



SUSTAINABILITY OF CACAO INDUSTRY DEVELOPMENT PROGRAMS IN DAVAO DEL NORTE, PHILIPPINES

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ABSTRACT

This study aimed to target four distinct research objectives which included describing the socio-economic profile of the cacao farmers-beneficiaries of the development programs in Davao del Norte, identifying the dimensions, level of the sustainability index, factors affecting the sustainability of the said development programs. This study utilized the quantitative research design employing the descriptive approach, the exploratory factor analysis (EFA), and the regression analysis technique. One research questionnaire was used as instrument in this study. A total of 260 farmers served as respondents to this study. The findings revealed that majority of the cacao farmers in Davao del Norte are male, married, aged 56-65 years old, Catholic Christian, Bisaya, with 41-50 years of farming experience, with 10 years and below cacao farming experience, earning a monthly income of Php. 10,000.00 and below, belonging to a household size with 4-6 members, having a membership to either Pamacaun Farmers Association, Alonga Sagayen Water System Association, or Cacao Farmers Linao Association, and with 6 to 10 years of membership. Moreover, findings also revealed 14 emerging dimensions of the sustainability of cacao industry development programs in Davao del Norte based on the responses of the cacao respondents. Furthermore, it was also found that the level of sustainability index of cacao industry development programs in Davao del Norte vary from one another. Lastly, findings revealed that only four of the factors significantly affected the sustainability of cacao industry development programs in Davao del Norte which are the years of farming experience, household size, organization membership, and years of membership.

KEYWORDS: *Sustainability, Development Programs, Cacao Industry*

INTRODUCTION

The cacao industry holds significant promise for economic development and agricultural sustainability, yet persistent challenges threaten its viability, particularly in regions like Davao del Norte, Philippines. Despite efforts to bolster production through development programs, issues such as poverty among farmers, environmental degradation, and resource constraints persist. Understanding the sustainability of these development initiatives is crucial for informing effective policies and interventions.

In similar regions with comparable climatic conditions, such as Indonesia and the Philippines, the cacao industry faces multifaceted challenges including low production yields, disease outbreaks, and inadequate farming practices. Programs like the Cacao Double-Up Program (CDUP) have been implemented to address these challenges, but their long-term impact remains uncertain.

This study aims to address gaps in existing literature by assessing the sustainability of cacao industry development programs in Davao del Norte. By examining socioeconomic profiles, identifying dimensions of sustainability, and assessing factors influencing program effectiveness, this research seeks to provide valuable insights for stakeholders. The significance of this study lies in its potential to inform policy decisions and interventions aimed at enhancing the sustainability of cacao production. By understanding the socioeconomic context, dimensions of sustainability, and factors affecting program effectiveness, stakeholders can tailor interventions to address specific challenges faced by cacao farmers and promote long-term viability of the industry.



Reviewing the current state of research reveals a complex landscape marked by poverty among farmers, environmental threats, and challenges in program implementation. Controversies and diverging hypotheses exist regarding the most effective strategies for sustainable cacao production.

The primary aim of this study is to assess the sustainability of cacao industry development programs in Davao del Norte, with specific objectives including describing socioeconomic profiles, identifying dimensions of sustainability, determining sustainability index levels, and identifying factors influencing program sustainability.

In conclusion, this study provides valuable insights into the sustainability of cacao industry development programs in Davao del Norte, highlighting socioeconomic factors, dimensions of sustainability, and factors affecting program effectiveness. By addressing these issues, stakeholders can work towards promoting a more sustainable and thriving cacao industry in the region.

METHODOLOGY

This study utilized the quantitative research design employing the descriptive approach, the exploratory factor analysis (EFA), and the regression analysis technique. Quantitative research is the collection and interpretation of numerical information. It could be employed to identify trends and medians, make projections, examine connections between variables, and extrapolate results to larger samples. It deals with data that are numerical or that can be converted into numbers (Sheard, 2018). In contrast, the descriptive approach seeks to characterize a population, circumstance, or occurrence precisely and methodically. It can answer queries about the what, the where, the when, and the manner in which, but not the reason. It tracks and analyzes the variables but is not in a position to influence them (McCombes, 2019). In contrast, Exploratory Factor Analysis (EFA) is typically employed to determine the framework of factors of a measurement and to assess its internal stability. When investigators have no assumptions regarding the character of the fundamental factor framework of their measurement, EFA is frequently recommended (Watkins, 2018). In addition, regression analysis is a potent statistical technique that permits the examination of the causal connection among multiple variables of concern. Although there are numerous types of regression analysis, they all investigate the impact of a number of independent variables on the dependent variable (Montgomery et al., 2021).

The quantitative research design was appropriate for the study as the data gathered are all numerical in nature. This data was generated using the survey questionnaires to be distributed among the respondents. Meanwhile, the descriptive approach was also fit for the other objectives of the study. Particularly, this approach allowed the descriptive analysis of the socio-economic profile of the cacao farmers and the level of sustainability of cacao industry development programs in Davao del Norte. Meanwhile, the exploratory factor analysis was utilized to determine the dimensions of the sustainability of cacao industry development programs in Davao del Norte. Also, the regression analysis helped determine the factors that affect the sustainability of cacao industry development programs in Davao del Norte.

Sources of Data

Usually, quantitative study design requires a sizable sample size. This is due to the fact that the outcomes of your study will be indicative of a wider range of people. Experiments, monitored observations, polls document, kiosk, mobile devices, survey forms, longitudinal research, polls, phone conversations, and personal conversations are all ways to collect quantitative data (FreeOnlineSurveys, 2021).

In the conduct of this study, the primary data sources were the survey questionnaires given among the recipients of cacao development programs in Davao del Norte. In addition, the researcher utilized additional sources of information such as publications, periodicals, articles, and internet-based resources to corroborate the study's conclusions (Trefry, 2020). Thus, the aforementioned data sources were adequate for achieving the respondents' desired interpretation and obtaining the information required for the analysis of the data.

Data Gathering Instrument

This survey was conducted using a single research questionnaire. This questionnaire was selected as an appropriate instrument in light of the study's purpose. The research instrument was turned in for validation by the specialists. The reliability of the questionnaire was also determined by administering a pilot test to at least 35 cacao producers from Davao del Norte who were not among the participants of the study. The data was subsequently analyzed to determine the Cronbach alpha value.



The survey questionnaire was divided into two parts. Part I surveyed their socio-economic profile. This is where they provided their information regarding their sex, civil status, age, religious affiliation, ethnicity, years of farming experience, years of farming cacao experience, monthly income, household size, organization membership, and years of membership. Meanwhile, Part II surveyed their responses on the level of the sustainability of cacao industry development programs in Davao del Norte. Survey questions were based on the adapted questionnaire called *Program Sustainability Assessment Tool* by Douglas et al., (2014).

Table 1. Parameter Limits and Interpretation of Data

Range of Means	Descriptive Equivalent	Interpretation
4.51 – 5.00	Very High	This means that the sustainability of the cacao industry development programs is manifested at all times.
3.51– 4.50	High	This means that the sustainability of the cacao industry development programs is manifested most of the time.
2.51 – 3.50	Moderate	This means that the sustainability of the cacao industry development programs is manifested occasionally.
1.51 – 2.50	Low	This means that the sustainability of the cacao industry development programs is manifested in few instances.
1.00 – 1.50	Very Low	This means that the sustainability of the cacao industry development programs is not manifested at all.

