International Journal of Advanced Engineering, Management and Science

Vol-9, Issue-6 | Jun 2023

INFOGAIN
P U B L I C A T I O N

https://www.ijaems.com/ | ijaems.editor@gmail.com

International Journal of Advanced Engineering, Management and Science

Editor in Chief

Dr. Dinh Tran Ngoc Huy

Chief Executive Editor

Dr. S. Suman Rajest

Publisher

Time Series Analysis of Philippine Agricultural Rice Productivity using Cobb-Douglas Production Function from 2017 To 2022

Giselle H. Daproza[1], Maria Lourdes M. Dominguez[2], Myrell Ann C. Esguerra[3], Jocelyn E. Gonzales[4], Jocelyn B. Cruz[5]

[1]Teacher I, Maruhat National High School
[2]Branch Head, Producers Savings Bank Corporation
[3]Account Officer, LandBank Nueva Ecija Lending Center
[4]Teacher II, Bongabon Senior High School
[5]Dean, NEUST Graduate School

Abstract— One of the main agricultural industries in the Philippines, particularly in Central Luzon, has been rice production. This study investigated the influences and determinants on national rice production. Labor, capital, credit to agriculture, spending, irrigated areas, land, and fertilizer are the relevant factors. The Cobb-Douglas Production Function was used in the study. The relationship between production output and production inputs (factors) is modeled by the Cobb-Douglas Production Function. It is used to calculate ratios of inputs to one another for efficient production and to estimate the technological change in production methods. It measured the elasticity, marginal rate of contribution, and marginal returns of capital, labor, fertilizer, irrigation, production loan, farm area, and government spending to the total agricultural rice productivity of the Philippines. This paper also analyzed the production in terms of its input and output and estimated the relationship between each input and output. The results of this study showed that capital, expenditure, and land do not significantly affect the volumes of production of rice. While labor, credit to agriculture, irrigated areas, and fertilizer significantly affect the volume of production of rice.

Keywords— Agricultural rice production, capital, Cobb-Douglas production function, fertilizer, irrigated areas.

I. INTRODUCTION

Agriculture is our wisest pursuit because it will in the end contribute most to real wealth, good morals, and happiness. - Thomas Jefferson

Productivity growth in agriculture has captured the interest of economists for a long time. As agriculture develops, it releases resources to other sectors of the economy. This has been the base of successful industrialization in now-developed economies such as the United States, Japan, and countries in the European Union. Thus, agricultural development becomes an important precondition of structural transformation towards industrial development, as it precedes and promotes industrialization.

Agriculture is the industry that stands as the basic foundation of other industries. It provides wheat for a bakery, grapes for your wine, tobacco leaves for your cigar, and roses for a flower shop. It is the root of most industries because it provides raw materials or inputs that other industries cannot survive without. So this makes the agriculture industry to be developed hand in hand with infrastructure. In the Philippines, agriculture plays a vital role in the economy. Rice is the most important agricultural commodity. As a major staple food, it accounts for 35% of the average calorie intake of the population and as much as 60-65% of the households in the lowest income quartile.

However, the Philippines' agricultural sector was indeed rendered less competitive over time caused by some

identified factors. The immigration of the youths to the urban centers in pursuit of wage employment in the non-agricultural sectors, erratic weather conditions, poor input supply such as fertilizers to resuscitate the depleted soils, low capital expenditure, and poor financial resources available to farmers in the forms of loans and advances necessary in all the stages of production.

Therefore, it is good to look into the factors that influenced the most and least in agricultural rice production. Thus, this paper would like to study agricultural rice productivity at a national level. Making use of the well-known Cobb-Douglas Production Function, this paper aims to determine the statistical impact of capital, labor, fertilizer, irrigation, credit to agriculture, land, and government spending on the total agricultural productivity of the Philippines.

The general aim of the paper is to measure the total factor productivity (TFP) of the agriculture sector in the Philippine economy and analyzing input-output in the said industry. Specifically, the study intends to achieve the following:

1. To expand the Cobb-Douglas production function with the inclusion of production loans, agricultural spending, irrigation, farmland area, and fertilizer.

