.

One way of integrating the use of technology into an English course is to use a blended learning approach.

Blended learning here refers to a language course that combines face-to-face communication in the classroom with the use of technology, and this definition implies that learners use technology at home. Although many teachers believe that blended learning training consists of face-to-face communication in the classroom with the addition of an online course (i.e. 90% online; 10% face-to-face), this term should be understood differently: the online component is added to the face-to-face training.

One of the best ways in which teachers can implement this type of blended learning is the creation and use of information and communication subject environment, which is a set of conditions contributing to the emergence and development of processes of information interaction between the learner(s), teacher and means of information and communication technology, as well as the formation of cognitive activity of the learner provided the content of the environment components. At that the following is provided: activity with information resource of some subject field by means of interactive means of information and communication technologies; information interaction with means of interactive information and communication technologies, interacting with a user as a subject of information communication and personality; interactive information interaction between a user and objects of subject field,



reflecting regularities and features of appropriate subject field (or field); information interaction between a teacher and a pupil. The functioning of information and communication subject environment is determined by the following factors: implementation of information interaction between a user (users) both among themselves (within educational interactions) and with screen representations of studied objects, influence on the processes or phenomena under consideration, learning plots occurring and developing on the basis of the use of information and educational resource of a particular subject area; possibility to work under the conditions of implementation of embedded technologies.

A common obstacle to integrating technology into a foreign language course can be the question of what the teacher should do if something goes wrong. A teacher using technology should always have a plan B, i.e. be prepared for the possibility that the technology might not work as planned. But this article is not about that, but about the actual process of integrating information technology into the curriculum.

### **1. Vocabulary training with digital information technology**

As you know, learning vocabulary can be quite difficult. Not only do the students have to learn a large number of words, but they also have to meet them in context several times before they can memorise and use them in practice. In addition to individual words, students have to learn a large number of word combinations. In most language courses, there is simply not enough time to learn all the vocabulary the learners need, so much of it has to be learned outside the classroom.

With all these factors in mind, the teacher should not only focus on teaching pre-selected words and phrases, but also introduce students to strategies for effective vocabulary learning, developing students' self-study skills.

Information technology can help learners to learn words because it has been proven that words are remembered better if they are presented in an interesting way and if words and phrases affect learners emotionally. Thus, technology can help the teacher find different and sometimes fun ways to introduce vocabulary into the classroom. An example of such a task could be "Word puzzles".

### **2. Teaching grammar with digital information technology**

Consider how information technology grammar instruction.

Many of the technologies are used by people in everyday life to test their knowledge of grammar and to help them write texts.

For example: sites that automatically translate texts and tools embedded in word processing programmes (spell and grammar checkers), comparing results in Google, using a web page called Googleflight, etc.

These techniques are useful both in language learning and in everyday life.

### **3. Teaching listening with digital information technology**

Technology has helped with language learning since ancient times, from the wax cylinders produced in Linguaphone 1 and gramophone records to digital recordings on CDs.

But it's safe to say that learning foreign languages has become much more interesting with the advent of the Internet, through podcasts and other online audio sources. Technology, when used properly, can help teachers and learners with real-life oral comprehension. Listening is an active process in which listeners select and interpret information that comes from audio and visual sources in order to determine what is happening and what the speaker is trying to convey. However, teaching listening is not an easy task, and the results are not easy to demonstrate.

How can digital technology help? There is a perception that the main aim should be to keep learners motivated, facilitate practice and listen outside the classroom. Teachers can use technology, especially the Internet, to show learners the benefits of real-world sources of information by engaging them in tasks that are of personal interest to them.

There are many authentic videos and podcasts on YouTube aimed at improving listening skills.

In addition to the Internet, sound recording devices (mobile phones and MP3 players) can be used to record people known to the teacher and learners. Telephony tools (such as Skype) can also be used.





#### **4. Learning to read using digital information technology**

Reading is a complex and multi-faceted skill. Perceptions of how best to learn to read have been constantly changing, especially with the rise in popularity of the internet. The International Reading Association has stated that in order to be fully literate in today's world, new competences in information and communication are needed. Therefore, it can be argued that teachers should help students develop reading skills, Different reading strategies are needed when it comes to electronic texts (e.g. how to deal with hyperlinked texts), and with the advent of new text genres (email, chat, microblogging, etc.) as well as new combinations of text and image, the nature of text itself has changed. All these new texts require a new set of skills, which are usually grouped under the general term "digital literacy".

#### **5. Teaching writing with digital information technology**

The skill of writing is probably among the most problematic due to the growth of internet users. Recently, there has been an increased interest in important new tools such as blogs, "Wikipedia" or social media platforms that help learners get used to writing. In many cases, you will find that your students regularly write online. One of the challenges for a foreign language teacher is to help the learner to extending their "internet world beyond the mother tongue". And the way to do this is to use the internet as an opportunity for language learning.

Blogs are another means for learning a foreign language. Collective work can also be celebrated through the use of technology. Perhaps the best tool for this is Wikipedia (a simple website, with content that can be easily edited). Whereas emails, chat rooms and blogs mostly focus on informal and personal exchanges, writing a wiki page is more formal and focuses on a specific topic. Apart from "Wikipedia", teachers can also experiment with other projects, such as Simple English Wikipedia (<http://simple.wikipedia.org>), which targets English language learners. Collaboration in a project of this kind can be very motivating for some students.

Writing on social media, is another area that cannot be overlooked. Social networks such as Facebook or Twitter have become an integral part of many learners' lives, and teachers may find that some of their students are already using a foreign language to communicate with others on these sites. In that case, using social media in the classroom would be an excellent option that would be very popular.

Collecting learners' written work in electronic portfolios is another area for the teacher to consider. This can become an integral part of the learner's personal environment.

In addition to conventional writing skills, your students may need digital literacy skills, which is another reason to use digital tools. There are many things to explore with learners: the multimodality of digital texts (e.g. combining text and pictures), writing in different digital contexts (e.g. use of mobile text messages or SMS as well as use of fonts and other design features, etc.

#### **6. Learning to speak using digital information technology**

For many years, the computer tended to be more associated with written rather than spoken language applications, but with new developments in Web 2.0, the increased access of teachers and learners to the Internet for teaching and learning, the focus has shifted. Web 2.0 tools are some of the best technologies that can help learners improve their speaking skills. These days it's easy to record the speaker as most mobile phones have a voice recorder, and there are many free web-based tools that also allow you to make such recordings. Such tools include audio-editing technology from mobile phones, webcams, VCRs and audio Internet sites, interview websites, computer games and virtual words, which can be used to show that there are now many tools available and many ways whose use enhances speech.

#### **7. Pronunciation training with digital information technology**

Pronunciation is an aspect of language teaching that often lacks time and is sometimes forgotten. Recently, many tools and websites have been developed to help teachers and learners with pronunciation.

Special Internet resources, websites, talking dictionaries, phonemic charts and other online tools can be used



to teach pronunciation, including general phonetic knowledge, common pronunciation errors, and to deal with specific points such as accentuation, features of coherent speech, use of phonetic transcription, etc.

Educators around the world are becoming increasingly aware of the benefits of the proficient use of modern ICTs in education. ICTs help solve the following problems: improving learning processes, increasing educational outcomes and motivation, networking and collaborative projects, improving organization and management of the educational process. This is not surprising, since the opportunities that ICTs offer for the development of an innovative economy and modern society have become available for education as well.

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## RESEARCH REVIEW OF RASAPUSHPA

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### ABSTRACT

Rasayanas are used to provide nutrients needed by the body for physical and mental well-being. Kupipakva Rasayana is one of the preparations that is mainly used for rejuvenation therapy and critical illnesses as emergency medicine. Rasapushpa is one of the Kupipakva rasayana of Nirgandha type. Rasapushpa is very effective in Vicharchika disease, eczema, and acute and subacute inflammation. In addition, it is very effective for wounds caused by syphilis and cholera bacteria. It has an action against *E. coli*, *Klebsiella* organism, and *Proteus* organism. It can be used as medicine directly, or as an ingredient for other formulations like Candanadivatika, Rasapuspa malahara, Rasapuspadya malahara. In the present study researches carried out on Rasapushpa are gathered from available resources and are discussed.

**KEYWORDS:** Kupipakva Rasayana, Rasapushpa, Vicharchika, Eczema, inflammation, Damaru yantra

### INTRODUCTION

Processing of *Rasaousadhi* (Formulations of *Parad*) is classified into four types these are *Kharleeya Rasayana*, *Parpati Kalpana*, *Kupipakva Rasayana*, and *Pottali Kalpana*. In the *Kupipakva Rasayana* method, medicines are prepared in a *kupi* and are heated through a sand bath until the processed medicine settles at the neck or top of the *kupi*. *Kupipakva Rasayanas* are prescribed very commonly in Ayurveda clinical practice owing to their properties like subtle dose quantity & due to augmenting effect. The action of these medicine remains for a longer period which indicates their greater potency and efficacy. *Parada* and *Gandhaka* are the main ingredients of *Kupipakva Rasayana*. Some formulations are also prepared in the absences of *Gandhaka*. According to the presence of *Gandhaka*, it is classified as *Sagandha* and *Nirgandha*. The application of heat plays a major role during the preparation of *Kupipakva rasayanas*. According to the type preparation, the temperature is adjusted as mild, moderate and intense. Based on heating patterns *Kupipakva Rasayans* are also classified as *Antaradhuma* and *Bahirdhuma*.

### Classification of Kupipakva Rasayanas

A. According to the presence of ingredients.			
Sl Number	Types	Description	Example
1	Sagandha	Prepared with the use of gandhak	Makardhwaj
2	Nirgandha	Prepared without the use of gandhak	Rasakarpara
B. According to the process of manufacturing.			
1	Antaradhuma	Cork is applied in the beginning and vapours are not allowed to escape	Rasasindura
2	Bahirdhuma	Cork is applied after burning of sulphur	
C. According to the place of the finished product.			
1	Kanthasta	The finished product is deposited at the neck	Makardhwaj
2	Talastha	The product is obtained from the bottom of Kupi.	swarnavanga
3	Ubhaysatha	Final products obtained from both sites	Samirpannag



## MATERIALS AND METHODS

Among all *Kupipakva Rasayanans*, *Rasapushpa* is one of the popular formulations which is commonly used by Ayurveda physicians. Now we discuss the efficacy of *Rasapushpa* with the help of research work which is already been published.

### A randomized clinical trial of *Rasapushpadi Malahara* on *Vicharchika* w.s.r. to *Eczema*

Here the Author Reetesh Ramnani et al., prepared two types of *Rasapushpa* one is the *Kupipakva* method and the second one is the *Damaru yantra* method by taking reference of *Rasatarangini*. Both the samples were further used to prepare two samples of *Rasapushpadi Malhara* using *Siktha taila* as a base. *Siktha & Til taila* was taken in a ratio of 1:5. Then randomised control trials between two groups are done. 30 patients of *Vicharchika* were randomly selected as per classical signs & symptoms for the study, from the OPD and IPD of NIA, Jaipur. Again, they divided randomly these patients into two groups of 15 patients each. For one group they gave twice-daily *Rasapushpadi Malahara* sample 1st, made by *Kupipakva* method and for the second group twice daily by *Rasapushpadi Malahara* sample 2nd made by *Damaru yantra vidhi*. In each group, external application is done. In the end, both groups showed significant results on different clinical parameters like *Kandu*, *Daha*, *Srava*, *Rukshta*, *Pidika*, *Vaivaranyata*, *Pidika*, and *Raji*. But *Rasapushpa* prepared by *Damaru yantra* method showed a highly significant result in EASI Score, which indicates the severity of *eczema*.

It is concluded that *Rasapushpadi Malahara* is very potent in the treatment of *Vicharchika*. It contains both mineral and herbal drugs who all have good antibacterial and antifungal properties e.g. *Parada*, *Kasis*, *Saindhava*, *Sphatika*, *Wax*, and *Tila taila*. So, *Rasapushpadi Malahara* showed significant results only by external application<sup>1</sup>.

### A pharmaceutico-analytical study of *Rasapushpa* with special reference to its in-vitro antimicrobial activity

This research article was published by Prema Kalmegh et al., here Author planned to assess the antimicrobial activity of the *Rasapushpa* on the causative organism *Treponema Pallidum*. Because it is already mentioned in *Rasatarangini* that *Rasapushpa* is a highly effective wound caused due to *Syphilis* and microorganisms causing *Cholera*.

Under materials and methods, they have taken *Parada*, *Kasis*, and *Saindhava Lavana* each 150gm and prepared *Rasapushpa* as described in *Rasatarangini*. After the preparation of the *Rasapushpa* confirmatory test was done by taking one pinch of *Rasapushpa* and dissolving it in distilled water using a test tube. Then to this solution, a few drops of ammonia were added. At the bottom of the test tube, a black precipitate was formed so it was proved that the precipitate formed is Mercurous Chloride (HgCl) i.e., *Rasapushpa*.

The prepared medicine was first tested for organoleptic characteristics such as order, colour. Physicochemical analysis of pH, Loss on drying, determination of ash value, determination of acid insoluble ash and water-soluble extractive, fineness of particles and X-Ray diffraction were also done. Assay of Elements was done to calculate the % of Mercury, Sulphur, Sodium and Chlorine.

Require quantity of Agar solution was prepared according to the standard ratio of pH 7.2. The sterile nutrient Agar medium was cooled to 45°C and spread with 106 cells/ml of respective bacterial culture individually and 5 holes or wells about 9mm in diameter were cut in the medium with a sterile cork borer. Then Disc was prepared.

The antimicrobial activity of *Rasapushpa* was studied to determine the zone of inhibition per mm against selected organisms for *Treponema Pallidum*. Thus, *Rasapushpa* has revealed good antimicrobial activity for the above organism. The author concludes that *Rasapushpa* has shown a better zone of inhibition against *Treponema pallidum* and thus showed good antimicrobial activity<sup>2</sup>.

### *Rasapushpa*-Effect on acute and sub-acute inflammation

Here Author Dr Akhilesh Shrivastava et al., have evaluated the anti-inflammatory activity of *Rasapushpa* on albino rats.

Here *Rasapushpa* was prepared by *Kupipakva* method as per Text *Rasatarangini* (6/29-31). 100g purified *Parad*, 100g purified *Kasis* (ferrous sulphate) and 100g *Saindhav* (rock salt) was taken. First *kajjali* is prepared by triturating *Parad* and *Kasis*. *Saindhav Lavan* is added and again triturated. Then this *kajjali* is processed with the *Kupipakva* method and *Rasapushpa* is obtained.

Then Animal experiments were performed on Wister strain rats of either sex.

*Rasapushpa* is water-insoluble so dilution and the oral dose were made in form of suspension. The suspension of *Rasapushpa* and Diclofenac was made with 0.25% of carboxymethyl cellulose sodium (CMC) by w/v. According to Text, the dose of *Rasapushpa* is 65-125 mg/day.

Dose in rats (per kg body weight) = human dose x 0.018 x 5 The doses of RP calculated in rats were 6 mg/kg & 12 mg/kg body weight.5, 6 Suspension was prepared for 6 mg/ml/kg by 60 mg RP added in 10 ml of 0.25% of CMC and for 12 mg/ml/kg by 120 mg RP added in 10 ml 0.25% of CMC, drug was administered by tuberculin syringe.

In conclusion, it is shown that the anti-inflammatory effect of *Rasapushpa* is dose-dependent. In acute inflammation, the dose of 12mg/kg of *Rasapushpa* showed highly significant anti-inflammatory activity compared to Diclofenac (standard) but a dose of 6 mg/kg showed less significant anti-inflammation activity. In sub-acute inflammation decreases in granuloma weight by *Rasapushpa* indicate the significant proliferative activity. A microscopic study also showed granuloma tissue with predominantly collagen deposition that re-confirms the anti-inflammatory activity of *Rasapushpa*<sup>3</sup>.



### Rasapushpa-anti-microbial activity

Anti-microbial activity of *Rasapushpa* was done at IPGT&R, Jamnagar, Gujarat, by Shailesh Nawakar. *Rasapushpa* is prepared by various methods i.e.

- Kupipakva* method using all the ingredients viz. *Hingulottha Parada*, *Suddha Kasis* and *Saindhava* in equal proportions. (RPKE)
- Kupipakva* method using the ingredients, *Kasis* & *Saindhava* in Double proportions than *Parada*. (RPKD)
- Damaru yantra* method using all the ingredients viz. *Parada*, *Kasis*, *Saindhava* and *Sphatika* in Equal proportions. (RPDE)
- Damaru yantra* method using the ingredients *Kasis*, *Saindhava* and *Sphatika* in Double proportions than *Parada*. (RPDD)
- Suksmausadhi* sample was prepared by mixing 1 part of the RPDE sample with 9 parts of pure lactose and triturated it for 32 hrs. This was its first dilution. Again 1 part of this firstly diluted sample was mixed with fresh 9 parts of pure lactose and triturated for 32 hrs. (SMD)

The mean temperatures of *Rasapushpa* the range were 105°C + 5°C at Mrdu agni stage; 220°C + 10°C at Madhya agni stage and 360°C + 20°C at Tivragni stage.

After the preparation of all samples toxicity study and the antimicrobial study were done.

From an Analytical study, it is concluded that RPKD shows superior quality to the other three samples.

In the NPS test pattern spots of *Rasapushpa Kupipakva* with an equal proportion of ingredients and *Rasapushpa Kupipakva* with double proportions except Hg were very similar to each other, also spots of *Rasapushpa Damaru yantra* with an equal proportion of ingredients and *Rasapushpa Damaru yantra* double proportion of ingredients except Hg are similar to each other but minute differences may be the identification marks for individual samples. Also, in the NPS test, all four samples were having specific purple spots of mercurous chloride and reddish shades of mercuric chloride (as impurities), but finally, all four samples were showing the dominance of mercurous chloride.

The conclusion of the toxicity study revealed that none of the samples seems to be highly toxic, but it also shows that *Rasapushpa Damaru yantra* equal proportion of ingredients was least toxic in comparison to the other three samples.

The antimicrobial study reveals that all the group samples (except *Suksmausadhi*) have an action against *Staphylococcus aureus* above the concentration of 35µg in each disc.

RPKD, RPDE and its *Suksmausadhi* sample have an action against *E. coli* above the concentration 4.12µg in each disc.

None of the samples has shown action against *Pseudomonas aeruginosa*.

RPKE, RPDE, RPKD and RPDD samples have an action against *Klebsiella* organism above the concentration of 70µg/disc.

All the samples except *Suksmausadhi* have an action against the *Proteus* organism above the concentration of 35µg in each disc. RPKD was the most active among all samples, showing activity in lower concentrations (8.25µg/ disc) also<sup>4</sup>.

### DISCUSSION

*Rasapushpa* is a mineral formula widely used by Ayurvedic doctors. There are different types of *Rasapushpa* available. Some researchers have also changed its dosage form. One of the clinical studies was done by *Rasapushpadi Malahara* on *Vicharchika* W.s.r in eczema. Here *Rasapushpadi Malahara* shows high efficiency in *Vicharchika* with clinical parameters like *Kandu*, *Daha*, *Srava*, *Rukshata*, *Vaivaranyata*, *Pidika*. But *Rasapushpadi Malahara* prepared by *Damaru Yantra* showed highly significant results in the EASI score, indicating the severity of eczema. In *Rasatarangini* it is mentioned that *Rasapushpa* is very effective against ulcers caused by syphilis. To demonstrate this, a pharmacological analysis study of *Rasapushpa* with special reference to its in vitro antibacterial activity was performed. It is shown here that *Rasapushpa* has a better zone of inhibition for *Treponema pallidum* and thus shows good antibacterial activity. From another study, *Rasapushpa* has also been shown to be important in acute inflammatory conditions. Microscopic studies also showed granulomatous tissue with a predominantly collagenous deposition, also confirming its anti-inflammatory activity. In another study, *Rasapushpa* was shown to be effective against *Staphylococcus aureus* at a concentration of 35µg in each disc, which is very effective. *Rasapushpa* has no effect on *Pseudomonas aeruginosa*. Furthermore, it is active against *Klebsiella* organisms above a concentration of 70µg/disc.

### CONCLUSION

From the available resources, we could get Four published Research. The remaining are classical review articles. Among 4 articles one is on a clinical trial, two are on pharmaceutical-analytical and Anti-microbial another one is an Animal study. After reviewing these available 4 types of research we can conclude that *Rasapushpa* is safe antimicrobial preparation which can be used in various skin diseases.

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## **A STUDY ON FINANCIAL PERFORMANCE OF MRF TYRES LIMITED**

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### **ABSTRACT**

*The largest manufacturer of tyres in India, Maddras Rubber Factory (MRF) is the subject of this study's analysis of its financial performance from 2017 to 2022. This study aims to assess the financial performance of MRF Tyres Limited, a prominent tire manufacturer in India, for the period last five years. Using financial ratio analysis, including liquidity, profitability, solvency, and efficiency ratios, the study evaluates the company's financial health and efficiency. Additionally, a comparative analysis is conducted to examine MRF Tyres Limited's financial performance in relation to its industry competitors. The findings indicate that MRF Tyres Limited has sustained steady financial growth and stability, with consistent profitability and liquidity ratios. The study concludes that MRF Tyres Limited is a financially sound organization with a strong competitive position within the tire industry.*

### **1. INTRODUCTION**

Finance is defined as the provision of money at the time when it's required. Every enterprise, whether big, medium or small, needs finance to carry on its operation and to achieve its targets. Finance is so indispensable today that it is rightly said to be the life hood of an enterprise. Without adequate finance, no enterprise can possibly accomplish its objectives. Financial statements are prepared mainly for decision making. The statements are not ends in themselves but are useful in decision making. The balance sheet may describe as financial cross section taken at certain intervals and the coming statements as a condensed history of the growth and delay between cross sections.

### **2. STATEMENT OF THE PROBLEM**

The purpose of this study is to fill this gap by conducting a comprehensive analysis of MRF Tyres' financial performance, including its profitability, balance sheet, shareholder returns, and future prospects. The study will also evaluate the impact of market dynamics on the financial performance, and compare its performance with that of its competitors to better understand its position in the market.

### **3. OBJECTIVES OF THE STUDY**

- To analyse profitability position of MRF Tyres Ltd.
- To evaluate the solvency position of MRF Tyres Ltd.
- To measure the liquidity position of MRF Tyres Ltd.

### **4. FINANCIAL ANALYSIS**

- Net profit ratio
- Return on capital
- Return on Investment
- Asset turnover ratio
- Fixed asset turnover ratio
- Receivable turnover ratio
- Payable turnover ratio
- Inventory turnover ratio



- Working capital turnover ratio
- Operating Profit ratio
- Proprietary ratio
- Debt equity ratio.
- Current ratio
- Liquid ratio
- Absolute liquidity ratio

## 5. REVIEW OF LITERATURE

**Amalendu Bhunia, et.al (2022)** The study aimed to evaluate the financial strengths and weaknesses of two Indian public sector pharmaceutical enterprises by analyzing their balance sheet and profit and loss account over a period of 12 years (1997-98 to 2008-09). The data was obtained from CMIE database and the results showed a strong liquidity position but a decreasing trend in financial stability. The study only focuses on the public sector data and does not compare with the private sector, which is a limitation. The study is important for investors to understand the nature of the Indian pharmaceutical industry and make investment decisions.

**Zixuan Qin, Abeer Hassan and Mahalaxmi Adhikari parajuli (2022)** The study analyzes the impact of COVID-19 on Amazon's financial position using a longitudinal case study and quantitative methods. It compares Amazon's financial performance and position with Walmart to show robustness. The results suggest that COVID-19 did not have a significant negative impact on Amazon's financial performance. The study provides an in-depth analysis of COVID-19's influence on Amazon's financial situation and highlights the company's response. The study contributes to the accounting literature by showing the impact of COVID-19 on internet companies' financial performance.

**Harjit Singh Deepak Balodi Amlan Chakrabarti (2022)**, The paper analyses the role of key auto makers on the financial performance of the Indian auto industry, using a novel construction of financial ratios to increase accuracy. India was the fourth largest car market in 2018 and the seventh largest commercial vehicle manufacturer. The government aims to develop India as a center for global manufacturing. The paper also discusses the challenge of using financial ratios effectively without losing details.

**Bhupender Kumar Som, Himanshu Goel (2021)**, This study evaluates the performance of Tata Motors over the last 5 years (2016-2020). 5 ratios were calculated to assess the company's financial performance, including net profit margin, return on capital employed, inventory turnover, asset turnover, and current ratio. Secondary data from Tata Motors' annual reports was used. The results showed that the company performed well and had good potential for earning returns for shareholders.

**Ms. K. Ramya (2019)**, The value of a firm is influenced by financial decisions that balance risk and profitability. The ultimate objective of firm performance is a topic of debate, with some believing it to be profit maximization and others believing it to be wealth maximization. However, it is observed that profit and wealth maximization are interrelated and affect each other.

**Devi Naveen Kumar, et.al (2019)**, this study on ratio analysis the fixed profit analysis is integrated, expanded and supplemented with the growth analysis. This study enables us to have access to various facts of organization. This study aims to measure the profitability of the company and performance of the company by using profitability and turnover ratio. This study is based on secondary data was collected from published sources such as annual reports brochures, income and internal records, magazines and the company's website.

**S Kumar & Dr.N.Saravanan (2019)**, The study aims to analyze the financial performance of selected tire companies in India, including JK Tyres Industries Ltd, over a five-year period. This is achieved through the use of ratio analysis and ANOVA test. The results of the analysis revealed the comparative financial performance of the companies and showed that the mean returns of the selected tire firms were insignificant. This helped in understanding the financial performance of the company.

**Sharmil A.P (2019)**, Finance plays a critical role in business as it guides policies and decision making. The financial performance of a company can be assessed through ratio analysis, such as Liquidity, Solvency, Profitability, and Trend analysis. This study focuses on the financial performance of Hindustan Unilever Limited (HUL) using data from the last 5 years. The aim is to evaluate the company's financial stability and success over this period. Overall, finance is essential for understanding and improving the financial performance of a business.

**Dr. R. Jayanthi (2018)**, This study focuses on financial statement analysis of selected Indian Tyre Companies using secondary data collected from various sources to understand their financial performance. The tyre industry in India is a mature and important sector contributing to the country's development and economy. It consists of a large consumer base, including passenger cars, buses, trucks, and more. The market for tyres is dominated by the replacement segment and the top 10 manufacturers account for





80% of the market. Major players like MRF, Apollo Tyres, and CEAT Tyres are pursuing global strategies to enhance their competitiveness.

**J.Pavithra, Dilip Gurukrishnan (2018)**, Financial analysis measures business efficiency and performance through examination of financial statements. It helps assess profitability, track trends, and determine the growth potential of a business. This is achieved by evaluating the return on investment, comparison of previous years' financial statements, and analysis of expenses, sales, and assets/liabilities. Financial analysis is a crucial tool for determining the future prospects of a business.

**Dr.A.Ramya, Dr.S.Kavitha (2017)**, This analysis is used to assess a firm's financial characteristics from accounting and financial statements, with the goal of determining the management's efficiency and performance. The study focuses on the overall financial position of Maruthi Suzuki over a specific period and is useful for decision-making and maximizing the company's intrinsic value.

**Shivam Kakati & Arup Roy (2017)**, The study evaluates the performance of Farmer Producer Companies (FPCs) in Northeast India to determine their sustainability. A Performance Score Method is proposed to measure the FPCs' performance based on financial ratios such as liquidity, solvency, efficiency, and profitability. The study analysed the financial statements of four FPCs operating for more than three years with published financial statements. The results showed poor performance in terms of solvency, efficiency, and profitability, with only marginal liquidity.

**J.Pavithra, et.al (2017)**, This research study has a comprehensive plan that guides the collection and analysis of data. The focus is on Jeppiaar Cements Pvt Ltd and the research design is analytical. The researcher will classify data relationships to the research problem and use various tools to analyse the data and identify connections to the research problem. The plan serves as a blueprint for the research and ensures that the objectives are met. In summary, the master plan is a critical aspect of the research study.

**Dusan BARAN, et.al (2016)**, Acknowledges the success of a business is tied to the skills of its management. In order to maintain success, managers must adapt their approach to changing market conditions. This includes maintaining customer and supplier relationships. During challenging times, changing the management approach can help ensure the long-term stability of the business. By implementing these measures, the business can gain an advantage over its competitors. In short, effective management is key to a successful business.

**6. TABLE**

YEAR	NET PROFIT	RETURN ON CAPITAL	RETURN ON INVESTMENT	ASSET TURNOVER	FIXED ASSET TURNOVER
2018	7.34	0.15	15.5	0.93	2.149
2019	7.03	0.15	14.3	0.87	1.961
2020	8.76	0.12	11.7	0.83	1.530
2021	7.90	0.13	12.8	0.71	1.547
2022	3.46	0.07	6.9	0.83	1.796

YEAR	RECEIVABLE TURNOVER	PAYABLE TURNOVER	INVENTORY TURNOVER	WORKING CAPITAL TURNOVER	OPERATING PROFIT
2018	6.80	7.684	7.01	4.70	23.03
2019	6.86	7.951	5.36	5.35	17.76
2020	7.13	5.179	5.58	5.60	9.68
2021	7.04	4.680	5.49	5.21	19.21
2022	8.98	9.707	4.67	5.97	12.72

YEAR	PROPRIETARY RATIO	DEBT EQUITY	CURRENT RATIO	LIQUID RATIO	ABSOLUTE LIQUIDITY RATIO
2018	0.59	0.13	1.71	1.71	0.026
2019	0.58	0.09	1.54	1.54	0.024
2020	0.62	0.06	1.55	1.55	0.225
2021	0.59	0.02	1.43	1.43	0.019
2022	0.61	0.05	1.46	1.46	0.051



- The company should diversify its revenue streams and reduce its reliance on a few keycustomers or products to reduce its revenue risk.
- The net profit ratio measures the relationship between net profit (either before or after taxes) and sales. The report shows that the company's net profit ratio has varied over the years, ranging from 3.46% in 2021-2022 to 8.76% in 2019-2020. The data indicates that the company's profitability has been somewhat volatile over the years, with changes in net profit and net profit ratio.
- The return on capital ratio measures the return on investment by stock investors and bondholders. The report shows that the company's return on capital has declined over the years, reaching a low of 0.07 in 2021-2022, which indicates that the company was earning a return of 7% on its capital investments. The return on capital suggests that the company's profitability had declined over the years, despite the increase in the amount of capital invested.
- The company's profitability has been somewhat volatile over the years, and it is important to investigate the reasons behind these fluctuations in profitability to ensure long-term financial stability. It is also important to evaluate the company's financial performance using multiple financial ratios and indicators to gain a comprehensive understanding of its financial health.
- The company's profitability has been somewhat volatile over the years, and it is important to investigate the reasons behind these fluctuations in profitability to ensure long-term financial stability. It is also important to evaluate the company's financial performance using multiple financial ratios and indicators to gain a comprehensive understanding of its financial health.
- The asset turnover ratio for the company has fluctuated over the years, with the highest ratio in 2017-2018 and a decrease in subsequent years, indicating a decline in the company's ability to generate revenue from its assets. However, the ratio improved in 2021-2022.
- The fixed asset turnover ratio decreased over the years until it increased significantly in 2021-2022, indicating an improvement in the company's efficiency in utilizing its fixed assets to generate net credit sales.
- The receivable turnover ratio has generally increased over the years, indicating an improvement in the company's ability to collect payments from its customers on credit sales. The ratio increased significantly in 2021-2022.
- The payable turnover ratio initially increased slightly but then decreased significantly over the years until it increased substantially in 2021-2022, indicating an improvement in the company's payment performance to its suppliers.
- The inventory turnover ratio has been decreasing over the years, indicating that the company is selling and replacing its inventory less frequently.
- The working capital turnover ratio has generally increased over the years, indicating that the company had become more efficient in using its working capital to generate sales. However, a high working capital turnover ratio may not always be a good thing, as it could indicate inadequate working capital to meet current obligations.

## 7. SUGGESTIONS

- Based on the analysis of the company's various turnover ratios, it seems that the company has experienced both positive and negative trends in its financial performance over the years.
- The company was able to generate more revenue from its assets during that period, but the subsequent decrease may indicate a decline in the company's overall financial performance. However, the recent improvement in the turnover ratio is a positive sign, indicating that the company may be on the path to recovery.
- Similarly, the company has become more efficient in utilizing its fixed assets to generate net credit sales, which is a positive sign. The increase in receivable turnover ratio also indicates that the company has been successful in collecting payments from its customers on credit sales, which is another positive sign.
- On the other hand, the company was taking longer to pay its suppliers, which is not a good sign for maintaining good supplier relationships. However, the recent increase in turnover ratio is a positive sign, indicating that the company has improved its payment performance to its suppliers.
- The company is not selling and replacing its inventory as frequently as it should, which could lead to excess inventory and decreased cash flow. Finally, while the increase in working capital turnover ratio over the years is generally positive, it's important to note that a very high working capital turnover ratio may indicate inadequate working capital to meet current obligations.

## 8. CONCLUSION

The company should focus on improving its liquidity position by increasing current assets or reducing current liabilities. It should also diversify its revenue streams, invest in research and development, and improve communication with investors. The analysis of various turnover ratios shows both positive and negative trends in the company's financial performance over the years. The recent increase in turnover ratios are positive signs, while the recent increase in payable turnover ratio is a good sign for maintaining good supplier relationships.

Based on these findings, it is recommended that the company should conduct a detailed analysis of the reasons behind the fluctuations



in profitability and take necessary steps to ensure long-term financial stability. The company should also evaluate its financial performance using multiple financial ratios and indicators to gain a comprehensive understanding of its financial health. Additionally, the company should continue to improve operational efficiency, reduce costs, and invest in innovative products and services to stay competitive in the market. By implementing these suggestions, the company can improve its financial performance, reduce risk, and ensure long-term success.

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## PLACE OF YOGA IN 'NATIONAL EDUCATION POLICY 2020'

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### ABSTRACT

29 July 2020 a new education policy was adopted in India. There is an ambiguity/ confusion about meticulous implementation though, on all levels from KG to PG, about the possible ways of implementation. Serious doubts still prevail about how the policy is going to be implemented. Only from this point of view in this context, from the perspective of in-depth study and better understanding and access, some committees, study groups were formed and their reports are surfaced. At some points in time since 1968, different Education Policies have been adopted and implemented but sadly an objective consideration for Indian Knowledge System has not been prominently seen in any of them. In the new education policy, the concept of "Students today, citizens tomorrow" has been primarily kept under consideration and a pondering in true sense has been done accordingly. An emphasis on Indian knowledge system has been given in this policy. There are multiple facets to the idea of knowledge in Indian context. Knowledge in India has been vivid and comprehensive. There has been a time-tested and proven meticulous implementation of that knowledge system sharing in the past which is attempted to be revived now. 'Yog' or 'Yoga' as it is popularly known these days is one of those facets. The knowledge aspect from the 'Yoga' is proving to be appropriate for all stages of life ranging from conception to fag end. As a matter of fact, even before conception. Therefore, 'Yoga' will play a very significant and important role in the holistic education system. In this research paper, a comparative study of previously implemented education policies and current one has been presented on the point of Indian Education System and importance of Yoga in the policy has been emphasised.

**KEY WORDS:** New Education Policy 2020, Indian Knowledge System, Yog,

### INTRODUCTION

It has been 2 years now since the implementation of the new National Education Policy, but the implementation will be from the next academic year (2023-24). This will gradually reduce the current confusion, but some different problems will come to light. Gradually this situation will change and students will become students of knowledge rather than examinees. During the British rule, however, a bookish, ill-directed, and clerical education system was imposed that prevented the use of intellect. Staying in a gurukula and receiving knowledge from the guru, along with proper direction of conduct and thinking, students had respect for their parents, gurus and country. Conscious citizenship was being formed. However, since 1968, educational policies were formulated to bring about educational changes, and their implementation was also easy. Since it was basically a reformative change in the existing system, it was easily implemented. But in the new education system introduced in 2020, various skills are also included along with inclusion of various languages, philosophy, mathematical knowledge, science, commerce, management, medicine including other therapies, sports. Have come, which also includes Yoga Shastra. The subject of yoga is included in philosophy, treatment methods, and sports. That is why the importance of the subject of yoga in terms of overall education is automatically highlighted. A review of that related literature has been taken in this research paper.

### RESEARCH TITLE

Place of Yoga in 'National Education Policy 2020'

### OBJECTIVES OF THE STUDY

The purpose of this research paper is a comparative study by reviewing the previous educational policies and the new educational policy proposed in 2020. It is also to highlight the idea of 'Yoga' in the Indian Knowledge System proposed in the new educational policy.

**Research Methodology-** This research is a comparative and descriptive. Secondary data was collected from various websites, magazines, journals, other publications, etc.



## **VARIOUS EDUCATIONAL POLICIES AND THEIR HIGHLIGHTS**

In the year 1935, Macaulay presented the educational proposal. The idea behind it was completely useful to the British Empire. This created an impression of the education system that produced clerks by creating apathy towards their own culture, traditional knowledge, Gurukul system that provides comprehensive education on the generation that is being educated.

1948 – In order to implement the educational policies, let us take a brief look at the various functional changes. After India got independence in 1947, the University Education Commission was established under the chairmanship of Dr. Radhakrishnan. After this, the Mudaliar Committee was established in 1952, and the Kothari Commission was established in 1964.

In 1968, the National Education Policy came out. Salient features of this- After independence order to achieve harmony in the society, Gandhi presented the urgency of education which is intellectual and human work and directly related to everyone's life. While rebuilding education, he included the consideration of factors such as economic level, culture, science and technology, moral and social values, and youth in the society. This pattern was 10+2+3. Compulsory but free education, education in agriculture and industry, teacher training, grassroots education, examination requirement, book production, etc. were considered for language development. Indian knowledge can be studied.

In 1986, the National Education Policy came again. In this policy, the pattern of 10+2+3 was kept as before. In this policy, teacher training, women education, education for Scheduled Castes and Scheduled Tribes, Mid-day meal, healthy awareness, these all areas are focusing. The policy should also have a cultural perspective and inclusion of three languages was considered. It gives instructions for reorganizing previous topics by including topics. The idea of making education more effective with minimum resources was highlighted by planning Chalk-Board Plan.

In 1986, a plan to formulate a National Education Policy came forward. After its report was submitted in 1990, a committee of N. Janardan Reddy was formed for implementation. The report of that committee was submitted in 1992.

In 1990 - External Quality Assessment cell, 1994 - National Assessment and Accreditation Council, National Board of Accreditation, Internal Quality Assurance Cell (IQAC), 2005- National Knowledge Commission, regarding these objectives were Expansion, Inclusion and Excellence. etc.

But in this creation of 50 National Universities, and Inclusion has been considered and there are suggestions for the same.

2008- Dr. Yashpal Committee, emphasized on research and highlighted its imperative.

2013-RUSA Rashtriya Uchchatar Shiksha Abhiyan focuses on expansion of education and quality improvement.

2011- In Maharashtra- Dr. Kakodkar/Dr Nigvekar/Dr Takawale committee, was established. In this, A3 i.e. Anyone, Anytime, Anywhere is the overall idea of education. Also, adding to this, Dr Narendra Jadhav Committee has suggested to improve the quality of education by setting different criteria for research, skill development, and people of each level.

2015 – It was during this period that the idea of 'New Education Policy' was started. A committee headed by TSR Subramanyam submitted a report in 2016, but the policy was not approved.