Sampling Technique

This study's respondents were selected using a basic random sampling technique. Simple random sampling is a form of sampling for probability in which an investigator selects a subset of a population's respondents at random. Every individual in the population held an equal probability of being chosen. Then, data was obtained from the largest possible proportion of this randomized subset. In this study, the researcher had to scout for 260 qualified respondents from the 54 associations who became beneficiaries of the CDUP in Davao del Norte only as a product of the computation using the Slovin's formula.

Procedure of the Study

Steps and processes were established to collect relevant data from respondents for the purpose of this research. The researcher obtained authorization and permission to conduct the investigation from the Dean of the institution's Graduate School after a comprehensive evaluation of the research procedures to guarantee the study's integrity. The researcher then submitted the revised questionnaire to the tool validators to ensure that its validity was sufficient.

Third, the researcher sent communication letters to the Provincial Office, then to the City and Municipality Offices. After the approval, the researcher also sent the approved consent to the presidents of the associations where my respondents work for. Then, the researcher asked for guidance from their respective human resource officers for my communication with the actual respondents. Then, the distribution of the questionnaires to the respondents followed through the aid of whoever is available and capable from the association. The researcher personally handed in the questionnaires and explained the research tool and its purpose to the respondents. After they answered the questionnaires, the researcher retrieved all survey tools. Finally, the researcher tallied and tabulated all the data gathered from the respondents and subjected them to statistical computation and analysis.

Statistical Treatment

The results were analyzed and interpreted accordingly utilizing the following statistical tools.

F/ % / Mean / SD. These statistical tools will be used to analyze data to describe the socio-economic profile of the cacao farmers in Davao del Norte.

Inferential Statistics. This statistical tool will particularly use the Exploratory Factor Analysis (EFA) to determine the dimensions of the sustainability of cacao industry development programs in Davao del Norte.

Descriptive Statistics. This is the statistical method to be used in determining the level of sustainability using the factors generated from the EFA.

Multiple Regression Analysis. This statistical tool will be used to determine the factors affecting sustainability index of cacao industry development programs in Davao del Norte. The working model is:

$$y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_iX_i + e, \text{ where:}$$

y= the sustainability index

X_i= beta coefficient

B₀= constant

X_i= independent variables (age, sex...)

e= error percentage

RESULTS AND DISCUSSION

Socio-Economic Profile of the Respondents

Sex

Shown in Figure 1 is the distribution of sex characteristics among the respondents of the study. It can be noticed that there are more males from among them consisting of 55.8% of the total sample size which is equivalent to 145 male farmers. Meanwhile, the remaining 44.2% of the respondents are female farmers which is equal to 115 female farmers. This result corresponds to the findings of Kaur & Singh (2020) who also found out in their study on that there are more male farmers than female farmers in India. While there is a substantial difference in numbers between the two sexes, it does not imply a biased perception in their honest responses to the employed survey. It is also not fair to conclude that males are meant to be better farmers compared to female farmers. As Kaur & Singh (2020) emphasized, the farming efficiency of farmers are not significantly affected by their sex characteristics.

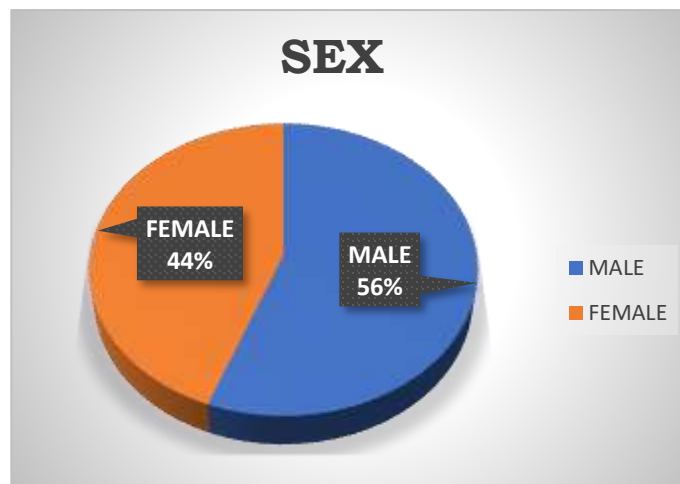


Figure 1. Research Respondents by Sex

Civil Status

The results shown in Figure 2 are the civil statuses of the respondents included in this study. It was revealed that majority of them are married consisting of the 95% of the total sample size. The widowed respondents come second in numbers with 3.5% of the total sample size which is equivalent to 9 respondents. Next to it are the single respondents with a count of three which is equivalent to 1.2%. The least among the respondents are the separated with only one (1) farmer-respondent equated to 0.4% of the total sample size. The results imply that most of the farmers in Davao del Norte are married people and that they do this job for the support they have to provide for their families.

In spite of how hard it is to live each day in the farm, the motivation of doing it for their spouses and children is more than enough to continue with this noble job. Meanwhile, this result corresponds to the findings of Nelson & Phillips

(2018) who revealed that majority of the farmers included in their study are married individuals. The drive that keeps them on the farming field are the financial needs that their families have to keep up considering the financial crisis that their country is facing. Nevertheless, the civil statuses of the farmers do not imply any superior nor inferior complex regarding their farming performances.

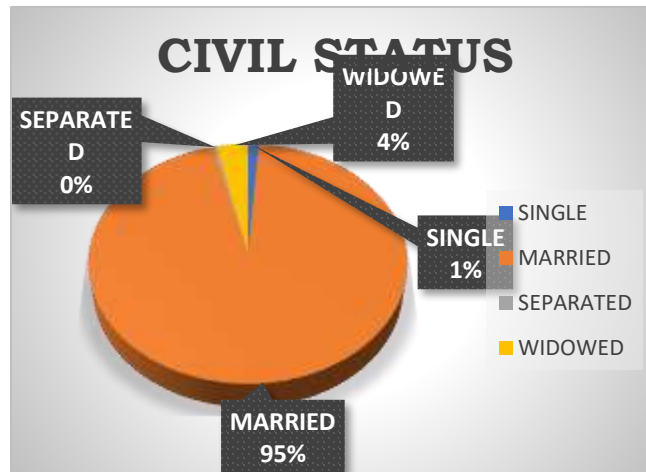


Figure 2. Research Respondents by Civil Status

Age

in Figure 3 are the results on the analysis of the frequency of age characteristics among the respondents. Findings revealed that majority of the respondents are aged 56-65 years old with an actual number of 172 equivalent to 66.2% of the total sample size. Next to this group are aged 46-55 with a frequency value of 46 which is equal to 17.7%. Then, following this group are the ones aged 66 and above with a total count of 29 which is equivalent to 11.2%. The two age groups with the least frequency values are those in 36-45 years old and 35 and below with actual numbers of 9 and 4 respectively which are equivalent to 3.5% and 1.5 % correspondingly.

The results imply that majority of the farmers included in the study are already in their old age. Apparently, this is because of the hard reality that they could no longer work in corporate companies or other fields that have maximum age requirements for their employees. Aside from that, Or these people have also been farmers for so long and there is really no retiring from farming. Furthermore, the age of the farmers implies a key role in the intent to adopt sustainability initiatives for the betterment of their production. This finding corresponds to the results of Kouassi, et al. (2021) who found that farmers older than 50 are more inclined to implement creative and environmentally friendly projects that could improve their future earnings, thus preparing for the foreseeable future. This finding provides additional support for the notion that the age of producers may be an important consideration in their acceptance of sustainability efforts for growth initiatives.