2. To determine if there is a significant statistical impact of the independent variables on the output.

II. METHODOLOGY

Data

National accounts analyzed in this paper were obtained through the website of the Philippine Statistics Authority (PSA), and Food and Agricultural Statistics (FAOstat). It was time-series data. The variables are defined in the table as follows:

Variable	Definition
The volume of Production – in metric tons	It accounts for the quantity of rice production.
Labor (L) – in million persons	It accounts for the manpower (labor force) in the agricultural sector for both males and females.
Capital (K) – in million pesos	These are tangible properties other than buildings or land that are used in the operations of a farm. It accounts for the machinery, specifically tractors and combine harvester-threshers that are in use.

Credit to Agriculture (C) – in million pesos	These are the loans that are available for the purpose of agricultural production.
Expenditure (E) – in million pesos	This is the amount spent in the agricultural sector by the government for the years.
Irrigated Areas (I) – in hectares	It is the artificial application of water to land for agricultural production. The data used is the total irrigated areas in the country by different irrigation systems.
Land (L) – in thousand hectares	It accounts for the farm area that is being used for farming and other agricultural activities.
Fertilizer (F) – in million tons	These are any chemical or natural substance added to soil or land to increase its fertility. What is analyzed in this study is the total consumed fertilizers throughout the country irrespective of their kind.

Econometric Model

The agricultural input-output potential model is focused on eight (8) variables: volume of production (Y), capital (K), labor (L), credit to agriculture (C), expenditure (E), irrigation (I), land (Ln), and fertilizer (F). Rewriting the production function from the theoretical framework section, the relation between output and input is expressed as:

$$Q = A\, K^{\propto}\, L^{\beta}\, C^{\theta}\, E^{\delta}\, I^{\sigma}\, Ln^{\gamma}\, F^{\tau}$$

Hypothesis

Relating the expectation is that variables capital, labor, credit to agriculture, expenditure, farmland, and fertilizers will be positively affecting agricultural production function.

The hypotheses for the study are stated as:

Null Hypotheses, H_o: $\beta_0 > 0, \beta_1 < 0, \beta_2 < 0, \beta_3 < 0, \beta_4 < 0, \beta_5 < 0, \beta_6 < 0, \beta_7 < 0$

Alternative Hypotheses, H_a: $\beta_0 < 0, \beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 > 0, \beta_5 > 0, \beta_6 > 0, \beta_7 > 0$

The statement in the null hypothesis assumes that β_0 will take a positive sign while on the other hand $\beta_1\ to\ \beta_7$ will negatively impact the output. For the alternative hypothesis, it is vice versa.

III.   RESULTS AND DISCUSSION

1. Expanding the Cobb-Douglas production function with the inclusion of credit to agriculture, expenditure, irrigation, farmland area, and fertilizer is as follows:

$$Q = K^{\propto} L^{\beta} C^{\theta} E^{\delta} I^{\sigma} Ln^{\gamma} F^{\tau}$$

Whereas: Q = volume of production

K = capital

L = labor

C = credit to agriculture

E = expenditure

I = irrigation areas

Ln = land

F = fertilizer

2. Determining if there is a significant statistical impact of the independent variables on the output is shown as follows:

Variables	Mean	Standard Deviation	Minimum	Maximum
ln Volume of Production (Y)	19,282.46	190.3998	18,814.8	19,960.2
ln Labor (L)	10	0.23	9.33	10.66
ln Capital (K)	340,226.3	12,816.37	314,445.6	385,008.5
ln Credit to Agriculture (C)	84.8	1.63	80.7	89.1
ln Expenditure (E)	137,837.2	0.06	112,420	179,742
ln Irrigated Areas (I)	14.54	0.06	14.35	14.7
ln Land (Ln)	4,757.54	31.45	4,651.5	4,811.8
ln Fertilizer (F)	4.73	0.03	4.66	4.78

