ENVIRONMENTAL SUSTAINABILITY AND ITS EFFECT ON THE SCENARIO OF SOCIO-ECONOMIC AND POLLUTION ASPECTS OF WATER BODIES IN UJJAIN, M.P.

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ABSTRACT

The protection of Natural resources is first and foremost responsibility of human beings towards environmental sustainability. Nobody can predict the 'nature' of Nature, which changes frequently and we have to come up with the fluctuation of nature!Otherwisesuper factors of nature will destroy the vital life.Environmental sustainability is the responsible use of natural resources to ensure they will be around in the future. It is important because the Earth is a finite place, with limited land, water, and wildlife. Responsibilities towards environmental sustainability will open the door of creative approach and progress in socio-economic aspects. National Service Scheme and National Cadet Corps put forth their milestone efforts regarding socio-economic-natural development of human wellbeing. Sustainable resource use is the only way to make sure future generations will have what they need to survive. Renewable energy, such as solar, wind, hydroelectric, and biomass, are examples of sustainable practices. Sustainability in agriculture includes crop rotation, crop cover, and smart water usage, while sustainability in forestry involves selective logging and forest management. It is proven that environmental economics has many benefits in preventing environmental problems and achieving sustainability. This economic concept also correlates with the majority of the goals of sustainable development programs, assisting many countries in achieving these objectives. The environmental contamination is seeming to a major problem of the World. In the present study the water contamination were thoroughly studied on the basis of estimation of pH, Turbidity, TSS, TDS on the basis of WHO and NDWQS standards.

KEY WORDS- *Environmental Sustainability, National Service Scheme, National Cadet Corps, Socio-economic aspects, Renewable energy, Biomass, WHO, NDWQS, TSS, TDS, pH, Turbidity.*

INTRODUCTION

The depletion of natural resources and environmental deterioration are two further environmental consequences of extensive economic activities. National Service Scheme reflects socio-environmental correlation through various programmes and Camps .It is acknowledged that various economic activities, including human and industrial activities frequently result in various environmental problems, such as water and air pollution. According to the World Health Organization (WHO), water pollution is one of the most major health risks, causing about 2 million human deaths each year. Annually, nearly the same number of premature deaths are caused by air pollution all over the world Air pollution, moreover, can lead to a severe degradation of the atmosphere, as well as many other environmental issues, including climate change, and famine. In the long term, all of these issues will not only disrupt the economy but may also affect society's well-being. However, the path to achieving environmental economics and the sustainable development goals might not be so simple. Environmental problems continue to grow in severity, and the solutions provided by environmental economists have proven ineffective [2]. It is also known that the implementation of environmental economics strategies leads to several other consequences, both economically and socially. For example, the rise of the "shadow economy", which is caused by inefficient fiscal policy. The "shadow economy" has spread to 162 Western countries, accounting for an average of 34.5 percent of official GDP [2]. In Asian countries, the average percentage of the "shadow economy" has reached about 31% of the official GDP. In the long term, the increasing level of the shadow economy can disrupt the stability of the economy [8]. Another consequence is market monopolization, which is found in the implementation of the green consumerism strategy. The environmental contamination of heavy metals such as lead, cadmium, mercury or cromium among other, is a serious and continuing problem throughout the world. Developmental toxicity among the harmful effects derives from the exposures to these elements. arsenic, mercury, cadmium and lead are considered as major environmental pollutants as well as developmental toxicants (Chang, 1996).

OBJECTIVES

The main objective of this research is to elucidate the Socio-Economic-Environmental aspects and environmental contaminants with their correlation with each other and promising effect of environmental fluctuations of especially five super factors viz: Light, Temperature, water, Humidity and Pressure on Socio-Economic life of human beings. In present circumstances it seems essential for the protection of the Nature and the balance of its ecosystems for peaceful and productive life of living beings.

HYPOTHESIS

This research work is absolutely based on the 10% law of energy in an ecosystem (Odum, 2004). This law is actually the part of Universal law of energy i.e. 'Energy neither created nor destroyed, it changes from one system to another system. Secondly, the energy of Universe increasing day by day due to tremendous increase in the establishment of various systems day by day on earth. 10% law is actually the transfer of 10% of total amount of energy in each and every trophic level of an ecosystem. This continuous transfer of energy maintains the life of living beings in Socio-Economic-Environmental aspects, whereas drastic energy fluctuation due to environmental contamination causes randomness in the environmental sustainability of the Nature.