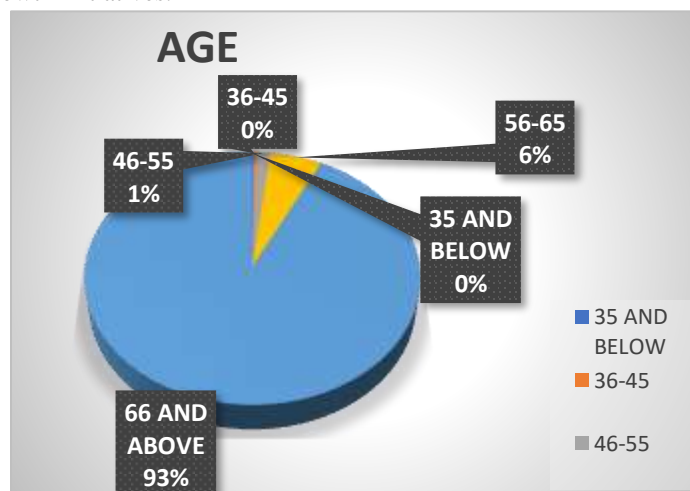


Figure 3. Research Respondents by Age

Religious Affiliation

Shown in Figure 4 is the analysis on the religious affiliations of the respondents included in the study. Findings revealed that majority of the respondents belong to Catholic Christian religious affiliation with a frequency value of 176 which is equivalent of 67.7% of the total sample size. Next to it are the respondents who are non-Catholic Christians consisting of 83 respondents that is equal to 31.9% of the sample size. Lastly, only one (1) Muslim farmer-respondent was included in the study which comprises 0.4% of the total sample size. Results imply that majority of the cacao farmers in Davao del Norte are Catholic Christians which is kind of expected as the region is primarily composed of the said religious affiliation as a whole. Nevertheless, it is also appropriate to indicate that the religious affiliations do not necessarily affect the farming performance of cacao farmers. This postulation can be strengthened by the ideas of Chen (2022) who mentioned that the religious beliefs of the farmers included in their study did not significantly predict efficiency and effectiveness in the farming performance of their respondents.

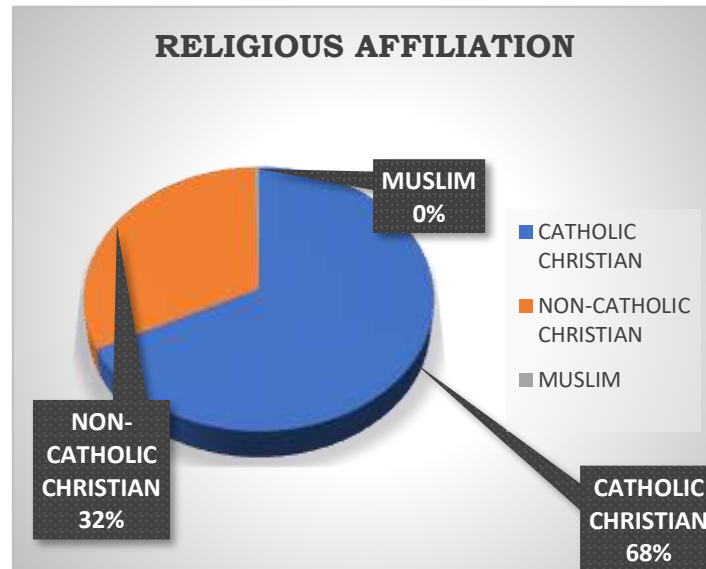


Figure 4. Research Respondents by Religious Affiliations

Ethnicity

Shown in Figure 5 are the results on the analysis of the ethnicity among the respondents included in this study. Findings revealed that majority of the respondents are Bisaya with a frequency value of 130 respondents which is equal to 50% of the total sample size. Next to it are the respondents who are Cebuanos with an actual number of 54 which is equal to 20.8% followed by the Ilonggos with 24 actual number of respondents that is equal to 9.2%. Meanwhile, the ethnicities with the least number of respondents are Bagobo, Dabawenyo, and Dibabawon which have a frequency value of 1 for each of them which is equal to 0.4% respectively. Results imply that since Davao del Norte are occupied with many Bisaya people, it is not surprising anymore that majority of the province's cacao farmers belong to this ethnicity.

Nevertheless, it is important to note that the ethnicities of the respondents do not have something to do with the quality of farming performance among the respondents. This idea can be supported by the conclusions of Fahmid (2013) who emphasized that ethnicities of Indonesian farmers show significant differences in numbers. However, when it comes to their cacao farming skills, ethnicities do not necessarily define the quality of their skills.

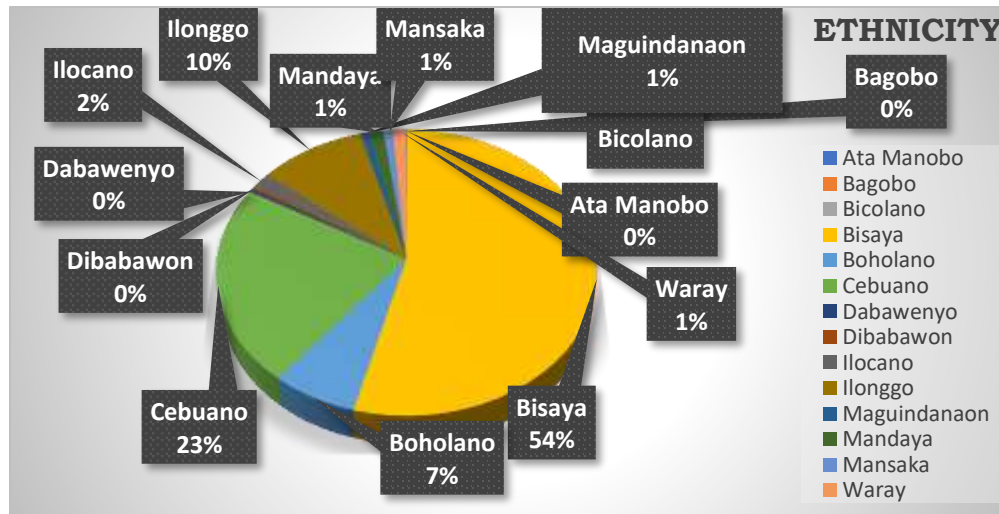


Figure 5. Research Respondents by Ethnicity

Years of Farming Experience

Shown in Figure 6 is the analysis on the years of farming experience among the respondents included in this study. Findings revealed that majority of the respondents in this study have experienced farming between 41 and 50 years with a frequency value of 103 that is equivalent to 39.6% of the total sample size. Second in the list are the 87 respondents with 31-40 years of farming experience which comprises the 33.5%. Third, are the 30 farmers with 21-30 years of farming experience which covers the 11.5%. Fourth are the 27 respondents with farming experience of 51 years and above which encompasses 10.4% of the total sample size. Fifth are the 9 farmers with 11-20 years of farming experience which is equal to 3.5% of the total sample size. Lastly, there are 4 respondents included in this study with a farming experience of 10 years and below which comprises the 1.5% of the total sample size.

The results imply that majority of the farmers in Davao del Norte are seasoned farmers considering their years of farming experiences in the field. Apparently, it can also be presumed that the more years of farming experience a respondent has, the higher the quality of farming performance they can manifest in the field. This implication can be supported by the ideas of Peprah (2015) who concluded in his study that the number of years in farming can significantly predict the efficiency of cacao production in the field. This means that higher the number of years experienced in farming by a farmer, the higher the possibility of yielding a greater production of cacao in the field. Ostensibly, these conclusions resonate the cliché which says that experience is the best teacher of all.