2020 – After 2016, the committee formed by K. Kasthurirangan, after considering many nuances, prepared a new education policy which was presented for implementation on 29th July 2020 and the new education policy was presented. It has drastically changed the education system. Education will be completed in 5+3+3+4 phases. Also, in this policy, education through mother tongue, interdisciplinary education, technical education, professional and skilled education, activities to promote Indian language, art and culture under the Indian Knowledge system, Indian healing methods, various traditional Indian sports, all these have been included. As one of these subjects is compulsory, the aspects of Indian knowledge will be revealed and research and development opportunities will be available on it. The importance of traditional and complementary treatment methods will be highlighted and the level of health will be raised.

## **INDIAN KNOWLEDGE SYSTEM**

In the Education Policy of 1986, culture and languages were considered in education. But it was not emphasized. Therefore, it was not even researched. As the use of foreign languages and the attraction of overseas employment opportunities increased, the acquisition and research of Indian knowledge was neglected. The location of various Indian languages and cultures remained limited to that region. For this knowledge can be useful for the whole world, if these branches of knowledge are included in the education sector, today's students can get opportunities for research and employment. Due to the attraction, the flow of going abroad will decrease and the artistic qualities and skills of the students will be given scope and it will increase the importance of Indian knowledge in front of the world.

## **OPPORTUNITIES IMPORTANCE AND NECESSITY OF YOGA**

Point No. 1 According to National Education Policy principles to find out the unique abilities of every student and try to develop them.

Point No. 7 - creativity and logical thinking.

Point No. 8 - Moral, Human, and Constitutional Values –

Point No. 10 - Life values like communication, cooperation, teamwork and flexibility-



Point No. 20 - To be proud of our Indian roots, of India, and of India's rich and diverse ancient and modern culture, knowledge systems and traditions.

Educational Strategy Part 1.1- Early Childhood Care and Education – In this phase, children in the infant group can be taught the movements of fingers, arms and legs, movements of the waist in yoga practice for motor skill dev. This will positively expend the enormous energy at this age and have stimulating effects on the brain.

Education Policy Part 1.4 - Curriculum and Pedagogy in Schools: Learning should be holistic, integrated and enjoyable and interesting.

Education Policy Part 4.17 - Importance of Indian Languages – Sanskrit Pronunciation will develop the taste of the language and lay the foundation for understanding various knowledge.

Education Policy Section 11.8, Value Based Education will include truth, religion, peace, love, non-violence. These things are mentioned as Yama Niyama in Ashtanga Yoga.

Foreign students eager to acquire Indian knowledge will be attracted as mentioned in Education Policy Part 12.7. Such branches of Indian knowledge include Indian lore, yoga, culture, Ayush system, etc., which can generate revenue opportunities for creating related curricula, teaching systems, student accommodation, and complementary structures.

According to the Education Policy Part 20.5, by restructuring the education of healthcare, it is expected to include yoga, naturopathy, Ayush system in this curriculum. This will help to avoid costly and risky drug treatment. Diseases can be prevented.

Education Policy Part 22.15 Indian Language, Art and Culture,- Knowledge and use of Sanskrit language will facilitate the acquisition of vast Indian knowledge in various fields like philosophy, science, yoga, Ayurveda, technology.

As per Salient features document, point no 2: Vision of policy: Making India knowledge superpower Indian ethos contributes directly to transforming India through Indian Knowledge which is at the root of it.

Point No. 5: Towards holistic and multidisciplinary education: It aims to emphasize on various languages, arts, sciences, philosophy, sports. Yoga subject can be included under this.

Point No. 7: Internationalization: Ever since the International Day of Yoga has started, the promotion and spread of Yoga has started in India and all over the world. International interest in yoga is growing, so students from outside India can be easily absorbed into the Indian education system.

Point No 8. Student Activity and Participation: Yoga practice increases social commitment. Also, for social development along with personal development, it will be necessary and beneficial to include the entire training of yoga in the main education.

Point No. 17. Professional Education: Yoga is a skill and self-employment opportunities can be obtained through it. Therefore, it can be included in the skill curriculum. Yoga comes under AYUSH Ministry as it is a branch of complementary therapies as well as immunity boosting.

Point No. 18. Promotion of Indian Languages, Arts and Culture: Yoga branch has been considered important in Indian knowledge culture. Yoga training can be included at every level from primary education to higher education.

Prof. R. D. Kulkarni report: This committee was constituted for Higher education. This committee submitted an actionable report considering the original education policy. Some of these issues are considered here.

Chapter 2.6 – Consideration of Professional, Ethical and Life Values –

2.7 : Implementation of curriculum based on Indian knowledge-

2.8 – Supplementary Curriculum – Sports, for preservation and enhancement of culture

## CONCLUSION

Before independence, the British rulers imposed an educational system that did not promote such ideas. Even after independence, there was not much change in such system. The education system was considered according to the economic condition of the country, the policy of the rulers. This is evident from various educational policies. Various changes were also made in this. Various efforts were also made to reach education to all levels of the society. However, no emphasis was placed on Indian knowledge system. By reviewing the consideration of these policies, the committees for the same, and their implementation, the inclusion of various branches of knowledge based on Indian knowledge in the 'New Education Policy 2020' is highlighted here. Yoga is a universal subject. Yoga and Sanskrit can be research topics related to language. Yoga is a healing method, so it can be included in health disciplines. If we consider Yoga, it will be incorporated into sports. Meditation method in Yoga is not only a stage in spiritual progress but also useful in mental disorders, yoga topic is related in Psychology. That is why Yoga is also called Indian psychology. *Yama-Niyama* in Yoga Shastra is useful for people and society. As this sector has an international scope, Yoga is also useful in the field of employment opportunities and markets. This is why it is possible and necessary to include the subject of yoga from primary education to Ph D as mentioned in the new education policy.



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9. RD Kulkarni Report



## **FLORA OF SANGAT SAHIB BHAI PHERU KHALSA SENIOR SECONDARY SCHOOL, FARIDKOT, PUNJAB, INDIA**

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### **ABSTRACT**

*A total of 165 species (158 Angiosperms, 5 Gymnosperms and one pteridophyte) belonging to 142 genera and 57 families are recorded from the campus of Sangat Sahib Bhai Pheru Khalsa Senior Secondary School Faridkot, Punjab, India from July 2022 to April 2023. Out of 57 families, grass family Poaceae is dominant with represented with 15 species. Ninety five (95) documented as a weed species, 67 species are cultivated and 3 species both cultivated as well as wild species. Eighty five (85) species are annual and 80 are perennials. This study will be helpful for people, researchers and scientific communities for identification and classification of cultivated as well as wild flora of the region.*

**KEY WORDS-** Angiosperm, flower, plant, inventory, Faridkot, Punjab

### **INTRODUCTION**

We all are surrounded by many groups of the plants such as algae, bryophytes, pteridophytes, gymnosperms, angiosperms etc. Among the groups, Angiosperms are the major group of the flowering plants with 2, 95, 383 species in the world and 18,666 in India (Christenhusz & Byng 2016; Dash & Kumar 2019). Plants fulfil human requirements in the form of food, fodder, shelter, medicine etc. These are also used in many cultural and religious functions in typical regions.

Plants generally identified on the basis of morphological features from old time. This is classical, simple, easily available and cost effective method of identification of plants (Singh and Sidhu, 2022). Morphological parameters such as stem, leaf, flowers, fruits, seeds etc. are considered for identification of plant species.

Sangat Sahib Bhai Pheru Khalsa Senior Secondary School is the pioneer institute of the district Faridkot, Punjab (India). The School campus is covered with large number of cultivated plants as well as wild plant species. The nature and number of weed species are varies with season to season. Floral diversity provides an information about number and nature of the plants. It also informs about richness as well as threatened nature of the species. Therefore, present investigation has been carried out for documentation of plant species.

Previously, Sharma and Bir (1978), Meenakshi and Sharma (1985), Sharma et al. (1987), Sharma (1990), Sidhu (1991) and Singh and Singh (2019), Singh and Singh (2020), Sidhu and Singh (2020), Sidhu and Singh (2021a), Sidhu and Singh (2021b) and Singh and Sidhu (2022) recorded the angiosperm diversity in the state of Punjab. But updated information about cultivated as well as wild plant species is not complete. Keeping this in view, present study was planned for documentation and inventorization of plants in this region. It will be useful for taxonomists, biologists, ethnobotanists and researchers as an updated information about the floral diversity.

### **MATERIAL AND METHODS**

#### **Study area**

Faridkot is located in the South- Western part of Punjab state which falls in the Malwa region between 29°-54' to 34°-54' North latitude and 74°-15' to 75°-25' East longitude. Present study was conducted in the campus of Sangat Sahib Bhai Pheru Khalsa Senior Secondary School, Faridkot. The School was shifted from Pakistan in 1955 due to great efforts of Late Sr. Karnail Singh Doad (Executive member, Shiromani Gurudwara Perbhandhak Committee, Sri Amritsar Sahib, Punjab). It is government aided School affiliated with Punjab School Education Board Mohali (Punjab) and managed by Sangat Sahib Bhai Pheru Sikh Educational Society, Faridkot, Punjab, India.





### Plant Collection and Identification

Plant species were documented from July 2022 to April 2023. Plant specimens were also collected for preparation of herbarium. Morphological features such as leaf, stem, flower, stamens, stigma, fruit, seeds *etc.* were studied for identification and available literature were also concerned for authentication of species such as Hooker, 1872-1897; Bamber, 1916; Nair, 1978; Singh and Singh, 2019; Singh and Singh, 2020. Sidhu and Singh, 2021a; Sidhu and Singh 2021b; Singh and Sidhu, 2022). Online websites such as efloraofindia, flowersofindia, theplantlist and worldfloraonline were also used. After proper identification, the plant specimens were deposited in the Herbarium, Biology Lab, Sangat Sahib Bhai Pheru Khalsa Senior Secondary School, Faridkot, Punjab, India. (KSF).

### RESULTS AND DISCUSSION

During documentation of floral diversity, total 165 plant species (158 Angiosperms belonging 52 families and 136 genera; 5 gymnosperms member of 4 families and 5 genera and one pteridophyte) were recorded from the School campus (Table.1) (Fig.1). Out of 165, 67 species are cultivated, 95 wild and 3 species occurs as wild as well as cultivated in the garden. Eighty five species are annual and 80 are perennials. Herbs are dominant over shrubs and trees represented with 109, 37 and 19 species respectively. Sidhu *et al.* (2011) studied the plant diversity of campus of Panjab University, Chandigarh and recorded 364 species belonging to 282 genera and 92 families in which herbs were dominant over shrubs and trees.

In Angiosperms families, Poaceae is dominant family represented with 15 species followed by Asteraceae (14), Euphorbiaceae (11), Fabaceae (10), Solanaceae (8), Amaranthaceae, Malvaceae and Moraceae with six (6) species each, Apocynaceae, Arecaeae and Portulacaceae with 5 species each, Araceae (4), Aizoaceae, Brassicaceae, Chenopodiaceae, Convolvulaceae, Lamiaceae, Nyctaginaceae, Scrophulariaceae and Verbenaceae with three (3) species each, Asparagaceae, Caryophyllaceae, Commelinaceae, Crassulaceae, Liliaceae, Myrtaceae, Polygonaceae and Rutaceae with two species each and rest of the families with one species each (Table.2). Genera *Euphorbia* is dominant with six species followed by *Ficus* (5), *Portulaca* (4) and *Solanum* (3) and rest of the genera are monotypic (Table.3). Soladoye *et al.* (2015) studied the angiosperm diversity from the campus of Bowen University, Iwo, Osun State, Nigeria. They recorded 110 species in which trees were dominant with 47 species followed by herbs (34) and shrubs (17). Family Asteraceae was dominant represented with 10 species followed by Euphorbiaceae and Poaceae with eight (8) species each. They suggested need of development of *ex situ* conservation strategies for preservation of medicinal and endangered species.

In Gymnosperms, out of four families *viz.* Araucariaceae, Cupressaceae, Cycadaceae and Zamiaceae, only Cupressaceae represented with two species rest are denoted with one species each where as in case of Pteridophytes, only one species (*Pteris vittata*) belonging to family Pteridaceae documented from the study area (Table.1).

*Achyranthus aspera*, *Ageratum houstonianum*, *Calotropis procera*, *Cannabis sativa*, *Chenopodium album*, *Chenopodium murale*, *Croton bonplandianus*, *Euphorbia hirta*, *Euphorbia heyneana*, *Euphorbia prostrata*, *Cynodon dactylon*, *Medicago polymorpha*, *Senna occidentalis*, *Parthenium hysterophorus*, *Verbesina encelioides*, *Fumaria indica*, *Malva parviflora*, *Malvastrum coromandelianum*, *Oxalis corniculata*, *Cenchrus ciliaris*, *Poa annua*, *Dactyloctenium aegyptium*, *Portulaca oleracea*, *Stellaria media*, *Solanum nigrum*, *Trianthema portulacastrum*, *Amaranthus viridis*, *Digera muricata* and *Tribulus terrestris* were dominant whereas *Mollugo nudicaulis*, *Zaleya pentandra*, *Eclipta prostrata*, *Cirsium arvense*, *Gnaphalium pensylvanicum*, *Launaea nudicaulis*, *Sonchus oleraceus*, *Spergula arvensis*, *Ipomoea pestigridis*, *Convolvulus prostrates*, *Vicia sativa*, *Dicanthium annulatum*, *Paspalum distichum*, *Anagallis arvensis*, *Mazus pumilus*, *Physalis angulata* and *Withania somnifera* are very rare in the study area.

Plant diversity of the campus of University of the Punjab, Lahore, Pakistan was studied by Iqbal *et al.* (2020). They recorded 220 species member of 157 genera and 55 families. They advised that regional flora provides opportunities for research and development of conservation strategies. Therefore, present study provides information about the nature of the regional flora.

### CONCLUSION

This study provides information about the occurrence of Angiosperm, Gymnosperm and Pteridophytes in the study area. It also throws a light on the dominant nature of Angiosperms. This study will be useful for researchers, scientists, botanists, biologists, people *etc.* for identification of plant species

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Fig.1. Morphology of Angiosperms, Gymnosperms and Pteridophytes (1-42). 1- *Alpinia offinarum* ;2- *Alstonia scholaris*; 3- *Asparagus sprengeri*; 4- *Bryophyllum tubiflorum*; 5- *Calendula officinalis*; 6- *Chenopodium album*; 7- *Cereus sp*; 8- *Colocasia sp*; 9- *Cupressus sempervirens*; 10- *Cycas revoluta*; 11- *Cyperus rotundus*; 12- *Dactyloctenium aegyptium*; 13- *Digera muricata*; 14- *Echinochloa crus-galli*; 15- *Euphorbia hirta*; 16- *Euphorbia milli*; 17- *Euphorbia prostrata*; 18- *Euphorbia umbelata*; 19- *Ficus microcarpa*; 20- *Ficus triangularis*; 21- *Gnaphalium pensylvanicum*; 22- *Jasminum polyanthum*; 23- *Lantana camara*; 24- *Livistona chinensis*; 25- *Monstera deliciosa*; 26- *Moringa oleifera*; 27- *Nerium indicum*; 28- *Oxalis corniculata*; 29- *Phyllanthus amarus*; 30- *Phyllanthus fraternus*; 31- *Poa annua*; 32- *Portulaca grandiflora*; 33- *Portulaca oleracea*; 34- *Portulaca pilosa*; 35- *Portulacaria afra*; 36- *Pteris vittata*; 37- *Rhapis excels*; 38- *Rosa indica*; 39- *Solanum virginianum*; 40- *Syngonium podophyllum*; 41- *Tabernaemontana divaricate*; 42- *Tagetes erecta*.

**Table.1. List of plant species with family, source, habit, life form and common names.**

S. No.	Family	Botanical Name	Source	Habit	Life Form	Common Name
1.	Acanthaceae	<i>Ruellia simplex</i> C. Wright	C	H	P	Bukhar jad
2.	Agavaceae	<i>Agave sp</i>	C	H	P	
3.	Aizoaceae	<i>Mollugo nudicaulis</i> Lam.	W	H	A	
4.		<i>Trianthema portulacastrum</i> L.	W	H	A	Itsit
5.		<i>Zaleya pentandra</i> (L.) C. Jeffrey	W	H	A	
6.	Amaranthaceae	<i>Achyranthes aspera</i> L.	W	H	P	Puthkanda
7.		<i>Alternanthera philoxeroides</i> (Mart.) Griseb.	W	H	A	
8.		<i>Alternanthera sessilis</i> (L.) R. Br. ex DC.	W	H	A	
9.		<i>Amaranthus viridis</i> L.	W	H	A	Chaulai
10.		<i>Digera muricata</i> (L.) Mart.	W	H	A	Tandal
11.		<i>Gomphrena celosioides</i> Mart.	W	H	A	
12.	Anacardiaceae	<i>Mangifera indica</i> L.	C	T	P	Amb
13.	Annonaceae	<i>Polyalthia longifolia</i> (Sonn.) Thwaites	C	T	P	Ashoka
14.	Apocynaceae	<i>Alstonia scholaris</i> (L.) R. Br.	C	T	P	Satt Patti
15.		<i>Catharanthus roseus</i> (L.) G. Don	C	H	P	Sdhabahar
16.		<i>Nerium indicum</i> Mill.	C	S	P	Kaner
17.		<i>Tabernaemontana divaricata</i> (L.) R.Br. ex Roem. & Schult	C	S	P	Kali
18.		<i>Thevetia peruviana</i> (Pers.) K. Schum.	C	S	P	Peeli Kaner
19.	Araceae	<i>Epipremnum aureum</i> (Linden ex Andre)G.S. Bunting	C	H	P	Money Plant
20.		<i>Monstera deliciosa</i> Liebm.	C	S	P	
21.		<i>Syngonium podophyllum</i> Schott.	C	H	P	Teer Plant
22.		<i>Colocasia sp</i>	C	H	P	
23.	Arecaceae	<i>Dypsis lutescens</i> (H. Wendle) Beentje & Dransf.	C	S	P	Areca Palm
24.		<i>Livistona chinensis</i> (Jacq.) R. Br. Ex Mart.	C	T	P	Fan palm
25.		<i>Phoenix roebelenii</i> O' Brien	C	S	P	Khajoor Palm
26.		<i>Rhapis excelsa</i> (Thunb.)A. Henry.	C	H	P	Bamboo Palm
27.		<i>Roystonea regia</i> (Kunth) O.F.Cook.	C	T	P	Bottle Palm
28.	Asclepiadaceae	<i>Calotropis procera</i> (Aiton) Dryand	W	S	P	Ak
29.	Asparagaceae	<i>Dracaena reflexa</i> Lam.	C	H	P	
30.		<i>Dracaena trifasciata</i> (Prain) Mabb.	C	H	P	Snake Plant
31.	Asteraceae	<i>Ageratum houstonianum</i> Mill	W	H	A	Nilam
32.		<i>Calendula officinalis</i> L.	C	H	A	
33.		<i>Cirsium arvense</i> (L.) Scop	W	H	A	
34.		<i>Eclipta prostrata</i> (L.) L.	W	H	A	Bhringraj
35.		<i>Erigeron bonariensis</i> L.	W	H	A	
36.		<i>Gnaphalium pensylvanicum</i> Willd.	W	H	A	
37.		<i>Launaea nudicaulis</i> (L.) Hook.f.	W	H	P	Bhaghtal
38.		<i>Parthenium hysterophorus</i> L.	W	H	P	Gajar Buti
39.		<i>Sonchus oleraceus</i> Wall	W	H	A	Dhoodhi
40.		<i>Tagetes erecta</i> L.	C	H	A	Genda
41.		<i>Tridax procumbens</i> (L.) L.	W	H	A	



42.		<i>Verbesina encelioides</i> (Cav.) Benth. & Hook.f. ex A. Gray	W	H	A	
43.		<i>Vernonia cinerea</i> (L.) Less	W	H	A	Sehdevi
44.		<i>Xanthium strumarium</i> L.	W	S	P	Gut patna
45.	Boraginaceae	<i>Heliotropium ellipticum</i> Ledeb.	W	H	A	Hathi sundi
46.	Brassicaceae	<i>Coronopus didymus</i> (L.) Sm.	W	H	A	Jungli halon
47.		<i>Sisymbrium irio</i> L.	W	H	A	Jungli saron
48.		<i>Lobularia maritime</i> (L.) Desv.	C	H	A	
49.	Cactaceae	<i>Cereus sp</i>	C	H	P	Thohar
50.	Cannabaceae	<i>Cannabis sativa</i> L.	W	H	P	Bhang
51.	Caryophyllaceae	<i>Spergula arvensis</i> L.	W	H	A	Jungli dhania
52.		<i>Stellaria media</i> (L.) Vill.	W	H	A	Buchbucha
53.	Casuarinaceae	<i>Casuarina equisetifolia</i> L.	C	T	P	Jhau
54.		<i>Chenopodium album</i> L.	W	H	A	Bathu
55.	Chenopodiaceae	<i>Chenopodium murale</i> L.	W	H	A	Karbatu
56.		<i>Atriplex crassifolia</i> Ledeb.	W	S	A	
57.	Commelinaceae	<i>Commelina benghalensis</i> L.	W	H	A	
58.		<i>Tradescantia pallida</i> (Rose) D. R. Hunt.	C	H	P	
59.		<i>Ipomoea pes-tigridis</i> L.	W	H	A	
60.	Convolvulaceae	<i>Convolvulus arvensis</i> L.	W	H	A	Hiran khuri
61.		<i>Convolvulus prostratus</i> Forrsk.	W	H	A	Shankh pushpi
62.	Crassulaceae	<i>Bryophyllum tubiflorum</i> Harv.	C	H	P	
63.		<i>Bryophyllum pinnatum</i> (Lam.) Oken	C	H	P	Pathar Chatt
64.	Cucurbitaceae	<i>Mukia maderaspatana</i> (L.) M.Roem.	W	H	A	
65.	Cyperaceae	<i>Cyperus rotundus</i> L.	W	H	P	Murk
66.		<i>Croton bonplandianus</i> Baill.	W	H	A	
67.		<i>Embllica officinalis</i> Gaertn.	C	T	P	Amla
68.		<i>Euphorbia heyneana</i> Spreng.	W	H	A	Shoti dudi
69.		<i>Euphorbia hirta</i> L.	W	H	A	Badi dudi
70.		<i>Euphorbia milli</i> Moul.	C	S	P	Kandian da mukt
71.		<i>Euphorbia prostrata</i> Aiton	W	H	A	
72.	Euphorbiaceae	<i>Euphorbia tithymaloides</i> L.	C	S	P	Chapal Plant
73.		<i>Euphorbia umbelata</i>	C	S	P	
74.		<i>Phyllanthus amarus</i> Schumach. & Thonn.	W	H	A	Hazardani
75.		<i>Phyllanthus fraternus</i> G. L. Webster	W	H	A	Hazardani
76.		<i>Ricinus communis</i> L.	W	S	P	Arind
77.		<i>Delonix regia</i> (Bojer ex Hook.) Raf.	C	T	P	Gulmohar
78.		<i>Desmodium triflorum</i> (L.) DC.	W	H	A	
79.		<i>Lathyrus aphaca</i> L.	W	H	A	Matri
80.	Fabaceae	<i>Leucaena leucocephala</i> (Lam.) de Wit.	W	T	P	Subabul
81.		<i>Medicago polymorpha</i> L.	W	H	A	Maina
82.		<i>Melilotus indicus</i> (L.) All.	W	H	A	Senji
83.		<i>Prosopis juliflora</i> (Sw.) DC.	W	T	P	Pahari kikar
84.		<i>Senna occidentalis</i> (L.) Link.	W	S	A	Kasoundi
85.		<i>Sesbania bispinosa</i> (Jacq.) W. Wight	W	S	A	Janter
86.		<i>Vicia sativa</i> L.	W	H	A	Rari



87.	Fumariaceae	<i>Fumaria indica</i> (Hausskn.) Pugsley	W	H	A	Pitpapa
88.	Lamiaceae	<i>Coleus aromaticus</i> Benth.	C	H	P	Ptta Ajwain
89.		<i>Coleus blumei</i> Benth.	C	H	P	Kukkar Kalghi
90.		<i>Ocimum basilicum</i> L.	C	S	P	Marua
91.	Lemnaceae	<i>Lemna perpusilla</i> Torr.	W	H	A	
92.	Liliaceae	<i>Aloe vera</i> (L.) Burm. F.	C	H	P	Ghe Kawar
93.		<i>Asparagus sprengeri</i> Regel	C	H	P	Shtavari
94.	Magnoliaceae	<i>Magnolia grandiflora</i> L.	C	T	P	Champa
95.	Malvaceae	<i>Abutilon indicum</i> (L.) Sweet	W	S	P	Kangi
96.		<i>Hibiscus rosa sinensis</i> L.	C	S	P	China Rose
97.		<i>Malva parviflora</i> L.	W	H	A	Mallow
98.		<i>Malvastrum coromandelianum</i> (Linn) Garcke	W	H	A	
99.		<i>Sida acuta</i> Burm.f.	W	S	A	Bla
100.		<i>Sida cordifolia</i> L.	W	S	A	Bla
101.	Meliaceae	<i>Melia azedarach</i> L.	C	T	P	Dharek
102.	Menispermaceae	<i>Tinospora cordifolia</i> (Willd.) Miers ex Hook.f. & Thomson	W	S	P	Gloe
103.	Moraceae	<i>Ficus microcarpa</i> Linn. f.	C	S	P	
104.		<i>Ficus benghalensis</i> L.	W+C	T	P	Bohr
105.		<i>Ficus benjamina</i> L.	C	S	P	Sunehari Bohd
106.		<i>Ficus religiosa</i> L.	W+C	T	P	Pipal
107.		<i>Ficus triangularis</i> Warb.	C	S	P	Tikona Bohd
108.		<i>Morus nigra</i> L.	C	T	P	Shehtoot
109.	Moringaceae	<i>Moringa oleifera</i> Lam	C	T	P	Sawanjna
110.	Myrtaceae	<i>Melaleuca bracteata</i> F. Muell.	C	S	P	Golden Bottle Brush
111.		<i>Psidium guajava</i> L.	C	T	P	Amrood
112.	Nyctaginaceae	<i>Boerhavia diffusa</i> L.	W	H	P	
113.		<i>Bougainvillea glabra</i> Choisy	C	S	P	Gul e kagzi
114.		<i>Mirabilis jalapa</i> L.	C	H	P	
115.	Oleaceae	<i>Jasminum polyanthum</i> Franch.	C	S	P	Jasmine
116.	Oxalidaceae	<i>Oxalis corniculata</i> L.	W	H	P	
117.	Poaceae	<i>Brachiaria ramosa</i> (L.) Stapf	W	H	A	
118.		<i>Cenchrus ciliaris</i> L.	W	H	A	Kutta ghas
119.		<i>Cynodon dactylon</i> (L.) Pers.	W	H	P	Khabal
120.		<i>Dactyloctenium aegyptium</i> (L.) Willd.	W	H	A	Madhana
121.		<i>Desmostachya bipinnata</i> (L.) Stapf	W	H	A	
122.		<i>Dichanthium annulatum</i> Stapf	W	H	A	
123.		<i>Digitaria sanguinalis</i> (L.) Scop.	W	H	A	
124.		<i>Echinochloa crus-galli</i> (L.) P.Beauv.	W	H	A	Swank
125.		<i>Eragrostis tenella</i> (L.) P. Beauv	W	H	A	Chirian da dana
126.		<i>Paspalum distichum</i> L.	W	H	A	
127.		<i>Phalaris minor</i> Retz.	W	H	A	Gulli danda
128.		<i>Poa annua</i> L.	W	H	A	
129.		<i>Polypogon monspeliensis</i> (L.) Desf	W	H	A	Lumbad puchha
130.		<i>Setaria verticillata</i> (Linn.) P. Beauv.	W	H	A	
131.		<i>Sorghum halepense</i> (L.) Pers.	W	H	A	
132.	Polygonaceae	<i>Polygonum plebeium</i> R. Br.	W	H	A	



133.		<i>Rumex dentatus</i> L.	W	H	A	Jungli palak
134.	Portulacaceae	<i>Portulaca grandiflora</i> Hook.	C	H	A	Dupehrkhidi
135.		<i>Portulaca oleracea</i> L.	W	H	A	Jungli Dupehrkhidi
136.		<i>Portulaca pilosa</i> L.	C	H	A	Dupehrkhidi
137.		<i>Portulaca umbreticola</i> Kunth.	C	H	A	Dupehrkhidi
138.		<i>Portulacaria afra</i> Jacq.	C	H	P	Elephant Bush
139.		Primulaceae	<i>Anagallis arvensis</i> L.	W	H	A
140.	Ranunculaceae	<i>Ranunculus sceleratus</i> L.	W	H	A	Jaldhania
141.	Rosaceae	<i>Rosa indica</i> L.	C	S	P	Gulab
142.	Rutaceae	<i>Citrus microcarpa</i> (Bunge) Wijnands	C	S	P	Klamnsi
143.		<i>Murraya koenigii</i> (L.) Spreng.	C	S	P	Karri patta
144.	Scrophulariaceae	<i>Mazus pumilus</i> (Burm.f.) Steenis	W	H	A	
145.		<i>Veronica anagallis aquatica</i> L.	W	H	A	
146.		<i>Veronica didyma</i> Ten.	W	H	A	Gajargulla
147.	Solanaceae	<i>Cestrum nocturnum</i> L.	C	S	P	Raar Di Rani
148.		<i>Datura innoxia</i> Mill.	W	S	A	Datura
149.		<i>Nicotiana plumbaginifolia</i> Viv.	W	H	A	Jungli tambaku
150.		<i>Physalis angulata</i> L.	W	H	A	Jungli rasbhari
151.		<i>Solanum americanum</i> Mill.	W	H	A	Makoe
152.		<i>Solanum nigrum</i> L.	W	H	A	Makoe
153.		<i>Solanum virginianum</i> L.	W	H	A	Chamak namoli
154.		<i>Withania somnifera</i> (L.) Dunal	W	S	P	Aksin
155.	Verbenaceae	<i>Lantana camara</i> L.	W + C	H	P	
156.		<i>Phyla nodiflora</i> (L.) Greene	W	H	A	
157.		<i>Tectona grandis</i> L.	C	T	P	Sagwan
158.	Zingiberaceae	<i>Alpinia offinarum</i> Hance	C	H	P	Ptta Elachi
159.	Zygophyllaceae	<i>Tribulus terrestris</i> L.	W	H	A	Bhakhra
<b>Gymnosperms</b>						
160.	Araucariaceae	<i>Araucaria cokii</i> R.Br. ex Endl.	C	T	P	Christmas Tree
161.	Cupressaceae	<i>Cupressus sempervirens</i> L.	C	S	P	
162.		<i>Thuja occidentalis</i> L.	C	S	P	Mor Pankhi
163.	Cycadaceae	<i>Cycas revoluta</i> Thunb.	C	S	P	Kangi Palm
164.	Zamiaceae	<i>Zamia furfurea</i> L.	C	S	P	Card Board Palm
<b>Pteridophytes</b>						
164.	Pteridaceae	<i>Pteris vittata</i> L.	C	H	P	

C= Cultivated; W= Wild; A= Annual; P= Perennial; H= Herb; S= Shrub; T= Tree.

**Table.2. List of families with number of genera and species**

S. No.	Family	Genera	Species
<b>Angiosperms</b>			
1.	Acanthaceae	1	1
2.	Agavaceae	1	1
3.	Aizoaceae	3	3
4.	Amaranthaceae	5	6
5.	Anacardiaceae	1	1
6.	Annonaceae	1	1
7.	Apocynaceae	5	5
8.	Araceae	4	4
9.	Arecaceae	5	5



10.	Asclepiadaceae	1	1
11.	Asparagaceae	1	2
12.	Asteraceae	14	14
13.	Boraginaceae	1	1
14.	Brassicaceae	3	3
15.	Cactaceae	1	1
16.	Cannabaceae	1	1
17.	Caryophyllaceae	2	2
18.	Casuarinaceae	1	1
19.	Chenopodiaceae	2	3
20.	Commelinaceae	2	2
21.	Convulvulaceae	2	3
22.	Crassulaceae	1	2
23.	Cucurbitaceae	1	1
24.	Cyperaceae	1	1
25.	Euphorbiaceae	5	11
26.	Fabaceae	10	10
27.	Fumariaceae	1	1
28.	Lamiaceae	2	3
29.	Lemnaceae	1	1
30.	Liliaceae	2	2
31.	Magnoliaceae	1	1
32.	Malvaceae	5	6
33.	Meliaceae	1	1
34.	Menispermaceae	1	1
35.	Moraceae	2	6
36.	Moringaceae	1	1
37.	Myrtaceae	2	2
38.	Nyctaginaceae	3	3
39.	Oleaceae	1	1
40.	Oxalidaceae	1	1
41.	Poaceae	15	15
42.	Polygonaceae	2	2
43.	Portulacaceae	2	5
44.	Primulaceae	1	1
45.	Ranunculaceae	1	1
46.	Rosaceae	1	1
47.	Rutaceae	2	2
48.	Scrophulariaceae	2	3
49.	Solanaceae	6	8
50.	Verbenaceae	3	3
51.	Zingiberaceae	1	1
52.	Zygophyllaceae	1	1
Total		136	159
<b>Gymnosperm</b>			
53.	Araucariaceae	1	1
54.	Cupressaceae	2	2
55.	Cycadaceae	1	1
56.	Zamiaceae	1	1
Total		5	5
<b>Pteridophyte</b>			
57.	Pteridaceae	1	1





**Table.3. List of Dominant genera of Angiosperms.**

S. No.	Genera	Number of Species
1.	<i>Euphorbia</i>	6
2.	<i>Ficus</i>	5
3.	<i>Portulaca</i>	4
4.	<i>Solanum</i>	3



# INFLUENCING FACTORS AFFECTING THE IMPLEMENTATION OF REPUBLIC ACT 9003(ECOLOGICAL SOLID WASTE MANAGEMENT ACT) IN THE PROVINCE OF LAGUNA

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## ABSTRACT

*This study aimed to determine the influencing factors affecting the implementation of Republic Act 9003 (Ecological Solid Waste Management Act of 2000) in the province of Laguna. It aimed to study the extent of influencing factors, the level of compliance, and the challenges encountered by LGUs in SWM implementation.*

*The results of the study revealed that the respondents regarded the influencing factors such as institutional, technical, legal, financial, external assistance, and public participation and awareness as very influential to SWM implementation. However, most of it does not significantly predict the level of implementation of RA 9003. Among the challenges experienced by the LGUs, financial or budget insufficiency was the only serious problem identified.*

*Based on the results of the study, the following are recommended to improve the level of compliance of LGUs with the provisions of RA 9003: the institutionalization of MENR Offices, capacitation of personnel assigned in the SWM section, allocation of sufficient budget for SWM programs and projects, strict enforcement of local ordinances, and conduct of intensive IEC to encourage the community to participate in solid waste management programs.*

**KEYWORDS:** *solid waste management, influencing factors, RA 9003*

## INTRODUCTION

Solid waste management (SWM) is a perennial problem that is being faced by all countries worldwide. This is due to the continuing increase in waste generation which is influenced by population growth, rapid urbanization, industrialization, and a booming economy. According to Teh (2022), the Philippines is the fourth-largest producer of waste in Southeast Asia. Several causes contribute to this, including the increased rate of trash generation in our country and the shortcomings in the collection, segregation, and recycling of waste in many local government units (LGU). As a result, various parties, including lawmakers and non-governmental organizations, have expressed the same views that the problem of waste management calls for immediate action (COA, 2023).

In 2001, the Republic Act 9003, or the Ecological Solid Waste Management Act was put into law which mandates the adoption of a systematic, comprehensive, and ecological solid waste management program in the country. After more than two decades, most LGUs have not yet complied with some of the provisions of RA 9003, particularly those relating to the submission and implementation of Ten-Year SWM Plans, the establishment of Materials Recovery facilities, and the closure of all open and controlled dumpsites (SEPO, 2017).

It has been noted that over time, the amount of solid waste generated has gradually increased rather than decreased. In this context, a research study was done to identify the influencing factors that have been preventing the country from effectively implementing solid waste management programs.

## OBJECTIVES OF THE STUDY

1. Determine the extent of influencing factors affecting the SWM implementation in terms of institutional, technical, financial, legal, external support from NGAs and other sectors, and public awareness and participation.



2. Determine the level of LGUs' implementation of the provisions of RA 9003 in terms of implementation of Ten-Year SWM Plan, operationalization of Materials Recovery Facilities, closure and rehabilitation of open and controlled dumpsites, and establishment/operation and/or disposal of/to Sanitary Landfill.
3. Determine if the influencing factors significantly predict the level of LGUs' implementation of the provisions of RA 9003.
4. Determine the challenges encountered by the respondents during the implementation of Ecological Solid Waste Management.

## MATERIALS AND METHODS

This study employed a quantitative approach to analysis and a survey research methodology. Collecting and evaluating numerical data is the process of quantitative research which involves regulating or modifying an independent variable in order to ascertain the impact it has on a dependent variable (Bhandari, 2022). The opinions and perceptions of the respondents were gathered using a custom questionnaire using a 5-point Likert scale. Face-to-face interviews were done. In the event that a respondent was unavailable, a questionnaire was left at their workplace or sent via email. A deliberate sample was taken. The researcher employed regression analysis, mean calculations, frequencies, and percentages to analyze the data.

### Population and Sampling Technique

The study was conducted in three (3) cities and twenty-four (24) municipalities in the province of Laguna wherein the respondents were composed of two (2) distinct groups: the LGUs and the DILG personnel involved in the solid waste management implementation. The total number of respondents was 162; 135 came from LGUs and 27 from the local DILG.

Survey questionnaires were used to meet the objectives of determining the level of influencing factors affecting SWM implementation in the province of Laguna.

### Data Collection Procedure

Prior to the actual gathering procedure, the researcher sought permission from the heads of offices by submitting a letter request. Upon approval, the researcher personally interviewed the respondents. The purpose of this research was explained carefully to the respondents to attain the desired results and all data/information gathered will be used only for research. The data gathered were presented in tabular form, analyzed, and interpreted using appropriate statistical tools.

The study used a purposive sampling technique wherein the selected respondents were those involved in the planning and operational aspects of SWM implementation. They are proficient and well-informed about the field of study. In addition to knowledge and experience, what is important is the availability and willingness of the respondents to participate in the study (Dalugdog, 2021).

## RESULTS AND DISCUSSION

**Table 1. Frequency Distribution on the Socio-Demographic Profile of the Respondents**

Demographic Profile	LGUs		DILG	
	f	%	f	%
<i>Age (in years)</i>				
21 - 30	18	13.3%	2	7.4%
31 - 40	21	15.6%	8	29.6%
41 - 50	32	23.7%	12	44.4%
51 - 60	38	28.1%	4	14.8%
61 and above	26	19.3%	1	3.7%
<i>Gender</i>				
Male	100	74.1%	9	33.3%
Female	35	25.9%	18	66.7%
<i>Educational Status</i>				
High School	8	5.9%	0	0.0%
College Undergraduate	12	8.9%	0	0.0%
College Graduate	90	66.7%	18	66.7%
Graduate Studies	25	18.5%	9	33.3%
<i>Training Attended</i>				
Yes	117	86.7%	26	96.3%
No	18	13.3%	1	3.7%
<i>Number of Years Employed</i>				



Less than a year	14	10.4%	0	0.0%
At least 1 year but not less than 3 years	16	11.9%	1	3.7%
At least 3 years but not less than 5 years	12	8.9%	1	3.7%
At least 5 years but not less than 10 years	26	19.3%	4	14.8%
10 years or more	67	49.6%	21	77.8%
<i>Rate of Involvement</i>				
No involvement at all	3	2.2%	1	3.7%
Slightly involved	24	17.8%	6	22.2%
Moderately involved	38	28.1%	7	25.9%
Very involved	47	34.8%	8	29.6%
Extremely involved	23	17.0%	5	18.5%

Table 1 shows the socio-demographic profile of the respondents. This study was participated by the respondents from LGU and DILG. In terms of age, the majority of the DILG (81.4%) were young and middle adulthood, while the LGUs were 52.6 percent. In terms of late adulthood, 47.4 percent came from LGU, while DILG was 18.6 percent. In gender, the greatest number of participants in LGUs were males, which was 74.1 percent, while in DILG, were females corresponding to 66.7 percent. Both LGU and DILG respondents were college graduates with 66.7 percent, but 33.3 percent of the population from DILG pursuing their graduate studies relative to 18.5 percent of LGU. In years of employment, 77.8 percent were 10 years or more in service in DILG while only 49.6% for LGU. Also, 10.4% of the population in the LGU were employed for less than a year. In the rate of involvement, most DILG respondents were very involved in the implementation, which was 29.6 percent, like LGU but with 34.8 percent.