The table above shows the statistics of the dependent and independent variables. The double log form of volume of production has a mean of 19,282.46 which ranges from 18,814.8 to 19,960.2. The double log form of labor input has a mean of 10 and a minimum and maximum of 9.33 and 10.66 respectively. The double log form of the capital input has an average of 340,226.3 and ranges from 314,445.6 to 385,008.5. The double log form of the credit to agriculture has a mean value of 84.8 and a minimum value of 80.7 and a maximum value of 89.1. The double log form of expenditure has an average of 137,837.2 and ranges from 112,420 to 179,742. The double log form of irrigated areas has a mean of 14.54 and a minimum and maximum value of 14.35 and 14.7 respectively. The double log form of land has an average of 4,757.54 and ranges from 4,651.5 to 4,811.8. And lastly, the double log form of the fertilizer input has an average of 4.73 and is minimum of 4.66, and is maximum of 4.78.

Regression Results

This study aims to measure the total factor productivity (TFP) of the agriculture sector in the Cordillera Administrative Region (CAR) and analyze input and output in the said industry. This portion of the paper discusses the findings on the regression results done in manipulating the data.

Variables	Coefficient	T-Statistics	P-Value
Intercept	26,443.83		
Labor (L)	745.0513	3.231148	0.048174
Capital (K)	-0.00092	-0.1072	0.921398
Credit to Agriculture (C)	88.91443	2.023963	0.136134
Expenditure (E)	0.003955	0.432459	0.69461

Irrigated Areas (I)	2,593.678	2.382901	0.097363
Land (Ln)	3.626575	1.295698	0.285765
Fertilizer (F)	6,045.469	2.33579	0.10161
Adjusted R^2	0.9867		

Interpretation of results is as follows:

$$lnY_i = 26,443.83 + 745.0513 lnX_2 - 0.00092 lnX_3 \\ + 88.91443 lnX_4 + 0.003955 lnX_5 \\ + 2,593.678 lnX_6 + 3.626575 lnX_7 \\ + 6,045.469 lnX_8$$

a.) Adjusted R^2

The R² is a measurement for the goodness of fit. We could say that about 98.67% is explained by the variation of the independent variables which are labor, capital, credit to agriculture, expenditure, irrigated areas, land, and fertilizer to the rate of the dependent variable which is the volume of production.

b.) T-test

So that we could identify if the independent variable has a significant relationship with the dependent variable, we will use the Rule of Thumb as the basis of the level of significance whereby the t-values should be greater than the value of 2.

The t-value for capital, expenditure, and land are -0.1072, 0.432459, and 1.295698 respectively, and the t-value there are all less than 2. Therefore, β2, β4, and β6 are not statistically significantly different from 0.

Whereas the labor, credit to agriculture, irrigated areas, and fertilizer have t-values of 3.231148, 2.023963, 2.382901, and 2.33579 respectively, all t-values are greater than 2. Therefore, β1, β3, β5, and β7 are all statistically significantly different from zero.

c.) P-value

P-value measures how much evidence we have to reject the null hypothesis. The smaller the p-value, the more evidence we have to reject the null hypothesis and the other way around. The p-values of labor, capital, credit to agriculture, expenditure, irrigated areas, land, and fertilizer are 0.048174, 0.921398, 0.136134, 0.69461, 0.097363, 0.285765 and 0.10161 respectively. Therefore, the p-values of labor, credit to agriculture, irrigated areas, and fertilizer have evidence to reject the null hypothesis.

IV. CONCLUSION AND RECOMMENDATIONS

The Philippines is still primarily an agricultural country despite the plan to make it an industrialized economy. Most citizens still live in rural areas and support themselves through agriculture, mainly farming.

Based on the results, it can be concluded that changes in capital, expenditure, and land do significantly affect rice production in the Philippines. This paper recommends that the government create projects and training on how to maximize the use of capital (e.g. machinery), expenditure, and land to see how these inputs can improve and increase the production of rice.