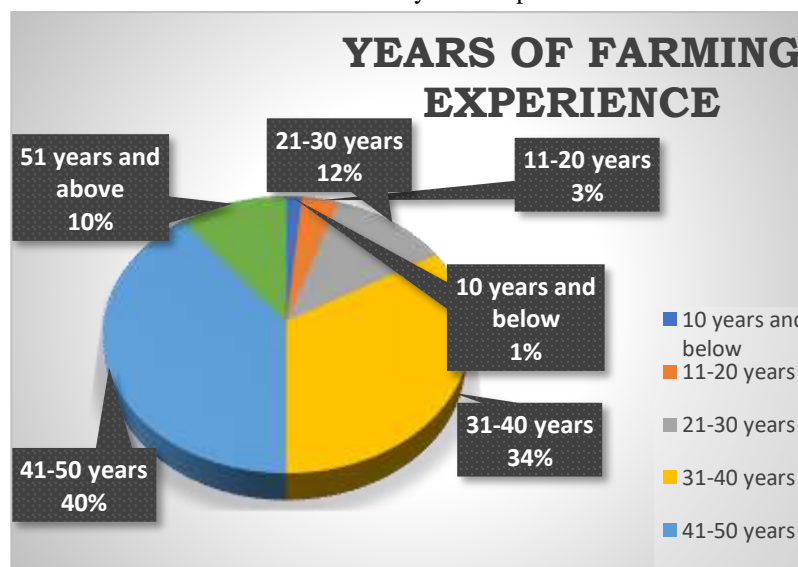


Figure 6. Research Respondents by Years of Farming Experience

Years of Cacao Farming Experience

Shown in Figure 7 is the analysis on the years of cacao farming experience among the respondents of this study. Findings revealed that majority of the respondents have been in the cacao farming industry for 10 years or below with a frequency value of 153 that is equal to 58.8% of the total sample size. Second are those farmers who have cacao farming experience between 11 and 20 years comprising 29.6% of the sample size or 77 actual number of respondents. Third in the list are the farmers who have cacao farming experience between 21 and 30 years comprising 6.2% or 16 actual number of them. Fourth are those farmers who have 31 to 40 years of cacao farming experience with a frequency value of 11 or 4.2%. Lastly, there were 3 respondents comprising 1.2% of the total sample size who have 41 years or more of cacao farming experience. The results imply that majority of the cacao farmers in Davao del Norte have been working in the field for not more than a decade. It means that they are not neophytes when it comes to this job nor excellent experts in this tedious occupation that only a few can survive.

This particular finding of the study greatly implies that the more a cacao farmer has experienced years of farming, the greater the possibility of knowledge and skills in this job. This assumption can be supported by the conclusions of Maydasari (2016) saying that the respondents of his study disclosed the information on how very long they have been cacao farmers in their fields. Apparently, these experiences they have acquired led them to becoming better at this job.

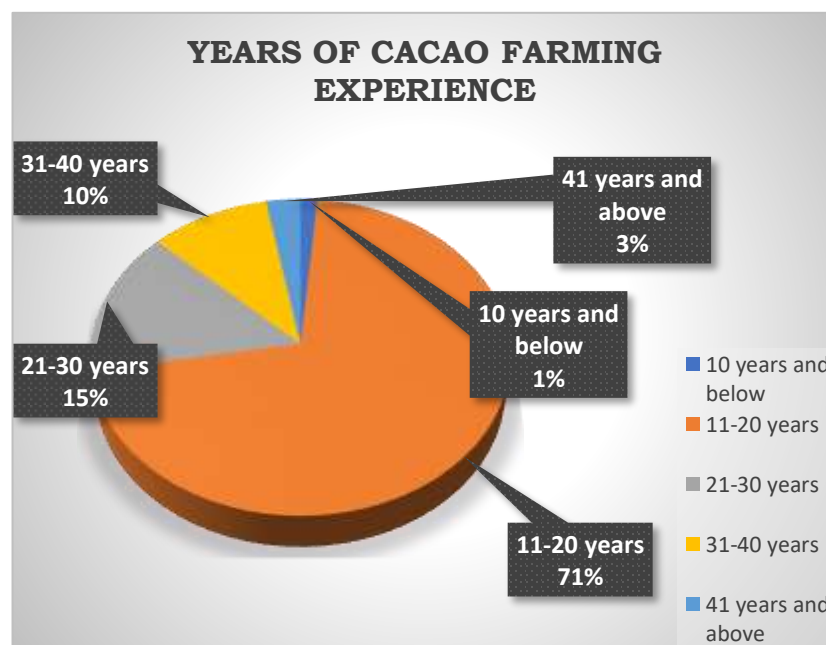


Figure 7. Research Respondents by Years of Cacao Farming Experience

Monthly Income

Shown in Figure 8 is the analysis on the monthly income of the respondents in this study solely from their cacao farming only. Findings revealed that majority of the respondents only yield a monthly income not more than ₱10,000.00 in a frequency value of 213 which is equal to 81.9% of the total sample size. Next to it are those respondents who have monthly income between ₱10,001.00 and ₱20,000.00 with a frequency value of 34 which is equivalent to 13.1%. Then, it is followed by those respondents with a monthly income between ₱20,001.00 and ₱30,000.00 with a frequency value of 6 which is equal to 2.3%. Fourth are those respondents with a monthly income of ₱40,001.00 and above in a frequency value of 4 which is equivalent to 1.5%. Lastly, there were 3 respondents who yield a monthly income between ₱30,001.00 and ₱40,000.00 which comprises 1.2% of the total sample size.

The results imply that the majority of the respondents rely their daily financial needs and expenses on their jobs as cacao farmers. It means that despite the tediousness of this work, they do not really have much of a choice but to take their chances in cacao farming for the sake of their needs. This finding corroborates the ideas of Magallon, Patalinghug, & Tangalin (2022) who concluded in their study that that most of the farmers engaged in cacao farming were in 'hand to mouth' existence who are merely depended on their farm's given inputs.

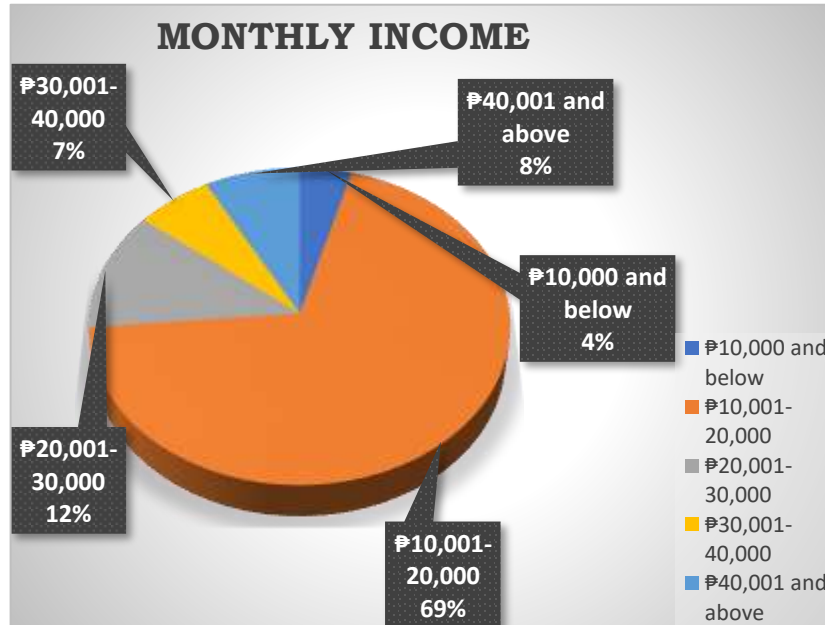


Figure 8. Research Respondents by Monthly Income

Household Size

Shown in Figure 9 is the analysis on the distribution of household sizes among the respondents of this study. Findings revealed that majority of the respondents belong to a household size with 4-6 members in a frequency value of 165 which is equal to 63.5% of the total sample size. Next to them are the respondents who belong to a household size of 7-9 members in a frequency value of 46 equivalent to 17.7%. Then, it is followed by the respondents who belong to a household size with 1-3 members in a frequency value of 33 equivalent to 12.7%. Fourth are those respondents who belong to a household size with 10-12 members in a frequency value of 14 equivalent to 5.4%. Lastly, there were 2 respondents who belong to a household size with 13-15 members comprising the 0.8% only of the total sample size.