In the study conducted by Fagan et al. (2011), they analyzed different challenges and practices in the juvenile system in the United States in implementing a system program. They suggested that knowing demographic factors like age, gender, educational status, years of employment, and training needed to be considered in implementing different programs. This will help researchers identify barriers in planning and implementing programs or policies to meet the needs of different populations. In context, the researcher applies this suggestion to the solid waste management program implementation.

## EXTENT OF INFLUENCING FACTORS AFFECTING SWM IMPLEMENTATION

**Table 2. Extent of Institutional Factors Affecting the Solid Waste Management Implementation**

Institutional Factors	LGU			DILG		
	Mean	SD	QI	Mean	SD	QI
1. Existence of a permanent C/MENR Office or an office that handles waste management matters	4.43	0.94	EI	4.37	1.15	EI
2. Sufficient number of permanent plantilla positions	3.90	1.07	VI	4.11	1.15	VI
3. Personnel's educational background and/or experiences are related to the job	4.16	0.96	VI	4.19	1.14	VI
4. Capacity building and mentoring such as training, and workshops for continuous knowledge enhancement	4.12	0.94	VI	4.33	1.04	EI
5. The personnel are well-informed of the programs and projects and the strategies towards the attainment of goals and objectives.	4.23	0.78	EI	4.22	1.05	EI
6. Presence of skilled personnel	4.13	0.97	VI	4.19	1.14	VI
7. Provision of rewards and incentives to personnel	3.56	0.99	VI	3.70	1.17	VI
8. Provision of rewards and incentives to personnel	3.56	0.99	VI	3.70	1.17	VI
<b>Overall Mean</b>		<b>4.07</b>			<b>4.16</b>	
		<b>Very Influential</b>			<b>Very Influential</b>	

Legend: 4.20 - 5.00 Extremely Influential (EI) 3.40 - 4.19 Very Influential (VI) 2.60 - 3.39 Moderately Influential (MI)

1.80 - 2.59 Slightly Influential (SI) 1.00 - 1.79 Not at all Influential (NAI)

Table 2 shows both the employees from the LGU and the DILG believed that the existence of a permanent office that handles waste management matters is *extremely influential* to the implementation of SWM. On the part of the DILG employees, the provision of capacity building and other mentoring schemes was also *extremely influential*, but this was rated by the LGU



employees as *very influential*. The extent of institutional factors based on the perceptions of both the DILG and LGU employees were *very influential* in terms of a sufficient number of plantilla positions, the personnel's experiences, the presence of skilled personnel, and the provision of rewards and incentives to personnel. The overall mean indicated that the institutional factors were *very influential* in the implementation of the SWM, according to the LGU employees ( $M=4.07$ ) and the DILG employees ( $M=4.16$ ).

It can be concluded from the data shown on the provision of capacity building and other mentoring schemes that LGUs require attention in their training and workshop needs comparable to DILG. This can be explained by the role of LGU in SWM implementation. As per RA 9003, the LGUs are mandated to implement the provisions of RA 9003 which was also cited in the Performance Audit Report (PAO-2023-1) of the Commission on Audit (2023). In the case of Zimbabwe, as enumerated in the study of Shabani & Jerie (2022), they explained that solid waste management effectiveness is fueled by an institution or organization that is responsible for its efficient system.

**Table 3. Extent of Technical Factors Affecting the Solid Waste Management Implementation**

Technical Factors	LGU			DILG		
	Mean	SD	QI	Mean	SD	QI
1. Presence of adequate infrastructure and facilities such as MRF, composting area, etc	4.30	0.88	EI	4.44	1.05	EI
2. Availability of equipment and machinery	4.16	0.93	VI	4.44	0.85	EI
3. Well-maintained vehicles to ensure smooth transport and disposal of collected solid waste	4.32	0.79	EI	4.44	0.85	EI
4. Well-maintained routes for smooth flow of hauling solid wastes	4.15	0.85	VI	4.33	0.78	EI
5. Provision of Lakbay-Aral to have hands-on experience with new technologies	3.62	0.98	VI	3.41	0.89	VI
6. Provision of communication equipment	3.64	0.98	VI	3.67	1.24	VI
7. Proper recording of wastes received, recycled, and disposed	4.10	0.96	VI	4.30	0.99	EI
<b>Overall Mean</b>		<b>4.04</b>			<b>4.15</b>	
		<b>Very Influential</b>			<b>Very Influential</b>	

Table 3 shows the extent of technical factors affecting the SWM implementation. Both employees from LGU and DILG believed that the presence of adequate infrastructure and facilities such as MRF, composting area, etc., also, well-maintained vehicles to ensure smooth transport and disposal of collected solid wastes were both *extremely influential*. The provision of lakbay-aral to have hands-on experience with new technologies and the provision of communication equipment were both interpreted by the LGU and DILG as *very influential*. On the part of LGU, the availability of equipment and machinery, well-maintained routes for smooth flow of hauling solid wastes, and proper recording of wastes received, recycled, and disposed of were only rated as *very influential*, while for DILG, those were *extremely influential*. Moreover, both DILG (4.15) and LGU (4.04) interpreted the extent of technical factors affecting solid waste management as *very influential*. The differences in the interpretation of both the LGU and DILG in three out of seven variables may be in the technicality of their implementation. However, the mean reflected a similar verbal interpretation *very influential*.

Table 4 below shows the extent of financial factors affecting SWM implementation. Among the variables rated, both groups of respondents differ only in the allocation of sufficient budget for the hiring of the contract of services, or for land procurement. In the view of LGU, it was very influential in contrast to the interpretation of DILG which was *extremely influential*. This rating led to a difference in the overall financial factors. The former rated it as *extremely influential* while the latter interpreted it as very influential. As such, DILG believed that the allocation of a sufficient budget for hiring contract services and SWM infrastructure is an extremely important variable in making the implementation of the SWM in terms of financial factors. In an article published by ADB (2014), it said that the quality and coverage of solid waste management (SWM) services are determined to a large extent by the amount of funding available for the collection, transport, disposal, and recycling of waste. Effective SWM requires funds to cover said operating activities including the payment of staff salaries. With the present situation on the ground, most LGUs do not have sufficient numbers of employees assigned to SWM services, hence the DILG respondents, being the overseer, have seen its importance in SWM implementation.



**Table 4. Extent of Financial Factors Affecting the Solid Waste Management Implementation**

Financial Factors	LGU			DILG		
	Mean	SD	QI	Mean	SD	QI
1. Adequate financial support from the LGU’s budget (NTA)	4.36	0.79	EI	4.52	0.80	EI
2. Establishment of a Local Solid Waste Management (SWM) Fund by RA 9003	4.31	0.82	EI	4.78	0.42	EI
3. Imposition of fines and penalties to violators as an additional source of funds	3.92	1.06	VI	4.07	1.07	VI
4. Imposition of service collection fees to stakeholders as an additional source of funds	3.74	1.03	VI	3.74	0.94	VI
5. Provision of other relevant resources from the LGU	3.83	0.89	VI	4.07	0.83	VI
Proper utilization of allocated funds for specific projects or program	4.20	0.80	EI	4.52	0.85	EI
6. Allocation of sufficient budget for the hiring of the contract of services to work on SWM services and land procurement for SWM infrastructure	4.19	0.82	VI	4.22	0.97	EI
<b>Overall Mean</b>	<b>4.08</b>			<b>4.28</b>		
	<b>Very Influential</b>			<b>Extremely Influential</b>		

**Table 5. Extent of Legal Factors Affecting the Solid Waste Management Implementation**

Legal Factors	LGU			DILG		
	Mean	SD	QI	Mean	SD	QI
1. Existence of comprehensive laws and local ordinances related to SWM	4.50	0.72	EI	4.63	0.63	EI
2. Existence of adequate regulations supporting the implementation of the laws and ordinances related to SWM	4.39	0.70	EI	4.56	0.70	EI
3. Strict enforcement of RA 9003 and local ordinances convey local ordinances and regulations to the stakeholders	4.37	0.77	EI	4.48	0.85	EI
4. Arresting violators and issuance of citation tickets	4.27	0.77	EI	4.30	0.91	EI
5. Imposition of fines and penalties to violators	3.79	1.07	VI	3.89	1.31	VI
6. Updating of local policies and ordinances to cater to the present needs of the community	3.84	1.05	VI	4.00	1.27	VI
<b>Overall Mean</b>	<b>4.19</b>			<b>4.32</b>		
	<b>Very Influential</b>			<b>Extremely Influential</b>		

Table 5 shows that both DILG and LGU believed in terms of legal factors such as the existence of comprehensive laws and local ordinances related to SWM, the existence of adequate regulations supporting the implementation of the laws and ordinances related to SWM, strict enforcement of RA 9003 and local ordinances and convey local ordinances and regulations to the stakeholders were interpreted as *extremely influential*. While arresting violators and issuing citation tickets and imposition of fines and penalties on violators were interpreted as *very influential*. On the contrary, DILG perceived updating local policies and ordinances to cater to the present needs of the community as *extremely influential* differs from the interpretation of LGU as *very influential*. The overall mean score and verbal interpretation of the legal factors affecting solid waste management implementation differ. For LGU, the mean score was 4.19 and interpreted as *very influential*. Meanwhile, for DILG, it is 4.32 with the interpretation of *extremely influential*. This implied that legal factors in DILG were perceived to have an extra influence in terms of SWM implementation in comparison to LGU’s very influential interpretation. These differences in their perceived extent can be explained by Republic Act 9003 otherwise known as the Ecological Solid Waste Management Act of 2000, in reference no. 1996-110 (1996) that DILG has a task of enjoining all parts of the country in adopting comprehensive solid waste management that was enacted by a legal basis. In summation, since DILG is the implementing body that tasked the LGU in implementing the program, DILG has a strong basis or understanding of the importance of SWM regarding legal it will contribute to the implementation.



**Table 6. Extent of External Support from EMB and other NGAs Affecting the Solid Waste Management Implementation**

External Support Factors	LGU			DILG		
	Mean	SD	QI	Mean	SD	QI
1. Receiving external support from national government agencies through technical means such as monitoring and consultations	4.01	0.90	VI	4.26	0.94	EI
2. Availability of equipment and vehicles from private and government agencies	3.90	1.06	VI	3.96	1.16	VI
3. Secure assistance in the development of customized information and educational materials	3.76	1.00	VI	3.81	1.00	VI
4. Invite National Government Agencies to conduct training for concerned sectors and implementers for policy updating and skills enhancement	3.79	1.07	VI	4.26	0.98	EI
5. Coordination with neighboring LGUs on possible shared SWM facilities	3.78	1.15	VI	3.78	1.12	VI
6. Cooperation with private enterprises on the disposal of wastes thru Buy-back programs	3.84	1.02	VI	3.89	1.12	VI
7. Engagement in a waste-to-energy process through a Public-Private Partnership Scheme	3.64	1.16	VI	3.70	1.10	VI
<b>Overall Mean</b>	<b>3.82</b>			<b>3.95</b>		
	<b>Very Influential</b>			<b>Very Influential</b>		

Table 6 shows the extent of external support from EMB and other NGAs affecting SWM implementation. The DILG and LGU both perceived the majority of the external support as *very influential*. However, two of the variables got different interpretations. These were external support through technical means such as monitoring and consultations and inviting National Government Agencies to conduct training for concerned sectors and implementers. The former interpreted those as extremely influential while very influential only for the LGU respondents. These differences in perceived extent can be attributed to the fact that the DILG, being a national government agency have a strong fold of interest in the conduct of training and skills enhancement because they are the implementors and assessors of the program. In summary, the extent of external support affecting solid waste management implementation was interpreted as *very influential* for both LGU (3.82) and DILG (3.95). This result is congruent with the study of Yukalang (2017), which was conducted in highly urbanized areas in Thailand. Yukalang used SWOT analysis and found out that external support from the government is important as it can provide opportunities for the improvement of the program.

Table 7 shows the respondents from the LGU and DILG have similar perceptions of the extent of public awareness affecting solid waste management implementation. Both have an overall mean score of 3.82 with the verbal interpretation being *very influential*. However, they differ on the three (3) variables such as encouraging public participation through community meetings, etc; cooperation between and among the LGUs, private sectors, NGOs, and people’s organizations; and conducting consultations with concerned agencies and stakeholders. The LGU rated those as *very influential* while *extremely influential* for DILG. With this, DILG in comparison with LGU posed a perspective on a range of items regarding the importance of public awareness as it affects the implementation of SWM. This result was proven by the lens of the study of Camarillo and Bellotindos (2021) conducted in Cebu City, Philippines. By using the Slovin formula, the authors identified 1,523 respondents from 30 barangays and determined respondents’ compliance with SWM policies and guidelines. The study recommended that higher participation of the public should be encouraged to effectively see the progress in SWM. It is the same as what the respondents perceived regarding public awareness and participation.



**Table 7. Extent of Public Awareness and Participation Affecting the Solid Waste Management Implementation**

Public Awareness and Participation	LGU			DILG		
	Mean	SD	QI	Mean	SD	QI
1. Encourage public participation through community meetings, radio broadcasts, and through community websites, etc	4.14	0.97	VI	4.33	1.00	EI
2. Provision of rewards and incentives to individuals and communities who are actively involved in Solid Waste Management activities	3.76	1.00	VI	3.96	1.09	VI
3. Launching of collaborative activities like the “Palit Basura Program” targeting different sectors such as schools, commercial establishments, subdivisions, etc	3.79	1.04	VI	3.93	1.11	VI
4. Provision of technical assistance and training for commercial establishments and industries due to limited environmental management programs	3.73	0.96	VI	3.96	1.09	VI
5. Cooperation between and among the LGUs, private sectors, NGOs, and people’s organization	4.08	0.95	VI	4.26	0.98	EI
6. Conduct consultations with concerned agencies and stakeholders in case of new programs or projects before implementation	4.00	0.88	VI	4.30	0.87	EI
7. Focusing on social work sentences such as community clean-up rather than the imposition of fines may enhance public awareness and participation	4.10	0.84	VI	3.96	1.16	VI
<b>Overall Mean</b>	<b>3.82</b>			<b>3.82</b>		
	<b>Very Influential</b>			<b>Very Influential</b>		

**Table 8. Level of LGU's Implementation of the Provisions of RA 9003 as to the Implementation of Ten-Year SWM Plan**

Indicators	LGU			DILG		
	Mean	SD	QI	Mean	SD	QI
1. Implementing waste segregation at the source	3.76	1.03	UI	3.89	0.97	UI
2. Implementing segregated collection of wastes.	3.76	1.00	UI	3.85	1.03	UI
3. The service collection area coverage increased as the Plan is being implemented.	4.00	0.81	UI	4.30	0.82	FI
4. Has functional MRFs, composting facilities, and/or other technologies that improve waste management.	3.67	1.07	UI	3.96	1.02	UI
5. No open dumpsite and currently disposing of wastes to a sanitary landfill.	4.21	1.16	FI	4.30	1.38	FI
6. Developed or established linkages for marketing composts, recyclables, and processed materials out of wastes	3.35	1.17	SI	3.41	1.25	UI
7. Established collection scheme and storage for special household hazardous wastes.	3.21	1.27	SI	3.56	1.42	UI
8. Strictly enforcing the local ordinances related to SWM.	3.89	0.93	UI	3.81	1.04	UI
9. Regularly conduct IEC and other information campaigns related to SWM.	3.82	0.97	UI	4.07	1.04	UI
<b>Overall Mean</b>	<b>3.74</b>			<b>3.91</b>		
	<b>Usually Implemented</b>			<b>Usually Implemented</b>		

Legend: 4.20 - 5.00 Fully Implemented (FI) 3.40 - 4.19 Usually Implemented (UI) 2.60 - 3.39 Slightly Implemented (SI) 1.80 - 2.59 Rarely Implemented (RI) 1.00 - 1.79 Not Implemented (NI)





Table 8 shows that both LGU and DILG believed that in terms of implementation of the provisions of RA 9003 as to the implementation of an improved Ten-year SWM plan the following indicators were rated as *usually implemented*; Implementing waste segregation at source, Implementing segregated collection of wastes, functional MRFs, composting facilities and/or other technologies that improves waste management, Strictly enforcing the local ordinances related to SWM and lastly, Regularly conducting IEC and other information campaign related to SWM. While the indicator, no open dumpsite and currently disposing wastes to a sanitary landfill, was interpreted as *fully implemented*. LGU also implied regarding developed or established linkages for marketing of composts, recyclables, and processed materials out of wastes and Established collection scheme and storage for special household hazardous wastes as *slightly implemented* while for DILG it is *usually implemented*. On the contrary, LGU perceived that the service collection area coverage increased as the Plan is being implemented is *usually implemented* while for DILG it is *fully implemented*. To conclude, the data showed some slight differences in terms of the level of implementation. Although, there are some by which DILG and LGU have the same level of implementation and observation. As such five (5) indicators were interpreted as *usually implemented*, and one (1) as *fully implemented*. While there are two (2) same results indicators for LGU as *slightly implemented*, and *usually implemented as per DILG*. Also, the LGU-rated indicator #3 is *usually implemented* while *fully implemented* for the DILG. Since the DILG is mostly basing their responses on the reports submitted by the LGUs, it was observed that their responses are more positive in comparison to LGU in terms of indicator #3 which is the service collection area coverage increased as the Plan is being implemented. Despite that, both LGU and DILG, with an overall mean score of 3.74 and 3.91, respectively, interpreted the level of implementation of the provisions of RA 9003 as to implementation of a Ten-year SWM Plan as *usually implemented*.

**Table 9. Level of LGUs' Implementation of the Provisions of RA 9003 as to the Operationalization of Materials Recovery Facilities**

Indicators	LGU			DILG		
	Mean	SD	QI	Mean	SD	QI
1. All barangays have established MRF	3.79	1.13	UI	3.89	1.01	UI
2. All barangay MRFs are operational	3.57	1.08	UI	3.63	0.97	UI
The personnel assigned to the MRF has a logbook for recording daily waste acceptance, recovery, and disposal	3.58	1.16	UI	3.59	1.19	UI
4. The MRF does not receive mixed wastes	3.41	1.15	UI	3.48	1.12	UI
5. The MRF has sufficient storage area for segregated wastes	3.50	1.15	UI	3.56	1.09	UI
The MRF has basic equipment such as a shredder, composter, weighing scale, etc.	3.39	1.20	UI	3.56	1.25	UI
7. Adopted measures for odor and vermin control in the MRF	3.21	1.24	SI	3.56	1.19	UI
8. The working staff is trained in MRF operation	3.48	1.18	UI	3.56	1.19	UI
The working staff are provided with appropriate personal protective gears	3.44	1.18	UI	3.59	1.22	UI
9. The LGU has established linkages on the sale/disposal of products out of waste	3.44	1.22	UI	3.48	1.19	UI
<b>Overall Mean</b>	<b>3.48</b>			<b>3.59</b>		
	<b>Usually Implemented</b>			<b>Usually Implemented</b>		

Table 9 shows that relative to the operationalization of materials recovery facilities, both LGU and DILG interpreted almost all indicators as *usually implemented* with an overall mean score of 3.48 and 3.59, respectively. The difference in interpretation was on the adoption of measures for odor and vermin control in the MRF. The LGU has a mean score of 3.21 while the DILG got 3.56 with verbal interpretation of *slightly implemented* and *usually implemented*, respectively. This variation in the response can be attributed to the actual implementation on-site and the time of monitoring by DILG. Based on experience during field monitoring, there were times when the LGUs were compliant and sometimes were not. There were many factors affecting LGUs' compliances such as the availability of supplies, the presence of MRF workers, and the type of weather on a particular date, to name a few. In summation, both the DILG and LGU reflected the actual situation in most of the MRFs in Laguna.



**Table 10. Level of LGUs’ Implementation of the Provisions of RA 9003 as to the Closure and Rehabilitation of Open and Controlled Dumpsites**

Indicators	LGU			DILG		
	Mean	SD	QI	Mean	SD	QI
1. The dumpsite is completely closed and rehabilitated.	4.30	1.11	FI	4.59	0.89	FI
2. There is no ongoing activity at the closed dumpsite.	4.10	1.25	UI	4.59	0.80	FI
3. The waste is graded, compacted, and covered with soil.	4.13	1.16	UI	4.37	1.11	FI
4. Gas vents were installed at the closed dumpsite.	3.39	1.56	UI	3.85	1.46	UI
5. Constructed a leachate pond.	3.38	1.53	UI	3.89	1.42	UI
6. The leachate pond is properly maintained.	3.22	1.42	SI	3.81	1.49	UI
7. The closed dumpsite has a perimeter fence to prevent unauthorized entry.	3.87	1.37	UI	4.26	1.13	FI
8. A signage that the dumpsite is CLOSED is installed at the entrance of the facility.	3.87	1.40	UI	4.33	0.96	FI
9. No waste pickers were operating at the closed dumpsite.	4.02	1.30	UI	4.41	0.89	FI
<b>Overall Mean</b>	<b>3.81</b>			<b>4.23</b>		
	<b>Usually Implemented</b>			<b>Fully Implemented</b>		

Based on Table 10, both the LGU and DILG perceived the same level of interpretation as *fully implemented* in the first indicator which was the dumpsite is completely closed and rehabilitated. However, both groups of respondents have different interpretations of most of the indicators. As per LGU, the following items were interpreted as *usually implemented*; no ongoing activity at the closed dumpsite; waste is graded, compacted, and covered with soil; the closed dumpsite has a perimeter fence to prevent unauthorized entry; signage that the dumpsite is CLOSED is installed at the entrance of the facility and lastly, no waste pickers were operating at the closed dumpsite in contrast to the response of the DILG which was *fully implemented*. *Slightly implemented* was given as an interpretation by the LGU on the indicator “the leachate pond is properly maintained” while for DILG it was *usually implemented*. This result is congruent with the news published in the freeman last 2017 by Gallarde. It reported that SWM laws were violated in Negros Oriental by LGU with penalties ranging from 500,000 pesos to 2.5 million pesos due to the backsliding of the open dump site despite the presence of a leachate pond. This report implied that the leachate pond was not properly maintained. Overall, LGU’s mean score was 3.81 and interpreted as *usually implemented* while 4.23 for the DILG and interpreted as *fully implemented*. With this result, the difference in the responses revealed that some of the respondents from the LGU such as the ABC President or the Sangguniang Bayan representative may not be aware of the actual status of their closed dumpsite, or the report submitted by the LGU to the DILG was outdated.

The respondents were asked about the operation of a sanitary landfill in their municipalities and cities. Their responses with the item “No sanitary landfill but disposing the waste to an accredited sanitary landfill” is presented in Table 11A as a frequency distribution. This item does not apply to the city of San Pablo, and the municipalities of Kalayaan, Mabitac, and Paete. These LGUs were operating their sanitary landfills, hence the respondents from these LGUs did not provide their rating for this item. A total of 115 responded to this item on the part of the LGUs and 23 on the part of DILG, representing 2 cities and 21 municipalities.

**Table 11A. Frequency Distribution on the Non-existence of Sanitary Landfills but Disposing Waste to an Accredited Sanitary Landfill**

Agency	Fully Implemented		Usually Implemented		Slightly Implemented		Rarely Implemented		Not Implemented	
	f	%	f	%	f	%	F	%	f	%
LGU	89	77.4%	12	10.4%	9	7.8%	3	2.6%	2	1.7%
DILG	17	73.9%	4	17.4%	1	4.3%	1	4.3%	0	0.0%

As shown in Table 11A, out of one hundred fifteen (115) respondents from the LGU, 77.4% answered for *fully implemented*, followed by 10.4% (*usually implemented*), 7.8% (*slightly implemented*), 2.6% (*rarely implemented*), and 1.7% for *not implemented*. In contrast, DILG has 73.9% *fully implemented*, 17.4% *usually implemented*, 4.3% *slightly implemented*, 4.3% *rarely implemented* and 0% *not implemented*. Though the respondents answered differently, they were aware that their respective localities were disposing of



solid wastes to a third-party service provider, which was a privately operated sanitary landfill. These private sanitary landfills were in San Pedro City, Calamba City, and Santa Cruz, Laguna.

**Table 11B. Level of LGUs’ Implementation of the Provisions of RA 9003 as to the Establishment/operation and/or Disposal of/to Sanitary Landfill**

If the LGU is operating a sanitary landfill, ...	LGU			DILG		
	Mean	SD	QI	Mean	SD	QI
1. The site has a perimeter fence to prevent unauthorized entry into the area.	4.75	0.55	FI	4.50	1.00	FI
2. Installed signages in appropriate places within the landfill.	4.75	0.55	FI	4.50	1.00	FI
3. The landfill is not accepting mixed wastes.	4.15	1.31	UI	4.50	1.00	FI
4. Practicing daily soil covering of wastes	4.05	1.28	UI	4.50	1.00	FI
5. With installed gas vents	4.15	1.31	UI	4.50	1.00	FI
6. With leachate collection pipes and a leachate pond	4.35	1.09	FI	4.50	1.00	FI
7. Storm drainage canals are constructed.	4.55	0.89	FI	4.50	1.00	FI
8. Practice of open burning is prohibited	4.65	0.67	FI	4.50	1.00	FI
9. Waste pickers, if any, are organized by the LGU.	4.10	1.48	UI	4.50	1.00	FI
<b>Overall Mean</b>	<b>4.39</b>			<b>4.50</b>		
	<b>Fully Implemented</b>			<b>Fully Implemented</b>		

The disagreement of the respondents with the item "No sanitary landfill but disposing the waste to an accredited sanitary landfill" as presented in Table 11A lead to subsequent items in the case the LGUs are operating a sanitary landfill. Table 11B presents the indicators for the proper establishment/operation of a sanitary landfill.

As per the DILG, all indicators are interpreted as *fully implemented*. In despite of that LGU interpreted some indicators as *usually implemented* such as the landfill not accepting mixed wastes, practicing daily soil covering of wastes, with installed gas vents, and waste pickers, if any, are organized by the LGU, the rest are believed by both LGU and DILG as fully implemented. With this, both respondents interpreted their level of LGU's Implementation of the Provisions of RA 9003 as to the establishment/operation and/or disposal of/to Sanitary Landfill as *fully implemented* with overall means for LGU (4.39) and DILG (4.50).

**Regression of Influencing Factors on the Level of LGUs’ ‘Implementation of the Provisions of RA 9003**

**Table 13A. Regression Analysis of Influencing Factors on the Level of LGUs’ Implementation of the Approved Ten-Year Solid Waste Management Plan**

Factors	beta	t-value	p-value	Analysis
Institutional	-0.158	-1.137	.257	Not significant
Technical	0.082	0.482	.631	Not significant
Financial	0.067	0.384	.702	Not significant
Legal	0.060	0.363	.717	Not significant
External Support	0.054	0.398	.691	Not significant
Public Awareness and Participation	0.225	1.527	.129	Not significant

*Intercept = 2.432      Adjusted R-Square = 0.0644      F-value = 2.539      Sig. = 0.023*

Regression results in Table 13A showed that none of the influencing factors as institutional, technical, financial, legal, external support, and public awareness and participation significantly predict the level of implementation of the Ten-Year SWM plan. The beta coefficients were too small, and the p-values were all greater than the threshold of 0.05. This means that the Ten-Year SWM plan is implemented by strictly enforcing the contents of the plan regarding waste collection, segregation, information campaign, and establishing linkages for marketing composts, recyclables, and processed materials out of waste. While implementing the plan, the influencing factors were not taken into consideration although usually implemented but not accounted for by the respondents. This implied that the factors mentioned are not primary drivers or variables in assessing the success or failure of the program. A more detailed



study that will reflect the actual situation on the ground should be conducted.

**Table 13B. Regression Analysis of Influencing Factors on the Level of LGUs' Establishment and Operationalization of Materials Recovery Facility**

Factors	beta	t-value	p-value	Analysis
Institutional	-0.084	-0.504	.615	Not significant
Technical	0.274	1.353	.178	Not significant
Legal	0.084	0.425	.672	Not significant
External Support	0.096	0.592	.555	Not significant
Public Awareness and Participation	0.156	0.892	.374	Not significant
<i>Intercept = 1.627    Adjusted R-Square = 0.0827    F-value = 3.014    Sig. = 0.009</i>				

Regression results in Table 13B showed that none of the influencing factors as institutional technical, financial, legal, external support, and public awareness and participation significantly predict the level of LGU's establishment and operationalization of materials recovery facility. The beta coefficients were too small, and the p-values were all greater than the threshold of 0.05.

This means that the implementation of the provisions of RA 9003 about the Operationalization of Materials Recovery Facilities such as the non-acceptance of mixed waste, presence of trained personnel, and basic equipment necessary for the operation and maintenance of the MRF are not regarded as important factors for effective implementation. Relative to the influencing factors such as institutional, financial, legal, external support, and public awareness and participation, the result of this study showed that these factors have no bearing on the assessment of the success or failure of the program. A study involving those involved in the actual operationalization of the MRF such as the equipment operators, the garbage collectors, and the secondary sorters must be conducted to reflect the actual situation and the challenges encountered on site.

**Table 13C Regression Analysis of Influencing Factors on the Level of LGUs' Closure of Open and Controlled Dumpsite**

Factors	beta	t-value	p-value	Analysis
Institutional	0.042	0.221	.825	Not significant
Technical	0.020	0.086	.932	Not significant
Financial	0.508	2.128	.035	<b>Significant</b>
Legal	0.357	1.576	.117	Not significant
External Support	-0.211	-1.136	.258	Not significant
Public Awareness and Participation	0.599	2.978	.003	<b>Significant</b>
<i>Intercept = 2.580    Adjusted R-Square = 0.0723    F-value = 2.740    Sig. = .015</i>				

Influencing factors such as financial, and public awareness and participation showed *significant* influence on the LGU's implementation of closure and open and controlled dumpsite. The beta coefficient of 0.508 indicates that for every standard deviation unit increase in the financial factor, there is a corresponding increase in the implementation of closure and open and controlled dumpsite. The t-value of 2.128 is significant at the .035 probability level. Also, the beta coefficient of 0.599 indicates that for every standard deviation unit increase in public awareness and participation factor, there is a corresponding increase in the implementation of closure and open and controlled dumpsites. The t-value of 2.978 is significant at the .003 probability level. The adjusted R-squared value indicates that 7.23% of the variation in the implementation of closure and open and controlled dumpsite was explained by the financial factor and public awareness and participation. The F-value of 2.740 is significant at the .015 probability level.

This means that the closure and rehabilitation of open and controlled dumpsites are affected by financial factors, and public awareness and participation. Depending on the situation, a certain LGU's program on closure and rehabilitation can be a failure or a success. Some municipalities like Sta. Cruz, Cavinti, Pagsanjan, and Luisiana succeeded in their rehabilitation programs because of the support of their local chief executives. Sufficient budget and manpower were allotted for the purpose. Said municipalities also conducted training, meetings, and posted posters and billboards containing SWM matters. They launched several programs to encourage the public to implement proper waste management.

However, the influencing factors such as institutional, technical, legal, and external support did not significantly predict the



LGU's implementation of the closure of open and controlled dumpsite. This means that the personnel's experiences, training, and skills as well as the presence of heavy equipment and enforcement of local ordinances did not affect or contribute to the effectiveness of the program. This implied that the program on closure and rehabilitation of dumpsites can be successfully undertaken if the LGUs have allocated sufficient budget to finance the activities incorporated in the rehabilitation program. Likewise, the awareness and participation of the citizenry on proper waste management help because the volume of waste that supposedly goes to the dumpsite is greatly reduced, thus in turn resulting in a high percentage of waste recycling and recovery.

**Table 13D. Regression Analysis of Influencing Factors on the Level of LGU's Establishment/ Operation of SLF or Disposal to Accredited Landfill**

Factors	beta	t-value	p-value	Analysis
Institutional	0.608	1.631	.127	Not significant
Technical	-0.338	-0.656	.523	Not significant
Financial	-0.791	-1.596	.134	Not significant
Legal	1.124	2.250	.042	<b>Significant</b>
External Support	1.513	2.382	.033	<b>Significant</b>
Public Awareness and Participation	1.209	2.018	.065	<b>Significant</b>

*Intercept = 2.829    Adjusted R-Square = 0.1219    F-value = 3.439    Sig. = .012*

Influencing factors such as legal, external support and public awareness and participation showed *significant* influence on the level of LGU's establishment/ operation of SLF or disposal to accredited sanitary landfill. The beta coefficient of 1.124 indicates that for every standard deviation unit increase in the legal factor, there is a corresponding increase in the LGU's level of establishment/operation of SLF or disposal to an accredited landfill. The t-value of 2.250 is significant at the .042 probability level. Also, the beta coefficient of 1.513 indicates that for every standard deviation unit increase in external support factor, there is a corresponding increase in the LGU's level of establishment/operation of SLF or disposal to an accredited landfill. The t-value of 2.382 is significant at the .033 probability level. Moreover, the beta coefficient of 1.209 indicates that for every standard deviation unit increase in public awareness and participation, there is a corresponding increase in the LGU's level of establishment/operation of SLF or disposal to an accredited landfill. The t value of 2.018 is significant at the .065 probability level. The adjusted R-squared value indicates that 1.219% of the variation in the implementation of closure and open and controlled dumpsite was explained by the legal, external, and public awareness and participation factors. The F-value of 3.439 is significant at the .012 probability level.

This means that factors such as legal, external, and public awareness contribute to the successful implementation of the program. These three (3) factors are interlinked with each other. Awareness of the people on the existence of local ordinances on waste management and strict enforcement of these ordinances by the local authorities coupled with the support or assistance from national agencies such as the provision of training will make any program a success. The operation of the sanitary landfill does not only involve dumping and covering waste at the disposal area. It starts with the collection of waste from households. Strictly enforce waste segregation at the source, with the households actively participating, the volume of waste that will go to the landfill will be reduced. The assistance from the national government through technical means and cooperation with the private sector such as the establishment of a Waste-to-Energy program through the Public-Private Partnership scheme or the Build Better More program of the current administration is a big leap. This will result in a longer lifespan of the landfill and less pollution to the environment. Mendoza et. al., (2022), in their study, recommended that officials involved in project implementation should conduct an annual meeting and information campaign on the proper handling of solid waste to ensure the success of implementation.

However, the influencing factors such as institutional, technical, and financial did not significantly predict the LGU's establishment/operation of SLF or disposal to an accredited landfill. This explained the support such as financial and technical know-how encompasses the program operation to the institutional practices.

**Challenges encountered by the LGU in the Implementation of Ecological Solid Waste Management**

In Table 14, the challenges encountered by the LGUs were presented. These were rated according to the seriousness of the problem ranging from "not at all a problem to very serious."

In this study, challenges are listed and rated by the respondents that enable them to effectively perceive the program implementation. Respondents interpreted 11 out of 13 problems they encountered as moderate such as the Absence of C/MENR Office (majority of the staff are concurrent or designated only) (3.30), Insufficient number of personnel (3.37), Insufficient knowledge and



skills of SWM staff (3.13), Lack of trained personnel especially on the operation of SWM equipment (3.13), Lack of land for the construction of

**Table 14. Challenges Encountered by the LGU in the Implementation of Ecological Solid Waste Management**

Challenges	Mean	SD	Qualitative Interpretation
1. Absence of C/MENR Office (majority of the staff are concurrent or designated only)	3.30	1.41	Moderate
2. Insufficient number of personnel	3.37	1.24	Moderate
3. Insufficient knowledge and skills of SWM staff	3.13	1.19	Moderate
4. Lack of trained personnel especially in the operation of SWM equipment	3.13	1.16	Moderate
5. Insufficient funding allotted for solid waste management programs and projects	3.43	1.16	Serious
6. Lack of land for the construction of SWM facilities	3.30	1.35	Moderate
7. Lack of collection vehicle	3.02	1.32	Moderate
8. Lack of equipment	3.24	1.22	Moderate
9. Weak enforcement of local ordinances	3.21	1.14	Moderate
10. Unwillingness to pay for the SWM services	2.96	1.17	Moderate
11. Solid waste management is not a priority by the Local Chief Executive	2.24	1.37	Minor
12. Poor public cooperation	3.34	1.25	Moderate
13. Low level of awareness of the community on SWM	3.07	1.19	Moderate
<b>Overall Mean</b>	<b>3.13</b>		<b>Moderate</b>

Legend: 4.20 - 5.00 Very Serious (VS) 3.40 - 4.19 Serious (S) 2.60 - 3.39 Moderate (Mo) 1.80 - 2.59 Minor (Mr) 1.00 - 1.79 Not at all a problem (NaP)

SWM facilities (3.30), Lack of collection vehicle (3.02), Lack of equipment (3.24), Weak enforcement of local ordinances (3.21), Unwillingness to pay for the SWM services (2.96), Poor public cooperation (3.34), and lastly, Low level of awareness of the community on SWM(3.07). Moreover, solid waste management is not a priority by the Local Chief Executive with a mean score of 2.24 is interpreted as a minor problem while insufficient funding allotted for solid waste management programs and projects with a mean score of 3.43 interpreted as a serious problem. As such, some of the respondents added “allocation of sufficient funding for the establishment of SLF”, “financial assistance from the national government for the establishment of WTE”, “budget for the procurement of equipment”, “funding coming from the national agency”, and “lack of funds to develop SLF and equipment” are just some of few additions that strengthened the budget as a strong factor that influences the success of program implementation. Before this, a study by Malik et. al., (2022) of Khonozai Town, Baluchistan, Pakistan on the household level implied the willingness of respondents to pay and contribute to the improvement of solid waste management because of government LGUs agencies ignoring and not putting importance to solid waste management. The article of the Asian Development Bank (2014) titled “Solid Waste Management in the Pacific Financial Arrangements enumerated other financial sources that could be explored by LGUs to finance SWM activities such as intergovernmental transfers or subsidies, external development assistance, local taxes, user charges, and environmental fees.

## CONCLUSION AND RECOMMENDATION

Based on the findings of the study, it can be concluded that most of the respondents are in the prime of life, college graduates, and highly involved in SWM implementation. The short-term of office of the elected local officials is one reason for the frequent reshuffling and/or turnover of LGU employees thus affecting the sustainability of SWM program operations.

Both the LGU and DILG respondents regarded the influencing factors as important in SWM implementation. However, as to the level of implementation, variations in some responses were noted. This implied that the DILG respondents have different views compared with the LGUs being the overseer and the implementer, respectively. Further, significant differences were observed when the respondents were grouped according to socio-demographic profiles such as age, gender, educational status, and training attended. Hence, it can be said that the success of the implementation of SWM programs depends largely on the capacity of the implementers in terms of education and training. The higher the educational level and the more training attended related to SWM, the higher rate of success for



implementation.