However, other inputs such as labor, credit to agriculture, irrigated areas, and fertilizer significantly affect the production of rice. This paper recommends that labor must be trained more and enhanced to maximize its capacity. The government must educate farmers to avail more of the credit to agriculture. Irrigated areas must be increased because it positively affects rice production. There must be more government intervention and subsidies for fertilizers because as of this time, it costs are high. Fertilizers greatly influence the production of rice in the country.

REFERENCES

[1] Cao, K. H., et. al. Agricultural productivity, structural change, and economic growth in post-reform China. Retrieved from https://www.sciencedirect.com/science/article/abs/pii/S0304387813000850.

[2] Directorate: Economic Services Production Economics Unit. (March 2011). Agricultural Productivity in South Africa: Literature Review. Retrieved from https://www.semanticscholar.org/paper/AGRICULTURAL-PRODUCTIVITY-IN-SOUTH-AFRICA%3A-REVIEW./9a226570d64659e66d74f1838ee9158c18c7c4df.

[3] Echevarria, C. (Autumn 1998). A Three-Factor Agricultural Production Function: The Case of Canada, International Economic Journal 63, vol. 12, no. 3. Retrieved from https://www.tandfonline.com/doi/abs/10.1080/10168739800000029.

[4] Ekbom, A. Some Determinants to Agricultural Productivity - An Application to the Kenyan Highlands. Retrieved from https://www.researchgate.net/publication/228451728_Some

_determinants_to_agricultural_productivity_An_application _to_the_Kenyan_highlands.

[5] Fasoranti, M. (2006). "A Stochastic Frontier Analysis of Effectiveness of Cassava Based Cropping Systems In Ondo State, Nigeria." PhD Thesis, Department of Agricultural Economics and Extension, FUTA, Akure.

[6] Food and Agricultural Statistics (FAOStat).

[7] Gujarati, D. N. (2003). Basic Econometrics, Fourth Edition, pp. 223-226.

[8] Habito, P. C., et. al. Philippine Agriculture over the Years: Performance, Policies and Pitfalls. Retrieved from https://www.researchgate.net/publication/265248373_Philip pine_Agriculture_over_the_Years_Performance_Policies_an d_Pitfalls_1.

[9] Kiani, A.K., Iqbal, M. and Javed, T. (2008). Total Factor Productivity and Agricultural Research Relationship: Evidence from Crops Sub-Sector of Pakistan's Punjab. European Journal of Science Research, Vol. 23 No.1, 2008, pp. 87-97.

[10] Liverpool-Tasie, L. S., et. al. (October 2011). A Review of Literature on Agricultural Productivity, Social Capital and Food Security in Nigeria NSSP Working Paper No. 21. Retrieved from https://www.ifpri.org/publication/review-literature-agricultural-productivity-social-capital-and-food-security-nigeria.

[11] Ludeña, C. (May 2010). Agricultural Productivity Growth, Efficiency Change and Technical Progress in Latin America and the Caribbean. Retrieved from https://publications.iadb.org/en/publication/agricultural-productivity-growth-efficiency-change-and-technical-progress-latin-america.

[12] Matsuyama, K. Agricultural Productivity, Comparative Advantage, and Economic Growth. Retrieved from https://web.iitd.ac.in/~debasis/Lectures_HUL737/papers/pap er2_JET%201992.pdf.

[13] Ogundari, K., Ojo S.O., Ajibefun I.A. (2006): Economies of Scale and Cost Efficiency in Small Scale Maize Production: Empirical Evidence from Nigeria. Journal of Soc. Sci., 13(2).

[14] Ojo, M. A., U. S. Mohammed, B. Adeniji, and A. O. Ojo. 2009. "Profitability and technical efficiency in irrigated onion production under middle Rima valley irrigation project in Goronyo, Sokoto State, Nigeria". Continental Journal of Agricultural Science 3: 7-14.

[15] Otitoju, M., et. al. (2014). Identification and Stochastic Analysis of Factors Influencing Technical Inefficiency of Nigerian Smallholder Soybean Farmers.

[16] Philippine Statistics Authority, Palay Production in the Philippines.

[17] Philippine Statistics Authority, Selected Statistics on Agriculture 2021.