The results imply that majority of the cacao farmers in Davao del Norte do not just really work for themselves. They have mouths to feed back at home. This must be the reason behind their perseverance in the cacao fields. Apparently, this finding corresponds to the conclusions of Gyau, et al. (2014) emphasizing that cacao farmers are hardworking individuals who strive hard for their family members. These industrious workers choose to work under any weather condition for the sake of yielding income that they can bring back to their homes.

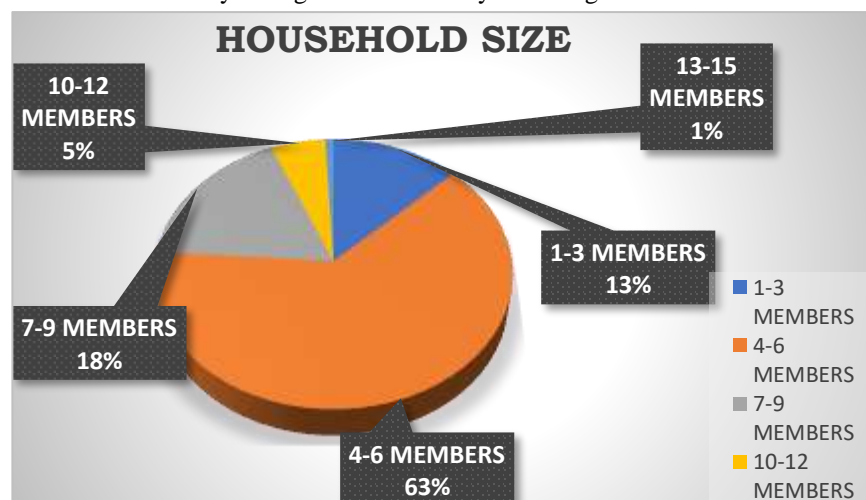


Figure 9. Research Respondents by Household Size



Organization Membership

Shown in Figure 10 is the analysis on the distribution of organization membership among the respondents included in the study. Findings revealed that Suaon Farmers Association has majority of the respondents in this study in a frequency value of 22 which is equivalent to 8.5% of the total sample size. Next to it are the organizations with a frequency value of 20 which comprise 7.7% of the total sample size respectively, namely Pamacaun Farmers Association, Alongan Sagayen Water System Association, and Cacao Farmers Linao Association. Meanwhile, Mamacao Rural Livelihood Association has the least frequency value among the respondents included in this study which is 9 comprising only 3.5% of the total sample size.

The results imply a very wide variation of organization membership among the cacao farmers in Davao del Norte. Considering the 17 organizations that were found in the analysis of this aspect in the profiles of the respondents, it can be assumed that they differ in many ways such as their workplace background, administrative experiences, salary rates, production yield rates, and many other aspects. Nevertheless, their membership helped them a lot to become more productive in their farming. Their respective organizations’ systems paved their ways to become more effective and efficient in their productions. This supposition is corroborated by the thoughts of Quilloy (2015), who argues that the increased access, privileges, capability, and a platform that small cacao farmers have obtained as an organization contribute to their identities as one of the major people and collaborators in the cacao industry of Davao and the Philippines in general and as an important contributor, along with different local farming cooperatives and farmers groups, to obtaining an uninterrupted cacao supply.

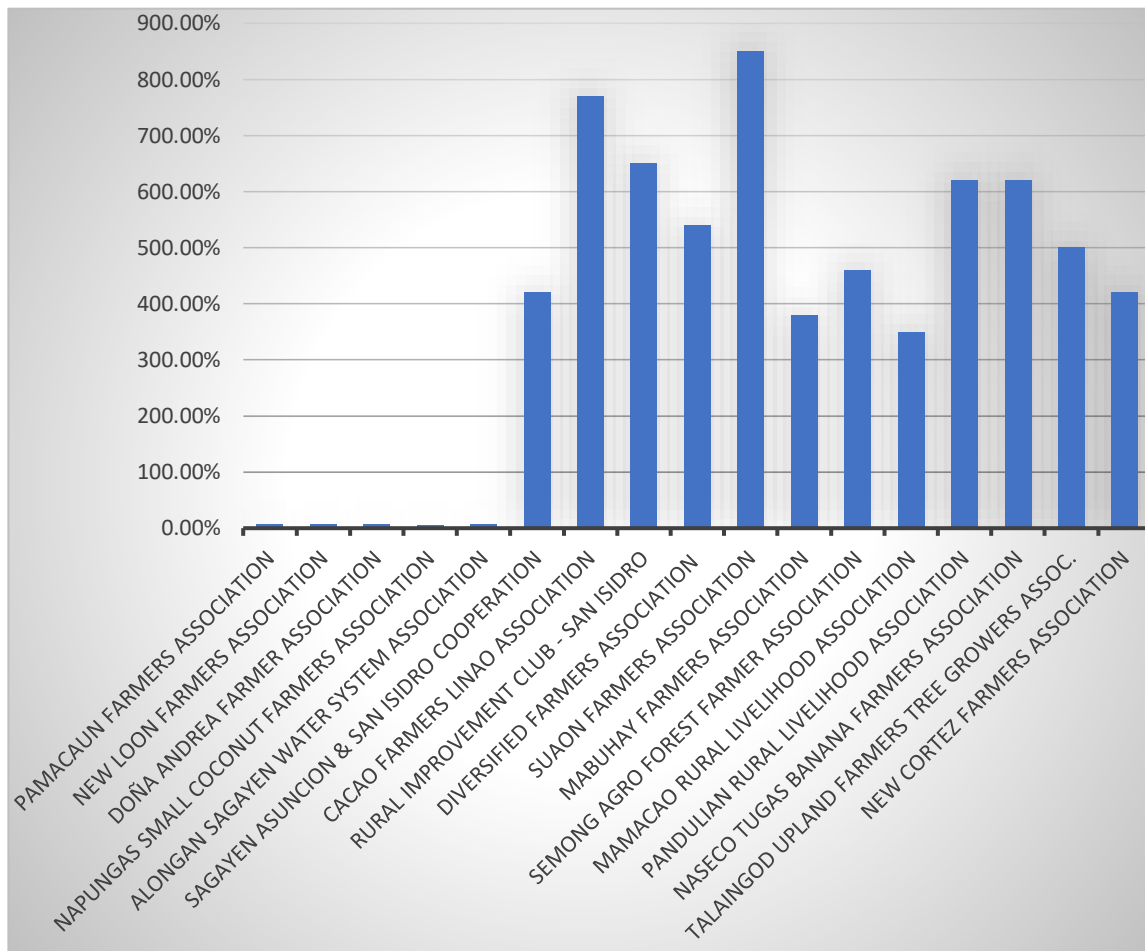


Figure 10. Research Respondents by Organization Membership

Years of Membership

Shown in Figure 11 is the analysis on the distribution of the years of membership among the respondents included in the study. Findings revealed that majority of the respondents have been members of their respective organizations for

6-10 years in a frequency value of 205 which comprises 78.8% of the total sample size. Next to them are those respondents who have years of membership of 1-5 years in a frequency value of 46 which is equivalent to 17.7% of the total sample size. Then follow those respondents who have 11-15 years of membership to their respective organizations in a frequency value of 5 which is equivalent to 1.9%. Lastly, there were 4 respondents who have 16-20 years of membership which comprises 1.5% of the total sample size.