On the other hand, the influencing factors have no bearing on the assessment of success or failure pertaining to the implementation of the 10-Year SWM Plan and MRF operation. Other factors need to be considered to combat existing problems in both aspects. For the closure and rehabilitation of dumpsites, and operation and/or disposal to sanitary landfill, legal, external support, and public awareness and participation significantly influence its implementation. Awareness of the people on the existing ordinances coupled with strict enforcement and external support from national agencies and other sectors would make any program a success.

The local governments faced many challenges in SWM implementation, but the results of this study revealed that insufficient funding was the only serious problem perceived by the respondents. If the budget is carefully planned and a large percentage is allocated to SWM programs and projects, a greater chance of success will be expected.

In order to effectively and efficiently implement the provisions of RA 9003, the local governments should focus on the allocation of sufficient budget for SWM programs, strictly enforce national laws and local ordinances, conduct intensive IEC targeting all sectors of the community, and capacitate its employees through training on the dynamics of solid waste management. Other recommendations that need utmost consideration by the current administration are the mandatory creation of the Municipal Environment and Natural Resources Office in every municipality and the establishment of a sanitary landfill or Waste-to-Energy Facility hosted by the provincial government in collaboration with the national agencies. Further, the assignment of a Special Court in every LGU that will handle SWM-related cases may also be considered.

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## **PEDAGOGICAL MECHANISMS OF IMPROVING THE CULTURE OF HEALTHY LIFESTYLE OF STUDENTS**

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### **ABSTRACT**

*This article provides information about the pedagogical mechanisms of improving the culture of healthy lifestyle of students. The world experience in teaching healthy lifestyle were discussed in the example of educational system in Finland, France and Singapore.*

**KEY WORDS:** *Increasing immunity, training, physical activity, exercise, personal hygiene, healthy lifestyle, activity.*

As a key area of child and youth development, the main task of the school is to promote the healthy growth of the physical and mental health of the students. Foreign studies have shown that the development of health education in schools helps to improve the health literacy of students and plays an important role in improving their quality of life. Promoting the overall physical and mental development of young people depends not only on the community providing them with a healthy environment and safety system, but also on the health education they receive, including a school health environment consisting of health lessons, environment, cultural environment and other factors. Among them, the health education course is the main element of this system. A 2004 report on health literacy in the United States states: "The most effective means of improving health literacy is to ensure that health education is included in the curriculum of every grade level." Internationally, Finland, Australia, Japan and other countries list "health care" as a basic education.

Schools are recognized around the world as the best places to promote health, and most children and young people spend most of their time at school. Human learning and development are accompanied throughout life, and also have positive plasticity in the sensitive period. Children and young people are in an accelerated period of physical development and a sensitive period of forming different habits and establishing different health concepts. The patterns of growth and development, cognitive development, and learning are highly consistent and complementary. Therefore, school health education can improve human health and educational outcomes through systematic design. Both largely determine the quality of the future population and economic efficiency.

Health plays an important role in controlling dropouts and ensuring school attendance. Unhealthy students have poorer academic performance, higher dropout rates, and are more likely to eventually drop out of school. An estimated 200-500 million students around the world miss school because of poor health, and healthy students learn better.

"Healthy lifestyle is an actual socio-pedagogical problem, which is considered from the point of view of human perception, psychology and motivation. The organization of lifestyle includes active work, physical strength, protection from extremely dangerous and harmful factors, as well as embodying spiritual culture. A healthy lifestyle is the guarantee of the young generation's all-round development. Lifestyle is our life activity, that is, how we spend a night. Maintaining and strengthening health is based on taking into account several healthy lifestyle factors. It is appropriate to explain the factors and content of a healthy lifestyle as follows. Health is the ability of the human body to adapt to the constantly changing conditions of the external environment. The external environment includes climatic factors and conditions, proper organization of work and rest, diet, social environment, etc. Adolescents' skillful adherence to the factors of a healthy lifestyle, conscious protection from harmful factors is the basis for ensuring personal and medical health, and it is considered a balanced unit of biological, mental, physical conditions and labor activity of the human body" [1].

"Health equity" is the same as "education equity" that affects children and young people. In addition to ensuring educational equity, schools also have a social responsibility to ensure 'health equity'. They are the main channel for improving





the intergenerational transmission of health inequalities and the main window reflecting the life and development of our country's citizens. Research shows that students of higher socioeconomic status are more aware of the importance of healthy habits than students of lower socioeconomic status. By providing strong health courses in critical knowledge and basic skills that directly and indirectly affect students' health, school health education reduces or eliminates individual health disparities caused by cognitive gaps and thereby prevents the intergenerational transmission of health disparities.

In our country, the physical and mental health of children and young people is deteriorating, and health problems are increasing. Physical and mental health problems resulting from unhealthy lifestyles, lack of health awareness and skills are major barriers to children's effective learning and social development. Key findings: The rate of bad vision is increasing year by year. Malnutrition and overnutrition coexist. On the one hand, the rate of malnutrition among 16-18-year-olds in the country has reached 11.5 percent, especially in the South-West region, while on the other hand, the detection rate of obesity among students of all ages has continued to increase. The obesity detection rates of rural boys and girls are 15.30%, 5.68%, 10.55% and 3.95%, respectively, compared to 2010 averages of 3.72%, 2.17%, 4.78 % and increased by 1.65%. The prevalence of psychological abnormalities is increasing. A 2020 survey found that the detection rate of youth mental health problems was 26.3%. Depression problems worsen with age. Some symptoms may persist into adulthood, increasing the risk of depression in adulthood by 2-4 times. Drug abuse is on the rise. In my country, the age of starting to smoke and drink alcohol among urban youth is much earlier, their number is increasing, and the gender gap is gradually decreasing. The situation regarding the prevention and control of AIDS is very serious.

Over the years, the absence of important health education areas such as mental health, lifestyle, safety education, emergency rescue, sanitation and communicable disease prevention and control, and sex education in schools has led to students' lack of health awareness, risk recognition, and survival skills. If it is not strong, it is easy to cause life safety accidents and cause great losses to people, families and society. Especially in the current socio-economic conditions of rapid development and changes, the increase of uncertain factors has a more negative impact on children and youth. The frequency and severity of many risky behaviors among young people gradually increases with socioeconomic development. If these problems are not addressed, the effectiveness of other educational innovations will suffer, according to the law of interaction between health and education.

In terms of international experience, in Finland, France, Singapore, and other countries, health education has been established on a multidisciplinary basis and integrated into the teaching of related subjects. For example, Finnish schools include age-appropriate content related to health, well-being and safety in the curriculum from various dimensions such as knowledge, skills, self-awareness, critical thinking and moral responsibility, and integrate environment and nature courses. Biology, geography, physics, chemistry and other subjects are integrated in grades 1-4; in grades 5-6. French primary and secondary schools combine food and nutrition education with sports lessons, food and nutrition education content in geography, science, foreign language and other teaching content; and civic education courses combined with tobacco control and drug addiction education; sexuality education life and earth science courses, civics and ethics courses, historical geography courses, French language courses and other related courses. Singapore integrates myopia prevention and control into physical education classes and extracurricular activities, and includes "outdoor activity time" in school curricula to encourage students to get more outdoors to protect eye health.

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# UNDERSTANDING MIGRATION PATTERNS IN RAJAPAKKHAR BLOCK OF VAISHALI DISTRICT, BIHAR

**Aditi Kumari**

## INTRODUCTION

Migration is a complex phenomenon that has significant implications for both the origin and destination regions. In the context of Vaishali district, Bihar, the migration patterns in Rajapakkhar block have been gaining attention due to the substantial outflow of migrants in recent years. Understanding the background and objectives of studying migration in this specific region is crucial for comprehending the factors driving migration and its potential impacts. Vaishali district, located in the eastern part of Bihar, is known for its rich historical and cultural heritage. It is one of the 38 districts in Bihar and comprises multiple blocks, including Rajapakkhar. Rajapakkhar block is an administrative unit within Vaishali district and consists of several villages and towns. The region, like many parts of rural Bihar, has witnessed a notable migration trend with a considerable number of people leaving their homes in search of better opportunities elsewhere. The decision to migrate is influenced by a complex interplay of push and pull factors. Push factors, such as limited employment opportunities, inadequate infrastructure, poverty, and social challenges, can create unfavorable conditions in the place of origin. In contrast, pull factors, such as better job prospects, improved living standards, access to education and healthcare, and social networks, attract individuals towards specific destinations. Understanding these factors is crucial for formulating effective policies and interventions to address the challenges associated with migration.

## OBJECTIVES

The primary objectives of this study are as follows:

1. To analyze the migration patterns in Rajapakkhar block of Vaishali district, Bihar and identify the push and pull factors that contribute to migration from Rajapakkhar block.
2. To examine the socio-economic, demographic, and environmental impact of migration on Rajapakkhar block and the destination regions with understand the challenges faced by migrants from Rajapakkhar block and explore their coping mechanisms.
3. To assess the role of local communities, government, and other stakeholders in addressing the issues related to migration in Rajapakkhar block and provide recommendations and strategies for sustainable development, social integration, and improved livelihood opportunities in Rajapakkhar block and similar regions.

## METHODOLOGY

To gain a comprehensive understanding of migration patterns in Rajapakkhar block of Vaishali district, Bihar, a mixed-methods approach combining quantitative and qualitative research methods will be employed. The following methodology will guide the research process:

## DATA COLLECTION

**a. Census and Demographic Data:** Secondary data from the Census of India and other relevant demographic sources will be collected to understand the population dynamics, migration trends, and demographic characteristics of Rajapakkhar block.

**b. Surveys:** Primary data will be collected through structured surveys administered to a representative sample of households in Rajapakkhar block. The survey will capture information on migration history, reasons for migration, socio-economic conditions, and challenges faced by migrants.

**c. Interviews:** In-depth interviews will be conducted with key stakeholders, including migrants, community leaders, local government officials, and NGOs working in the field of migration. These interviews will provide qualitative insights into the experiences, perspectives, and coping strategies of migrants.

**d. Focus Group Discussions (FGDs):** FGDs will be conducted with community members, including both migrants and non-migrants, to gather diverse viewpoints on migration, its impact, and community responses.



### LIMITATIONS

- a. Sampling Bias:** Due to resource constraints, the sample size for surveys and interviews may be limited, potentially resulting in sampling bias.
- b. Data Reliability:** The accuracy and reliability of data collected through surveys and self-reporting may be subject to recall bias and social desirability bias.
- c. Generalizability:** The findings of this study may be specific to Rajapakkhar block and may not be fully generalizable to other regions.

### PROFILE OF VAISHALI DISTRICT

Vaishali district, located in the eastern part of Bihar, encompasses a rich historical and cultural heritage. With a population of approximately 3.4 million people, the district primarily consists of rural areas dominated by agricultural activities. The fertile Gangetic plains, traversed by the Gandak and Ganges rivers, contribute to the agricultural productivity of the region. Vaishali district faces certain socio-economic challenges, including lower literacy rates compared to the state average and a sex ratio below the desirable mark. While there have been improvements in infrastructure development, poverty and unemployment persist as significant concerns.

The district's historical significance as the capital of the Licchavi Republic and its association with Lord Buddha add to its cultural prominence. Vaishali attracts tourists and pilgrims due to its archaeological sites, such as the ruins of the ancient city, stupas, and monasteries. Festivals and traditional arts in Vaishali showcase the vibrant cultural heritage of the region. Despite its historical and cultural significance, Vaishali district grapples with the need for sustainable development and addressing socio-economic disparities to enhance the well-being of its residents.

### GEOGRAPHICAL OVERVIEW

Rajapakkhar block is located in the northeastern part of Vaishali district, Bihar. Situated in the Gangetic plains, the block is characterized by its flat topography, making it suitable for agricultural activities. The block shares its northern border with the Ganges river, a prominent natural feature that influences the livelihoods of the local population. With a subtropical monsoon climate, Rajapakkhar block experiences hot summers, cool winters, and receives significant rainfall during the monsoon season, which plays a crucial role in supporting agricultural productivity. The block is well-connected to other parts of Vaishali district and neighboring regions through a network of roads, facilitating transportation and accessibility. Understanding the geographical overview of Rajapakkhar block provides essential context for analyzing migration patterns, as it sheds light on the natural environment and geographical factors that shape the socio-economic dynamics of the region.

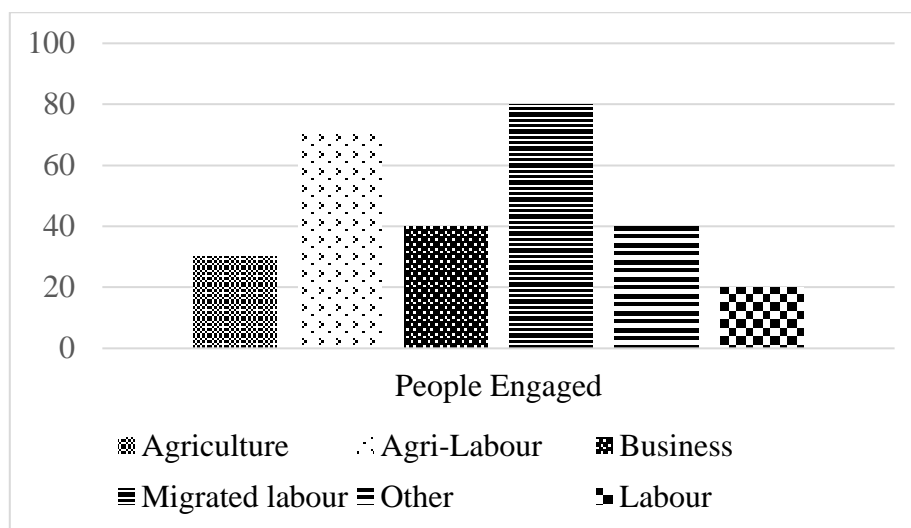
### DEMOGRAPHIC CHARACTERISTICS

Particular	Total	Cultivation	Population	Waste
Land Coverage (in Hectare)				

(Source: Secondary Data, Block office)

### Livelihood

When understanding Migration, it is crucial to research the means of subsistence used by the residents. It assists in determining the community's requirements and difficulties as well as new prospects for employment. Understanding the community's means of subsistence enables the creation of inclusive and long-lasting interventions that are suited to the requirements of the community.



**Poverty Level**

**Table 1: Wealth Ranking**

*Financial Assets/Wealth Ranking (As per Community Explanations)				
Well Off	Average	Poor	Poorest of the Poor	Destitute
{Concrete houses, Govt. Officer, cars, Tractors, Cattles, children in private schools, Electronic equipment's, Agriculture land, Health affordability, Servants, shops}	{Personal house, enough food, avg. source of income, health facility, children in private schools, medium pieces of agriculture land, small hurt}	{Live in insufficient partitioned houses, children in govt. schools, poor & inconsistent source of income, Not enough food, No or less health facility}	{Live in temporary rented/ dispersed houses/shelters, tenants, daily wagers, not enough food, insufficient income, no health affordability, children do not attend tuition}	{Live in miseries, high tenancy, bonded labour, No land, out of schools, Not enough food & health facility, deprived people etc.}
10%	35%	15%	25%	15%

**Labor**

Migration for labor work is a significant aspect of livelihood in Bihar, especially during the off-seasons in agriculture. It is a strategy adopted by many individuals and families to supplement their income and improve their economic conditions. There are three main cropping seasons:

1. Kharif: This season starts with the onset of monsoon in June and continues until September. Major Kharif crops include paddy, maize, jute, pulses, and oilseeds.
2. Rabi: The Rabi season begins in October and lasts until March. During this time, crops like wheat, barley, gram, lentils, and mustard are cultivated.
3. Zaid: Zaid crops are grown between March and June and include vegetables, melons, and fodder crops.

During the periods between these seasons, known as the "off-season," employment opportunities in the agricultural sector are limited. As a result, many people from Bihar, especially those from rural areas, migrate to other parts of the country in search of livelihood opportunities.

**Table 1: Time of migration**

Months	Work	Place
Jan to Feb	Sowing	In Village
Mar to Apr	Harvesting	In Village
May to Aug.	Migrated	Tamil Nadu, Delhi, Rajasthan, Tripura,
Sep to Nov	Harvesting	In Village
Dec to Jan	Sowing	In Village

(Source: Primary Data, Livelihood calendar, As on Aprile,2023)



The most common destinations for Bihari migrants include metropolitan cities like Delhi, Mumbai, Kolkata, and Bengaluru, as well as neighboring states such as Uttar Pradesh, Maharashtra, and Punjab. These migrants often engage in unskilled labor work, including agricultural labor during harvest seasons and construction work.

**Period of migration**

It depends on the family need, if the family is small and the bread earners are less they do migration for less days if they have sufficient land in the native to cultivate. On the other hand the livestock is also another component. If in the family livestock is their other than the agriculture then there is an alternative source of income. In such cases the migration become very rare if there is no need in the family. But if the number of maily members is high and the earning in native is not sufficient people migrate by keeping few family members in native. The period of migration varies from 3-6 months.

**Type of migration**

If we try to understand the type of migration on the aspect of period of migration, all the migration happened in the location are seasonal migration. But if we study in depth we can find 41 another aspect where this migrations vary. If we watch this dimension of study through the lens of number of family members migrate we can find two types of migration here viz. Family migration and only male migration.

**Family Migration**

In this case the whole family migrate to the places where they get additional livelihood. It has been observed that the small and nuclear families do such kind of migration. Mostly the unit size of this families are one couple (adults) and two kids (one teenager and one infant). The couples use to work as labour and the teenager take care of the infant, drinking water and cooking during the work hours. Usually this families do not do any type of livestock rearing in the household level.

**Only male migration**

In this case the families are big and joint families, where only males migrate to the place of alternative livelihood, the kids, women and the aged members of the family stay in the home, take care of the livestock and small scale agro-activities.

**Table 2: Details of migration mobility, work and wages**

Place	Works	Distance	Wages (Rs)	
			Skilled	Unskilled
Tamil Nadu	Textile industry workers, construction workers, domestic workers	2000Km	10,000-15,000	8000-12000
Uttar Pradesh	construction workers, rickshaw pullers, street vendors, factory workers	700Km	8,000-12,000	4,000-10,000
Maharashtra	Construction workers, domestic workers, hotel and restaurant staff, security guards, drivers	1,500Km	8,000-15,000	5,000-10,000

(Source: Primary Data, Survey, As on Aprile,2023)

From the information provided, it can draw several inferences regarding migration and labor work from the village to different states in India:

Migration from Village occurs due to the seasonal availability of water for cultivation, leading to unemployment during non-agricultural periods. People from village migrate to various states across India, including Tamil Nadu, Uttar Pradesh, Maharashtra, Punjab, Delhi, and Rajasthan. Migrants engage in a range of jobs, both skilled and unskilled, such as agricultural labor, construction work, domestic work, street vending, and industry-specific roles. Wages vary based on the type of work and skill level, with skilled labor generally earning higher wages compared to unskilled labor. Migrants from village travel considerable distances, with Tamil Nadu being the farthest destination at approximately 2,000 km. Metropolitan cities like Delhi, Mumbai, and Kolkata attract migrants due to the availability of diverse job opportunities across multiple sectors. Migration serves as a strategy for individuals and families to supplement their income and improve their economic conditions by accessing employment opportunities in different states.



**Economics of Migrate Labour Vs Labour**

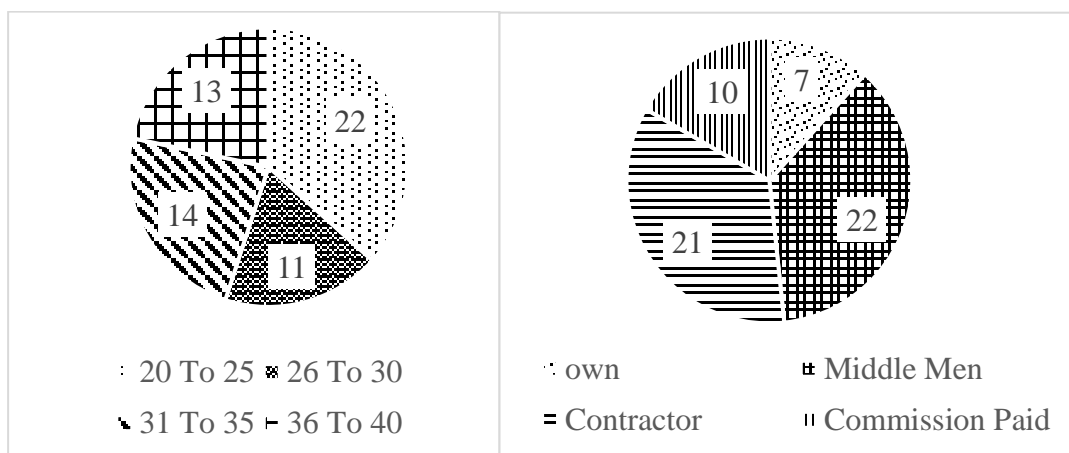
Work	Migrated					Net Profit
	Income		Expenditure			
	Wages	Food	Medical	Shelter	Total	
	<b>F</b>					
construction workers	1,20,000	24,000	3000	36,000	63,000	57,000
factory workers	1,80,000	24,000	3000	36000	63,000	1,17,000
Other	96,000	24,000	3,000	36,000	63,000	33,000
Labour						
Works	Income		Expenditure			Net Profit
	Wages	Food	Medical	Shelter	Total	
construction workers	1,20,000	12,000	1000	0000	13000	1,07,000
factory workers	1,80,000	12,000	1000	000	13,000	1,67,000
Other	96,000	12,000	1,000	000	13,000	83,000

(Source: Primary Data, Survey, As on Aprile,2023)

The profitability of labor work among villagers suggests untapped potential for economic growth within rural communities. However, factors such as limited understanding of changes, caste-related pride, and the absence of regular job systems contribute to villagers' push and pull factors for migration.

**General Information for Migrant Labour**

The migration of youth from the village can lead to a demographic imbalance, workforce shortage, brain drain, reduced innovation, and social impact. These consequences hinder the village's vitality, productivity, economic development, and social cohesion. To address these challenges, opportunities for youth should be created, including education, skill development, entrepreneurship, and community engagement. This can also result in exploitation of youth.



(Source: Primary Data, Survey, As on Aprile,2023)

From this data, we can conclude that job migration information in this context is sourced through personal networks, middlemen, contractors, and commissions paid to intermediaries. These various channels play a role in connecting individuals with job opportunities for migration. The people who are working under contractor usually not get payment for 2 months. It is keep with the contractor to keep them with themselves. The people who obtain for commination basic have to give there two months complete salary or 50% of the salary for 4 months. The person who go with middle men that is relatives don't have to pay for any of this. The person who go their own have to supper from getting exploited, cheating and other problems. Whether it is pulling or pushing the expectation both are to get better job and improve their living condition.



### **Challenges Faced by Migrants**

Lack of access to services is a pervasive issue faced by migrants, as discrimination and social exclusion often hinder their ability to access essential services such as healthcare and education. Migrants may encounter barriers that prevent them from receiving quality healthcare, leading to untreated illnesses and limited support for their medical needs. Similarly, limited access to education and skill development programs further perpetuates their vulnerability and restricts their opportunities for socio-economic advancement. To address this challenge, it is crucial to promote equal access to services for migrants, eliminate discriminatory practices, and provide targeted support to address their specific needs.

Housing and living conditions pose another significant challenge for migrants. Discrimination and exploitation can result in substandard housing and overcrowded living spaces. Migrants often find themselves living in informal settlements or cramped accommodations with inadequate sanitation facilities, which not only compromises their well-being but also increases their susceptibility to exploitation. Improving housing conditions and providing affordable and safe housing options for migrants are essential steps towards enhancing their living conditions and protecting them from exploitation.

Health and sanitation also present challenges for migrants, with limited access to healthcare services and inadequate sanitation facilities. Discrimination and language barriers can impede their access to healthcare providers, leading to untreated illnesses and compromised health outcomes. In addition, insufficient sanitation infrastructure in workplaces and living areas further exacerbates health risks. Addressing these challenges requires prioritizing the provision of affordable and accessible healthcare services, as well as improving sanitation facilities, to ensure the well-being and dignity of migrants.

To tackle discrimination and exploitation, a comprehensive approach is needed. This includes enacting and enforcing legal protections, raising awareness about migrants' rights, building the capacity of stakeholders, and fostering collaboration between government agencies, civil society organizations, and employers. By promoting inclusive policies and practices that safeguard the rights and well-being of migrants, and by addressing the specific challenges of lack of access to services, housing and living conditions, and health and sanitation, we can work towards creating a more equitable and inclusive environment for migrants in Vasali, Bihar.

### **CONCLUSION**

Migration for labor work is a common strategy adopted by individuals and families in Vasali, Bihar, especially during the off-seasons in agriculture. Limited job opportunities and seasonal unemployment push migrants to seek livelihood opportunities in other parts of the country, primarily in metropolitan cities and neighboring states. However, migrants face numerous challenges in their pursuit of better economic conditions. They often engage in unskilled labor work, such as agricultural labor and construction, and earn lower wages compared to the local workforce. Exploitation and payment issues arise, particularly when working under contractors or intermediaries. The migration of youth leads to demographic imbalances and workforce shortages in the village, affecting its vitality and productivity. Additionally, migrants encounter a lack of support systems and infrastructure in their destination areas, hindering their access to essential services. To address these challenges, it is crucial to implement interventions that create alternative livelihood opportunities within the village, improve education and skill development programs, support entrepreneurship, and establish proper support systems for migrants. Additionally, addressing issues of exploitation and ensuring fair treatment for migrants is essential for their well-being and overall improvement.

### **WAY FORWARD**

The way forward to address the challenges faced by migrants in Vasali, Bihar requires a multi-pronged approach that encompasses various aspects of intervention. Firstly, efforts should be focused on enhancing livelihood opportunities within the village itself. This can be achieved by promoting agriculture-based enterprises, providing skill development programs, and encouraging entrepreneurship. Strengthening local infrastructure, including access to healthcare, education, and housing, is crucial to improve living conditions and reduce the need for migration. Skill development and education programs should be prioritized to enhance the employability of migrants, providing them with the necessary skills for better job prospects. It is also essential to address wage differentials and ensure fair remuneration for migrants' work, promoting transparency and regulation in labor markets. Establishing support systems, including counseling centers, helplines, and migrant resource centers, will provide guidance, assistance, and protection for migrants. Raising awareness about migrants' rights and entitlements, empowering them to make informed decisions and seek legal remedies in case of exploitation, is crucial. Strengthening social security measures specific to migrant workers, such as healthcare and insurance, is important to provide them with a safety net regardless of their location. Collaboration among stakeholders, including government agencies, NGOs, and the private sector, is essential to develop comprehensive migration policies and share resources. Regular research and data collection on migration patterns will provide insights for evidence-based policies and interventions. By adopting this comprehensive approach, we can work towards addressing the challenges faced by migrants in Vasali, Bihar, and promote their well-being and economic growth.



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# LE TOURISME DE MASSE POST-COVID : RENOUVEAU DES PRATIQUES TOURISTIQUES ET DES ADAPTATIONS EN TUNISIE

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## RESUME

La pandémie de COVID-19 a impacté gravement le tourisme mondial. Le secteur, pourtant habitué des crises, n'a jamais traversé une épreuve d'une telle ampleur au cours de son histoire. L'importance de la crise est telle que toutes les composantes de ce secteur sont impactées. L'offre touristique va devoir composer avec des réglementations sanitaires nationales et internationales complexes, voire des interdictions de voyager, impactant à la fois les pays émetteurs, mixtes et récepteurs. Le tourisme étant l'unique produit de consommation pour lequel le consommateur doit se déplacer pour consommer sur le lieu de production, l'interruption brutale des circulations nationales et internationales s'est traduite par un arrêt de l'activité.

Ainsi, le manque à gagner est très important, surtout pour des pays comme la Tunisie où l'activité a un poids considérable dans l'économie et la société. Le sud tunisien marqué par la prédominance d'un tourisme balnéaire de masse se voit la nécessité d'une mutation de son fonctionnement et le développement de nouvelles formes de tourisme comme une stratégie de substitution au tourisme de masse.

Cet article étudiera comment le tourisme en Tunisie doit connaître une diversification de son offre en réponse aux crises du tourisme de masse et l'urgence de la prise en compte de l'écologie, du patrimoine local et le respect de la société dans la planification touristique.

**MOTS-CLES :** *Tourisme, patrimoine, adaptation-résilience, développement territorial.*

## SUMMARY

The Covid-19 pandemic has severely impacted global tourism. The sector, although accustomed to crises, has never gone through an ordeal of such magnitude in its history. The importance of the crisis is such that all the components of this sector are impacted. The tourist offer will have to deal with complex national and international health regulations, even travel bans, impacting both sending, mixed and receiving countries. Tourism being the only consumer product for which the consumer must travel to consume at the place of production, the sudden interruption of national and international circulation has resulted in a stoppage of activity.

Thus, the loss of earnings is very significant, especially for countries like Tunisia where the activity has a considerable weight in the economy and society. The south of Tunisia, marked by the predominance of mass seaside tourism, sees the need for a change in its functioning and the development of new forms of tourism as a strategy to substitute for mass tourism.

This article will study how tourism in Tunisia must experience a diversification of its offer in response to the crises of mass tourism and the urgency of taking into account ecology, local heritage and respect for society in tourism planning.

**KEYWORDS :** *tourism, heritage, adaptation-resilience, territorial development.*

## INTRODUCTION

En Tunisie, l'offre touristique balnéaire, qui a débuté par quelques unités hôtelières, a connu plusieurs concepts et phases d'aménagement touristique (zone, station touristique de 1<sup>re</sup> génération, station touristique de 2<sup>me</sup> génération) pour répondre à la demande des tour-opérateurs qui sont les intermédiaires avec la clientèle internationale. L'État tunisien, acteur primordial de la planification via l'élaboration de ces concepts, n'a pas cessé, depuis les années 1980, de se désengager en incitant les promoteurs touristiques à prendre le relais de l'aménagement touristique. Donner en concession des projets touristiques et immobiliers traduit



l'entrée en force des investisseurs privés pour aménager les nouveaux types de stations intégrées « de 3<sup>ème</sup> génération », greffées sur les anciennes zones et les centres villes.

Ce désengagement financier de l'État aurait dû être compensé par un nouveau rôle des pouvoirs publics, régulateurs du jeu d'acteurs, s'agissant d'une libéralisation quasi totale de l'aménagement touristique. Les acteurs territoriaux qui ont été plus ou moins impliqués, jusqu'au début des années 1980, dans l'aménagement des stations intégrées de premières générations, à travers des sociétés d'économie mixte, ont tendance à se retirer du récent processus d'aménagement touristique. Cette politique a conduit à la réalisation d'opérations urbaines de plus en plus dominées par l'hôtellerie de masse et par l'offre immobilière, pour répondre aux objectifs lucratifs de leurs promoteurs privés. En ce sens, l'exemple de la station de Djerba-Zarzis montre que, si l'État se laisse guider uniquement par les promoteurs privés, sans passer par des études de perspectives, on risque d'aboutir à des résultats en totale contradiction avec les enjeux initiaux de développement harmonieux. Pour autant, les tendances confirment que le territoire touristique est contraint de répondre en priorité aux besoins d'autres acteurs potentiels, les touristes internationaux mais également les touristes locaux.

Aujourd'hui le développement d'un tourisme de masse basé sur l'unique offre internationale montre de plus en plus ses limites. En effet le tourisme est un secteur très sensible à tout changement brusque. Il est très impacté par les crises. Vital pour l'économie tunisienne et, malgré la crise sanitaire, ce secteur doit, impérativement, reprendre ses activités en trouvant d'autres alternatives pour son développement. Le tourisme tunisien a pu assurer, en 2018, une recette non négligeable au PIB de la Tunisie couvrant ainsi le déficit commercial à hauteur de 21,1 %. Le secteur est également source de 389.000 emplois directs et indirects.

Mais, avec la pandémie du coronavirus, pas moins de 27.000 emplois directs ont été perdus à la fin de 2020. L'Organisation Mondiale du Tourisme (OMT) pense qu'un retour à la normale de l'activité touristique ne sera pas possible avant 2023. Plus grave encore, l'Association internationale du transport aérien (Iata) annonce, de son côté, qu'une reprise du trafic aérien habituel n'est attendue qu'en 2024. Comme tous les pays, la Tunisie a été affectée par cette pandémie. Et malgré la réouverture des frontières, à la fin du mois de juin 2020, la fréquentation estivale a été nettement en-deçà des attentes du gouvernement.

Le manque à gagner est très important pour la Tunisie où l'activité a un poids considérable dans l'économie et la société. Le sud tunisien marqué par la prédominance d'un tourisme balnéaire de masse se voit la nécessité d'une mutation de son fonctionnement et le développement de nouveaux chemins de résilience et de développement du secteur de tourisme pour ce territoire.

Cette évolution–mutation va se traduire par une forme de résilience qui vise « non pas à s'opposer à l'aléa, mais à en réduire au maximum les impacts ». En cela, la résilience est un « outil d'aide stratégique » qui vise à atténuer le choc et à retourner au plus vite à l'état initial.

Ce papier traitera comment le tourisme dans le sud tunisien doit connaître une évolution, voire une mutation de son fonctionnement : d'abord la disparition potentielle d'un tourisme de masse tel que pratiqué avant crise, suivie de la prise en compte majorée de l'écologie aussi bien pour l'offre que pour la demande touristique, finalement le développement d'un tourisme socialement plus responsable respectueux et durable.

## **1. Revue de la littérature : le trio tourisme, territoire et patrimoine local au service du développement durable**

### **1.1. Les aménités territoriales**

Les ressources dont disposent les territoires pour accroître leur dynamisme économique et leur richesse sont multiples et renvoient à de nombreux postulats théoriques et empiriques. Ainsi, la ressource peut être territorialement générique ou au contraire spécifique au lieu, elle peut être diffuse ou localisée, abondante ou au contraire rare, épuisable ou renouvelable, matérielle ou immatérielle, exogène ou endogène... Identifier ces facteurs de développement, en prendre la mesure, en comprendre les processus de création, de valorisation, de diffusion sont au cœur des préoccupations des sciences régionales. Il peut s'agir de ressources liées aux activités productives comme le capital humain, le capital physique, les matières premières, la disponibilité foncière, la qualité des réseaux et des infrastructures, un savoir-faire particulier ; mais également des facteurs d'activités résidentielles et touristiques, comme le patrimoine historique, culturel, un climat, un paysage...

Des enquêtes réalisées aux Etats-Unis auprès de chefs d'entreprises ont montré l'importance de la qualité de l'environnement dans le choix de localisation des firmes (Foster, 1977 ; McLoughlin, 1983 ; Lyne, 1988 ; Gotlieb, 1994). Par ailleurs, il semble que le poids accordé à ces facteurs environnementaux est d'autant plus important que la firme intervient dans des secteurs à haute technologie, secteurs qui requièrent du personnel à la fois mobile et très qualifié (Stafford, 1983 ; Lund, 1986 ; Schmenner, 1982). Pour Gotlieb (1994) les raisons qui motivent ces chefs d'entreprises, en particulier pour les travailleurs indépendants, sont liées à la maximisation de leur « revenu psychique » plutôt qu'à celle de leur profit. Ainsi, les firmes implantées dans des sites privilégiés



seraient plus à même de recruter plus facilement mais également de mieux retenir leur main-d'œuvre qualifiée (Gottlieb, 1995). De plus, les travailleurs seraient prêts à accepter un salaire moindre pour vivre dans des endroits plaisants (Rosen, 1979).

De nombreux travaux ont également été développés pour comprendre l'inversion des soldes migratoires des espaces ruraux qui s'opère dans la plupart des pays développés à partir du milieu des années 1970. Aux Etats-Unis, par exemple, Kusmin (1994) montre que les facteurs économiques habituels liés au business ne permettent plus d'expliquer le renouveau rural que connaissent certains comités américains. En 1997, il reprend ces travaux et introduit d'autres facteurs tels que le climat, des éléments topographiques (présence de montagne mais aussi de points d'eau), le taux de retraités ou bien encore des indicateurs du système éducatif (Kusmin, Aldrich, 1997). La croissance rurale est mesurée à partir du revenu total local. Une vague de travaux s'est également consacrée aux migrations d'agrément (Moss, 2006 ; Cognard, 2010...). Rudzitis (1999), qui s'intéresse aux migrations résidentielles des retraités et des actifs vers des espaces ruraux, montre que le cadre de vie, la qualité paysagère, le calme, la sécurité sont les premiers arguments qui guident ces installations dans les campagnes américaines.

Les aménités seraient donc devenues en quelques décennies l'un des facteurs prépondérants du développement des villes et des campagnes. Nous employons le terme d'« aménité » comme synonyme d'agrément, afin de décrire un ensemble de dotations naturelles, patrimoniales ou culturelles qui rendent un endroit agréable à « habiter », même ponctuellement dans le cas de touristes et excursionnistes. Certains auteurs parlent d'aménités de consommation (Glaeser & al., 2001 ; Glaeser & Gottlieb 2006), d'autres y préfèrent le terme de "Place luck" pour marquer le fait que leur présence n'est que peu voire pas liée à des politiques publiques locales, mais font tout simplement partie des atouts intrinsèques au lieu (le climat...) ; ou liés à son histoire (patrimoine...), à son nombre d'habitants (infrastructures éducatives, sanitaires...) (Reese L. & Minting Ye, 2011).

## 1.2. Le tourisme comme moyen de marketing territorial

Pour l'Organisation Mondiale du Tourisme, « le tourisme est un déplacement hors de son lieu de résidence habituel pour plus de 24 heures mais moins de 4 mois, dans un but de loisirs, un but professionnel (tourisme d'affaires) ou un but sanitaire (tourisme de santé) ».

Le changement de lieu, la durée et les motifs du séjour, sont les trois dimensions du tourisme qui déterminent ses formes, la classification des touristes et la répartition des nuitées. Sur cette base, on distingue le tourisme intérieur, le tourisme extérieur (avec franchissement de frontières) et les motifs.

Le marketing territorial est une discipline qui s'est développée dans le monde à partir des années 1980. C'est une pratique encore assez méconnue. A la fois semblable et différente du marketing des produits, elle est basée sur le partage d'une vision transversale qui comprend les richesses culturelles, touristiques, historiques, économiques, sociales, créatives et éducatives. Ce marketing présente une démarche qui vise à élaborer, sur la base de la connaissance de l'environnement (géographique, démographique, culturel, économique, social, politique), l'offre territoriale par les dirigeants élus d'une collectivité locale (ville, village...) en vue d'assurer son adéquation permanente à diverses cibles (touristes, citoyens, entreprises...) tout en poursuivant les missions d'intérêt général auprès de tous leurs administrés.

Le marketing territorial se traduit de manière opérationnelle par une offre intégrant à la fois des produits et des services destinés soit aux résidents permanents soit aux utilisateurs occasionnels du territoire considéré (équipements touristiques, capacité d'hébergement, monuments historiques mis en valeur...).

Le sud-est tunisien, dispose de plusieurs et d'importantes richesses et ressources en termes de diversité de paysage, d'un mode de vie authentique et plus d'une centaine de produits de terroir. Ceci reflète un savoir-faire séculaire et une culture subtile et riche aux multiples facettes qui constituent un levier de développement qui mérite d'être étudié, valorisé et exploité. L'application des stratégies de marketing territorial vise à améliorer l'image de la région.