LITERATURE REVIEW

The work of Following Authors/Scientists / Economists are in support of this research work Odum (2004), Investigated the pattern of environmental factors and global ecological aspects. Drexhag and Murphy (2010), thoroughly studied the Sustainable development of nature. Dunlop *et al.* (1983) studied environmental behavioral aspects whereas, Elkington (1997) studied environmental performance index. On the other hand, Maidment (2009) observed the global economic aspects and its drastic changes. Whereas, Nilsson *et al.* 2004 thoroughly studied willingness to accept climate change stratagies. While Pannayotou (1993) studied environmental degradation at different stages of economic development. Meanwhile Plummer (1989) thoroughly studied new emphasis on self actualization with reference to economics and sustainable development. Parameters are included in the research work on the basis of guidelines of WHO. Dissmeyer (2000) investigated the drinking water quality from Forests and Grasslands ecological areas. Azrina *et al.* (2011) observed major inorganic elements in tap water samples in Penninsular Malaysia.While Fawell (1993) studied the impact of inorganic chemicals on water quality and health. Meanwhile Jia *et al.* (2010) thoroughly studied testing and analysis of drinking water quality in the rural area of high tech district in Taian city and Katsoyiannis and Zouboulis (2013) seen removal of uranium from contaminated drinking water. While Tuzen and Soylak (2006) found evaluation of metal levels of drinking water from Tokat- Black sea region of Turkey. While Heyderi and Bidgoli (2012) studied chemical analysis of drinking water of kashan district of Iran. Meanwhile Pillay *et al.*(2001) investigated drinking water quality surveilliance and safety in Malaysia. While Jahi (2002) thoroughly studied issues and challenges in environmental management in Malaysia. Meanwhile Chan (2004) studied managing water resources in the 21st century all stakeholders towards sustainable water resources management in Malaysia. On the other hand, Hasbiyana (2008) investigated the determination of heavy metals in tap water by using atomic absorption spectroscopy. Meanwhile Cui et al. (2011) thoroughly studied determination of methylitin compounds in urine of occupationally exposed and general population by in situ ethylation and head space SPME coupled with GC-FPD. Many other scientists effectively done their research work in the field of environmental sustainability and pollution mentioned in the references.

RESEARCH METHODOLOGY

The study of environmental sustainability is hampered by two factors, first the frequent changes in the environment and second the environmental pollution. The present research work is based on the survey of water bodies of different area of Kshiprariver with collection of water sample for physic-chemical analysis, Turbidity, and Level of contamination with reference to environmental variables. The whole plan and methodology of the present research was based on Environmental Sustainability and its effect on the Scenario of Socio-Economic and pollution aspects of water bodies in Ujjain area of M.P. The survey parameters were taken as follows:

* Collection of sample and survey of the water bodies in every six months of the year 2019-20
* Collection of sample and survey of the water bodies in every six months of the year 2020-21
* Collection of sample and survey of the water bodies in every six months of the year 2021-22
* Collection of sample and survey of the water bodies in every six months of the year 2022-23 till 31 December 2023

EXPERIMENTAL DESIGN/ SURVEY PARAMETERS

Survey– I
1. Collection of water sample in collection bottles for Physico-chemical analysis in the first six month of the 2019 i. e. July 2019-Dec.2019.
2. Collection of water sample in collection bottles for Physico-chemical analysis in the first six month of the 2019 i. e. Dec.2019- June 2020.

Survey– II
1. Collection of water sample in collection bottles for Physico-chemical analysis in the first six month of the 2019 i. e.June 2020-Dec. 2020.
2. Collection of water sample in collection bottles for Physico-chemical analysis in the first six month of the 2019 i. e. Dec. 2020-June 2021.

Survey– III

3. Collection of water sample in collection bottles for Physico-chemical analysis in the first six month of the 2019 i. e.June 2021-Dec.2021
4. Collection of water sample in collection bottles for Physico-chemical analysis in the first six month of the 2019 i. e.Dec.2021-June 2022.

Survey– IV

5. Collection of water sample in collection bottles for Physico-chemical analysis in the first six month of the 2019 i. e. June 2022-Dec.2022.
6. Collection of water sample in collection bottles for Physico-chemical analysis in the first six month of the 2019 i. e. Dec.2022-June 2023.

Survey– V

7. Collection of water sample in collection bottles for Physico-chemical analysis in the first six month of the 2019 i. e. June 2023-Dec.2023.

During experimental survey, following parameters were recorded.

a) Time duration of survey on site.
b) Collection of water from various area of the water body to see the concentration and quality of water in that particular area.
c) Sampling and marking of collection bottle on site.
d) Estimation of acidity/alkalinity by Universal Indicator Solution on site.
e) Estimation of concentration of water pollutants of the varioussample water body in the laboratory.
f) Estimation of Turbidity and pollution level of water body by turbid meter in the laboratory.
g) Survey of surrounding people affected by water pollution on site.
h) Estimation of pH of contaminated water by pH meter in the laboratory.
i) Estimation of TSS (Total Suspended solids) and TDS (Total Dissolved Solids) byvacuum filtration process in the laboratory.

STATISTICAL ANALYSIS

For testing the significance of difference between the means of the reading of experimentalsurvey,student't' test was used and expressed in SD ± SEM (Bancroft, 1966). The different histograms were plotted for experimental survey.