The results imply that the respondents opted to secure memberships to these different organizations for many years as they could really benefit from it. This is supported by Quilloy's (2015) conclusion that the number of years as a member demonstrates the important function and impact made by any group in enabling small producers in the agricultural industry. Small cacao producers have been given access to numerous entrepreneurial support and services coming from by government and private organizations. It has also granted farmers liberty to have recourse to domestic and international market and agricultural interactions, market knowledge and initiatives, appropriate training and instruction, and agricultural inputs and tangible assets, especially postharvest infrastructure.

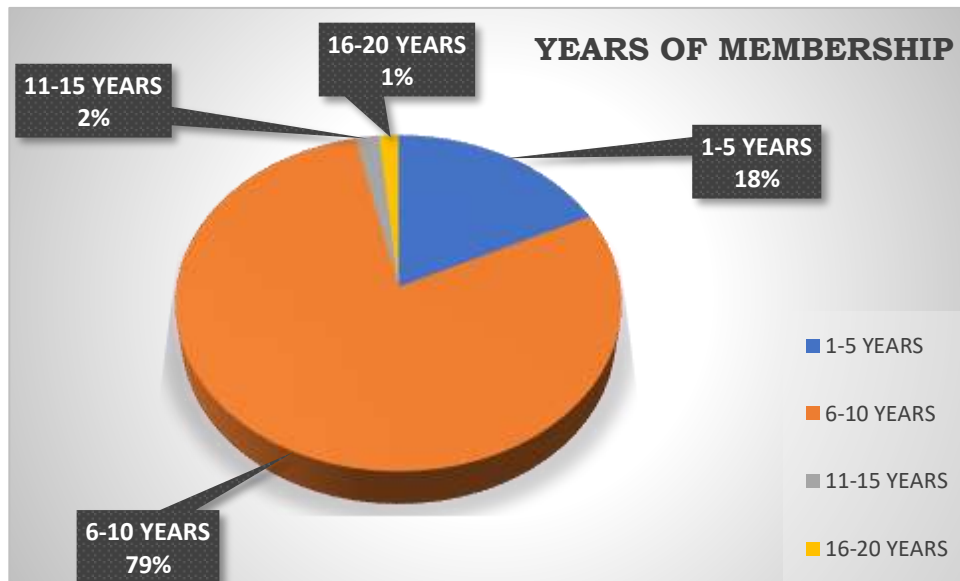


Figure 11. Research Respondents by Years of Membership

Dimensions of the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Using the exploratory factor analysis, dimensions of the sustainability of cacao industry development programs in Davao del Norte were identified with the aid of inferential statistics on the responses of the cacao respondents included in this study. As the emerging survey questionnaire items were grouped, themes were created to form labels of constructs or dimensions. Shown in the succeeding tables are the 14 dimensions with their corresponding set of survey questionnaire items alongside with their eigen values and the theme for each of the dimensions.

Table 2. Dimension 1 of the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Item Statements	Eigen values	Theme
10 – having sustained funding	.680	Financial and Non-financial Resources Sustainability
11 - being invested by diverse community organizations	.586	
24 - having evaluation results used to demonstrate successes to funders and other key stakeholders	.502	
29 - proactively adapting to changes in the environment	.662	Sustainability
30 - making decisions about which components are ineffective and should not continue	.588	
31 - having communication strategies to secure and maintain public support	.480	



Shown in Table 2 is the Dimension 1 of the of the Sustainability of Cacao Industry Development Programs in Davao Del Norte, labeled as **Financial and Non-financial Resources Sustainability**, which is composed of items 10 – *having sustained funding*, 11 - *being invested by diverse community organizations*, 24 - *having evaluation results used to demonstrate successes to funders and other key stakeholders*, 29 - *proactively adapting to changes in the environment*, 30 - *making decisions about which components are ineffective and should not continue*, and 31 - *having communication strategies to secure and maintain public support*.

Table 3. Dimension 2 of the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Item Statements	Eigen values	Theme
20 – having adequate staff to complete the program’s goals	.639	Human Resource Competencies
21 – having the capacity for quality program evaluation	.799	
28 – adapting to new science	.556	

Shown in Table 3 is the Dimension 2 of the Sustainability of Cacao Industry Development Programs in Davao Del Norte, labeled as **Human Resource Competencies**, which is composed of items 20 – *having adequate staff to complete the program’s goals*, 21 – *having the capacity for quality program evaluation*, and 28 – *adapting to new science*.

Table 4. Dimension 3 of the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Item Statements	Eigen values	Theme
16 – being well-integrated into the operations of the organization, needs	.455	Program Structure and System
17 – involving systems in place to support the various program	.519	
18 – having leaders who articulate the vision to external partners	.695	
35 – demonstrating its value to the public	.472	

Shown in Table 4 is the Dimension 3 of the of the Sustainability of Cacao Industry Development Programs in Davao Del Norte, labeled as **Program Structure and System**, which is composed of items 16 – *being well-integrated into the operations of the organization*, 17 – *involving systems in place to support the various program needs*, 18 – *having leaders who articulate the vision to external partners*, and 35 – *demonstrating its value to the public*.

Table 5. Dimension 4 of the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Item Statements	Eigen values	Theme
3 – having political support from the larger organizations	.681	Strategic Support (macro level)
4 – being supported by non-government organizations	.653	

Shown in Table 5 is the Dimension 4 of the of the Sustainability of Cacao Industry Development Programs in Davao Del Norte labeled as **Strategic Support (macro level)**, which is composed of items 3 – *having political support from the larger organizations* and 4 – *being supported by non-government organizations*.



Table 5. Dimension 6 of the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Item Statements	Eigen values	Theme
12 – communicating with community leaders	.524	Operational communication system (Community-Level)
32 – having program staff members to communicate the need for the program to the public	.676	

Shown in Table 6 is Dimension 5 of the of the Sustainability of Cacao Industry Development Programs in Davao Del Norte, labeled as **Operational communication system (Community-Level)**, which is composed of items 12 – *communicating with community leaders* and 32 – *having program staff members to communicate the need for the program to the public*.

Table 7. Dimension 6 of the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Item Statements	Eigen values	Theme
25 – providing strong evidence to the public that the program works	.650	Evidence- based Framework
26 – periodically reviewing the evidence base	.692	
27 – adapting strategies as needed	.444	

Shown in Table 7 is the Dimension 6 of the of the Sustainability of Cacao Industry Development Programs in Davao Del Norte, labeled as **Evidence-based Framework**, is composed of items 25 – *providing strong evidence to the public that the program works*, 26 – *periodically reviewing the evidence base*, and 27 – *adapting strategies as needed*.