Les politiques de développement local ou durable imprègnent et animent aujourd'hui les orientations stratégiques de cette région. Les décideurs politiques, les ONG et associations, les entreprises comme les citoyens se mobilisent pour concevoir des actions de valorisation des patrimoines naturel, matériel et immatériel menacés par diverses dégradations, mais aussi porteurs d'espoirs de ce développement.

Ainsi, la préservation des sites, les formes de tourisme alternatif, les artisanats locaux et les produits de terroir se trouvent, aujourd'hui, au centre des préoccupations des acteurs politiques et de la société civile, qui multiplient et diversifient les démarches de développement territorial avec le même mot d'ordre : valorisation. Pour ce faire, les acteurs de cette valorisation convoquent des supports ou des dispositifs tels que l'événementiel, les médias locaux, les TIC, le management de projets et le marketing territorial



et équipent leurs discours de légitimation de notions singulières présentées comme des valeurs à savoir la recherche d'une authenticité et un retour au terroir.

Tout se passe donc comme si le développement territorial était maintenant inséparable d'une qualification d'« authentique » inhérente aux lieux, aux produits, aux savoir-faire, aux objets artisanaux ou aux sites touristiques. Dans le même temps, la diversification des politiques de valorisation des patrimoines se confond avec une logique commerciale. La communication publique et territoriale est ainsi doublement sollicitée notamment via la communication touristique pour plébisciter l'authenticité y compris dans sa dimension marchande.

## 2. Méthodologie

Pour appréhender les bouleversements du secteur, nous avons choisi d'effectuer une analyse qualitative sur le territoire sud tunisien. Cette région est représentative de beaucoup de secteurs concernés : elle est à la fois riche en tourisme balnéaire de masse, de tourisme culturel saharien, en visiteurs locaux et nationaux, de retour de la diaspora vivant en Europe. Touché comme toutes les régions du monde entier par la crise de la COVID-19, le sud tunisien a connu une forme de résilience intimement liée aux plans de sauvegarde nationaux, mais également au rôle de la diaspora tunisienne vivant à l'étranger qu'il est utile de présenter l'importance de leurs implication en matière d'investissement touristique. Nous proposons une démarche en trois temps. En premier, il faut rappeler que si la crise post covid19 est inédite, il y a eu durant toute l'histoire du tourisme tunisien moderne une succession de crises qui se sont traduites toujours par des baisses plus ou moins importantes (révolution de 2011, attentats, crise financière de 2008...) des retombées économiques du secteur. Ces crises étant toutes liées au fait que le modèle touristique tunisien est fortement dépendant d'une clientèle étrangère, la seule solution préconisée à chaque fois c'est le recours à la demande interne, toujours utilisée comme substitution. Et cette fois-ci encore on ne déroge pas à la règle. Or, cette demande domestique, bien réelle, doit être conçue dans le cadre d'une révision globale du modèle touristique tunisien et non comme un simple palliatif à l'occasion de chaque crise. Ce modèle souffre de nombreux handicaps que la crise a révélés et accentués.

Dans la deuxième partie de cet article et après un diagnostic territorial de la région, on procèdera à l'analyse SWOT qui permettra de mettre en perspective les forces et les faiblesses de l'offre territoriale mais aussi les opportunités et les menaces. Il ne s'agit pas de porter un jugement de valeur sur le territoire mais bien d'avoir une analyse objective de la situation.

Dans une troisième partie, on va essayer d'entrevoir quelques pistes pour revisiter le modèle touristique conçu pour la région en explicitant trois exemples de développement touristique durable comme étant une alternative au tourisme de masse en valorisant les richesses patrimoniales et paysagères de trois écosystèmes différents : écosystème saharien, balnéaire et oasien.

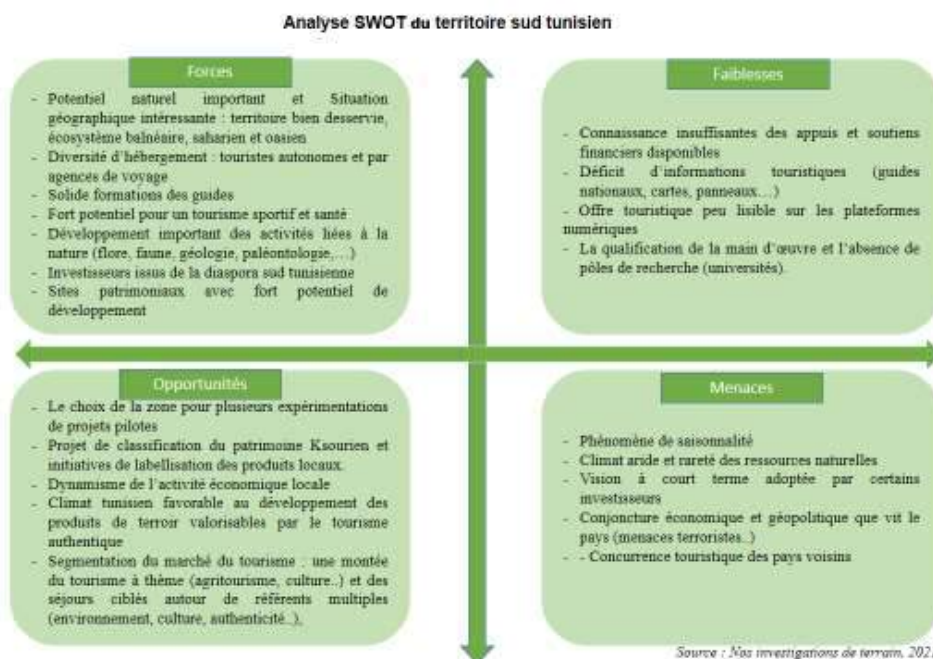
## 3. RESULTATS ET DISCUSSION

### 3.1. Le tourisme tunisien entre croissance et crises conjoncturelles, quelles solutions

Aujourd'hui, pour résister à la concurrence, le tourisme doit combiner deux facteurs : l'avantage comparatif et la compétitivité (Lafay, 1999). L'industrie touristique tunisienne est « un modèle économique à rénover davantage ». C'est vrai que l'attractivité de la Tunisie, c'est d'abord le littoral, mais la Tunisie dispose d'un patrimoine culturel très riche et varié non valorisé. Face à une concurrence mondiale de plus en plus intense, à des comportements en évolution rapide, la destination « Tunisie » doit s'adapter et s'organiser. Dans ce contexte où les acteurs du tourisme évoluent vite, cette mutation incite aujourd'hui à faire des propositions concrètes, susceptibles d'améliorer l'efficacité du secteur notamment en termes de qualité et de durabilité. Si la période 1960-1990 était qualifiée de « 30 glorieuses du tourisme tunisien », depuis le milieu des années 90 si la demande a progressé et progressera encore, l'offre touristique a augmenté encore plus rapidement au point d'être désormais excédentaire par rapport à la demande. Principale conséquence pour le marché touristique, les années à venir seront déterminées par la demande. Il faudra impérativement proposer une offre de produits en adéquation avec les attentes des clientèles touristiques variées et jouer sur la qualité et l'authenticité du produit. Les nouvelles tendances de la consommation touristique ont donc changé : « le nouveau touriste cherche le calme, la facilité de circuler, l'authenticité. Il cherche à explorer de nouvelles cultures tout en respectant l'environnement.

### 3.2. Analyse SWOT

Dynamiser les territoires à partir de leur patrimoine agri-culturel ou de leurs cultures traditionnelles à haute valeur ajoutée représente une réponse aux menaces de standardisation et de perte d'identité. C'est aussi un levier de construction d'une politique de développement durable, respectueuse de la diversité des cultures et de leurs spécificités. Pour cette raison, l'intégration du patrimoine dans la planification touristique dans le sud tunisien est désormais pleinement prise en compte par les investisseurs et les décideurs. Le diagnostic territorial et notamment en matière de valorisation des produits de terroir sud-tunisien par l'industrie touristique a dégagé des atouts et des faiblesses de l'offre territoriale mais aussi des opportunités et des menaces.



En résumé de cette analyse SWOT, on peut dire que le sud tunisien constitue un territoire difficile et défavorisé. Appartenant à la marge aride, il est confronté à plusieurs difficultés pour suivre le mode de développement, mais doté d'une richesse patrimoniale très importante et une dynamique touristique considérable.

Cette « zone difficile » n'est donc pas une réalité « marginale ». Elle est surtout confrontée à une réalité stratégique, soit à un échec des planificateurs de développement. Certes c'est dans ce territoire que se vit la pauvreté d'aujourd'hui et aussi celle de demain si un processus de développement adéquat ne sera pas pris en compte, mais c'est également une zone bien placée pour inventer et mobiliser des ressources locales valorisables. « Elle est même mieux placée que les zones « favorables » pour inventer et mobiliser. Nous faisons, pour notre part, l'hypothèse que les zones difficiles sont plus à même de pratiquer le développement territorial car elles sont dans l'obligation de se mobiliser et donc de valoriser le « capital social » et la gouvernance territoriale. » (Abichou, 2015).

### 3.3. Le tourisme alternatif comme un mode de résilience : l'écotourisme oasien, saharien et balnéaire

Face à l'essoufflement du tourisme de masse suite aux différentes conjonctures du secteur, le gouvernement a commencé de faire de la « destination Tunisie » une plateforme de commerce et de services adaptée aux autres types du tourisme et notamment « le tourisme patrimonial » et « l'éco-tourisme ». Trois formes de tourisme patrimonial ont été identifiées dans les trois écosystèmes du sud tunisien (oasien, saharien et littoral).

#### ❖ *L'écotourisme au Sahara et dans le Dahar : quand le patrimoine devient un véritable atout d'écotourisme*

Le sud tunisien s'ouvre sur quatre unités géographiques différentes à savoir le Sahara, le Jebel qui s'étend depuis les monts de Matmata au Nord jusqu'au-delà de la frontière tuniso-libyenne au Sud, le Dahar (vaste plateau) et la Jeffara (plaine littorale). C'est une région stratégiquement importante pour un tourisme culturel car elle permet le passage d'un tourisme balnéaire, basé sur un seul secteur, au tourisme saharien développant de multiples secteurs et valorisant d'autres richesses cachées. Les richesses naturelles et patrimoniales, articulées aux ressources agencées à celles culturelles manifestées par les riches traditions locales, justifient d'ailleurs le choix de la zone pour plusieurs expérimentations de projets pilotes avec l'objectif de développer le tourisme en tant qu'axe fédérateur sur ce territoire.

La Tunisie est quasiment le seul pays à pouvoir offrir au touriste, non loin des belles plages, des montagnes boisées, des centres urbains au rythme trépidant et les étendues calmes et grandioses du Sahara. On y trouve les villages de montagne, des oasis, des espèces de flore et de faune sauvage protégées par la loi. Les sites naturels et culturels très anciens sont abondants en Tunisie. Le sud est caractérisé par des modes d'agriculture spécifiques aux oasis, des systèmes ingénieux de partage et de gestion de l'eau, une architecture spécifique, des ksars de montagne qui sont des citadelles refuges perchées sur des pitons rocheux, des ghorfas ou greniers fortifiés, des centres urbains avec leur cachet architectural spécial, l'habitat troglodyte sous forme de maisons creusés dans le sol au flanc des falaises.



Soucieux de valoriser les ressources du pays, les pouvoirs publics tunisiens ont consacré une stratégie de développement au tourisme patrimonial, laquelle répond à des objectifs stratégiques de développement : étalement de la saison touristique, diversification de l'offre et de la clientèle, amélioration de la qualité du produit. D'importantes mesures ont été prises au profit du développement du tourisme saharien : nombreux encouragements dont, surtout, l'octroi d'avantages incitatifs à l'investissement dans les zones sahariennes; de grands travaux d'infrastructures dans le cadre de l'aménagement des zones touristiques; instauration, en 1995, d'une Journée du Tourisme saharien; construction d'hôtels de différentes catégories, ainsi que des travaux d'infrastructures.

Ainsi, le tourisme patrimonial représente une opportunité pour la région. Cette activité est considérée comme un secteur prometteur en termes de croissance, offrant d'importantes possibilités de diversification économique. La mise en tourisme du patrimoine de la région lui offre une chance de conservation, l'évolution vers un rôle durable qui concilie rentabilité économique et équité sociale et contribue à la naissance d'un rapprochement entre tous les acteurs. Cette richesse naturelle et patrimoniale justifie d'ailleurs le choix de la zone pour plusieurs expérimentations de projets pilotes avec l'objectif de développer le tourisme en tant qu'axe fédérateur sur ce territoire. Le projet «Destination DAHAR» (<https://destinationdahar.com/>) financé par le SECO<sup>1</sup> s'est développé dans la région sur la base d'appui aux initiatives privées comprenant des maisons d'hôtes, des circuits pédestres et des villages berbères. Le Dahar devient une nouvelle destination authentique dans le sud-est tunisien et a d'ailleurs reçu le premier prix Green Destinations, lors de l'ITB<sup>2</sup> Berlin 2022, dans la catégorie communautés et culture. Destination Dahar fait désormais partie des cinq sites historiques mondiaux répertoriés sur le site web Good Travel Guide.

❖ *L'écotourisme dans le système oasien de Tozeur : cas de l'initiative de Diar Abou Habib*

Le système oasien est un paysage patrimonial ingénieux et un écosystème unique, construit et maintenu par l'être humain depuis des générations à partir d'une gestion rigoureuse des ressources naturelles. Sauver ce système agricole ingénieux c'est contribuer au développement local durable. Une initiative d'un investisseur de la région qui propose un séjour inoubliable dans des lodges immergés au cœur d'une nature et d'une culture d'exception. Ces lodges sahariens sont conçus sous forme de cabanes perchées sur les palmiers, et s'intègrent d'une façon harmonieuse dans la palmeraie oasienne. Elles sont construites entièrement en bois, et s'intègrent parfaitement dans la palmeraie naturelle et le mode de vie oasien. Le concept est très original proposant un séjour inoubliable et écologiquement responsable à encourager évidemment. Un Art de vivre ancré dans le respect de l'environnement, et la passion de la nature. Pour des vacances autrement dans le calme et la sérénité on retrouve la nature en famille sans renoncer au confort.

❖ *L'écotourisme sur le littoral : Cas du village de Hessi Jerbi-Zarzis*

Cette partie explicitera l'initiative faite par les acteurs locaux et la diaspora du village de Hessi Jerbi-Zarzis dans la mise en place d'un projet communautaire d'écotourisme sur le littoral du village. Les autorités locales ainsi que la diaspora font depuis 2019 déjà la promotion de l'écotourisme en tant qu'outil efficace de conservation de la biodiversité et de développement.

En Tunisie et dans le cadre de l'orientation vers la gestion durable des ressources écologiques et naturelles, le Ministère de l'Environnement et du Développement Durable intervient de plus en plus dans la valorisation des ressources nécessaires au développement de l'écotourisme (la gestion du littoral et la préservation des milieux naturels sensibles) perçue à travers une logique de préservation des ressources et d'une stratégie de valorisation durable. Cette dynamique, ainsi amorcée, s'est traduite à travers de nombreux projets et programmes nationaux et régionaux. Actuellement, la promotion de l'écotourisme est en cours d'examen par différents acteurs du tourisme, de l'agriculture et de la culture visant à protéger les écosystèmes fragiles pour les générations futures tout en générant un revenu pour les populations locales souvent démunies et exerçant une pression anthropique sur les ressources naturelles.

L'écotourisme devient une alternative et un vecteur de développement local durable des territoires fragiles ou en déclin. C'est en effet, un tourisme qui est responsable, ayant un faible impact sur l'environnement, et qui procure des avantages aux populations locales. Il traduit de nouveaux modes d'exploitation et de mise en valeur du patrimoine naturel et humain dans une dynamique de développement durable.

Le développement de l'écotourisme dans le village de Hessi Jerbi s'est imposé car ce territoire dispose d'un capital naturel fragile et limité, soumis à de fortes pressions dans l'objectif de satisfaire les besoins de la population en croissance et de plus en plus consommatrice de ressources naturelles. Il se justifie également par le fait qu'il permettra au tourisme régional de se positionner sur les segments haut de gamme, à haute valeur ajoutée et de rehausser l'image quelque peu terne (tourisme de masse) dont il jouit aujourd'hui.

<sup>1</sup> Secrétariat d'État à l'Economie Suisse.

<sup>2</sup> International Tourism Exchange Berlin



Un diagnostic territorial a été mené grâce à des entretiens de terrain auprès de la population locale, du tissu associatif, des entrepreneurs locaux et des représentants des administrations en charge du développement du territoire afin de balayer les atouts et les contraintes du village. L'inventaire et l'analyse des potentialités écotouristiques du village ont permis de relever les efforts consentis pour promouvoir l'écotourisme notamment par le biais d'activités et d'aménagements de quelques circuits écotouristiques estivales. Les principales caractéristiques relevées étant :

- L'existence d'un potentiel naturel avéré : un site à fortes potentialités écotouristiques répondant aux critères de développement durable (propension à lutter contre la pollution humaine et la désertification marine, à impliquer les populations locales et à contribuer à leur développement socio-économique). La diversité des ressources de ce site offre des possibilités d'activités très diversifiées (observation de la nature, retour des cigognes, randonnées et activités sportives, agritourisme, arts et traditions populaires, festivités...);
- Produits agricoles qualifiés de terroir valorisables par le secteur de l'écotourisme ;
- Pépinière d'initiatives individuelles et collectives : le niveau de sensibilisation des acteurs au processus écotouristique est variable d'une catégorie d'acteurs à une autre. Deux catégories ont été identifiées dans le village : l'une est représentée par les associations locales et internationales (issus de la diaspora) d'appui au développement. L'écotourisme y est perçu comme une activité annexe pouvant d'une part, générer des revenus complémentaires aux communautés locales, et d'autre part, nuire aux ressources naturelles limitées. La viabilité de ces démarches est néanmoins tributaire de l'adhésion des populations locales au processus. L'autre catégorie d'acteurs regroupe les promoteurs privés, qui sont souvent au fait des exigences du marché, qui croient en leurs projets même si ces derniers ne sont pas encore intégrés dans une démarche de développement local durable, en ce sens qu'ils n'associent pas toujours les populations locales dans le processus écotouristique. Ces initiatives sont encore très timides dans le village. La région dispose d'un ensemble d'atouts considérés comme richesse qui peut être valorisable. La participation volontariste et efficace des investisseurs locaux dans la valorisation de cette richesse est un élément de base pour la pérennité de la démarche du développement local durable.
- L'existence d'une population très attachée à son territoire ;
- L'existence d'un savoir-faire dans la gestion de la production agricole (techniques de stockage et de conservation des produits de terroir). La base de la nourriture de la région était le blé, l'orge et l'huile d'olive. La femme rurale a bien gardé ce régime alimentaire familiale jusqu'à nos jours.

Grâce à l'exploitation des études réalisées par l'office du tourisme sur quelques marchés émetteurs d'écotouristes, à l'exploitation d'informations collectées de différentes sources, et à une enquête exploratoire réalisée auprès des promoteurs touristiques de la région Djerba-Zarzis nous avons pu cerner le profil des touristes, leurs motivations, leurs attentes et surtout les facteurs déterminants le choix de leur destination. Il est apparu à l'issue de cette analyse, qui pourrait être explicitée d'une manière plus approfondie dans les rapports scientifiques ultérieurs, que des opportunités non négligeables se présentent pour la région sous réserve qu'elle sache proposer des services adaptés et attractifs. En effet, l'expansion du marché de l'écotourisme prend de plus en plus de l'importance dans l'esprit du touriste qui visite le sud-est tunisien. Les principaux pays émetteurs d'éco-touristes en Tunisie sont : Canada, USA, Allemagne, Grande Bretagne et France.

Les différentes orientations de planification environnementale qui ont été mises en place sont :

- La création d'un parc littoral marin : La création de ce parc marin doit être considérée comme la réalisation d'un outil nouveau de développement local qui permettra d'atteindre deux objectifs principaux : valoriser et préserver la biodiversité locale et développer l'écotourisme dans le village de Hessi Jerbi en valorisant la richesse territoriale. Les communautés locales sont impliquées dans les processus de gestion de ce projet pilote à Hessi Jerbi. Les associations locales vont jouer un rôle important dans la sensibilisation et la mise en valeur du site et notamment pendant la période estivale où la pression sur le littoral augmente considérablement. Ce projet de parc dans le village de Hessi Jerbi est porteur à plusieurs titres pour l'écotourisme et se présente comme un levier économique puissant pour un développement local durable.
- Circuit sentier du littoral : La randonnée ressort comme une pratique pouvant intégrer les nouveaux modes de consommation (budget faible pour sa pratique), avec des possibilités de rencontres, de découvertes, d'apprentissages et de lien avec la nature. Le souhait étant de retrouver un aménagement plus naturel de la plage et une réconciliation avec la nature pour une meilleure protection et ceci sur le lieu de l'ancien dépôt clandestin de déchets.
- Village artisanal : valorisation des produits locaux et l'activité de la femme : L'artisanat est un élément d'identité locale résultant d'une histoire socioculturelle propre. «L'histoire qu'elle soit récit, elle raconte alors les choses qui se sont passées, ou qu'elle soit une reconstitution et une interprétation des faits, construit un mémoire qu'il s'agit de faire connaître et partager. L'histoire conduit à identifier ce qui peut rester pertinent aujourd'hui dans l'apport du passé. L'identité n'est donc pas une donnée acquise, c'est un construit de l'histoire » (Caune, 2006). L'étonnant niveau d'authenticité des habitants de Hessi Jerbi ne peut témoigner que de son attachement à son identité culturelle. Cette dernière nous paraît revêtir un aspect rural alliant paysans, pêcheurs et agriculture. L'étude de terrain nous a permis d'identifier nombreux produits artisanaux exclusivement caractéristiques du sud tunisien. Certes ces initiatives sont parfois heurtées à un manque d'encadrement ou de développement pour les faire évoluer vers des produits attractifs et compétitifs, mais elles sont néanmoins fort intéressantes et permettront à l'activité écotouristique



projetée dans la zone de se distinguer par rapport au tourisme conventionnel. Certains produits tels que le tissage, les produits agricoles de terroir ou la restauration pourraient évoluer, à notre sens vers l'artisanat d'art.

Le village de Hessi Jerbi est caractérisé également par une production agricole qualifiée de terroir. Elle concerne essentiellement le figuier et l'olivier, et sont principalement cultivés dans les vergers des habitants de la région.

C'est autour de l'olivier que se déploie la principale activité. La culture de l'olivier n'est guère possible que dans les endroits susceptibles d'être « irrigués » : en l'occurrence, il s'agit d'une irrigation par le ruissellement des eaux pluviales. La terre ne garde pas assez d'humidité pour que les racines de l'arbre en tirent profit, la culture de l'olivier « en sec » est pratiquement impossible sous les conditions climatiques du sud tunisien. Afin de recueillir les eaux des pluies et les matériaux arrachés aux collines qu'elles entraînent, on barre les ravins, de distance en distance, au moyen de murettes en pierre sèche (Tabias). Il se forme ainsi des terrasses, qui constituent presque autant de petits vergers que les gens de la région plantent d'oliviers et de figuiers.

L'huile d'olive est plus qu'un simple produit de consommation, il s'apparente davantage à un mythe. Elle n'est pas seulement l'élément fondamental de la cuisine du Sud, elle est aussi un remède multiple.

L'huile d'olive du Zarzis est considérée comme un produit de terroir. Ce produit peut avoir un label biologique qui lui permettra d'être un produit biologique et être destinée à l'exportation.

La figue constitue un élément fort de l'identité du territoire du sud-est tunisien. Les figues peuvent avoir aussi un label qui leur permettra d'être un produit biologique en sec et être destinés à l'exportation. Ces fruits desséchés 'Chérih' sont l'un des principaux produits de terroir de la région. L'amélioration du mode de conditionnement et de présentation du produit offrira de nouvelles opportunités au secteur.

La promotion de produits présentant certaines caractéristiques peut devenir un atout pour ce monde rural en assurant, d'une part, l'amélioration du revenu des agriculteurs locaux et, d'autre part, la fixation de la population du village.

En même temps, ces fruits, auxquels s'attachent avant tout une spécificité, une excellence liée à ce lieu, à cette société, à une histoire, peuvent servir de réservoirs génétiques. Rustiques et adaptées aux conditions climatiques de la région, ces espèces présentent des résistances aux maladies et aux dégénérescences et intéressent à ce titre la recherche agroalimentaire. Leur conservation implique le maintien de leur production dans ce territoire. C'est donc la survie de ce patrimoine qui est difficile à dissocier de la viabilité économique des populations locales.

## CONCLUSION

Le tourisme est un secteur économique important dans de nombreux pays, et le choc brutal et immense que la pandémie de COVID-19 a provoqué un choc qui s'est fait sentir dans le reste de l'économie. Si le tourisme tunisien doit se transformer, il faut penser à rajeunir le stock hôtelier qui est, pour la grande partie, traditionnel mais également développer le tourisme alternatif sur tout le territoire. Le tourisme saharien, par exemple, demeure encore le parent pauvre des activités touristiques. Pourtant, le désert tunisien compte plusieurs richesses qui doivent être mises en valeur en organisant des circuits touristiques où les touristes pourraient séjourner sous les tentes et passer d'agréables soirées au milieu des palmiers et des sources. Malheureusement, le Sahara a toujours été considéré comme un lieu de passage et non une entité à part entière. Par ailleurs, un intérêt constant devrait être donné au tourisme intérieur, maghrébin et golfique. Ce type de tourisme peut procurer aux hôteliers d'importantes recettes en devises vu le pouvoir d'achat élevé de ces touristes qui ne lésinent pas sur les moyens pour se faire plaisir. Encore faut-il savoir comment élaborer des programmes spécifiques répondant aux besoins de ces touristes qui ont des habitudes particulières à prendre en considération. L'écotourisme est aussi un segment du secteur qui mérite un développement. L'écotourisme devient une approche de développement local et durable, intégrant le social, l'environnemental et l'économique, maîtrisé par et pour les communautés locales.

Ce segment n'étant pas considéré comme une activité touristique à part entière, il se caractérise en plus par l'absence de cadre réglementaire propre ce qui génère des difficultés de taille pour les initiateurs des projets écotouristiques. Les contraintes majeures relevées se résument à :

- certaines professions liées à ce segment touristique ne sont pas reconnues ;
- les projets écotouristiques sont privés des avantages en matière de primes, de subventions, de fiscalité et de régime douanier octroyés aux autres activités touristiques ;
- plusieurs administrations interviennent à différents maillons de la chaîne écotouristique sans réelles concertation et coordination pénalisant ainsi l'aboutissement de certaines initiatives écotouristiques (difficultés d'exercice et d'obtention d'agrément) ;
- difficultés de financement du fait de l'insuffisance des garanties exigées par les banques....





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# **EXPLORING AN EFFECTIVE PEDAGOGY FOR GENERAL STUDIES COURSES DURING COVID 19 PANDEMIC IN 2 TERTIARY INSTITUTIONS IN GOMBE LOCAL GOVERNMENT AREA, GOMBE STATE, NIGERIA**

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*An IBR Proposal Submitted to Research & Development Unit, Federal College of Education (TECH), Gombe*

## **ABSTRACT**

*The study 'Exploring an Effective Pedagogy for General Studies Courses during COVID 19 Pandemic in 2 Tertiary Institutions in Gombe State' is a descriptive study aimed to assess the knowledge, beliefs, compliance to COVID-19 protocol by students and teaching staff, and most appropriate teaching and learning method during pandemic in two tertiary institutions in Gombe State, Nigeria, specifically the Federal College of Education Gombe and Gombe State University. Data was collected through administration of questionnaires to 20 students from each of the institution including teaching staff and HODS, Deans and Registrars. A controlled experimental was conducted to 60 students randomly assigned to three groups: traditional face-to-face instruction, online instruction, and blended learning to compare the learning outcomes of students. Data collected show high level of awareness and adoption of COVID-19 protocols among teaching staff and students of both institutions and both schools complied with COVID-19 protocol. Finally, the study showed that online teaching has higher learning outcome than the traditional face to face method, however a blended learning approach of the 2 teaching methods is considered to produce much higher learning outcome and performance. These findings highlight the need to increase COVID-19 knowledge, adopt protocols, and prioritize the well-being of teachers and students while monitoring compliance with COVID-19 protocols to prevent the rapid spread of the virus in teaching large number of students in a classroom setting.*

## **BACKGROUND TO THE STUDY**

The current Coronavirus Disease (COVID-19) outbreak has affected over 200 countries including Nigeria. It is one of the largest respiratory disease outbreaks affecting several countries simultaneously and a novel strain of Coronavirus (SARS-CoV 2) has been identified as the causative agent (Whenayon Simeon Ajisegiri et al, 2020). COVID 19 is a highly contagious virus that is contracted in the air and it affects anyone irrespective of one's status, race, background, and achievement. Globally, there are over 55326907 confirmed cases, and 1333742 deaths. Continently, Africa has over 1416524 confirmed cases; and there are over 65000 people who are infected and over 1163 deaths in Nigeria due to the virus (National Centre for Disease Centre daily Update 23 Nov 2020). It is transmitted through human contact, coughing, sneezing, and as soon as someone inhales the virus and it keeps spreading. It can be prevented by avoiding taking air in an environment where people are coughing and sneezing. Social distancing, regular use of facial masks, washing of hands over running water, and regular usage of hand sanitizer whenever you go out and come in are recommended (Adejoro, L. Adejoro 2020). In Nigeria, the country's existing health facilities and equipment (including ventilators and PPE) are grossly inadequate to handle the medical emergency due to COVID-19 (Ibekwe, 2020, Mac-Leva et al., 2020). Although the number of isolation facilities and capacity for intensive care units (ICU) in the country is growing, they are inadequate as many states are still struggling to set up isolation and treatment facilities. Beyond the shortage of personal protective equipment (PPE), health workers also face high risks of being exposed to infection as they are always on the front line in taking care of the numerous COVID-19 patients. As in the case of the Ebola virus disease, health workers often have a substantial share of the casualties



By the end of March 2020, the epidemic had spread to over 185 countries and resulted in the closure of over 90 percent of all schools, colleges, and universities impacting close to 1.38 billion students. COVID-19 is having a disproportionate impact on different population groups (APM, 2020; Aubrey, 2020; Garg et al., 2020; Lerner, 2020; Patton, 2020). People of high-income status were among the earlier class affected by the virus especially in the first 2 months of the first reported case on 27 February 2020. Later community infection was reported representing 2 out of three hospitalizations during the 2nd month of the Nigeria epidemic. The first case in Gombe state was confirmed on 20th April 2020 with 5 persons testing positive for the COVID-19 virus, and since then the cases have increased to 37 as at 27th April and subsequently 68 as of 30th April 2020 and on and on. Gombe State constituted COVID 19 Taskforce, established 3 isolation centers, and established testing centers to curb the Pandemic. Furthermore, with the support of the National Centre for Disease Control (NCDC), the State established Emergency Operational Centre for the Epidemics, and trained health Care Workers on prevention and surveillance. In the face of this outbreak, women, girls and PWD were most vulnerable. Children exposed to domestic violence were at risk for increased trauma, (Selvaratnam, 2020).

The UN Sustainable Development Goals, a blueprint for creating a just world, has named “quality education” as its fourth goal and COVID 19 is becoming a threat to the actualization of this goal. It is gradually changing this landscape. The virus has changed the way people in the world live, work, do business and learn. The COVID-19 pandemic has threatened the education of children or youths with special needs and children or youths disabilities of with special needs and disabilities. The impact of COVID 19 is far-reaching and has affected learning during the pandemic as many schools have discontinued face-to-face teaching (Sumitra Pokhrel, Roshan Chhetri, 2021). As of July 2020, 98.6% of learners worldwide were affected by the pandemic, representing 1.725 billion children and youths, from pre-primary to higher education, in 200 countries (United Nations, 2020). And “in Africa, about 297 million learners have been affected (UNESCO, 2020). Thus homeschooling has become the need of the hour. This option becomes near impossible in developing countries due to certain variables – population, subject, level, learners, teachers, time, space, method, power, internet connectivity, etc. In Gombe and Nigeria as a whole, the story was not different. On March 19, 2020, the Federal Ministry of Education in Nigeria approved the closure of all learning institutions (Nlebem, 2020). This abrupt closure led to significant disruptions in the education system including learning modes, access to school-related services, parenting routines, and crisis management capacities of the Federal and State Ministries of education in Gombe state like other federating units. To ensure continuity in learning during the pandemic, the Education Partnership (TEP) Centre and the Nigerian Economic Summit Group (NESG), with support from Hewlett Foundation, drew on their competencies in education and economic research, to study and report on education stakeholders’ responses to learning in the wake of the COVID-19 pandemic. The study recommended the prioritization of teacher development and well-being, the provision of support for parents, and the availability of infrastructure for remote teaching and learning (Education Partnership (TEP) Centre, 2020).

There is a greater chance of rapid spread of COVID 19 pandemic in tertiary institutions where a large population of students struggles for space in a confined classroom environment. With a student population of over 500 in a class of general studies courses, poor sitting arrangements, and poor knowledge of COVID prevention strategies, there is great concern that the school will become a place that exacerbates the spread of the virus. Also, poor COVID 19 response in most schools and absence of a monitoring framework to ensure strict compliance to COVID 19 protocol, makes it imperative to carry out this study to reduce the level of vulnerability to the virus infection. With vaccine being introduced into the country, frontline workers and top government officials were given priority for jabbing. It was later made available to all Citizen including students. It is therefore imperative to explore suitable pedagogy for delivering educational instruction to a large population of students offering the General subjects in tertiary institutions. This is to provide a balance in the learning and health needs of both learners and teachers.

### **GOMBE STATE UNIVERSITY (GSU)**

**Gombe State University** (GSU) established by Governor Mohammad Danjuma Goje in 2003. is located in Tudun Wada, an area in Shamaki Ward, Gombe State with a Latitude of 10.3062358 and a Longitude of 11.1713478. The State University has a Chancellor and 11-members of the governing council, as well as principal officers and management staff. Professor Abdullahi Mahdi was the first Vice Chancellor. It is a non-profit public higher-education institution located in the urban setting of the small city of Gombe (population range of 50,000-249,999 inhabitants). The University currently runs about 40 Programs under numerous Departments including a College of Medical Sciences, which is made up of three Faculties namely: Faculty of Medical Sciences, Faculty of Basic Clinical Sciences and Faculty of Clinical Sciences.

**FEDERAL COLLEGE OF EDUCATION TECHNICAL, GOMBE, GOMBE STATE**

The **Federal College of Education (Technical), Gombe (FCET)** is a federal government higher education institution located in Gombe, Gombe State, Nigeria, with a Latitude of 10.315061 and longitude of 11.1488145. It is affiliated to Abubakar Tafawa Belawa University and the University of Maiduguri for its degree programmes. The College originally known as National Technical Teachers College was established in 1977. It was later named Federal College of Education (Technical), Gombe. The College has School of Education, Technical, Vocational, Sciences, Primary Education Studies and Early Childhood Care Education, School Secondary Education- Arts and Social Sciences, Languages, General Studies. The school has a directorate of continuing education and Undergraduate studies.

**The Imperative of General Studies Courses in these Institutions.**

A general studies program embraces a broad-based education. Just as its name suggests, general studies do not focus on one specific major, like education or nursing. Rather, general studies are an overarching program that covers a range of skills needed for success within *any* given career. Within this type of program, students learn how to: Communicate effectively, think critically, interact in a multicultural environment, integrate knowledge from an array of disciplines, such as science, human services, and the arts, to name a few. In addition to teaching versatile skills (that can be applied to many different careers), a general studies degree enables students to earn college credits and complete general education courses while exploring their areas of interest. The GSE courses are so important because every student is expected to offer them, therefore explain why the classes are usually overcrowded. In most cases they are distributed among students in their first- third year of their course of study. It was for this reason that this study was embarked upon to identify the most appropriate pedagogy in teaching large numbers of students applicable to general students' course.

Jones, 2002; Patton, 2020, in their work 'Comparative landscape genetics reveals differential effects of environment on host and pathogen genetic structure in Tasmanian devils (*Sarcophilus harrisii*) and their transmissible tumour highlights that while children's health appears less impacted by COVID-19 than older adults, children's education has been interrupted, protective structures disrupted, and their families and communities placed under stress by health and economic burdens. People with disabilities are more vulnerable to the impacts of COVID-19 as many have fragile health situations. Also, COVID-19 worsened existing health conditions, particularly those related to respiratory function, immune system function, heart disease, or diabetes worsening barriers to accessing health care.

Freire, P., 2018, in his work, 'Pedagogy of the oppressed Pedagogy' described Pedagogy as the approach to teaching, is the theory and practice of learning, and how this process influences, and is influenced by, the social, political, and psychological development of learners. Li, G., 2012, work 'Culturally contested Pedagogy: Battles of literacy and schooling between mainstream teachers and Asian immigrant parents' defined Pedagogy as simply the method, and practice, of teaching. It encompasses Teaching styles, Teaching theory,

**FEEDBACK AND ASSESSMENT**

**Sumitra Pokhrel, Roshan Chhetr, (2021), 'A Literature Review on Impact of COVID-19**

**Pandemic on Teaching and Learning'** described the paradigm shift in the way educators deliver quality education—through various online platforms within and outside Nigeria. According to him, transitioning from traditional face-to-face learning to online learning can be an entirely a different experience for the learners and the educators, which they must adapt to with little or no other alternatives available. The transition to online teaching was so swift that it hardly gave any time to plan and reflect on the potential risks or the potential opportunities that such a sudden change could bring. Subedi S., Nayaju S., Subedi S., Shah S. K., Shah J. M. 2020, 'Impact of e-learning during COVID-19 pandemic among nursing students and teachers of Nepal work observed that E-learning tools have played a crucial role during this pandemic, helping schools and universities facilitate student learning during the closure of universities and schools). 2020). Petrie, 2020, Spotlight Quality Education for All during COVID is of the opinion that the best practices for online home schooling are yet to be explored. There are varieties of online infrastructure that have been prepared by many educational firms and made free for learning during this pandemic. The affordability and accessibility of these online infrastructures for all learners of varied economic backgrounds are still a challenge. The use of suitable and relevant pedagogy for online education may depend on the expertise and exposure to information and communications technology (ICT) of both educators and learners. Some of the online platforms used so far include unified communication and collaboration platforms such as Microsoft Teams, Google Classroom, Canvas, and Blackboard, which allow the teachers to create educational courses, training, and skill development programs (Petrie, 2020). of submitted assignments. Doucet A., Netolicky D., Timmers K., Tuscano F. J. (2020), in his work '*Thinking about pedagogy in an unfolding pandemic* is the view that while adapting to the new changes, staff and student readiness needs to be gauged and supported accordingly. The learners with a fixed mindset find it difficult to adapt and adjust, whereas the learners with a growth mindset quickly adapt to a new learning environment. There is no one-size-fits-all pedagogy for online learning. It has resulted in the rise of blended



learning and innovation of new learning management systems in the face of the pandemic. There are incomparable opportunities for cooperation, creative solutions, and willingness to learn from others and try new tools as educators, parents, and students share similar experiences (Doucet et al., 2020). Research highlights certain dearth such as the weakness of online teaching infrastructure, the limited exposure of teachers to online teaching, the information gap, the non-conducive environment for learning at home, equity, and academic excellence in terms of higher education. Different subjects and age groups require different approaches to online learning (Doucet et al., 2020). The sudden shift to online learning without any planning -- especially in states like Gombe and the country as a whole where the backbone for online learning was not ready and the curriculum was not designed for such a format -- has created risk for most of our students becoming passive learners and they seem to be losing interest due to low levels of attention span. Online learning is a special kind of methodology and not all teachers are good at it or at least not all of them were ready for this sudden transition from face-to-face learning to online learning. Thus, most of the teachers are just conducting lectures on video platforms such as Zoom which may not be real online learning in the absence of a dedicated online platform specifically designed for the purpose. Under this scenario, learning outcomes may not be achieved and are likely to result in mere engaging the students. Ravichandran P., Shah A. K. 2020, describe Domestic violence and child abuse during the COVID-19 lockdown in India. Violence and child abuse are on the rise as the perpetrators are many a time at home or in the neighbourhood, which is a mental distraction and threat to the learners (With students now experiencing homeschooling during this COVID-19 pandemic, conducive environment at home for all standards and socio-economic conditions is not uniform. In Bhutan, there are reports of students dropping out or opting to discontinue schooling. In South Africa, the digital learning divide has been highly evident. Learners from impoverished areas attend government-funded schools where education is free, but these schools are marked by dilapidated infrastructure, illiteracy, a lack of books, overcrowding, fewer teachers, and high dropout rates. The disparities that exist between fee and no-fee schools and private schools in terms of quality of education and access to resources ultimately determine the success or failure of the learner. Internet connectivity issues, limited data, and a lack of resources so the three main barriers to online learning for school children in impoverished areas (Sumitra Pokhrel, Roshan Chhetri, 2021). Schools in Nigeria are not left out in all these.