[18] Shehu, J.F., Iyortyer, J.T., Mshelia, S.I. and Jongur, A.A.U. (2010), "Determinants of Yam Production and Technical Efficiency among Yam Farmers in Benue State, Nigeria". Journal of Social Science, Vol. 24 No. 2, pp. 143 – 148.

[19] Tripathi, A and Prasad, A.R. (2008). Agricultural Productivity Growth in India. Journal of Global Economy An International Journal, ISSN: 0975-3931, 2008.

[20] Velazco, J. (2001). Agricultural Production in Peru (1950-1995): Sources of Growth. FAO Corporate Document Repository, Economic and Social Development Department.

[21] Yuan, Z. (December, 2011). Analysis of agricultural input-output based on Cobb–Douglas production function in Hebei Province, North China, School of Economics and Management, Hebei University of Science and Technology. African Journal of Microbiology Research Vol. 5 (32), pp. 5916-5922. Retrieved from https://academicjournals.org/journal/AJMR/article-full-text-pdf/5401F7029139.

Internet-Based Procurement: An Analysis of the Malpractices and Errors in the use of PHilGEPS Website of the Philippine Center for Postharvest Development and Mechanization

Trixia Kaye S. Dela Cruz[1], Gian Paolo B. Estrada[2], Aldren C. Garcia[3], James Lawrence A. Gose[4], Mercedes D. Santos[5]

[1]Administrative Assistant III, Philippine Rice Research Institute
[2]Manager, Marianne Family Beach Resort
[3]Administrative Officer II, DepEd Nueva Ecija
[4]Instuctor, Lyceum of the East Aurora
[5]Business Administration Faculty, NEUST

Abstract— *The strict implementation of the use of PHilGEPS has been a major practice in government agencies, going to lengths such as moving the dates of procurement activities or cancelling bidding projects due to errors in the posting of advertisements. Moreover, it is in no discreet information that PHilGEPS experienced major errors and technical difficulties last year, even opting to use a temporary facility for revamping and improvement of the old PHilGEPS Website. However, despite the strict implementation of the use of the website, errors and malpractices are still a major problem for some government agencies leading up to disallowances and even show-cause orders. This descriptive study aimed to determine the cause of the transgressions and errors in the use of the PHilGEPS Website and the possible solutions to avoid such malpractice in the Philippine Center for Postharvest Development and Mechanization. To obtain the needed information, a survey questionnaire in the form of Google Forms was undertaken for this aim. The participants of the study are employees of the agency that uses and manages the PHilGEPS account of the procurement unit. Findings show the lack of training related to the use of the website contributes to the errors in the transactions. Also, strengthening and continuous improvement of PHilGEPs must be prioritized to avoid errors and transgressions in required postings.*

Keywords – *Errors, malpractice, PHilGEPS, procurement activities, posting of advertisement, transgressions*

I. INTRODUCTION

The Philippine Government Electronic Procurement System (PHilGEPS) is a single, centralized electronic portal that serves as the primary and definitive source of information on government procurement. PHilGEPS or G-EPS, as it may be referred to, was established in November 2000 as the Pilot Electronic Procurement System (Pilot EPS) as a common portal for advertisement of bid opportunities and supplier registration. [1]

The passage of Republic Act 9184 or the "Government Procurement Reform Act" further augmented the importance of the portal. The law set forth the importance of ensuring and promoting transparency and efficiency in government procurement transactions. It required certain government procurement transactions to be centrally posted in the internet infrastructure and the website was further utilized in the conduct of procurement procedures for opportunities with an approved budget of PhP50,000.00 and

above. It now serves as the primary source of information on all government procurement. (2)

PHilGEPS is currently being managed by the Department of Budget and Management - Procurement Service (DBM-PS) under the supervision of the Government Procurement Policy Board (GPPB). all National Government Agencies (NGAs), Government Owned and Controlled Corporations (GOCCs), Government Financial Institutions (GFIs), State Universities and Colleges (SUCS) including Local Government Units (LGUs) are mandated to use the PhilGEPS. Suppliers, manufacturers, contractors and consultants who are interested in government procurement activities are required to register, as well. (8)