Table 8. Dimension 7 of the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Item Statements	Eigen values	Theme
22 – reporting short-term and intermediate outcomes	.486	Promotional Tactics
33 – being marketed in a way that generates interest	.463	
34 – increasing community awareness of the issue	.703	

Shown in Table 8 is the Dimension 7 of the of the Sustainability of Cacao Industry Development Programs in Davao Del Norte, labeled as **Promotional Tactics**, which is composed of items 22 – *reporting short-term and intermediate outcomes*, 33 – *being marketed in a way that generates interest*, and 34 – *increasing community awareness of the issue*.

Table 8. Dimension 9 of the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Item Statements	Eigen values	Theme
6 – existing in a supportive state economic climate	.550	Long-term Viability Strategy
36 – planning for future resource needs	.722	
38 – having sustainability plans	.547	



Shown in Table 9 is the Dimension 8 of the of the Sustainability of Cacao Industry Development Programs in Davao Del Norte, labeled as **Long-term Viability Strategy**, which is composed of items 6 – *existing in a supportive state economic climate*, 36 – *planning for future resource needs*, and 38 – *having sustainability plans*.

Table 10. Dimension 9 of the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Item Statements	Eigen values	Theme
1 – having political leaders who advocate for the programs	.484	Campaigning Activities
23 – having evaluation results that inform planning and implementation	.444	
39 – having goals that are understood by all stakeholders	.693	

Shown in Table 10 is the Dimension 9 of the of the Sustainability of Cacao Industry Development Programs in Davao Del Norte, labeled as **Campaigning Activities**, which is composed of items 1 – *having political leaders who advocate for the programs*, 23 – *having evaluation results that inform planning and implementation*, and 39 – *having goals that are understood by all stakeholders*.

Table 11. Dimension 10 of the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Item Statements	Eigen values	Theme
14 – engaging the community in the development of the goals	.714	Public engagement Initiatives

Shown in Table 11 is Dimension 10 of the of the Sustainability of Cacao Industry Development Programs in Davao Del Norte, labeled as **Public Engagement Initiatives**, which is composed of item 14 – *engaging the community in the development of the goals*.

Table 12. Dimension 11 of the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Item Statements	Eigen values	Theme
7- implementing policies to help ensure sustained funding	.580	Financial Strategies
9 – having a combination of stable and flexible funding.	.700	

Shown in Table 12 is Dimension 11 of the of the Sustainability of Cacao Industry Development Programs in Davao Del Norte, labeled as **Financial Strategies**, which is composed of items 7- *implementing policies to help ensure sustained funding* and 9 – *having a combination of stable and flexible funding*.

Table 13. Dimension 12 of the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Item Statements	Eigen values	Theme
5 – having strong advocacy support from stakeholders	.720	Collaborative Network

Shown in Table 13 is Dimension 12 of the of the Sustainability of Cacao Industry Development Programs in Davao Del Norte, labeled as **Collaborative Network**, which is composed of item 5 – *having strong advocacy support from stakeholders*.



Table 14. Dimension 13 of the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Item Statements	Eigen values	Theme
8 – being funded through a variety of sources	.795	Resource Allocation

Shown in Table 14 is Dimension 13 of the of the Sustainability of Cacao Industry Development Programs in Davao Del Norte, labeled as **Resource Allocation**, which is composed of item 8 – *being funded through a variety of sources*.

Table 15. Dimension 14 of the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Item Statements	Eigen values	Theme
15 – cultivating connections with private stakeholders	.631	Strategic Partnerships and Financial Planning
37 – having long-term financial plan	-.599	

Shown in Table 15 is Dimension 14 of the of the Sustainability of Cacao Industry Development Programs in Davao Del Norte, labeled as **Strategic Partnerships and Financial Planning**, which is composed of items 15 – *cultivating connections with private stakeholders* and 37 – *having long-term financial plan*.

Level of the Sustainability Index of Cacao Industry Development Programs in Davao Del Norte

Table 16. Level of the Sustainability Index of Cacao Industry Development Programs in Davao Del Norte

DIMENSIONS	INDEX	Descriptive Equivalent
Dimension 1 – Financial and Non-financial Resources Sustainability	0.689	Very Low
Dimension 2 – Human Resource Competencies	0.670	Very Low
Dimension 3 - Program Structure and System	0.663	Very Low
Dimension 4 - Strategic Support (macro level)	0.658	Very Low
Dimension 5 - Operational (community level) Communication System	0.710	Very Low
Dimension 6 - Evidence-based Framework	0.691	Very Low
Dimension 7 - Promotional Tactics	0.660	Very Low
Dimension 8 - Long-term Viability Strategy	0.669	Very Low
Dimension 9 - Campaigning Activities	0.673	Very Low
Dimension 10 - Public Engagement Initiatives	0.694	Very Low
Dimension 11 - Financial Strategy	0.660	Very Low
Dimension 12 - Collaborative Network	0.673	Very Low
Dimension 13 - Resource Allocation	0.658	Very Low
Dimension 14 - Strategic Partnerships and Financial Planning	0.680	Very Low

Shown in Table 16 is the analysis on the level of sustainability index of cacao industry development programs in Davao del Norte in terms of the 14 identified dimensions. Using the combined index for all the item-statements belonging to the same dimensions, this formula was used to compute the **level of sustainability index** of cacao industry development programs in Davao del Norte in terms of each of their dimensions:

$$\text{Summation} / (\text{highest rate}) \times (\text{no. of items belonging to the group}) \times (\text{no. of respondents})$$

Findings revealed that all dimensions have a very low sustainability index in relation to cacao industry development programs in Davao del Norte. Specifically, dimension 5 labeled as Operational (community level) Communication System has the highest level of sustainability index of 0.71. Then it is followed by this descending order of dimensions based on their sustainability indices: Dimension 10 - Public Engagement Initiatives with the index value of 0.694, Dimension 6 - Evidence-based Framework with the index value of 0.691, Dimension 1 – Financial and Non-financial Resources Sustainability with the index value of 0.689, Dimension 14 - Strategic Partnerships and Financial Planning



with the index value of 0.68, Dimension 9 - Campaigning Activities and Dimension 12 - Collaborative Network with both the same index value of 0.673, Dimension 2 – Human Resource Competencies with the index value of 0.67, Dimension 8 - Long-term Viability Strategy with the index value of 0.669, Dimension 3 - Program Structure and System with the index value of 0.663, Dimension 7 - Promotional Tactics and Dimension 11 – Program’s Funding Policies with both the same index value of 0.66, and Dimension 4 - Strategic Support (macro level) and Dimension 13 - Resource Allocation with both the same index value of 0.658.

These findings are consistent with the notion that sustainability in agribusiness productivity and commerce is a growing priority for growth, ecological protection, as well as accountable business (Nelson & Phillips, 2018). Evidently, efforts to promote sustainability in the cacao sector have always been at the cutting edge of social, ecological, and economic issues, which includes forest destruction due to cacao manufacturing, which has multiplied with increasing worldwide demand for chocolate confections, decreased yields from aging trees, lack of sustainable farming methods, and reducing suitable area for cultivation due to global warming (Kroeger et al., 2017).

Moreover, decisions regarding the expansion and improvement of the economy policies, for instance, should be taken in a transparent and fair manner with little harm to the environment and consumption of resources. In view of these interconnections, it is crucial to handle these interactions and enhance administrative expertise in order to make prudent choices (Malik & Abdallah, 2019).