Murgatrot S. (2020, March) work '*COVID-19 and Online learning*', broadly identified challenges with e-learning are accessibility, affordability, flexibility, learning pedagogy, life-long learning and educational policy. Many countries have substantial issues with a reliable Internet connection and access to digital devices. While, in many developing countries, the economically backward children are unable to afford online learning devices, the online education poses a risk of exposure to increased screen time for the learner. Therefore, it has become essential for students to engage in offline activities and self-exploratory learning. Lack of parental guidance, especially for young learners, is another challenge, as both parents are working. Murgatrot, broadly identified challenges with e-learning are accessibility, affordability, flexibility, learning pedagogy, life-long learning, and educational policy. In Gombe State, there are substantial issues with a reliable Internet connection and access to digital devices. The economically backward children are unable to afford online learning devices. Also, online education poses a risk of exposure to increased screen time for the learners. Therefore, it has become essential for students to engage in offline activities and self-exploratory learning. Lack of parental guidance, especially for young learners, is another challenge, as both parents are working. There are practical issues around physical workspaces conducive to different ways of learning.

Sintema, E. J. (2020) work on the 'Effect of COVID-19 on the Performance of Grade 12 Students: Implications for STEM Education Background; distinguishes the high-influence practice principles of online progressed instruction and gives a logical examination to partners at schools to think driving on the internet preparing in relative conditions. The innately motivated learners are relatively unaffected in their learning as they need minimum supervision and guidance, while the vulnerable group consisting of students who are weak in learning face difficulties. The Gombe experience is similar to Indian learners. Sumitra Pokhrel, Roshan Chhetri, 2021, research finding shows the negative experience of learners from rural villages in India where parents are mostly illiterate farmers. The majority of students do not have access to smartphones or TV at home in addition to poor Internet connectivity..

Therefore, there is a need for investing time and resources to explore and research the best alternatives for the educational needs (SEN) of learners while adhering to the COVID 19 protocol.

### Statement of Problem

The COVID-19 Pandemic has had severe psychosocial consequences on students in Gombe. Though many still display a great sense of disbelief about the existence of the virus. For many, the disruption of their regular academic and social activities may lead to anxieties and trauma that have negative effects on their everyday lives and if not addressed might affect their ability to perform effectively in



school virtually or physically. This is worsened when there is a near absence of ICT to provide online learning and poor capacity to mitigate its negative impact on students. The emotional anxiety due to regular NCDC reports, restriction in movements, ban on cluster events, difficulties in adjusting to COVID 19 protocols, and the loss of one's freedom to socialize are less visible than the physical scars can be devastating. Disruption to social relations, the anxiety and fears that accompany the event before, during, and the uncertainty about the future can render them helpless, and prevent them from taking care of themselves and their environment including practicing safety precautions. As a result, they are likely to lose hope for the future. If left unaddressed, the psychosocial effect of the pandemic may lead to distress, apathy, depression, frustration, aggression, and antisocial behavior, thereby increasing social tension, prolonging the recovery process, and weakening their resilience in the long term.

Online teaching, which is now the new norm has its challenges, ranging from lack of appropriate curriculum, unplanned school timetable, the unreliability of internet sources, poor electricity, overcrowded classes, untrained manpower, and the inability of parents and students to afford data usage. These and many more have made online teaching, not an option in most tertiary institutions in Gombe State, especially the public ones. The traditional face-to-face method which is prevalent is also an issue due to a large number of students in the class, poor adherence to COVID 19 protocol, poor access to protective prevention equipment, and poor monitoring framework to ensure compliance to COVID 19 protocol. Most importantly the inability of teachers to adopt appropriate pedagogical principles and approaches taking into cognizance the learning challenges due to COVID 19 becomes essential. It is therefore important to state that the current pedagogy for general studies can increase the vulnerability of Teachers and Students to COVID 19 infection.

#### **Purpose of the Study**

The purpose of this research is to help reinforce the resilience of students against anxieties and trauma caused by COVID-19 whilst strengthening their classroom performance through the adoption of appropriate pedagogy for general courses in tertiary schools in Gombe state

#### **Objectives**

##### **This study seeks to achieve these objectives**

1. Identify the level of students' knowledge of COVID 19, psychological and emotional challenges as well as their coping mechanisms in a classroom setting due to the pandemic.
2. Assess students' access to COVID 19 prevention information, testing, and vaccine in tertiary institutions.
3. Examine the current pedagogy adopted by teachers in delivering educational instruction under the pandemic.
4. Assess the effectiveness of the pedagogy in enhancing teaching and learning in tertiary institutions.

#### **SIGNIFICANCE OF THE STUDY**

This study will be relevant to students to bring to their sub consciousness their safety from the virus as they congregate in a confined space to learn. It will increase their knowledge base of the virus, its symptoms, prevention protocols, and commitment to COVID 19. The study will also benefit Teachers to develop, adapt and initiate the appropriate pedagogy to ensure that students and themselves remain safe during a class session. The finding will also benefit school administrators, managers, and supervisors in planning teaching and learning timetables as identified needs and issues will first be discussed with possible options that will help in planning school sessions to ensure observance of COVID 19 protocol in all classes not just general course of study. It will draw the attention of policymakers to develop policies that will ensure safety for students while learning is taking place during and after the pandemic that mitigates—not exacerbate—pre-existing health disparities and socioeconomic vulnerabilities. The study will keep policymakers abreast with emerging issues in school settings as this will equip them with adequate knowledge and information to develop policies for school responses to COVID 19.

The study will be beneficial to parents as it will equip them with knowledge of their expected roles to ensure that their children receive the right kind of knowledge and information to stay safe while at school. Further exploration and investigation of the monitoring tool to assess the effectiveness of pedagogy for general studies in tertiary institutions of learning is an area for research. Such research will find this study useful in reviewing related literature reviews and the methodology of data collection. The need for developing tools for authentic assessments of students' performance and timely feedback is found to be another area of study during this pandemic. Future researchers will equally benefit from this study.

#### **THEORETICAL FRAMEWORK**

The theoretical framework used for this proposal is the Socio-Ecological Framework (McLeroy, K.R., Bibeau, D., Steckler, A. & Glanz, K. 1988; Stokols 1992, 1996) which demonstrates that individual behavior and outcomes are influenced by their relationships, including



family and friends, school, and community, including features and access to where they live, work, and play, and by the larger social, political, and economic context. The socio-ecological framework acknowledges that while individual genetics, perceptions, beliefs, and behavior contribute to differential health outcomes, they should not be viewed without considering the individual's context. This study will use the socio-ecological framework as a guide to understanding not only the complexity of the response but also the place in which interventions or policy changes can occur to more equitably serve the local populations.

## METHODOLOGY

**Development of research tool (Questionnaire):** Questionnaire was developed by the Researcher and copies printed out. The research administration was undertaken by 12 research assistant. 2 university lecturers from Federal University of Kashere, Gombe, with 2 other experienced development workers. **Sampling:** We use snowball sampling to recruit students from the following population groups (women, young people, and people with disabilities). The research opportunity was also disseminated through radio advert radio, WhatsApp and SMS. We conducted approximately 20 IDIs per school. **Procedures:** 15 individuals were recruited and trained to conduct the IDIs. 9 individuals out of the group were trained to administer tools to the 2 groups and 3 cells. Kobo collect tool was used for collecting and analyzing data collected from the field, either offline or online. This stage of the research required Mobile phones to install the Kobo collect tool/, internet access and data to access and upload data collected.

## DISCUSSION

This study aimed to assess the knowledge, beliefs, and practices of students and teaching staff towards COVID-19 prevention in two tertiary institutions in Gombe State, Nigeria, specifically, the Federal College of Education Technical, Gombe and Gombe State University.

The findings suggest that there is a good level of awareness about the virus among the student population. 91% of respondents in Gombe State Federal College of Education Technical and 98% in Gombe State University were aware of them. From the study, most students in both institutions exhibited a positive attitude towards COVID-19, as evidenced by their belief in the existence and precautions taken to prevent infection, most students in both institutions reported using hand sanitizers, wearing face masks, and practicing social distancing. However, in Federal College of Education, 67% had not been tested for COVID-19, and 51% were not vaccinated. In Gombe State University, 78% had not been tested, and 55 students (69%) were not vaccinated. Also 87% teaching staff adopted at least one COVID-19 protocol in FCET, and 81% adopted at least one precautionary measure against COVID-19. Furthermore, 38% of teaching staff had been tested for COVID-19, and 43% had been vaccinated in GSU. The study also revealed that 63% of teaching staff's revealed availability of PPE during teaching. , the study also reveals that a significant proportion of teaching staff in both institutions still opted for traditional face-to-face teaching methods during the pandemic. 28% of the teaching staff across both institutions believed that students only partially complied with the protocols, and 7% believed that there was no compliance among students. 10% of the teaching staff across both institutions reported adopting no preventive measures. It is encouraging to see that teaching staff across both institutions have adopted strict adherence to COVID-19 protocols, including the use of face masks, social distancing, and hand sanitizers. This shows a strong commitment to the health and safety of students and staff. However, it is concerning that 10% of teaching staff reported adopting no preventive measures at all The project aimed at exploring an effective pedagogy for general studies courses during COVID 19 pandemic in 2 tertiary institutions in Gombe state. In terms of learning methods, 77.5% of (students in Federal College of Education Gombe preferred traditional face-to-face learning, while 21% of the students preferred online teaching. In Gombe State University 83% preferred traditional face-to-face learning, while 17% of students preferred online teaching. The results regarding student preferences for learning methods in both institutions provide valuable insights into how students prefer to receive their education. It is notable that a significant majority of students in both institutions prefer traditional face-to-face learning, which suggests that they value the social interaction and engagement that this method provides. The assumption that face-to-face learners enhances higher rates of retention and confidence in public speaking is further contested in the experimental method. The study used a controlled experimental design to compare the learning outcomes of students in the two modes of instruction. The study was conducted in one of the institutions Federal College of Education Gombe, and a total of 60 students from various departments were randomly assigned to three groups: traditional face-to-face instruction, online instruction, and blended learning. The same material was taught to all groups, and the same test was administered to all students. The test was designed to evaluate the students' understanding of the subject matter and was conducted under the same conditions. traditional face-to-face instruction involved a classroom setting where the instructor taught the material in person to the students. The data collected from the study was analyzed using a one-way ANOVA test. The analysis showed that there was a significant difference in the mean scores of the three groups of students. The results revealed that the students who received online instruction had a higher mean score ( $M = 14.72$ ) than the students who received traditional face-to-face instruction ( $M = 9.8$ ).



Additionally, the students who received blended learning ( $M = 16.575$ ) had higher mean scores than both the traditional face-to-face and online groups. This suggests that the blended learning approach was the most effective in terms of student learning outcomes.

### Recommendations

Efforts should be made to increase awareness and understanding of the seriousness of the virus and the importance of compliance with the protocols, as well as to increase testing rates among staff to detect and prevent the spread of the virus. From the finding above, it is important for institutions to continue exploring alternative teaching methods, such as online learning blended with face to face teaching, to ensure the safety of both their students and teaching staff.

However, there is room for improvement in terms of testing and vaccination rates, as well as the availability of PPE for students. Overall, the teaching environment during the pandemic presented unique challenges, but both institutions made efforts to prioritize the safety and well-being of their students and staff. The study suggests splitting students into smaller groups during face to face learning. The majority of teaching staff in both institutions did not consider traditional face-to-face teaching as an effective method during the pandemic, and there is a need for more diverse and effective teaching methods during the pandemic. These recommendations reflect the need for schools to adopt a multi-faceted approach to minimize the spread of COVID-19. Finally, there is a need for more comprehensive monitoring frameworks to ensure compliance with COVID-19 protocols during teaching periods.

### CONCLUSION

It has noted that there is a high level of awareness and adoption and complied with COVID-19 protocol among teaching staff and students. Most students still prefer traditional face-to-face because of the logistic and financial burden of associated with online teaching and learning during pandemic. However, some students expressed concerns about the adequacy of these measures and reported instances of non-compliance by their peers or instructors. A significant proportion of teaching staff in both institutions still opted for traditional face-to-face teaching. Finally the study showed that online teaching has higher learning outcome than the traditional face to face method, however a blended learning approach of face to face and online teaching is considered to produce much higher learning outcome and performance. This approach will reduce the number of face to face contact days reduce the fear of transmission of the virus.

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## **EFFECT OF YOGA PRACTICES ON SELECTED PCOS SYMPTOMS RELATED VARIABLES AMONG WOMEN STUDENTS WITH POLYCYSTIC OVARY SYNDROME**

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### **ABSTRACT**

The purpose of the study was to find out the effect of yoga practices on selected PCOS symptoms related variables among women students with polycystic ovary syndrome. To achieve the purpose of the study, thirty (30) women students with polycystic ovary syndrome were selected randomly 18 to 25 years of age from departments and affiliated colleges of Bharathiar University, Coimbatore, Tamil Nadu. The selected subjects were divided into two equal groups namely experimental and control group of 15 subjects each. The training period was limited to twelve weeks and for five days per week. The yoga practices were selected as independent variables and Alopecia (Slap hair loss), Hirsutism-Excessive hair growth and Menstrual Irregularities were selected as dependent variables and it was measured by Savin Scale for androgenic alopecia 1994, Modified Ferriman–Gallway Scale 1961 and Rhinessa women Questionnaire respectively. All the subjects were tested two days before and immediately after the experimental period on the selected dependent variables. The obtained data from the experimental group and control group before and after the experimental period were statistically analyzed with dependent ‘t’-test to find out significant improvements. The level of significance was fixed at 0.05 level confidence for all the cases. Significant improvement was found on Alopecia (Slap hair loss), Hirsutism-Excessive hair growth and Menstrual Irregularities of experimental group due to the effect of yoga practices when compared to the control group.

**KEYWORDS:** Alopecia (Slap hair loss), Hirsutism-Excessive hair growth and Menstrual Irregularities.

### **INTRODUCTION**

Polycystic ovarian syndrome (PCOS) is a common disorder seen in women at their reproductive age with a prevalence rate of 4 to 12%. Diagnosis of hyperandrogenism or chronic anovulation without any adrenal or pituitary conditions can be called as PCOS. The condition was first described by Stein and Leventhal in 1935, which was a combination of oligo-amenorrhea and polycystic ovaries often associated with hirsutism, obesity or acne. Thus the key findings in subjects with PCOS are hyperandrogenism and chronic anovulation. Clinical features also include acanthosis nigricans and male pattern alopecia.

The diagnostic criteria put forward by Rotterdam workshop (2003) consider two of the three following criteria to be present; chronic anovulation or oligomenorrhea, polycystic ovarian morphology, and hyperandrogenism. Hyperinsulinaemia due to insulin resistance leading to the production of excess ovarian androgen is considered to be one of the aetiology of PCOS. This may predispose to non-insulin dependent diabetes as well as cardiovascular diseases in their later life.

### **YOGA PRACTICES**

The world yoga derived from the Sanskrit root ‘yuj’ meaning to bind, join, attach and yoke, to direct and concentrate one’s attention on, to use and apply. It also means union or communion. Yoga was collated, co-ordinated and systematized by patanjali in his classical work, the yoga sutras, which consists of 185 terse aphorisms (Iyengar, 2008).

The most important aim of our lives should be to maintain good health. Many people take their health for granted and abuse their bodies with a sedentary life style, bad diets, medications and high stress factors. Every person, due to genetic weaknesses, is susceptible to certain ailments that if not prevented can lead to serious illnesses. When energy is depleted in the body the organs become weak and



they cannot function properly. The natural equilibrium will be disturbed and a disorder can develop. Genetic factors will dictate which particular disorder may develop and which organ might be affected. Some people may be prone to a certain condition such as diabetes, cancer, peptic ulcers and heart disease. Yoga acts preventive measures to disease by reducing stress level, keeping the internal organs toned and healthy and maintaining a balanced equilibrium between the physical, mental and spiritual level. The emphasis is to unite the system with a combination of breathing techniques, gentle exercise and mind control. This produces a tranquility that penetrates deep into the mind and soul. It improves the health of the person on all levels (VimalaLalvani, 2003).

## METHODOLOGY

For the purpose of this study, altogether thirty (30) women students with polycystic ovary syndrome were chosen on random basis from departments and affiliated colleges of Bharathiar University, Coimbatore, Tamil Nadu. Their age group ranges from 18 to 25 years. They were divided into two groups of 15. The Experimental group would undergo yoga practices. The second group Control group. Pre – test and post –test would be conducted. Treatment would be given for twelve weeks. It would be find out finally the effect of yoga practices on the polycystic ovary syndrome in scientific methods.

The selected tests were measured by following units for testing:

Criterion Variables	Test Items	Unit Measurements
Alopecia (slap hair loss)	Savin Scale for androgenic alopecia 1994	In points
Hirsutism(excessive hair growth)	Modified Ferriman –Gallway Scale 1961	In points
Menstrual Irregularities	Rhinessa women Questionnaire	In points

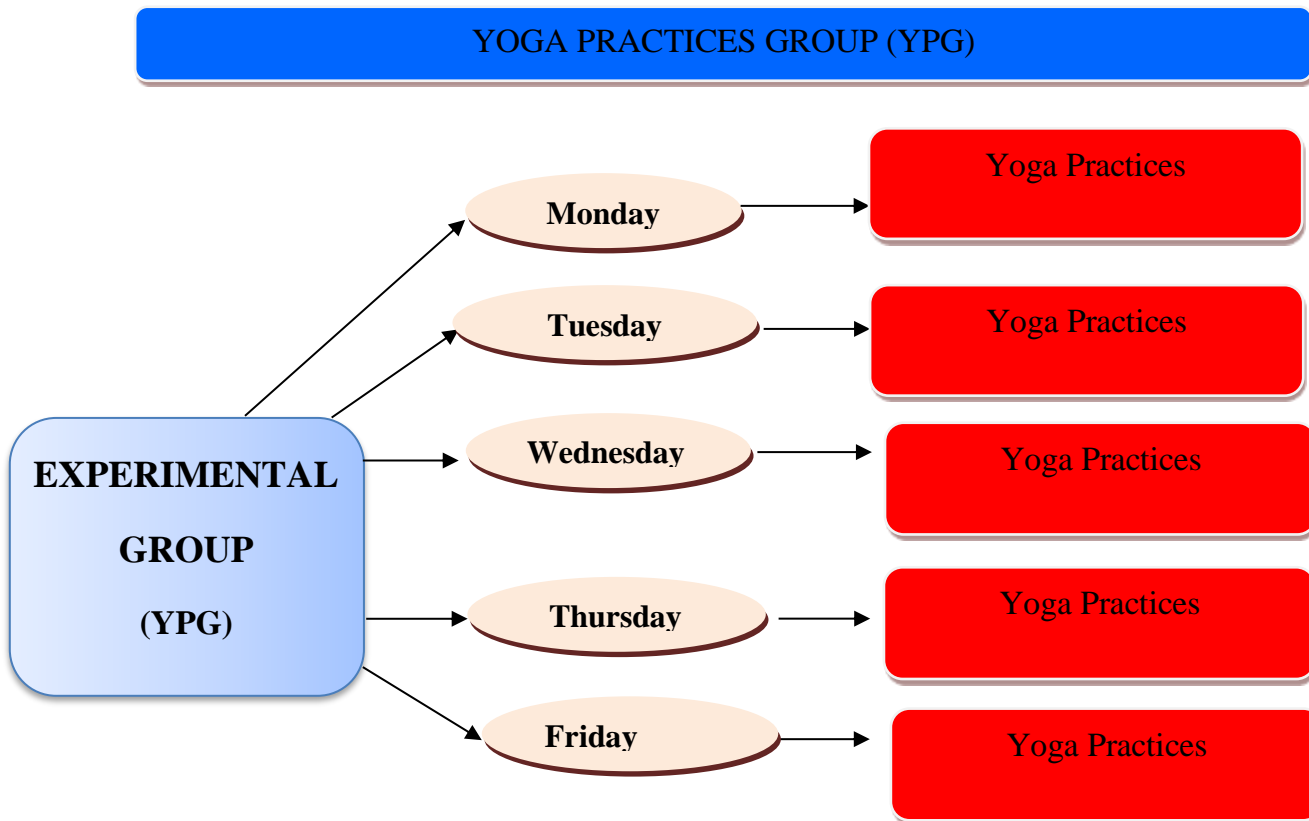
## TRAINING PROGRAMME

The following schedule of training was given for the CrossFit training group.

Group	Design of the Training
Experimental Group	Yoga Practices
Control Group	Did not do any Specific Training
Training Duration	60 Minutes
Training Session	5 Days a week
Total Length of Training	Twelve weeks



**CHART-I**  
**EXPERIMENTAL TREATMENT ADOPTED FOR EXPERIMENTAL GROUP**



### EXPERIMENTAL DESIGN

The experimental group was given Yoga Practices after taking an initial test. After the initial test selected Yoga Practices were given for twelve weeks in all days except Saturday and Sunday. The time of practice was from 6. 00A.M to 7.00 A.M. The control group were not participating in any of the special training programme. However, they were allowed to participate in their regular education classes in the college as per their curriculum.

### STATISTICAL TECHNIQUE

The achieved data since the experimental group and control group previously and subsequently the experimental dated were statistically evaluated with dependent t-test to discovery obtainable significant development. The level of significance was secure at 0.05 level of confidence for all the cases.

### RESULTS AND DISCUSSIONS

The effect of independent variables on each criterion variables was considered by dependent ‘t’ – test on the data achieved for Alopecia (Slap hair loss), Hirsutism-Excessive hair growth and Menstrual Irregularities. The pre-test and post- test means of experimental group and control group have been analyzed and existing in Table II & III.



**TABLE – II**

**MEAN AND DEPENDANT ‘t’ – TEST FOR THE PRE AND POST TESTS ON ALOPECIA (SLAP HAIR LOSS), HIRSUTISM-EXCESSIVE HAIR GROWTH AND MENSTRUAL IRREGULARITIES OF EXPERIMENTAL GROUP**

S.No	Variables	Pre test Mean± SD	Post test Mean± SD	SE	‘t’ – ratio
1.	Alopecia(Slap hair loss)( <i>In Points</i> )	5.73±.88	4.67±.82	.067	16*
2.	Hirsutism-Excessive hair growth ( <i>In Points</i> )	27.80±4.92	26.53±4.72	.19	6.95*
3.	Menstrual Irregularities ( <i>In Points</i> )	10.87±1.30	9.80±1.32	.067	15.01*

\*Significance at 0.05 level of confidence (2.14)

**TABLE – III**

**MEAN AND DEPENDANT ‘t’ – TEST FOR THE PRE AND POST TESTS ON ALOPECIA (SLAP HAIR LOSS), HIRSUTISM-EXCESSIVE HAIR GROWTH AND MENSTRUAL IRREGULARITIES OF CONTROL GROUP**

S.No	Variables	Pre test Mean± SD	Post test Mean ± SD	SE	‘t’ – ratio
1.	Alopecia(Slap hair loss)( <i>In Points</i> )	5.80±1.15	5.73±1.10	.067	12
2.	Hirsutism-Excessive hair growth ( <i>In Points</i> )	26.67±4.72	26.53±4.51	.13	3.25
3.	Menstrual Irregularities ( <i>In Points</i> )	10.93±1.49	10.80±1.66	.17	9.09

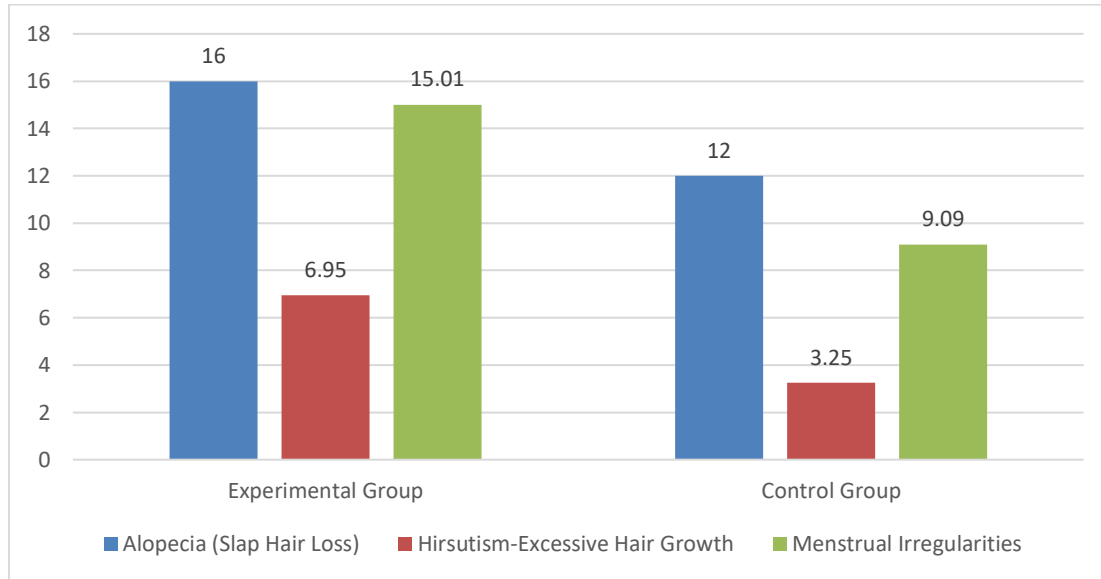
\*Significance at 0.05 level of confidence (2.14)

The table II and III, shows that, the obtained ‘t’-ratio between the pre and post-test means of experimental group were 16.00, 6.95 and 15.01 and control group were 12,3.25,9.09 respectively. The table values required for significant difference with df 1, 29 at 0.05 level of confidence. Since the obtained ‘t’ – ratio value of experimental and control group on Alopecia (Slap Hair Loss), Hirsutism-Excessive Hair Growth And Menstrual Irregularities were greater than the table value 2.14,it was concluded that Yoga Practices had significantly improved Alopecia (Slap Hair Loss), Hirsutism-Excessive Hair Growth and Menstrual Irregularities of experimental group.

The pre and post- test mean value of experimental and control group on Alopecia (Slap Hair Loss), Hirsutism-Excessive Hair Growth and Menstrual Irregularities were graphically represented in the figure I.



**FIGURE I**



## DISCUSSION ON FINDINGS

The finding of the study reveals that the followed by Yoga Practices group cause significant improvement in their PCOS symptoms related variables. In the view of control group there was no significant improvement in their PCOS symptoms related variables. The findings of the study they stated that Yoga Practices on exercise developed PCOS symptoms related variables.

## CONCLUSIONS

It was concluded that improvement of Alopecia (Slap hair loss), Hirsutism-Excessive hair growth and Menstrual Irregularities was found significantly on experimental group due to the effect of PCOS symptoms related variables followed by Yoga Practices when compared to the control group.

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# COMPARISON ON SELECTED PHYSIOLOGICAL VARIABLES COMPONENTS AMONG TRADITIONAL EVENTS PARTICIPANTS OF JALLIKATTU AND SILAMBAM

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## ABSTRACT

The aim of the present study is to comparison on selected physiological variables components among traditional events participants of jallikattu and silambam. For the present study 40 male players were selected during the traditional events participants. Between the age group of 19-25 years i.e. 20 male jallikattu and 20 male silambam Players of various districts in Tamilnadu were taken for the study. The pulse oximeter test was used to assess the pulse rate and the nose clip method test was used to assess breath holding time among jallikattu and silambam Players. The results of the study show that the jallikattu is having very good pulse rate and breath holding time compare to the silambam Players. It is recommended that jallikattu and silambam players must be given good pulse rate and breath holding time to enhance the performance.

**KEYWORDS:** pulse rate and breath holding time

## INTRODUCTION

Jallikattu, also known as eru thazhuvuthal and mañcuvirattu, is a traditional event that has been a part of Tamil Nadu's cultural heritage for centuries. This event involves releasing a bull, typically of the Pulikulam or Kangayam breed, into a crowd of people who attempt to grab the large hump on the bull's back with both arms and hang on to it while the bull attempts to escape. The participants hold the hump for as long as possible, attempting to bring the bull to a stop. In some cases, participants must ride long enough to remove flags on the bull's horns.

Jallikattu is usually practised in Tamil Nadu during the Pongal festival, specifically on Mattu Pongal day, which falls annually in January. The sport is an integral part of the celebrations, and the event is steeped in cultural and religious significance. The event symbolises the bond between humans and bulls and is believed to bring good fortune to the community. In fact, the term "jallikattu" is derived from the Tamil words "salli" and "kattu," which mean coins and package, respectively, and the sport is said to have originated as a way for young men to prove their strength and win a bride.

Despite its cultural significance, there have been several incidents of injury and death associated with Jallikattu. These incidents have occurred both to the participants and to the animals forced into the sport, leading animal rights organizations to call for a ban on the sport. The Indian Supreme Court has banned Jallikattu several times over the past few years, citing concerns over animal cruelty and human safety. ( **Ayyappan, A 1965**).

Silambam is a weapon-based Indian martial art originating in South India in the Indian subcontinent. This style is mentioned in Tamil Sangam literature. The World Silambam Association is the official international body of Silambam References in the Silappadikkaram and other works of the Sangam literature show that Silambam has been practiced since at least the 4th century BC. It derives from the Tamil word silam, meaning hill. The term silambambu referred to a particular type of bamboo from the Kurinjimala (kurinji hills) in present-day Kerala. Thus silambam was named after its primary weapon, the bamboo staff. It may have earlier used for self-defense and to ward off animals in the Kurinji hills and later evolved into the present-day martial art. Bamboo staffs – as well as swords, pearls and armor – were in great demand from foreign traders. The ancient city of Madurai formed as the point of focus of Silambam's spreading. The Silambam staff was acquired by the Egyptians, Greeks and Romans and was spread back to the Middle East, Europe and North Africa.





**Physiological variables** are essential measurements that provide insight into the functioning of the human body. These variables include heart rate, blood pressure, body temperature, respiratory rate, and oxygen saturation. They are measured to assess the health status of an individual and to monitor changes in response to various interventions, such as exercise, medication, or surgery. Heart rate is the number of times the heart beats per minute and is a critical indicator of cardiovascular health. It can be measured at rest or during physical activity to assess the heart's ability to pump blood efficiently. An elevated heart rate may indicate an increased risk of heart disease or other health conditions.

## METHODOLOGY

For the purpose of this study, altogether forty traditional event participants were selected randomly 18 to 25 years of age from various districts in Tamilnadu. Their age group ranges from 18 to 25 years. They were divided into two groups of 20 each. The jallikattu and Silambam Players are made to pulse rate and breath holding time were selected as dependent variables and it was measured by pulse oximeter and nose clip method in each batch of two members. The timing was taken by researcher. The selected tests were measured by following units for testing:

Criterion Variables	Test Items	Unit Measurements
pulse rate	pulse oximeter	Seconds
breath holding time	nose clip method	Seconds

## STATISTICAL TECHNIQUE

Descriptive statistics the analysis of variance (ANOVA) will be used to find out the significance among the mean differences, whenever the 'F' ratio for will be fixed to test hypothesis. The adjusted test will be found to be significant Scheffe's Post hoc test will use. In all cases 0.05 level of significance.

## RESULTS AND DISCUSSIONS

The impact of independent variables on each criterion variables was considered by 'F' ratio on the data achieved for pulse rate and breath holding time. The means of jallikattu and silambam have been analyzed and existing in Table II.

**TABLE – II**  
**MEAN AND 'F'– RATIO FOR THE PRE AND POST TESTS ON PULSE RATE AND BREATH HOLDING TIME OF JALLIKATTU AND SILAMBAM**

S.No	Variables	Jallikattu Mean	Silambam Mean	Source of variables	Sum of Square	df	Mean Square	'f'–ratio
1.	Pulse rate	71.80	70.83	Between	20.06	1	10.03	3.09*
				Within	28.33	37	3.24	
2.	Breath holding time	39.50	39.46	Between	24.68	1	12.34	3.17*
				Within	33.23	37	38.20	

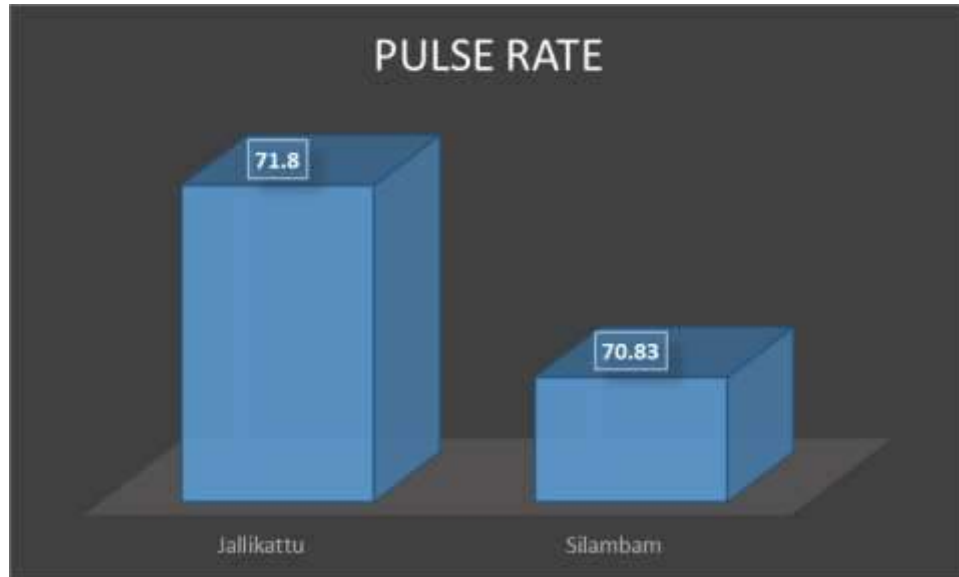
\*Significance at 0.05 level of confidence (2.70).

The table II shows that, they obtained 't'–ratio between the means values of jallikattu group were 71.80, 70.83 and silambam group were 70.83, 39.50 respectively. The table values required for significant difference with df 37 at 0.05 level of confidence. Since the obtained 'f' – ratio value of experimental group on pulse rate and breath holding time were greater than the table value 2.99, 3.09 and 3.17 it was concluded that the jallikattu group had significantly improved pulse rate and breath holding time.

Mean and 'F'– ratio for the pre and post tests on pulse rate and breath holding time of jallikattu and silambam were graphically represented in the figure 1 and II.



**FIGURE -I**



**FIGURE -II**



## DISCUSSION

On the basis of the result of the study, it can be concluded that there was a significant difference between the jallikattu and silambam of traditional events participants in relation to breath holding time ability. kalari players have speedier in comparison to silambam players due to the nature of the game, training schedule, ground length and flat running according to game demand. Sorabh Trikha (2014). Has conducted a study on Comparative Status of flexibility and Speed between Different Team Games, he found significant difference between Football and Hockey players in relation to pulse rate ability. Some other studies conducted by Natraj H.V. & Chandrakumar, M. (2006), Uppal and Roy (1986) and Angyan (1989) were support the result of the present study.

## CONCLUSION

It was concluded that jallikattu participants than the silambam participants were better on selected psychological variables namely pulse rate and breath holding time.



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# THE IMPACT OF ARTIFICIAL INTELLIGENCE ON LABOR MARKETS

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## ABSTRACT

*The increasing adoption of artificial intelligence (AI) technologies has sparked significant transformations in labor markets, presenting both opportunities and challenges for workers and the economy as a whole. This research paper explores the multifaceted impact of AI on labor market dynamics. Through an analysis of automation and augmentation effects, shifts in occupational structure, and the implications for job creation and destruction, the paper provides insights into the evolving nature of work in the AI era. Additionally, it investigates the labor market implications of AI adoption, including skills mismatch, income inequality, and distributional effects. Policy and societal responses are examined, including frameworks for AI and labor market adaptation, ethical considerations, and governance approaches. Drawing on case studies and empirical evidence, the paper offers a comprehensive understanding of the relationship between AI and labor markets, highlighting the need for proactive policies and initiatives to ensure a smooth transition and inclusive growth. The research contributes to the broader discourse on the future of work and provides valuable insights for policymakers, researchers, and stakeholders navigating the complex landscape of AI-driven labor markets.*

**KEYWORDS:** Artificial Intelligence, Labor Markets, Automation, Job Displacement, Workforce Transformation, Skills Mismatch, Employment Trends, Job Creation and Destruction, Technological Advancements, Occupational Shifts, Income Inequality, Policy Responses, Future of Work, Reskilling and Upskilling, Workforce Adaptation, Ethical Considerations, AI Governance, Economic Implications, Industry Disruptions, Job Polarization

## I. INTRODUCTION

Artificial intelligence (AI) has emerged as a transformative force in various sectors, revolutionizing industries and reshaping societal landscapes. As AI technologies continue to advance at an unprecedented pace, their impact on labor markets has become a topic of great significance and concern. The adoption of AI brings forth a range of opportunities and challenges for workers, businesses, and policymakers, necessitating a comprehensive understanding of the implications for the future of work.

Labor markets serve as the backbone of economies, facilitating the allocation of human capital and driving economic growth. However, with the advent of AI, the dynamics of labor markets are undergoing profound transformations. AI technologies, encompassing machine learning, robotics, natural language processing, and other advancements, possess the potential to automate routine tasks, augment human capabilities, and redefine occupational structures.

The primary objective of this research paper is to examine the impact of AI on labor markets. By delving into the effects of automation and augmentation, shifts in occupational structure, and the broader implications for job creation and destruction, this study aims to shed light on the evolving nature of work in the context of AI adoption. Furthermore, it seeks to analyze the consequences of AI adoption on skills requirements, income inequality, and distributional effects within labor markets.

Understanding the ramifications of AI on labor markets is crucial for policymakers, businesses, and individuals alike. By gaining insights into the expected changes in employment patterns, skill demands, and income disparities, stakeholders can proactively prepare for the challenges and opportunities that lie ahead. Additionally, an exploration of policy and societal responses, including frameworks for AI and labor market adaptation, ethical considerations, and governance approaches, is vital in shaping the future of work to ensure a just and inclusive transition.

To accomplish these objectives, this research paper will draw upon a range of sources, including academic literature, empirical studies, and real-world case examples. By synthesizing existing knowledge and providing original analysis, this study aims to contribute



to the growing body of research on the impact of AI on labor markets, informing policy discussions and offering valuable insights for stakeholders navigating the complex landscape of the AI-driven economy.