RESULT ANALYSIS

The Socio-Economic-Environmental Fluctuations and environmental contamination arethe real means of disturbance in the life of living beings especially human beings. Environmental factors are most powerful factors of the Nature which influences drastically the socio-economic balance of life. Social organization like National Service Scheme (NSS) can remove this fluctuation through its remarkable way of variety of social work to maintain the ecosystem of the Earth. Whereas, National Cadet Corps protect the Country by means of Social, Economic, and Defensive aspects.In the present study, the contamination level of various area of kshipra river water body was considerably fluctuated in the span of successive three years, i.e. 2019 to 2023 respectively.In the year 2019-20 the water contamination were slightly increased in the month of July and August. Whereas in the month of September and October, contamination level was negligible. But from November to June, the contamination level were tremendously increased (Table-I). In the year 2020-21 the contamination level were gradually increased from July to June respectively (Table-II). Meanwhile in the year 2021-22, the water contamination level was fluctuating in approx. every two months from July to June respectively (Table-III). In the year 2022-23 remarkable water contamination were observed from July to June 2023(Table-IV).Thus after estimation of pH, Turbidity, TSS, TDS of contaminated water of Kshipra River water body of Ujjain, a drastic fluctuation were observed with reference to pollution level . Though, during COVID19 period, the pollution was very less may be due to decline in the unsocial activities of human beings against nature following lockdown. Although, activities of NSS volunteers and NCC cadets towards cleanliness campaign will provide a major clue for clean Ujjain campaign or pollution free city.

Table-I: Experimental Survey of water body in different months of the year 2019-20
Analysis of water contamination in Experimental Survey No. I by NDWQS.

S.No.	Jul	Aug	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June
1.	06.90 ± 0.3	04.80 ± 0.6	02.40 ± 0.4	03.40 ± 0.2	11.76 ± 0.5	08.29 ± 0.7	14.39 ± 0.6	10.60 ± 0.6	20.70 ± 0.6	17.20 ± 0.2	22.64 ± 0.3	19.74 ± 0.9

All values are expressed in mean ± SEM.

Table-II: Experimental Survey of water body in different months of the year 2020-21
Analysis of water contamination in Experimental Survey No.II NDWQS.

S.No.	Jul	Aug	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June
1.	06.90 ± 0.3	04.80 ± 0.6	02.40 ± 0.4	03.40 ± 0.2	11.76 ± 0.5	08.29 ± 0.7	14.39 ± 0.6	10.60 ± 0.6	20.70 ± 0.6	17.20 ± 0.2	22.64 ± 0.3	19.74 ± 0.9

All values are expressed in mean ± SEM.

Table-III: Experimental Survey of water body in different months of the year 2021-22
Analysis of water contamination in Experimental Survey No.III NDWQS.

S.No.	Jul	Aug	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June
1.	06.90 ± 0.3	04.80 ± 0.6	02.40 ± 0.4	03.40 ± 0.2	11.76 ± 0.5	08.29 ± 0.7	14.39 ± 0.6	10.60 ± 0.6	20.70 ± 0.6	17.20 ± 0.2	22.64 ± 0.3	19.74 ± 0.9

All values are expressed in mean ± SEM.

Table-IV: Experimental Survey of water body in different months of the year 2022-23
Analysis of water contamination in Experimental Survey No.IIINDWQS.

S.No.	Jul	Aug	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June
1.	06.90 ± 0.3	04.80 ± 0.6	02.40 ± 0.4	03.40 ± 0.2	11.76 ± 0.5	08.29 ± 0.7	14.39 ± 0.6	10.60 ± 0.6	20.70 ± 0.6	17.20 ± 0.2	22.64 ± 0.3	19.74 ± 0.9

All values are expressed in mean ± SEM.

LIMITATIONS OF THE STUDY
Nobody can predict the fluctuation of Nature! Once the Nature changes, it influences on whole scenario of Socio-Economic life of living beings. One should protect the Nature in all aspects by understanding its frequently changing circumstances. This research work is mainly based on Socio-Economic-Environmental Correlation and understanding fluctuations in the form of decline in Socio-Economic life. However for Socio-Environmental purpose, further investigations are necessary.

CONCLUSION
Sustainable use of resources necessarily includes the rational use of natural resources, to provide solutions for the local people who make their living by tapping and processing this resources. A project for multiple uses of natural resources like forest water and energy should be launched. The intense social working of NSS and Defensive working of NCC should be continuingin the new aspects.

SCOPE FOR FURTHER RESEARCH
The Scope of sustainable development includes-
1. Using the available resources judiciously and working towards maintaining the ecological balance. 2. To prevent degradation of the environment and laying emphasis on protecting the environment.3.To prevent overexploitation of resources.4. Economic Growth: For creating an economy that is sustainable and growing in the right direction. 5. Protecting the Environment: This objective focuses on contribution by humans towards protecting and enhancing the natural environment, by minimizing pollution and waste, also working towards reducing the global carbon footprint.6. Social Inclusion: This objective focuses on providing the facility of housing for future generations and assisting in creating healthy, strong and vibrant global communities.

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