Concerns regarding sustainability initiatives for an array of agricultural and forestry goods that originate from tropical nations such as coffee, palm oil, cacao, and wood, include significant ecological, social, and commercial dimensions. Sustainability guidelines handle a number of these issues while also having a chance to make a difference to the achievement of development objectives. The growing popularity of the cocoa sector in numerous tropical nations presents a significant opportunity for achieving both economically and socially, but it also entails sacrifices with goals related to the environment and conflicts among customers, including small-scale farmers, large-scale consumers, and government departments (Mithofer et al., 2017).

The majority of policies and planning studies has focused on assessing localized sustainability initiatives, such as labeling comprehensive strategies to identify sustainability-related policy declarations and objectives. The meeting included an examination of land-use strategies from 30 areas that are either recognized to have creative land-use strategies or have designs that incorporate the idea of sustainable development. Climate initiatives which promote decreases in greenhouse gases through laws, enforcement of regulations, and discretionary and financial incentives have also been analyzed (Hawkins, et al., 2018).

Indeed, Multiple diversity agroforestry practices are a more environmentally friendly method of cacao production because they do not have an adverse effect on in general biodiversity, may yield an income-generating crop while preserving good soil quality and established forest structures, and provide farmers with a buffer in opposition to unforeseeable market swings (Schroth et al., 2016). In contrast to extensive monoculture structures, covered agroforests are capable of supporting significant amounts of biodiversity, storing above the ground biomass, and greater sustaining landscape carbon reserves (Middendorp et al., 2018). Long ago, stakeholders with unique sustainability concerns acknowledged the endless possibilities of cacao produced in diverse agricultural systems to address contemporary social and ecological concerns. Through placing a greater emphasis on financial rewards and farmer control, cacao production and the specialized cacao industry may present an opportunity to meet these requirements (Schroth et al., 2016).

Factors Affecting the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Table 17. Factors Affecting the Sustainability of Cacao Industry Development Programs in Davao Del Norte

Factors	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	3.829	.221		17.355	.000
Years of Farming Experience	.005	.002	.146	2.751	.006**
Household Size	.018	.009	.110	2.116	.035**
Organization Membership	-.039	.004	-.555	-11.140	.000**
Years of Membership	-.027	.007	-.193	-3.809	.000**



Shown in Table 17 is the analysis on the factors affecting the sustainability of cacao industry development programs in Davao del Norte. The constant factors involved in these analyses are sex, civil status, age, religious affiliation, ethnicity, years of farming experience, years of farming cacao experience, monthly income, household size, organization membership, and years of membership. If the Sig. value of a factor is less than 0.05, then that factor significantly affects the sustainability of cacao industry development programs in Davao del Norte. Results revealed that only four factors significantly affect the sustainability of cacao industry development programs in Davao del Norte, namely, years of farming experience with a Sig. value of 0.06, household size with a Sig. value of 0.35, organization membership with a Sig. value of 0.000, and years of membership with a Sig. value of 0.000.

This means that these four factors can directly affect all the sustainability of government's development programs geared towards sustaining the cacao industry. The results imply that to sustain a development program intended to help the cacao industry, the implementers should consider the knowledge and expertise of the cacao farmers based on their years of farming experience. They can think of ways on how to help them improve in these aspects. Moreover, the results also imply that their membership and the length of their membership to any organization should also be considered as to the implementation of the program's policies. It would help if they outlined their goals and visions to those of the organizations'. The trainings attended by the respondents can serve as a basis for further trainings that they need. By doing so, sustainability of the development programs would have higher chances of standing through the test of time. Also, the household size is an important aspect in designing policies for the development programs for the sustainability of the cacao industry.

CONCLUSION

Based on the findings of the study, the following conclusions were drawn:

1. In terms of the socio-economic profiles of the respondents, majority of the cacao farmers in Davao del Norte are male, married, aged 56-65 years old, Catholic Christian, Bisaya, with 41-50 years of farming experience, with 10 years and below cacao farming experience, earning a monthly income of Php 10,000.00 and below, belonging to a household size with 4-6 members, having a membership to either Pamacaun Farmers Association, Alonga Sagayen Water System Association, or Cacao Farmers Linao Association, and with 6 to 10 years of membership.
2. There are 14 dimensions of the sustainability of cacao industry development programs in Davao del Norte namely Dimension 1 – Financial and Non-financial Resources Sustainability; Dimension 2 – Human Resource Competencies; Dimension 3 - Program Structure and System; Dimension 4 - Strategic Support (macro level); Dimension 5 - Operational (community level) Communication System; Dimension 6 - Evidence-based Framework; Dimension 7 - Promotional Tactics; Dimension 8 - Long-term Viability Strategy; Dimension 9 - Campaigning Activities; Dimension 10 - Public Engagement Initiatives; Dimension 11 - Financial Strategy; Dimension 12 - Collaborative Network; Dimension 13 - Resource Allocation; and Dimension 14 - Strategic Partnerships and Financial Planning.
3. The levels of sustainability index of cacao industry development programs in Davao del Norte in terms of the 14 identified dimensions are very low.
4. Only four of the factors significantly affected the sustainability of cacao industry development programs in Davao del Norte, namely the years of farming experience, the household size, the organization membership, and the years of membership.

RECOMMENDATIONS

Since the sustainability index of the development programs in the cocoa industry in Davao del Norte is very low and that the only significant factors are years of farming experience, household size, the organization membership, and the years of membership, here are some recommendations that the government can consider. These recommendations aim to create an enabling environment for sustainable development in the cocoa industry.

Promote more farmer training and capacity building. Development programs may invest in training programs to educate cocoa farmers on sustainable farming practices, including proper soil management, pest control, and post-harvest processing techniques. These programs should also focus on enhancing entrepreneurial skills, financial literacy, and market access for farmers.

Facilitate access to financing. Organizations to which farmers belong may establish mechanisms that provide affordable credit and financial services tailored to the needs of cocoa farmers. This can help them invest in



productivity-enhancing technologies, inputs, and infrastructure, thereby improving their resilience and long-term viability.

Strengthen cooperative organizations. Promote the formation and strengthening of farmer cooperatives to enable smallholder farmers to collectively negotiate better prices, access shared resources, and benefit from economies of scale. Cooperatives can also facilitate knowledge sharing and collaboration among farmers.

Moreover, since the three dimensions with the lowest sustainability index are Dimension 11 – Program’s Funding Policies, Dimension 4 - Strategic Support (macro level), and Dimension 13 - Resource Allocation, the following recommendations are further given.

For Dimension 11 – Financial Strategy, **strengthen the organizations.** Foster collaboration between the government, cocoa industry players, NGOs, and research institutions to align efforts, share knowledge, and coordinate initiatives for sustainable cocoa development. Engage in multi-stakeholder dialogues to address shared challenges and develop innovative solutions. Encourage diversification and value addition. Promote the development of downstream industries, such as cocoa processing and chocolate manufacturing, to capture more value within the country. Encouraging value addition can lead to increased economic benefits, employment opportunities, and reduced dependence on raw cocoa exports.

For Dimension 13 – Resource Allocation, **invest in infrastructure and technology.** The government may help by improving rural infrastructure, including roads, irrigation systems, and access to electricity, to reduce post-harvest losses and facilitate efficient transportation of cocoa beans. Embrace digital technologies like mobile applications and data analytics to enhance farm management, market information, and traceability.

For Dimension 14 - Strategic Support (macro level), **monitor and evaluate impact.** Establish a robust monitoring and evaluation framework to assess the effectiveness and impact of development programs. Regularly measure key performance indicators and use the findings to fine-tune strategies, make data-driven decisions, and ensure accountability in achieving sustainability goals.

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