In conclusion, the convergence of AI technologies with labor markets presents both challenges and opportunities. By comprehensively examining the impact of AI on labor markets, this research paper seeks to contribute to the understanding of the transformative nature of AI and its implications for the future of work. Through a multidimensional analysis, this study aims to provide valuable insights for policymakers, businesses, and individuals to navigate the evolving labor market dynamics and promote inclusive growth in the era of AI.

**A. Background information on artificial intelligence (AI):** In this section, the research paper will provide a comprehensive background on artificial intelligence (AI). It will explain the concept of AI and its key components, such as machine learning, robotics, natural language processing, and computer vision. The paper will highlight the rapid advancements in AI technologies in recent years, including breakthroughs in deep learning algorithms and the availability of vast amounts of data for training AI models. Additionally, it will discuss the emergence of AI applications in various industries, such as manufacturing, healthcare, finance, and transportation.

**B. Overview of labor markets and their importance in the economy:** This section will present an overview of labor markets and their significance in the broader economy. It will explain the role of labor markets in allocating human resources, matching skills with job requirements, and facilitating economic growth. The paper will explore the structure of labor markets, including different sectors, occupations, and labor force participation rates. It will highlight the interplay between labor supply and demand, as well as the determinants of wages and employment levels. Furthermore, it will discuss the relationship between labor markets and macroeconomic indicators, such as productivity, inflation, and income distribution.

**C. Thesis statement:** The increasing adoption of AI technologies is transforming labor markets, leading to both opportunities and challenges for workers and the economy: The research paper's thesis statement will emphasize the transformative impact of AI technologies on labor markets. It will argue that the growing adoption of AI is reshaping the nature of work and employment dynamics. The thesis statement will recognize that the adoption of AI presents opportunities for increased productivity, efficiency gains, and the creation of new job roles. However, it will also acknowledge the challenges posed by AI, including potential job displacement, changes in skill requirements, and income inequality. The thesis statement will set the stage for the subsequent sections of the paper, which will delve into the specific effects and implications of AI on labor markets, providing a balanced analysis of both the positive and negative consequences.

By presenting background information on AI, providing an overview of labor markets, and articulating the thesis statement, the research paper will establish the necessary foundations for examining the impact of AI on labor markets and subsequently analyzing the opportunities and challenges that arise from this transformation.

## II. OVERVIEW OF ARTIFICIAL INTELLIGENCE

**A. Definition of AI and its key components:** In this section, the research paper will provide a clear definition of artificial intelligence (AI) and explain its key components. AI refers to the development of intelligent machines that can perform tasks that typically require human intelligence. The paper will discuss the concept of machine intelligence, including the ability to learn from data, reason, perceive the environment, and make decisions or take actions. It will highlight the distinction between narrow AI, which is focused on specific tasks, and general AI, which aims to exhibit human-like intelligence across a wide range of tasks.

The key components of AI will be elucidated, including machine learning, robotics, natural language processing (NLP), and computer vision. Machine learning involves training algorithms to learn patterns from data and make predictions or take actions without being explicitly programmed. Robotics encompasses the design and development of physical machines that can interact with the physical world. NLP focuses on enabling machines to understand, generate, and respond to human language. Computer vision involves teaching machines to interpret and understand visual information from images or videos.

**B. Types of AI technologies (machine learning, robotics, natural language processing, etc.):** This subsection will provide an overview of the different types of AI technologies. The paper will delve into machine learning, which is a dominant AI technique that enables machines to improve performance on specific tasks through experience and data. It will discuss supervised learning, unsupervised learning, and reinforcement learning as key approaches within machine learning.

Additionally, the paper will explore robotics as a crucial aspect of AI, highlighting advancements in hardware and the integration of AI algorithms to enable robots to perform complex tasks. It will discuss the applications of robotics in industries such as manufacturing, logistics, and healthcare.

Furthermore, the paper will examine natural language processing (NLP) and its relevance in AI. NLP focuses on enabling machines to understand, process, and generate human language. It will discuss techniques such as sentiment analysis, speech recognition, and machine translation.



The paper will also touch upon other types of AI technologies, such as computer vision, which enables machines to interpret visual information, and expert systems, which utilize knowledge bases and inference engines to emulate human expertise in specific domains.

**C. Examples of AI applications in various industries (manufacturing, healthcare, finance, etc.):** This subsection will provide real-world examples of AI applications in different industries. The paper will discuss how AI is transforming manufacturing processes, including the use of machine learning algorithms for quality control, predictive maintenance, and optimizing production workflows.

In the healthcare sector, the paper will explore how AI is being employed for medical image analysis, disease diagnosis, drug discovery, and personalized medicine. It will highlight the potential for AI to enhance patient care, improve treatment outcomes, and assist in medical decision-making.

Furthermore, the paper will delve into the applications of AI in the finance industry, such as algorithmic trading, fraud detection, credit scoring, and customer service automation. It will showcase how AI technologies are revolutionizing financial services by improving efficiency, risk management, and customer experience.

The examples of AI applications will span other sectors as well, including transportation and logistics (autonomous vehicles, route optimization), customer service (chatbots, virtual assistants), and agriculture (precision farming, crop yield prediction).

By providing an overview of AI, explaining its key components, discussing various AI technologies, and presenting real-world examples of AI applications in different industries, this section of the research paper will lay the groundwork for understanding the broad scope and significance of AI in contemporary society.

### III. AI AND LABOR MARKET DYNAMICS

**A. Automation of Routine Tasks:** This subsection will focus on the automation of routine tasks through AI technologies. It will discuss the impact of AI on jobs that involve repetitive and rule-based tasks, such as data entry, assembly line work, and customer service. The paper will highlight how AI algorithms and robotics can perform these tasks more efficiently and accurately than humans. It will analyze the potential displacement of workers in certain occupations and industries due to the automation of these routine tasks, exploring the challenges faced by workers who may find their jobs obsolete or significantly altered by AI.

**B. Augmentation of Human Capabilities:** This subsection will delve into how AI can augment human capabilities in the workplace. It will emphasize the collaborative relationship between humans and AI systems, where AI technologies assist and enhance human productivity and efficiency. The paper will discuss examples of human-AI collaboration, such as AI-powered decision support systems, intelligent assistants, and machine learning algorithms that help professionals analyze complex data. It will also examine the emergence of new job roles and skills required in the AI era, emphasizing the importance of human adaptability and the need for continuous learning to leverage AI technologies effectively.

**C. Shifts in Occupational Structure:** This subsection will explore the shifts in occupational structure resulting from AI adoption. It will examine how AI technologies can change the demand for different types of jobs and skills. The paper will discuss the potential for job polarization, where there is a growing demand for high-skill jobs that involve creativity, problem-solving, and complex decision-making, while low-skill jobs may face a decline in demand due to automation. It will analyze the potential consequences of job polarization, such as increased income inequality and the need for policies and programs to address skill gaps and promote equitable opportunities in the labor market.

By addressing the automation of routine tasks, the augmentation of human capabilities, and the shifts in occupational structure, this section of the research paper will provide a comprehensive understanding of the dynamic relationship between AI and labor markets. It will highlight both the potential disruptions and the opportunities that arise from AI adoption, shedding light on the evolving nature of work and the skills required in the AI era.

### IV. LABOR MARKET IMPLICATIONS OF AI ADOPTION

#### A. Job Creation and Destruction

1. Analysis of the net impact of AI on overall employment levels: This subsection will analyze the overall impact of AI on employment levels. It will assess the extent to which AI adoption leads to job creation or destruction, considering factors such as the productivity gains from automation, the emergence of new industries and job roles, and the potential displacement of workers. The paper will examine empirical evidence and studies to provide insights into the net effect of AI on employment.

2. Examining industries or occupations most affected by job loss or creation: This point will focus on specific industries or occupations that are most affected by job loss or creation due to AI adoption. The paper will explore industries where routine and repetitive tasks are more easily automated, such as manufacturing, transportation, and customer service. It will also identify industries experiencing job growth due to the increased demand for AI-related roles, such as data analysis, machine learning engineering, and AI ethics.



### **B. Skills Mismatch and Training Needs**

1. Identification of skills that are in demand with the rise of AI: This subsection will analyze the skills that are in demand as AI adoption increases. It will identify the skills required to work effectively with AI technologies, such as data analysis, machine learning expertise, problem-solving, critical thinking, and creativity. The paper will discuss the importance of these skills in the context of the changing labor market and provide insights into how workers can adapt and acquire these skills.

2. Assessing the challenges of reskilling and upskilling the workforce: This point will address the challenges associated with reskilling and upskilling the workforce to meet the demands of the AI era. The paper will discuss the need for lifelong learning and continuous skill development. It will analyze potential barriers to reskilling, such as access to training programs, the cost of education, and the need for targeted initiatives to support workers in transitioning to new roles.

### **C. Income Inequality and Distributional Effects**

1. Analyzing the impact of AI on wage disparities and income distribution: This subsection will examine the impact of AI on wage disparities and income distribution. The paper will analyze whether AI adoption exacerbates income inequality by concentrating wealth and opportunities among a few individuals or whether it leads to more equitable outcomes. It will explore how AI affects wages across different occupations and skill levels, highlighting the potential challenges faced by low-skilled workers.

2. Discussing potential policy measures to address inequality and ensure inclusive growth: This point will discuss potential policy measures to address the income inequality and distributional effects of AI adoption. The paper will explore policies aimed at enhancing workers' skills and employability, promoting social safety nets, and ensuring fair wages in the AI-driven economy. It will also discuss the role of government, businesses, and civil society in fostering inclusive growth and creating opportunities for all.

By addressing job creation and destruction, skills mismatch and training needs, and income inequality and distributional effects, this section of the research paper will provide a comprehensive analysis of the labor market implications of AI adoption. It will offer insights into the transformative impact of AI on employment, skills requirements, and income disparities, as well as propose potential policy measures to ensure a just and inclusive transition in the AI era.

## **V. POLICY AND SOCIETAL RESPONSES**

### **A. Policy Frameworks for AI and Labor Market Adaptation**

1. Government initiatives to support workforce transitions and skill development: This subsection will explore government initiatives aimed at supporting workforce transitions and facilitating skill development in the context of AI adoption. It will discuss policies such as retraining programs, educational reforms, and career counseling services that help workers adapt to changing job requirements. The paper will analyze the effectiveness of these initiatives and highlight examples of countries that have implemented successful programs.

2. Labor market regulations and social protection in the AI era: This point will address the need for labor market regulations and social protection mechanisms in the AI era. The paper will discuss how existing labor laws and regulations may need to be updated to address the challenges posed by AI, such as ensuring fair employment practices, protecting workers' rights, and addressing issues related to algorithmic bias and discrimination. It will also examine the importance of social protection measures, such as unemployment benefits, income support, and retraining assistance, to provide a safety net for workers affected by AI-related disruptions.

### **B. Ethical Considerations and AI Governance**

1. Discussion of ethical challenges in AI deployment and labor market implications: This subsection will delve into the ethical challenges associated with AI deployment and their implications for the labor market. The paper will address issues such as privacy, data security, algorithmic bias, and the potential for AI to amplify existing societal inequalities. It will explore the ethical considerations that arise in decision-making processes, workforce surveillance, and the potential devaluation of certain types of labor. The paper will emphasize the need for responsible AI development that considers the impact on workers and promotes ethical practices.

2. International collaboration and frameworks for responsible AI development: This point will discuss the importance of international collaboration and the development of frameworks for responsible AI deployment. The paper will examine initiatives at the global level aimed at establishing ethical guidelines, standards, and norms for AI development and usage. It will highlight the role of international organizations, governments, and industry stakeholders in fostering responsible AI practices that prioritize societal well-being and address labor market implications. The paper will also analyze the challenges and opportunities of international collaboration in AI governance.

By addressing policy frameworks for AI and labor market adaptation, as well as ethical considerations and AI governance, this section of the research paper will explore the policy responses and societal considerations necessary to navigate the challenges and opportunities presented by AI adoption. It will provide insights into the role of governments, regulations, and international collaboration in promoting workforce resilience, ethical AI practices, and ensuring a fair and inclusive AI-driven society.



## VI. CASE STUDIES AND EMPIRICAL EVIDENCE

**A. Examining specific industries or countries that have experienced significant AI-driven labor market changes:** This subsection will present case studies of specific industries or countries that have witnessed significant labor market changes due to the adoption of AI technologies. The paper will analyze the transformational effects of AI on industries such as manufacturing, healthcare, finance, and transportation. It will explore how AI has affected job roles, employment patterns, and skill requirements within these industries. Additionally, the paper will highlight countries that have been at the forefront of AI implementation and examine the unique labor market dynamics and policy responses observed in those regions.

**B. Presenting empirical studies on the impact of AI on employment, wages, and productivity:** This point will showcase empirical studies that have examined the impact of AI on various labor market indicators. The paper will review studies that analyze changes in employment levels, job polarization, and occupational shifts in response to AI adoption. It will also explore research on the effects of AI on wages, income inequality, and productivity. The studies presented will encompass diverse sectors and countries to provide a comprehensive understanding of the labor market implications of AI.

By presenting case studies of industries or countries and providing empirical evidence, this section of the research paper will offer real-world examples and data-driven insights into the impact of AI on labor markets. It will demonstrate how AI has influenced specific industries and countries, shedding light on the challenges and opportunities that arise. The empirical studies presented will strengthen the analysis and support the conclusions drawn throughout the paper.

## VII. FUTURE OUTLOOK AND RECOMMENDATIONS

**A. Predictions on the future trajectory of AI and its impact on labor markets:** This subsection will provide predictions on the future trajectory of AI and its impact on labor markets. The paper will discuss emerging trends and advancements in AI technologies, such as deep learning, reinforcement learning, and natural language processing, and how these developments may shape the labor market. It will explore potential scenarios regarding the scale of AI adoption, job displacement, and the creation of new job opportunities. The predictions presented will consider factors such as technological advancements, economic conditions, and social dynamics to offer insights into the potential future landscape of labor markets in the AI era.

**B. Policy recommendations for preparing the workforce for an AI-driven future:** This point will provide policy recommendations aimed at preparing the workforce for an AI-driven future. The paper will propose strategies for reskilling and upskilling programs that address the evolving skill requirements in the AI era. It will explore the importance of lifelong learning, digital literacy, and critical thinking skills. Additionally, the recommendations will focus on fostering collaboration between stakeholders, including government, educational institutions, and businesses, to develop comprehensive policies that support the workforce in adapting to technological advancements. The paper will also consider the need for social safety nets, inclusive growth, and worker protection measures to ensure a fair transition.

**C. Areas for further research and study:** This subsection will identify areas for further research and study related to AI and labor markets. The paper will highlight topics that require deeper investigation, such as the long-term effects of AI on employment and job quality, the social and psychological implications of AI on workers, and the ethical considerations in AI decision-making. It will emphasize the importance of interdisciplinary research and collaboration to address the complex challenges posed by AI adoption. The section will encourage future researchers to explore these areas and contribute to the evolving understanding of AI's impact on labor markets.

By providing predictions on the future trajectory of AI, policy recommendations for workforce preparation, and identifying areas for further research and study, this section of the research paper will offer insights into the future implications of AI on labor markets. It will guide policymakers, businesses, and researchers in formulating strategies and actions to navigate the evolving landscape and ensure a sustainable and inclusive AI-driven future.

## VIII. CONCLUSION

**A. Summary of key findings and insights:** In the conclusion section, the paper will provide a concise summary of the key findings and insights discussed throughout the research paper. It will revisit the main points addressed in each section, including the impact of AI on labor market dynamics, shifts in occupational structure, job creation and destruction, skills mismatch, income inequality, policy responses, and empirical evidence. This summary will serve as a reminder of the central arguments and evidence presented in the paper.

**B. Final thoughts on the implications of AI on labor markets and the broader economy:** In this subsection, the paper will offer final thoughts and reflections on the implications of AI on labor markets and the broader economy. It will discuss the transformative nature of AI technologies and their potential to reshape industries, job roles, and workforce dynamics. The paper will emphasize the importance of proactive policy measures, ethical considerations, and international collaboration in navigating the challenges and maximizing the benefits





of AI adoption. It will also highlight the need for continuous research, innovation, and adaptability to ensure a sustainable and inclusive future in the AI era.

The conclusion will provide a comprehensive summary of the research paper, reiterating the main findings and insights. It will offer a closing perspective on the implications of AI on labor markets and the broader economy, leaving the reader with a clear understanding of the significance of AI adoption and the recommended strategies to address its impact.

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## CURRENT STATE OF THE BUKHARA DEER (*CERVUS ELAPHUS BACTRIANUS*) IN THE SOUTHERN ARAL REGION

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### ANNOTATION

The article examines the current state of the Bukhara deer (*Cervus elaphus bactrianus*) in the Southern Aral region. Bukhara deer (*Cervus elaphus bactrianus*) as an endangered, locally distributed deer subspecies is included in the Red Book of the Republic of Uzbekistan in category 1 (EN). It is also included in the International Red Book and Appendix II of CITES.

**KEY WORDS:** Amudarya, Syrdarya, Central Asia, Badai tugai, Zarafshan, open-air cage, nursery.

The Bukhara deer (*Cervus elaphus bactrianus*) is a subspecies of red deer that lives in the tugai forests along the rivers of Central Asia and is assessed as vulnerable by the IUCN. In total, there are less than four thousand individuals in the wild, living in four countries. The largest number of animals has been preserved in Uzbekistan, and the largest group of deer lives on the territory of the Lower Amudarya Biosphere Reserve (NABR) in Karakalpakstan (Uzbekistan).

Bukhara deer (*Cervus elaphus bactrianus*) as an endangered, locally distributed deer subspecies is included in the Red Book of the Republic of Uzbekistan in category 1 (EN). It is also included in the International Red Book and Appendix II of CITES.

In the 1960s and 70s, it was on the verge of extinction due to the economic development of land, the reduction in the area of tugai forests and uncontrolled hunting. At present, thanks to the creation of tugai reserves in Uzbekistan, Kazakhstan and Tajikistan (including Kyzylkum, Zarafshan, Badai-Tugai), breeding in nurseries, the implementation of a special interstate program and other conservation measures, the population has been restored. Mining is prohibited.

The Bukhara deer (*Cervus elaphus bactrianus*) is a large hoofed animal of graceful build, on high legs. Dimensions: height at the withers about 120 cm, weight of adult males 165-250 kg, females - about 150 kg.

Horns are present only in males, they are medium in size, usually with five processes. Coloration brownish gray. The tail is short. At the base of the tail there is a well-defined light spot, the so-called "mirror"; it is smaller than other subspecies, reddish above, white below. The lips and chin are white.

Previously, it was widely distributed in the valleys of the Amudarya, Syrdarya and their main tributaries. Currently, only a few isolated populations have survived in Uzbekistan, Tajikistan, Turkmenistan, Kazakhstan and Afghanistan. In Uzbekistan, the natural population lives in the middle reaches of the Amu Darya (on the territory of the Kyzylkum Reserve). In the lower reaches of the Amu Darya (in the Lower Amudarya Biosphere Reserve), in the Zarafshan Reserve and in the upper reaches of the Zeravshan River (on the border of Uzbekistan and Tajikistan), groups created as a result of the artificial resettlement of deer live.

Bukhara deer (*Cervus elaphus bactrianus*) inhabits only tugai - floodplain forests growing in a narrow band along river valleys.



Bukhara deer feed on turanga twigs and various herbaceous and woody-shrub plants. The total list of plants eaten by deer is more than 230 species. Deer are excellent swimmers. They live in family groups, the composition of which is unstable. The rut begins in the fall, in late August - early September, accompanied by a roar and fights of males. During the mating season, "harems" are formed, consisting of a male and 2-3 females. In March-April, males shed their antlers, which grow back in summer. The duration of pregnancy in deer is about 8 months. In the second half of May - early June, the female gives birth to one calf, some females give birth in July. The young stay with their mother for up to 1 year, reaching sexual maturity at the age of 2.5 years. Horns grow in males in the second year of life. Currently, deer often die from wolves, severe floods, harsh winters, and fires.

Due to the narrow confinement to limited habitats, the Bukhara subspecies of the red deer is very vulnerable and, due to the degradation of the tugai and predatory extermination, quickly found itself on the verge of complete extinction. In 1976, three deer (two females and one male) were brought to the Badai-Tugai reserve from the Ramit reserve (Tajikistan), and in 1979 another 9 deer were brought. In 1981-1982, deer were released from enclosures into the wild. The reindeer took root well and bred. The success was achieved thanks to the serious actions of national and international organizations for the conservation of the reindeer. In addition, in connection with the increase in the number in the Badai-Tugai reserve, there have been problems associated with overpopulation and insufficient space and forage capacity of habitats.

The territory of the reserve became small, and the deer began to independently settle in the neighboring tugai forests of Taldyk-tugai and Sherembet-tugai.

In order to further restore the habitat and population of the Bukhara deer, the Badai-Tugay reserve was reorganized in 2011 into the Lower Amu Darya Biosphere Reserve with a protected area of 11,568 hectares.

The Lower Amudarya State Biosphere Reserve (LABR) was established in 2011 as part of a joint project of the United Nations Development Program, the Global Environment Facility and the government of the Republic of Karakalpakstan "Preservation of the tugai forests of Karakalpakstan in the Amudarya river delta" on the basis of the Badai-Tugai reserve. In addition to the territory of the former reserve, the tugai forests of the Beruni and Amu Darya regions of Karakalpakstan were transferred to the biosphere reserve.

The Lower Amudarya Biosphere Reserve (NABR) occupies a vast territory of 68,717 hectares, divided into three zones:

The protected zone of the reserve (a zone with a strict protection regime) is 11568.3 hectares. The territory of the protected zone is intended for the conservation of old forests, forests of natural regeneration, rare and endangered species while preserving the biodiversity of the zone. Any economic activity is prohibited in this zone and only scientific research and monitoring is allowed.

A buffer zone of 6,731.4 ha surrounds the protected area and provides a "buffer" or barrier between the protected area and the area of increased resource use. The buffer zone provides important ecological corridors between sections of the protected area for the movement of wild animals, contributes to the conservation of forests and their renewal.

The transition zone or economic development zone 50,418.1 ha is adjacent to the main zones (reserve and buffer) and is intended for the development of sustainable nature management. This zone provides for the presence of the rural population, excludes large settlements and harmful and dangerous economic production facilities. Demonstration pilot projects are being implemented here on resource-saving technologies (drip irrigation, development of bio-organic farming, energy-efficient houses and stoves, stall keeping of cattle and small cattle), planting trees as a living barrier between the forest and the sown areas of local residents, development of beekeeping.

At present, the Lower Amudarya State Biosphere Reserve is the custodian of the world's largest population of the Bukhara deer in the Republic of Uzbekistan. Today, the number of Bukhara deer in the reserve is more than 1800 individuals. Thus, in order to further increase the number and create favorable conditions for deer in the biosphere reserve, it is important to carry out protective measures:

- improve the forage base,
- create artificial watering places;
- create protective conditions, remedies;



- to carry out preventive measures to protect against diseases and other harmful effects;
- it is necessary to install modern feeders, observation towers,
- to carry out propaganda work among the population on the protection of the Bukhara deer.
- conduct a census of the number of deer using modern innovative technologies;
- activate compensation mechanisms.

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UDC 59

## **BIOECOLOGICAL FEATURES OF COLLEMBOLA IN THE CONDITIONS OF THE REPUBLIC OF KARAKALPAKSTAN**

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### **ANNOTATION**

*The article discusses the features of springtail biology in the conditions of the Republic of Karakalpakstan. Collembola are animals belonging to the Collembola group, a class of insects (Insecta) of the phylum Arthropoda. All their representatives, together with shell mites and insects, form the soil microfauna.*

**KEY WORDS:** *process, microflora, organism, agrocenosis, ecosystem, soil.*

At present, the determination of the species composition of organisms actively involved in the processes of soil formation and increase in soil productivity, affecting biological and ecological properties, is considered one of the most important tasks. Therefore, much attention is paid to the development of modern methods for identifying soil organisms common in various agrocenoses, the study of natural ecosystems and their ecological properties in agrocenoses, and the establishment of patterns of communities of organisms that increase soil productivity.

In the work of soil organisms, springtails are distinguished by the fact that they are of great importance in increasing the humus content of the soil. In particular, the indicator property of the springtail is of particular importance in determining the ecological crisis in anthropogenic areas, and the system for assessing the state of agrophytocenoses by their ecological properties can increase the efficiency of the system for assessing agrophytocenoses in agricultural fields where agriculture is intensively carried out.

Therefore, it is of great scientific and practical importance to determine the abundance of springtail species growing in natural ecosystems and various soils of agrocenoses, to study their ecological properties, and to reveal the role of springtails in increasing soil productivity and in diagnostics.

Collembola - animals belonging to the group Collembola, a class of insects (Insecta) of the phylum Arthropoda. All their representatives, together with shell mites and insects, form the soil microfauna. Collembola or arthropods (Collembola) - one of the most important groups of terrestrial animals, the remains of which were found in the strata of the Middle Devonian. Each joint of the mustache of an arthropod has its own muscles; legs do not divide into calves and feet, spermatozoa do not have additional tubules and external fibers, body division is complete, embryonic membranes are absent, fertilization is external-internal, molting continues after puberty.

Due to skin respiration, the cover of their body does not have an epicuticular layer and does not resist the evaporation of the skin. Springtails are a diverse group, distinguished by a number of characteristic morphological structures. First of all, the presence of a jumping difference in the 4th segment of the abdomen is characteristic of the locomotor organ; in the third segment of the abdomen is attached with kisses; the presence of an abdominal tube that provides adhesion to the substrate after the jump. The sense organs of Collembola are also characteristic: post-antennal, antennal, etc. [3].



Springtails are considered the most important generation of arthropods that have evolved in arid environments. Their body is covered with hard chitinous cuticle. The epicuticle prevents the body from drying out by preventing water saturation outside the cuticle. They are very widespread and diverse due to the fact that they are very resistant to adverse conditions. Species grown in a tropical climate can withstand heat up to +400 C. There are especially many of them in forest soils with low humidity. Invertebrates in bed consume 10-15% of their biomass. During the year, 2-3 sets of springtails develop. Due to differences in distribution over the soil layer, springtails are divided into groups that form in the bed, bed-soil and soil.

The body is carpet-crested, dark in color and covered with a thick shell. Collembola belonging to this group are saprophagous springtails. The body of soil-dwelling species is pale, and the body cover is somewhat thin, so they are sensitive to soil moisture. In the case of floor soil types, the interval between these two groups is calculated. Springtails are very picky about food.

They can be divided into groups that feed on true plants, herbs, spores, pollen, herbs, aquatic plants. Collembola actively absorb humus and mineral components of the soil. Under favorable conditions, it penetrates to a depth of up to 1 m. Among them, the active participation of springtails in the process of soil formation was confirmed [3].

The number of Collembola is 1 million per 1 m<sup>2</sup> of the soil layer .. The average size of all springtails is 1 mm, the largest are 0.2-0.7 mm long, and the largest are 5-9 mm. The fact that their body is divided into three parts is similar to typical flies. They are very important for increasing the humus content in the soil. In addition, Collembola, like other microorganisms, play an indicator role in determining environmental damage in anthropogenic areas. For this reason, their study is considered one of the urgent tasks [3].

Their body is divided into three parts. The head has a three-membered thorax with a pair of segmented whiskers, a segmented abdomen with three pairs of legs, and characteristic internal structures; all tissues, developed pectoral muscles and others. In addition, the abdomen of the springtail consists of only 6 segments, and not 10-11, as in polychaete flies. In the oral cavity, it resembles a mosquito, but the lower and upper jaws are recessed into the head [4].

In the soil layers of alfalfa, wheat and cotton agroecosystems of the Arka (Shymbai, Karaozek, Takhtakopyr) districts of Karakalpakstan, 23 species of Collembola belonging to 2 groups, 4 relatives and 21 congeners, were identified. The diversity of representatives of the Poduromorpha and Entomobryomorpha groups in the studied areas is explained by their distribution in the upper soil layers. Various types of agroecosystems of Karakalpakstan are characterized by the species composition and characteristics of springtail populations in soils. In the soil layers of the agroecosystem of alfalfa, 14 species of springtails were found, in wheat plants - 15 species, in cotton plants - 13 species. This indicates the similarity of ecological conditions in agroecosystems.

The species composition and composition of springtails in the agroecosystems of the rear areas of Karakalpakstan increase to the maximum in a 10-20 cm soil layer. In alfalfa, wheat, cotton agroecosystems and soil layers of natural ecosystems, the absence of seasonal dynamics of springtail in the spring-autumn period was noted. In alfalfa plants - *Isotoma notabilis*, (*Isotomiella* (*Isotoma*) *minor*), *Folsomina onychiurina* species, wheat agroecosystems in soil layers - *Freesia* (*Triaeana*) *mirabilis*, *Henyllodes armatus*, *Isotomyella* (*Isotoma*) *minor*, *Folsomina candida*, *Folsomina onachiurina*, species, cotton agroecosystems in soil layers - *Willmia anophthalma*, *Henylla maritima*, *Oligaphorura* (*Lipura*) *Greenlandica* species dominate.

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## **USE OF EDUCATIONAL TRADITIONS OF FOLK PEDAGOGY IN FORMING YOUTH WORLD VIEW**

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### **ANNOTATION**

*The article discusses the features of the educational traditions of folk pedagogy in the formation of the worldview of young people. Folk pedagogy covers labor, physical, patriotic, spiritual and moral, environmental, mental, aesthetic education. Elements of folk pedagogy contribute to the formation of a harmoniously developed personality.*

**KEY WORDS:** *stage, experience, personality, philosophy, culture, people, fairy tale, epic, proverb.*

The upbringing of the younger generation is an extremely complex, difficult, multifaceted and multifaceted process. One of the ways to promote the upbringing of a full-fledged personality who loves his people and his country, who cares about its present and future, is to turn to the traditions of folk pedagogy, which contains a lot of valuable, positive experience accumulated over the centuries [7].

Folk pedagogy is the most ancient phenomenon of human culture. She is as old as the people themselves. Selecting from the experience of the people all the best, fixing the sparks of the mental and moral wisdom of the people and passing them on from generation to generation, she led humanity along the steps of growth. In other words, folk pedagogy is based on the worldview of the people, on folk philosophy.

Folk pedagogy permeates all stages of a person's life: it begins with the birth of a child and accompanies his entire adult life, selecting all the best, controls his behavior in society.

Folk pedagogy covers all aspects of education: labor, physical, patriotic, spiritual and moral, environmental, mental, aesthetic, etc. Elements of folk pedagogy permeate all aspects of the life of every person in society, complement each other, thereby contributing to the formation personality [2].

The traditions of folk pedagogy have a national character: each nation has its own original pedagogical culture, inherent only to it and based on its own culture, psychology, philosophy and labor traditions [10].

The origin of the concept of "tradition" comes from the Latin "traditio" - transmission. Today, this concept is commonly understood as certain values, attitudes, norms and rules of behavior, i.e. elements of social experience, historically formed forms of people's behavior, which are transmitted from generation to generation and persist for a long time decisively in all areas of public life. Traditions and customs play an important role in educating the moral qualities of young people [1].

If we pay attention to the literary heritage, historical memory, customs and games of any people, we will understand that the education of youth takes first place. This is especially clearly seen in oral folk art: folk proverbs, fairy tales, legends and epics. Oral folk art, which forms the basis of folk pedagogy, occupies an important place in the cultural history of the Karakalpak people. In this regard, at all times, oral folk art has served as an important educational tool.

The educational customs of the Karakalpak people begin with a lullaby. A child raised by his mother on lullabies will grow up smart, decent, quick-witted, courageous, loyal to the Motherland [6].





Epics are powerful spiritual food of the Karakalpak people for many centuries. They reflect the images, traditions and customs, rituals and religious beliefs of the historical life of the people. Folk Karakalpak epics, passed down from generation to generation from early centuries, are one of the most powerful works of educational value. In Karakalpak families, the upbringing of children has long been carried out on the basis of folk epics, for example, such as: “Alpamys”, “Forty 14 girls” (“Kyryk kyz”) “Edige” (“Edige”), which served as a means of spiritual and moral education of youth [5].

Fairy tales constitute one of the most significant sections of the Karakalpak oral folk art, it is also one of the first and main creations of the spiritual life of the Karakalpak people, for example, such as: “Kyran”, “Tyiyn”, “Four Abdulla”, “Gulziyba, Gulzamze”, etc. .d. The creators and keepers of fairy tales and other genres of oral folk art are the people. The main material for folk tales was the life of the Karakalpak people. They reflect the best features of the people - diligence, devotion to the Motherland, courage, kindness [11,12].

The first educational aspect of a fairy tale is its content. They tell about the life, life, occupations, customs and mores of the people. The fairy tale helps to believe in the power of good and the fight against evil. Fairy tales teach to think, to understand goodness. Fairy tales colorfully describe natural phenomena, many of them involve both wild and domestic animals, problems, riddles and their solutions are given, which broaden horizons, enrich knowledge about the world around them, for example: “Bull and donkey”, “Quail and fox”, “The Old Man and the Bull” and “The Tale of the Camel”, etc. There are many proverbs and sayings in fairy tales that are very apt and instructive [11,12].

Karakalpak folk proverbs have an important place in the spiritual and moral education of the younger generation. Karakalpak folk proverbs urge especially teenagers to love the Motherland, master a profession, work in a team, be honest and find perfection as a conscientious person [3].

Riddles have an important place in folk pedagogy for improving the mental development, worldview of children, and strengthening memory. Since ancient times, children who knew riddles more, guessed correctly, were encouraged. In the old days, riddle contests were widespread. Riddles related to natural phenomena were widely used in such mind-improving competitions [2].

Labor education is the core problem of folk pedagogy at all times. Folk pedagogy calls for the formation in children from their earliest age of a stable habit of a conscientious attitude to work. The upbringing in children of a respectful attitude to the work of other people requires special attention [9].

Folk pedagogy solves the following tasks of labor education:

- Development of interest and love for any kind of work;
- Education of such a character trait as diligence;
- Formation of belief in the need for work, education
- the need to work;
- Formation in children, adolescents, young men of various
- labor skills, skills, qualities, education in them on this basis
- work habits, labor efforts;
- Raising respect for working people;
- Education of respect for nature, resources;
- Formation of socially significant motives in adolescents
- labor activity (sense of duty, enthusiasm for the labor process);
- Work on professional orientation of youth [9].

Labor in the traditions of the Karakalpak people was closely connected with animal husbandry, horticulture, sericulture, fishing, hunting and other folk crafts. Children were accustomed to work gradually and thoroughly. The main thing was the physical development of children and the nature of their participation in the labor activity of the family. Mothers taught their daughters needlework, spinning, weaving, embroidery, knitting. Fathers taught boys many types of agricultural work, fishing, hunting, etc. [7].

Thus, folk pedagogy is of great importance in the education of the younger generation, and also deserves the most careful attention, deep and close study, and creative use.



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# QUANTITATIVE CHANGES IN THE PHYSIOLOGICAL GROUPS OF MICROORGANISMS IN RICE VEGETATION PHASES IN THE RICE FIELDS OF THE NUKUS REGION

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## ANNOTATION

*The article discusses the quantitative changes in the physiological groups of microorganisms in the vegetation phases of rice in the Rice fields of the Nukus region. The existence of active compounds of these elements and their entry into the soil is the result of the*

*Activity of soil microflora. Soil microflora absorbs oxygen from the soil air in drought conditions.*

**KEY WORDS:** *microflora, oxygen, element, soil, phase, rice, mesophyte.*

In the life of rice plants, 2 stages are distinguished depending on the requirements of environmental conditions. The first stage lasts from sowing seeds to rooting, during the time when the plant is a normal mesophyte, there is a clear need for free oxygen in the soil air, and when transplanting a mature plant adapted to water pressure soil, rerooting compounds accumulate in the soil, as well as hydrogen sulfide, which is a toxin for the plant. The process of sulfate reduction is the result of the activity of sulfate-regenerating microorganisms. With the formation of 140-180 lateral roots from the beginning of root formation, an oxidation zone with well-developed breathable tissues appears at the base of the root. This zone is formed by the release of oxygen from the air into the soil through the roots. A microaerophilic zone is formed in which aerobic microorganisms develop.

The processed toxins in the soil are broken down in the root zone. The rice plant adapts to waterlogging. Based on the foregoing, there should be free oxygen in the soil in two stages of plant development, from sowing to the rooting phase and from rooting to ripening, there should not be a lack of oxygen. The floodplain flooding at the measurement stage leads to the development of regeneration processes in the soil. At the same time, the concentration of root oxygen increases rapidly.

Under anaerobic soil conditions, hydrogen sulfide is simultaneously formed from iron. Unsaturated fatty acids and other compounds form toxins that have a strong influence not only on seed germination, but also on the growth of young plants.

Germination of rice seeds begins in an environment that is sufficiently aerated and has favorable redox conditions. The first 10-15 days are used as top dressing until the roots appear. As the vegetative mass grows, many nutrients are needed: nitrogen, phosphorus, potassium, silicon, iron, zinc and others. The existence of active compounds of these elements and their entry into the soil is the result of the activity of soil microflora.

Soil microflora absorbs oxygen from the soil air in drought conditions. In addition, the microbiological and biochemical processes of the focus turn into anaerobiosis. But for the active growth of the plant, nutrition must be available all the time, otherwise the lateral root zone will be weakened. Unlike other cereal plants that have such a water system, the original root morphology is separated from the arenchymal structure of breathable tissue.



The root system is supplied with oxygen and synthesizes organic matter, which allows it to have various symbiotic relationships with soil microflora. Thus, it promotes the growth of aerobic microorganisms. Flooded soils will be distinguished by researchers from their lack of activity. Anaerobic microflora has the ability to secrete reducing substances, protect against oxygen in the center and show resistance to oxygen in the center. Ammonifiers are the leading group in terms of quantity, and the mineralization of organic substances is provided by aerobic steam from washing machines. An analysis of their dynamics shows that in our study, flooding to a certain extent reduces their development. Waterlogging of the soil leads to a rapid change from aerobic to anaerobic conditions

As a result, the nature of the biochemical and microbiological processes occurring in them changes. This negatively affects the number of ammonifying microorganisms. The dynamics of the number of ammonifying microorganisms changed significantly after the flooding of the soil. Their number decreases during the measurement period, then increases again and reaches a maximum during the transformation period. After  $35 \times 10^7$  the amount of secondary ammonifiers decreases to a minimum, and after the removal of water it increases to  $4.3 \times 10^6$ . Nitrophytizing microorganisms are similar in their dynamics to ammonifiers.

The processes of sulfur transformation in rice cultivation have different meanings. Under anaerobic conditions, sulfate-reducing bacteria are among the most common microorganisms in nature. As a result of their activity, hydrogen sulfide is formed, which stops the growth of their numerous sulfur compounds. The absorption of nutrients due to the hydrogen sulfide root stops.

The action of hydrogen sulfide is especially reduced in the first 30 days after darkening. In the case of Karakalpakstan, the content of sulfate reducers in cultivated soils increases very slightly. In watered soils, the amount of sulfate reducers increases. When they reach the dimension level, they double. Their number increases rapidly towards the end of the measured sermon. The absence of bacteria during this period clearly indicates a horizontal movement. This is due to the decomposition of organic matter in it. With the most sulfate-reducing bacteria, before they release water, the number of sulfate-reducing bacteria rapidly decreases, especially in the non-existent horizon, as the soil begins to dry out and the air becomes stronger.

The data obtained indicate an increase in sulfate-reducing microorganisms in the soils of flooded fields. Due to the intensity of their growth, it prevents the release of water during the ripening period. In these sermons, their maximum growth is observed. If the number of sulfate reducers is counted in thousands, then 59-85 thousand cells/g of soil can reach 45 million cells/g of soil in a flooded area. They begin to multiply at the end of the growing season, and here all conditions are created for their reproduction.

Anaerobic focus is the presence of  $\text{CO}_2$ -4 and the presence of organic matter. The development of sulfate-reducing bacteria in watered soil depends on the intensity of regeneration processes in the outbreak. The most regenerative situation occurs in the second half of the growing season in the soil, the number of sulfate-regenerating microorganisms increases.

The presence of sulfate-reducing bacteria in the soil depends on the presence of  $\text{CO}_2$ -4. Nitrophic bacteria are aerobic microorganisms. and in most cases, after waterlogging the soil, several days pass when there is already free oxygen in the center. At later dates, their number decreases, but neutrophicators, like other aerobic microorganisms, always increase in waterlogged soil. In waterlogged soils rich in potassium and sodium, the reaction time of ammonium increases. The ammonia washed into the lower layer is suitable for nitrifying bacteria formed in the process of ammonification and for the oxidation of ammonium nitrogen to nitrate. In the root zone, intensive growth is observed, in other zones the activity of intrification is moderate.

The concentration of nitrifiers is in the range of 100-14 thousand cells/g of soil. Aerobic and anaerobic nitrogen-fixing microorganisms play an important role in the biological oxidation of nitrogen. The activity of non-limbic nitrogen fixers on waterlogged soils under rice is 57-63 kg H. The quality of the soil around rice plants has a significant impact on the activity of nitrogen fixation. The data obtained show that the number of nitrogen-fixing microflora is closely related to the growth of plants in the soil. It increases as the plant grows and decreases during maturation and after planting. Under microaerophilic conditions, optimal for the survival of nitrogen fixers, it is formed when planted in soils saturated with moisture. Due to the aeration of the roots, oxygen in sufficient quantities enters the root zone and the surrounding soil.



This creates favorable conditions not only for anaerobes, but also for aerobic nitrogen fixers. In the studied soils, the largest number of anaerobes is represented by *Eoutrilium buturicum*, its abundance is 100-750 thousand cells/g of soil, the maximum number is in the root zone. In the previous period, *Azotobacter* increased by 100,000 cells/g of soil. So, they retained their name in the early days of the flood, by the time they were established, their numbers had increased to hundreds of thousands, and then stabilized. After harvesting in the Pisiu field, the content of aerobic and anaerobic nitrogen fixers decreases due to the drying of plant soils. Attention is drawn to the growth of oligotrophic microorganisms in saline soils.

The amount of ammonifiers increases due to oligotrophic organisms, which reaches 238 mln. l/g of soil in the measured amount. In the future, the density of oligobrophylls decreases somewhat, but their composition remains stable until the end of the growing season.

The activity of oligonitrophils lies in the fact that their abundance is nitrogen fixers and leads to the accumulation of nitrogen compounds in the soil. Denitrification is the only way for the formation of free nitrogen from microorganisms, which is necessary for fish nutrition. Denitrifiers are a group of bacteria that digest nitrogen gas. In watered soil, the content of denitrifiers is low; after flooding, their amount increases before flowering, then decreases and remains in small amounts even after flowering.

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## **PHILOSOPHY OF EDUCATION: RETROSPECTIVE AND METHODOLOGICAL APPROACHES**

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### **ABSTRACT**

*The philosophy of education is considered as the most effective theoretical basis for changes in the field of education, which creates conditions for the most complete realization of the spiritual potential of a person. The history of the separation of the philosophy of education from philosophy itself, the stages of the formation of its conceptual and categorical apparatus and the formation of its institutional forms are traced.*

**KEYWORDS:** *education; systemic foundations of the philosophy of education; institutionalization of the philosophy of education; personal development*

Education at all times was an objectively necessary condition for the formation of a personality developed in professional, spiritual and general cultural relations. Of course, any personality is characterized by the ability to self-development, self-education, but its life self-determination, civil and moral development in different historical eras has its own characteristics, largely due to changes in the education system. According to the authors of this article, the most effective theoretical basis for such changes in education as a complex system of civilizational values has always been and is the philosophy of education, since it is precisely this that lays down the mechanism of self-development and develops in each person his inner spiritual potential to the maximum extent. The philosophy of education as a relatively independent branch of philosophical knowledge associated with the study of the general patterns of education in its historical and social contexts was not formed immediately. Three stages are usually distinguished in the history of its formation:

- a) the prehistory of the philosophy of education (from ancient Greek philosophy to the end of the 18th century);
- b) the proto-philosophy of education (beginning of the 19th - middle of the 20th centuries);
- c) the philosophy of education in its institutional form (since the second half of the 20th century) (for details see: [1; 2; 3; 4; 5; 6; 7; 8]).

At each of these stages, in various philosophical and pedagogical schools and systems, there was a continuous search for fundamental ideas for the development of creative abilities, ethical and aesthetic worldview, and the spiritual development of a person. Separate ideas that are not transient in nature are used in the educational process to this day. These include the ideas of the ancient Greek philosophers, who saw in education a special life meaning, only capable of educating a decent person [9, p. 32]. So, Plato [10, p. 126] and Aristotle [11, p. 376] noted that all people are different in their abilities, inclinations, interests, and therefore the same education cannot be suitable for everyone - each person needs to be helped to develop the best spiritual qualities, by virtue of which education should be guaranteed, cultivating moral humanistic the beginnings and the best preparation for life together in society.

M. Montaigne, J.-J. Rousseau, G. Spencer, argue that the learning process consists not so much in the transfer of knowledge and banal truths, but in learning to think independently and develop independent critical judgments that contribute to the acquisition of personal life experience based on humanistic values. In the same way, in the worldview systems of I. Kant, G. Hegel, J. G. Herder, J. Dewey, the idea was repeatedly emphasized that education should form knowledge that contributes to the establishment of humanistic goals in society (for more details, see: [12; 13; 14; 15; 16]). The modern understanding of education originated at the end of the 18th century, when neo-humanists, in contrast to the enlighteners, began to present it as a "general spiritual process of personality formation" [17, p. 7-10].

In the 20th century, especially during the period of the actualization of the way out of the crisis phenomena that affected almost all spheres of world public life, new approaches were developed in the theory and practice of education. At the same time, the concept of "philosophy of education" was being rethought. If in the first quarter of the twentieth century. Since the majority of



philosophers and educators, led by the founder of the philosophy of education, the Anglo-American philosopher J. Dewey, brought to the fore democratic changes in the educational environment, by the middle of the century, the range of goals expanded significantly, especially after the creation of the United States at Columbia University (1941 .), and then in Europe (Great Britain, 1965) of societies for the philosophy of education. These societies considered one of the most important tasks to overcome the heterogeneity of the initial principles and approaches to teaching and education in various pedagogical theories and concepts, as well as the development of fundamental principles for mastering theoretical knowledge based on the axiological approach. Propaganda of their ideas, wide organizational and publishing activities of societies (formation of specialized departments, publication of textbooks, reference books, scientific journals, interdisciplinary curricula on the philosophy of education) and associations of philosophers and teachers created under their influence contributed to a certain isolation of the philosophy of education from philosophy.

Based on the reflection of the content of education, it was proposed to build a new system of education with new ideals and goals that reflect alternative approaches to the main subject of education — the individual (which was largely facilitated by the introduction of independent training courses in the philosophy of education at the universities of the USA, Canada and some other countries). The institutional form of the philosophy of education warned against a limited, narrowed understanding of education only as an institution for training a future professional with a rational type of thinking, but very vague ideas about the modern world order and its current problems that predetermine the prospects for social development in general. Despite some differences in national educational systems, in the philosophy of education in the second half of the 20th century, two vectors were clearly visible: empirical-analytical and humanitarian. The first was focused on scientific research in the field of theoretical pedagogical knowledge based on positivist ideas, the second on the humanistic interpretation of certain philosophical trends (idealism, existentialism, philosophy of life, etc.). The emergence of the analytical direction in the philosophy of education was closely connected with the study of the conceptual and categorical apparatus used in the educational environment, especially in the context of the content of such concepts as “education”, “teaching”, “learning”, etc. , structure and status of pedagogical knowledge based on the principles of logical positivism. The critical-rationalist direction was based on the principles of K. Popper's critical realism and his idea of an "open society" and "open education". In particular, it was argued that the appeal to experience as the only criterion of truth in this case is detrimental, since linguistic semantics cannot give an exhaustive understanding of the essence of education. The main emphasis of this direction was on the formation of critical thinking of students and the democratization of the educational process as a whole. The philosophical idealism of the 19th century served as the initial principles of humanitarian philosophical trends in the philosophy of education. (F. Schleiermacher, G. Hegel), philosophy of life (W. Dilthey, G. Simmel), existentialism (S. Kierkegaard, E. Husserl), somewhat later - philosophical anthropology. But here, too, the humanistic meaning of the educational process was in the first place.

It should be noted that all these areas are characterized by an attitude towards education as a two-way process of interaction between the teacher and the student, with the latter's independent critical reflection of the entire set of meaningful actions in the course of the educational process. The allocation within the humanitarian philosophy of education of separate relatively independent areas is associated with their semantic specificity. So, the existential-dialogical philosophy of education saw this meaning in interpersonal interactions, in the system of communicative relations "I - You", according to its supporters, only developing the personality; while the critical-emancipatory trend, which inherited the basic ideas of the Frankfurt School (“negative dialectics”), on the contrary, opposed the school as a social institution, within which strict discipline “reigns” and various kinds of manipulations on the part of the teacher, reducing to no creative potential of the learner. In this regard, the main theorists (T. Adorno, L. Lowenthal, G. Marcuse, M. Horkheimer, E. Fromm) considered it necessary to eliminate the so-called institutional dictate - any generally binding norms and pedagogical requirements, replacing them with empathic communication of all participants in the educational process. The hermeneutic direction, on the one hand, saw as its goal "comprehension of all spiritual objectifications" of the individual in the course of education and self-education, based on the fact that human existence always includes one or another educational moment; on the other hand, it stood up for the autonomy of education (structural hermeneutics). Philosophical and pedagogical anthropology of education considered the possibility and necessity of the formation of some kind of integrative science of education, which includes all the achievements and methods of other sciences about Homo educandus - a person who learns.

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## **WAYS TO IMPROVE CREDIT RISK MANAGEMENT IN COMMERCIAL BANKS**

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### **ТИЖОРАТ БАНКЛАРИДА КРЕДИТ РИСКЛАРИНИ БОШҚАРИШНИ ТАКОМИЛЛАШТИРИШ ЙЎЛЛАРИ**

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#### **ҚИСҚАЧА МАЗМУНИ**

Мақоланинг асосий ғояси – тижорат банклари томонидан ўз мижозлари, жисмоний шахслар ва тадбиркорлик субъектларига ажратиладиган кредит/қарз рискларини тан олиш, уларни пасайтириш, олдини олиш ва бошқаришни такомиллаштиришдан иборат. Банklar олдида турган риск турлари жуда кўп ва улардан энг кўп учрайдигани бу кредит рискдир. Тижорат банклари мижозларининг молиявий аҳволини, жамиятда тутган ўрнини тахлил қилиб ўрганади, лекин барибир қутилган ва қутилмаганда мижозларининг молиявий аҳволи қийинлашади, ҳаттоки оғирлашади. Мақолада банкнинг мижозлари молиявий аҳволини прогнозлаш, скоринг қилиш ва улар билан яқиндан ишлар олиб бориш, кредитларини қайтариш йўлларини излаб топишдан иборат. Шу йўллардан бири бу ўз мижозларини кредит беришдан аввал тадбиркорлик асослари ва амалиётда уни қўллаш усулларини ўргатишдир.

**КАЛИТ СЎЗЛАР:** Банк тизими, тижорат банклари, тадбиркорликни ривожлантириш, бизнес, жисмоний шахс ажратиладиган кредитлар, кредитлар, лизинг, молиялаштириш, консалтинг, таълим, банкларнинг жамият олдида ижтимоий жавобгарлиги.

#### **КИРИШ**

Охирги ўн йилдан ортиқ вақт давомида жаҳон ҳамжамияти тарихида Жаҳон молиявий-иқтисодий инқирозини бошидан кечирган бўлса, Ковид-19 Пандемияси билан боғлиқ инқирозлар ҳали ҳам давом этмоқда ва кўпгина давлатларда унинг таъсирини ханузгача бошидан кечирмоқда. Макроиқтисодий танглик ва инсонларнинг молиявий қийинчиларга олиб келиши бўйича ҳаммамиз гувоҳ бўлиб турибмиз. Аҳоли даромади кам бўлган давлатларда айниқса, уларнинг яшаш шароити янада заифлашди, ишсизлик сони ортди, инсонлар даромадсиз қолишди ва кейинги ҳаётлари қандай бўлиши ҳали номаълум. Янги бизнес турлари пайди бўлди, баъзи бизнес турлари ҳаттоки умуман керак бўлмай қолди ва шу бизнес билан шуғулланган кишиларнинг аҳволи сезиларли даражада ёмонлашди. Баъзи инсонлар шу инқироз даврида ўз даромадларини орттирган бўлсалар, баъзилари банкротлик қобилиятсизликка юз тутишди. Тижорат банкларининг бир гапи бор, “мижозинг сен бой”. Агар мижоз



кўп амалиёт ўтказса, банклар шунча даромад олишади. Пандемия даврида банклар онлайн хизматларни кўпайтиришган бўлишса, аксинча аксарият активлари рискка тортилди, жумладан ажратилган кредитлар. Ҳар хил давлатларда Регуляторлар тижорат банкларига мижозлари учун кредит каникулларини беришди, ажратган кредитлари муаммога айланмаслиги учун муддат берилди. Лекин, баъзи мижозлар қарздорликни қайтаришни янада узайтиришни сўрашган бўлса, баъзилари ҳаттоки маблағи бўлса ҳам қайтармай қўйиш ҳолатлари ҳам бўлди. Тадбиркорлар ва жисмоний шахсларга кредит ажратишдан аввал ўтказиладиган скоринг тизими, микро, кичик ва ўрта бизнес ҳамда хусуий тадбиркорлик йирик корхоналарга қараганда заифроқ, уларнинг бизнес юритишда молиявий билимлари чекланганлиги, корхоналарнинг молиявий ресурслари етишмаслиги, кадрлар сони ва солиқ ҳамда солиққа оид маслаҳатларга бўлган эҳтиёж борлигини кўришимиз мумкин.

Кўплаб ўзбекистонлик олимларнинг мақолаларини ўрганганда асосий эътибор хорижий амалиётга асосланган ҳуқуқий базани янгилашга, тадбиркорликни давлат томонидан рағбатлантиришга, республиканинг айрим туманлари ва чекка шаҳарларидаги банкларнинг кредит ажратишга лаёқатлилигига, банкда ҳисобаврақларни очишдаги муаммоларга, бизнесни рўйхатдан ўтказишга, тадбиркорларнинг кредит таъминоти гаровлари етишмасликларига эътибор қаратилган.

Тижорат банклари муаммоли кредитлари улуши ортиб бориши тенденцияси ортиб бормоқда. Бу борада регулятор томонидан банкларнинг NPL<sup>1</sup> - 90 кун ва ундан ортиқ кунлар давомида ишламайдиган кредитларининг улуши ортиб бориши кўрсаткичини жиловлашларига ва назоратга олишлари лозимлиги тўғрисида огоҳлантирмоқда.

Назарий билимлардан ташқари, амалда тижорат банклари "уйдан-уйга" кредит ажратишган, тадбиркорликни ривожлантириш, қашшоқликни камайтириш ва аҳоли турмуш тарзини сифатини яхшилашга қаратилган лойиҳалар молиялаштирилган. Бир томондан, аҳолининг тижорат банклари кредитларига бўлган эҳтиёжи қондирилса, бошқа томондан эса, кредит меъзонларига асосан ажратиладиган кредитлар risks юқори бўлиб, муаммоли кредитлар тоифасига тўғри келмоқда. Гарчи мавжуд корхоналар ўнлаб йиллар давомида ишлаб фаолият юритиб келишган бўлсада, ўсиш суратлари суст ва банклардан олинган қарзларни улар қайтара олмасликлари, қарз ботқоғига олиб бориши мумкинлиги эҳтимоли борлигини тўғри тушунишлари лозим.

Кўпгина давлатлар каби Ўзбекистонда ҳам аёллар тадбиркорлиги қобилятларига ишонч билдиришмайди, уларнинг ишбилармонлик тенденцияси ошишига жиддий аҳамият берилмайди ва гендер тўсиқлик сабаб уларни катта бизнесга кириб борадиган кам сонли аёлларга айлантиради.

Микро, кичик ва ўрта бизнес субъектлари тижорат банклари томонидан асосан қиса муддатли молиялаштириш ёки кредитлаш амалиётлари кенг қўлланилади, банклар ўз таҳлилларидан венчур ва бошланғич бизнесни молиялаштириш юқори рискли амалиёт деб билишади. Мамлакат миқёсида хориж тажрибасига нисбатан банк бўлмаган молиявий институтларнинг бизнес учун бериладиган молиялаштириш ва кредитлаш фоиз ставкалари анча юқори бўлганлиги сабаб уларнинг молиявий воситаларидан аксарият фойдаланишмайди.

Ҳамюртларимиз бошқа давлатларда ишлаб келиб, ўз бизнесини очиш ниятида бўлганлари эса, ўрганган кўрган бизнес йўналишларни мамлакатда давом эттириш ёки қўллашларида сармоя етсада, билим ва маблағ етмаслиги, бизнесни бошлашда иккиланишлар туфайли банк ва солиқ мутахассисларига мурожаат қилишади.

<sup>1</sup> <https://www.investopedia.com/terms/n/nonperformingloan.asp> Non-Performing Loans – муддати ўтган кредитлар қарз олувчининг белгиланган муддатда режалаштирилган тўловларни амалга оширмаганлиги сабабли қарзни тўлаб бўлмайдиган қарз. Номалум мақомдаги аниқ элементлари маълум кредит шартларига қараб ўзгариши мумкин бўлсада, "тўловсиз" одатда асосий қарз ёки фоизи бўйича нол тўлов сифатида белгиланади. Белгиланган муддат соҳага ва кредит турига қараб ҳам ўзгариб туради. Бу муддат 90 кун ёки 180 кунни ўз ичига олади.



Банклар ўз навбатида рискларини хеджерлаш, уларни камайтиришни инobatга олишади, Марков занжири<sup>2</sup> эффектини яъни бир-бири билан боғлиқ бўлган рисклар келиб чиқишини олиш натижасида рискли лойиҳаларни молиялаштирмаслик тўғри йўл эканлигини билишади.

Тижорат банклари мижозни кредит лаёқатини ўтган даврдаги фаолияти амалларига NPV, IRR ва PP кўрсаткичлари таҳлили билан башорат қилишади<sup>3</sup>. Кейинчалик қандай ходиса ва йўл тутилишни олдиндан башорат қилиб бўлмаслигини инobatга олиб, Ковид-19 Пандемияси ҳам, биз қуйидаги таклифимиз берамиз, биринчидан, корпоратив бошқарув ахлоқи орқали корпоратив банк фаолиятида нафақат акциядорлар манфаатлари, балки ходимлар, истеъмолчилар ва умуман жамияти манфаатларига хизмат қилишида жамият олдидаги ижтимоий жавобгарликни<sup>4</sup> тарғиб қилиш мақсадга мувофиқ. Иқтисодиёти ривожланган давлатлар банклари жумладан, АКШнинг энг йирик ва капиталлашган банкларида шу каби ижтимоий жавобгарликни кўриш мумкин. Иккинчидан, банк мижозлари янги бизнесни бошлашларида банклар томонидан бизнесга оид маслаҳатлар ва кўрсатмалар беришлари, тижорат банкларининг кредит рискларини камайтиришда алоҳида бизнесни ривожлантириш фондларини ташкил этишлари нур устига аъло нур бўлади.

## УСУЛЛАР

Банкнинг мижози бой – банк бой, тижорат банклари ё ўз ходимларини бизнес ва тадбиркорликни юритишда ўқиш ташкил этиш ёки тайёр аутсорсинг хизматидан фойдаланиб мижозларни ўқитиши лозим бўлади.

Банклар Директорлар Кенгашига банк сектори ва тадбиркорлардан мустақил кузатувчиларни танлаши, тадбиркорлик ва бизнесни ривожлантириш банклар олдидаги Асосий масъулият эканлигини тарғиб этиши лозим бўлади.

Давлат томонидан тадбиркорликни ривожлантириш фондидан ажратиладиган кредитлар имтиёзли, узоқ муддатли, венчур ва бошланғич бизнес учун кредитлар, банк кредит портфелидаги муаммоли активлар тоифасига киритмаслик ва уларни давлат томонидан қоплаб берилиши мақсадга мувофиқдир, агар қопланмас экан банклар rischi ортса улар кредит ажратишни тўхтатишади.

Давлат статистикаси банкрот ва дефолт ҳолатидаги корхоналар рўйхатини юритиши лозим. Чунки, бугунги кунда бизнес ва тадбиркорлар оламида банк активларини муаммоли активларга айлантирган шахслар рўйхати юритилиш мақсадга мувофиқ. Коллекторлик фаолиятига рухсат берилиши керак.

Банкларга рақобатдош молиявий институтларни кўпайтириш, бугунги кунда молиявий хизматлар кўрсатиш нобанк институтлар сони чегараланган, Регулятор томонидан уларга имкон берилиши лозим.

Ўқитилган, бизнес юритиш сирларини ўрганган шахсларни кластер ва сегментларга бўлиш, банклар ҳали ҳам жойларда тадбиркорликни рағбатлаштирмоқда, аммо бу етарли эмас. Шу билан бирга, аҳоли даромадли соҳаларга, шу жумладан, банк депозитлари орқали ўз даромадларини қандай кўпайтиришни, улар ва уларнинг оилалари ўз бизнесларини бошлашлари, ўзлари биладиган машғулотлар билан шуғулланишлари, давлат ва корпоратив қимматли қоғозлардан ва валюта савдосидан қандай даромад олишларини ўргатиш орқали молиявий саводхонликка эришиш мумкин.

- жамият олдида ижтимоий бурч сифатида банклар ҳам ўз маблағлари ҳисобидан бизнес соҳасини учун мутахассисларни тайёрлашлари мақсадга мувофиқ. Тижорат банклари мутахассисларини бизнес ва тадбиркорлик

<sup>2</sup> <https://nut-code-monkey.blogspot.com/2016/04/markov-chain.html>

<sup>3</sup> <https://finzz.ru/6-metodov-ocenki-effektivnosti-investicij-v-excel-raschet-na-primere-npv-pp-dpp-irr-arr-pi.html>

<sup>4</sup> <https://gandhi.gov.in/social-responsibility.html>



юритишда қайта тайёрлаш ва улар мижозларига ва мижози бўлмаганларга бизнес ва тадбиркорликни юритишда кенг лойиҳалар тарғиб этиш;

- билим ва ҳаётий тажриба ва олинган таълимдан келиб-чиқиб, ота-онасининг ҳаётий фаолияти ёки иш тажрибасини давом эттиришга ундаш, бизнес ёки тадбиркорликни баҳолаш, бошқариш ва бошқаришга мойил бўлганларни аниқлаш ва танлаш;

- билим олишга ҳунар ва касбни ўрганишга ва уни янада такомиллаштиришда мотивация бериш;

- бизнес ёки тадбиркорликни бошқариш асосларини такомиллаштириш, молиявий бошқарув тизимини, рискларни баҳолаш ва уларни бошқариш, корхона баланси ва бухгалтериясини, миллий ва хоржий ковенантлари билан ишлашни ўргатиш;

- банк мижозларини бизнес юритишда уларнинг ота-оналарининг ўз фаолиятини давом эттириш, оилавий бизнесни кейинги авлодга бериш, ўтказиш усуллари, бериш вақти, давом эттир қанчалик осон кечиши ҳақида тасаввур ўйғотиш, бўлажак тадбиркорларга аввало ўз меҳнати учун ҳақ тўлашлари, маслаҳат ва кўрсатмалар беришлари, устозлик қилишлари, B2B-ни муваффақиятли олиб боришлари, бизнес юритишда келишув ва музокаралар олиб бориш сирлари ва уларни амалиётда қўллаш;

- тайёр тадбиркорлик ва бизнес субъектларини давлат рўйхатидан ўтказиш, манфаатдор шахслари билан мулоқотлар ўрнатиш ва ҳисоботдорлик, бизнес ва тадбиркорлик соҳасида бозор конъюктурасини ўрганиш тадқиқот олиб бориш;

- бозорларни таҳлил қилиш турлари, улар асосида бизнес-режа тузишни ўргатиш, ўзлари бизнес-режа ёзишлари қанчалик муҳимлигини ва тўғри эканлиги ҳақида тушунча бериш;

- бизнес ва тадбиркорлик учун Исм (бизнес номи) яратиш ва танлашнинг аҳамияти, тадбиркорлик ва бизнес ҳаёти тушунчаси, йўқотишларни баратаф этиш ёки бизнесдаги барқарорликка эришиш тамойиллари "win-win"<sup>5</sup> ва brend яратиш;

- солиқ ва солиққа масалалари, бюджет даромадлари, имтиёзлар ва преференциялар, субсидиялар ва грантлар каби имтиёзларни амалда қўллаш усуллари;

- ўз маблағлари ва банк кредитлари ҳисобидан танланган бизнесни молиялаштиришда айланма маблағлар ва асосий воситаларни харид қилиш, аккредитивлар, лизинг, лойиҳаларни молиялаштириш, қимматли қоғозлар, шериклик, кластер, сегмент ва бирлашмаларга қўшилиш каби молиялаштириш усуллари бўйича батафсил билим улашиш;

- муаммоли вақтларда ечим топиш, стресс ҳолати юзага келишини олдини олиш, ўзига ишонч каби ҳиссий туйғуларни бериш;

- рақобат ва рақиблар, шериклик ва ишонч асосида яратилган бизнесни тарғиб қилиш;

Улар экспорт салоҳиятини кенгайтириш йўллари, банклар орқали валюта операцияларини кенгайтиришни ўрганадилар. Унда оилавий бизнесни бошлаш, бизнесни келажак авлодга бериш ва етказиш, тадбиркорлик асослари ва амалий тушунчаларни ўргатиш ёки бизнесни тугатиш каби муҳим жараёнларга эътибор қаратилади. Банклар томонидан танланган ва маъқулланган номзодларни ишбилармонларга лойиҳа ташаббускори

<sup>5</sup> <https://marketbusinessnews.com/financial-glossary/win-win-definition-meaning/> - Ғалаба қозониш – бу вазият, ўйин, музокаралар ёки сценарий, унда барча томонлар у ёки бу тарзда фойда кўради-ютқазганлар бўлмайди. Можароли вазиятлар, иштирокчилар ечим топишга ҳаракат қилсалар, ҳамма ғалаба қозониш стратегияси, барча иштирокчилар ғолиб чиқади.



сифатида тадбиркорлик фаолияти асосларидан тортиб, бизнесни босқичма-босқич, улар даромад (фойда)га етгунга қадар ва эҳтимол катта бизнес тоифасига киргунигача ёрдам беришади.

## НАТИЖАЛАР

Биз танлаган мақолада, тижорат банклари томонидан мижозларни ўрганишда кредит скоринги, мажбуриятларни бажармасликдан кўрилган йўқотишлар (Loss Given Default)<sup>6</sup>, эҳтимолий дефолт (Probability Default)<sup>7</sup>, дефолт таъсири (Exposure at Default)<sup>8</sup> каби ковенантни минимал йўқотишлар орқали кредитлаш ёки молиялаштиришга эътибор қаратилади. Келажакда ковенант ёки мижозларнинг молиявий қийинчиликлари туфайли банка етказиладиган зарарларни ҳисоблаш усуллари орқали ҳисобланади. Агар, тадбиркорлар ёки бизнес эгаси ва ходимларини янада билимини ошириш орқали уларга тўғри йўлни кўрсатиб рискларни камайтириш эса, анча банклар rischi камаяди ва банклар ўз мижозларига ҳар томонлама бир фикрлилар пайдо бўлади, тадбиркорлик ҳар томонлама моддий ва маънавий рағбатлантирилади. Банклар нафақат банк бизнеси балки, мавжуд бизнес тизимининг бошқа соҳаларига ҳам кириб борадиган мутахассисларга эга бўлишади.

## МУҲОКАМА

Мақоламизда келтирилган фикрлардан тижорат банклари учун корпоратив бошқарув тизимини тўғри йўлга қўйиш, банкнинг Директор Кенгаши, акциядорлари ва манфаатдор томонлари жамият олдида жавобгарликлари тушунчасини етказиш. Рискларни бошқариш кўплаб корпоратив стратегияларнинг асосидир. Йиллар давомида йиғилган обрў-эътибор, коррупция можаролари ёки экология офатлар каби ҳодисаларда бир неча соат ичида йўқ бўлиш мумкин. "Тўғри хатти-ҳаракатлар"нинг корпоратив маданиятни яратиш орқали рискларни камайтириш мумкин. Бундай ҳаракатлар натижасида банклар ўз обрўсини, мижозларини янада кўпайтиришади ҳамда рискларини ҳимоя қилишади.

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<sup>6</sup> <https://www.investopedia.com/terms/l/lossgivendefault.asp> Дефолт ҳолатида келтирилган зарар (LGD) бу қарз олувчи қарзни тўлашдан бош торгганда, банк ёки бошқа молия институти йўқотадиган пул миқдори. Молиявий институтнинг умумий LGD жами йўқотишлар ва рисклардан фойдаланган ҳолда барча қарзлар кўриб чиқилгандан кейин ҳисобланади.

<sup>7</sup> <https://www.investopedia.com/terms/d/defaultprobability.asp> Дефолт ҳолати эҳтимоллиги – бу қарз олувчи белгиланган муддатда, одатда бир йил давомида, режалаштирилган тўловларни амалга ошира олмаслиги эҳтимоли. У турли хил рискларни бошқариш ёки кредит таҳлилининг сценарийларни қўлланилиши мумкин. Дефолт эҳтимоли (PD) деб ҳам аталади, бу нафақат қарз олувчининг хусусиятларига, балки иқтисодий муҳитга ҳам боғлиқ.

<sup>8</sup> [https://www.investopedia.com/terms/e/exposure\\_at\\_default.asp](https://www.investopedia.com/terms/e/exposure_at_default.asp) Дефолт ҳолатида рентабеллик (EAD) бу кредит олувчининг дефолти ҳолатида банкнинг умумий қиймати. Молиявий ташкилотлар рейтингга асосланган (IRB) ёндашувдан фойдаланиб, ўз рискини ҳисоблайдилар. Банклар одатда EAD тизимин баҳолаш учун рискларни бошқаришнинг ички стандарт модлидир. Банк фаолиятдан ташқари, EAD бу кўрсаткични кредитга таъсир қилувчи омил деб номланади.



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## **IMPACTS OF LADDER TRAINING ON SELECTED PHYSICAL FITNESS VARIABLES AMONG KABADDI PLAYERS**

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### **ABSTRACT**

*This study was designed to investigate the impacts of ladder training on selected physical fitness variables among intercollegiate women kabaddi players. Thirty women kabaddi players were randomly selected from Dr. Sivanthi Aditanar College of Engineering, Tiruchendur, Govindammal Aditanar College for women, Tiruchendur, Wavoo Wajeeha women's college of arts and science, veerapandipattanam were participant selected. The age of the participant was ranged from 18 to 25 years. They were divided into two equal groups. The group 1 is considered as experimental group (ladder training) and group 2 was considered as control group. Pre-test was conducted on Speed, Agility and leg explosive power for both the groups and the reading were carefully recorded in their respective unit as pre-test score. After pre test, experimental group was treated with specific ladder training, for duration of 60 minutes, three days per week for a period of twelve weeks. The control group was not treated with any special training. After twelve weeks of training post test was conducted and the reading were carefully recorded in their respective units as post test score. The pre and post test were taken for analysis. The collected data on physical fitness variables due to twelve weeks ladder training was analysed by dependent 't' test with 0.05 level of confidences. From the results of the study, it was found that there was a significant improvement on physical fitness variables among intercollegiate women kabaddi players.*

**KEYWORDS:** Ladder training, Physical Fitness Variables, Kabaddi Players.

### **INTRODUCTION**

Physical fitness plays a crucial role in the success and performance of athletes across various sports disciplines. Kabaddi, a highly dynamic and contact sport, requires athletes to possess a unique set of physical attributes to excel. Among these attributes, agility, speed, coordination, and cardiovascular endurance are particularly essential for Kabaddi players to exhibit their skills effectively.

Ladder training, also known as agility ladder training, has gained popularity as an effective method for enhancing agility, quickness, footwork, and overall athletic performance. This training technique involves performing a variety of footwork patterns and movements in and around a ladder-like structure on the ground. It offers a comprehensive and systematic approach to develop neuromuscular coordination, spatial awareness, and rapid change-of-direction abilities.

Understanding the impacts of ladder training on specific physical fitness variables among Kabaddi players can provide valuable insights into optimizing their training regimens. The selected physical fitness variables for this study include agility, speed, coordination, and cardiovascular endurance. By examining the effects of ladder training on these variables, coaches, trainers, and athletes can gain evidence-based knowledge to improve their training protocols and ultimately enhance performance on the Kabaddi court.

### **STATEMENT OF THE PROBLEM**

The purpose of this study was to investigate the effects of ladder training on selected physical fitness variables among intercollegiate women Kabaddi players. Kabaddi is a highly demanding and physically challenging sport that requires athletes to possess a unique set of physical attributes, including agility, speed and leg explosive power. The success and performance of Kabaddi players depend on their ability to exhibit these physical fitness variables effectively during matches. While ladder training has been widely recognized as an effective method for improving physical fitness in various sports, limited research has specifically explored its impact on intercollegiate women Kabaddi players. Therefore, it is essential to examine the effects of ladder training on these players to better understand its potential benefits and optimize their training programs. By investigating the effects of ladder



training on selected physical fitness variables, such as agility, speed and leg explosive power this study aims to provide evidence-based insights that can assist coaches and trainers in developing tailored training protocols for intercollegiate women Kabaddi players, thereby enhancing their performance on the Kabaddi court.

**EXPERIMENTAL DESIGN**

The selected thirty subjects were randomly divided into two equal groups consist of 15 each such an experimental group and control group. Pre-test was conducted on Speed, Agility and leg explosive power for the two groups and the reading were carefully recorded in their respective unit as pre-test score. After pre test, experimental group was treated with specific ladder training, for duration of 60 minutes, three days per week for a period of twelve weeks. The control group was not treated with any special training. After twelve weeks of training post test was conducted and the reading were carefully recorded in their respective units as post test score. The pre and post test were taken for analysis.

**TRAINING PROGRAM**

The training program is design for 60 minutes per session in a day, three days in weeks for a period of twelve weeks duration these 60 minutes included 10 minutes warm up and 10 minutes warm down remaining 40 minutes allotted for ladder training program. Every four weeks 10% intensity is increase from 50% to 60% of work load. The training load is increased from the maximum working capacity of the subjects.

**STATISTICAL TECHNIQUE**

The collected data on physical fitness variables due to twelve weeks ladder training analyzed by using means and standard deviation. In order to find out the significant changes if any dependent ‘t’ test will be applied 0.05 level of confidences fixed to level of significant.

**RESULTS**

**Table 1: Computation of ‘t’ ratio between pre and post-test means of experimental group on physical fitness variables**

Experimental Group					
Physical Fitness Variables	Pre/Post test	Mean	Std. Deviation	Std Error Mean	‘t’ Ratio
Speed	Pre-Test	8.63	0.58	0.24	10.28*
	Post-Test	8.38	0.63		
Agility	Pre-Test	11.99	0.60	0.42	11.06*
	Post-Test	11.85	0.60		
Leg Explosive power	Pre-Test	1.65	0.12	0.01	20.40*
	Post-Test	1.77	0.12		

\*Significant at 0.05 level of confidence (2.145), 1 & 14.

**Table 1** reveals that the Computation of ‘t’ ratio between pre and post-test means of experimental group on Physical fitness variables. The ‘t’ ratio on Speed, Agility and Leg Explosive power are 10.28, 11.06 and 20.40 respectively. The required table value was 2.14 for the degrees of freedom 14 at 0.05 level of significance. Since the obtained ‘t’ ratio values were greater than the table value, it was found statistically significant.

**Table 2: Computation of ‘t’ ratio between pre and post-test means of Control group on Physical Fitness variables**

Control Group					
Physical Fitness Variables	Pre/Post test	Mean	Std. Deviation	Std Error Mean	‘t’ Ratio
Speed	Pre-Test	8.63	0.58	0.55	1.12
	Post-Test	8.73	0.57		
Agility	Pre-Test	11.95	0.60	0.03	1.17
	Post-Test	12.14	0.61		
Leg Explosive power	Pre-Test	1.56	0.12	0.89	1.04
	Post-Test	1.53	0.11		

\*Significant at 0.05 level of confidence (2.145), 1 & 14.

**Table 2** reveals that the Computation of ‘t’ ratio between pre and post-test means of control group on Physical fitness variables. The ‘t’ ratio on Speed, Agility and Leg Explosive power are 1.12, 1.17 and 1.04 respectively. The required table value was 2.14 for the degrees of freedom 14 at 0.05 level of significance. Since the obtained ‘t’ ratio values were lower than the table value, it was found statistically no significant.





## DISCUSSION ON FINDINGS

The effect of ladder training is a fantastic training which has been found to be beneficial for the kabaddi players. To study the ladder training on physical fitness variable of intercollegiate women kabaddi players, it was tested under, to differentiate between ladder training group and control group. It also improves the overall playing ability, game tactics, anaerobic capacity, quickness, eye hand coordination and other than some physical fitness components are namely speed, agility, and power.

The following studies was revealed that **Vallimurugan et al., (2022)<sup>1</sup>**, Effects of Circuit Training on Selected Physical Fitness Variables among Hockey Players. **Vallimurugan et al., (2022)<sup>2</sup>** Effects of Ladder Training on Selected Physical Fitness Variables among Hockey Players. **A hidyat (2022)<sup>4</sup>**, effect of agility ladder exercise on agility of participants extra-curricular futsal at bina darma university. The result of the study supports the result of the present study. **V Pratheep Kumar et al., (2019)<sup>7</sup>** Effect of ladder training and combination of ladder training with plyometric training on selected skill performance variable of school basketball players. The result of the study supports the result of the present study. These finding had not been previously replicated for a sample of college students. The result of the study showed that the control group was not significantly improved.

## CONCLUSIONS

Based on the findings and within the limitation of the study it is noticed that practice of ladder training helped to improve physical fitness variable among intercollegiate women kabaddi players. It was also seen that there is progressive improvement in the selected criterion variables of ladder training group of intercollegiate women kabaddi players after twelve weeks. Further, it also helps to improve speed, agility and leg explosive power. It was concluded that individualized ladder training group showed a statistically significant over the course of the treatment period on physical fitness variables of among intercollegiate women kabaddi players.

1. It was concluded that individualized effect of control group showed a statistically insignificant over the course of the period on selected physical fitness variables of intercollegiate women kabaddi players.
2. The results of comparative effects lead to conclude that the ladder training group had better significant improvement on selected physical fitness variables (speed, agility and leg explosive power) of intercollegiate women kabaddi players as compared to their performance with control group.

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