An opinion released by the GPPB on the 21st of December 2017 whether PHilGEPS Registration of suppliers is required states that the Bids and Awards Committee (BAC) should require all suppliers to submit PHilGEPS registration for purchases with an Approved Budget for the Contract (ABC) of at least PhP5,000.00, while those below such amount are exempted. (2)

The utilization of the G-EPS website is monitored through various reports, such as the Annual Procurement Plan (APP) and Procurement Monitoring Report (PMR) where the reference number, dates of posting, notices of awards, contracts and dates of procurement activities are required to be indicated.

The APP and PMR are required to be submitted in accordance with Section 7 of 2016 revised Implementing Rules and Regulations (IRR) of Republic Act (RA) No. 9184. Moreover, for purposes of Performance-Based Bonus (PBB), Procuring Entities (PEs) shall submit an APP consistent with its approved budget and as approved by the Head of the Procuring Entity (HoPE). (4)

The strict implementation of the use of PHilGEPS has been a major practice in government agencies, going to lengths such as moving the dates of procurement activities or cancelling bidding projects due to errors in the posting of advertisements and/or notices of award and proceedings.

A non-policy opinion released on the 30th of January 2018 regarding the non-compliance with the advertisement requirement for the procurement of common-use supplies and equipment, stated that it is a general rule that all procuring entities must comply with the advertisement and posting requirement as provided in Sec. 21.2.1 of the 2016 IRR of RA9184 in the procurement of goods and equipment. Failure to advertise and/or post the Invitation to Bid or Request for Expression of Interest constitutes a material defect that would affect the validity of the procurement process. (5)

In an opinion from GPPB, Pursuant to Section 37.1.6 of the revised Implementing Rules and Regulations (IRR) of Republic Act (RA) No. 9184 (RA 9184), "the BAC, through the Secretariat, shall post, within three (3) calendar days from its issuance, the Notice of Award in the PhilGEPS, the website of the procuring entity, if any, and any conspicuous place in the premises of the procuring entity." (2012) (6)

Moreover, it is in no discreet information that PHilGEPS experienced major errors and technical difficulties last year, even opting to use a temporary facility for revamping and improvement of the old PHilGEPS Website.

However, despite the strict implementation of the use of the website, errors and malpractices are still a major problem for some government agencies leading up to disallowances and even show-cause orders. This research aims to show errors and malpractices in the use of PHilGEPS limited to the Philippine Center for Postharvest Development and Mechanization.

In line with this, this study is significant because it will help determine the causes of the errors and transgression in the use of the website and assess whether these problems are intentional or systematical. In addition, this study will recommend solutions to address the current issues faced by PHilMech related to the use of PHilGEPS.

II. METHODOLOGY

This study used the descriptive method of research and convenience sampling technique in selecting its respondents. Moreover, data collection was done through questionnaires facilitated through a Google form. [1] Data was then analyzed and interpreted.

A total of five (5) respondents whose work involves the use of the system were asked to answer the form. A questionnaire can be accessed through a Google form and was the main gathering data tool for this research. A review was also conducted and a secondary data gathering in the form of an interview was done to further cross-check the answers provided.

The research has gathered, tabulated, analyzed and interpreted the data. It is used to determine the obtained data regarding the transgressions and errors which are experienced in the course of using the website.

III. RESULTS AND DISCUSSION

A total of five (5) respondents whose job involves the use of the PHilGEPS Website were involved in the study.

Through the tabulated results, the researcher came up with interpretations and quantitative outcomes, to wit:

I. ASSESSING THE CHALLENGES FACED BY PHilGEPS USERS IN PHilMech

1. I have had trouble using the PHilGEPS Website during my course of use.

Fig.1. Result of Question No. 1

In the question of whether they have had trouble using the PHilGEPS Website, 60% of the respondents agreed that they have had issues and troubles in using the site, whereas, 40% remained neutral.

2. PHilGEPS is accessible at any time of the day.
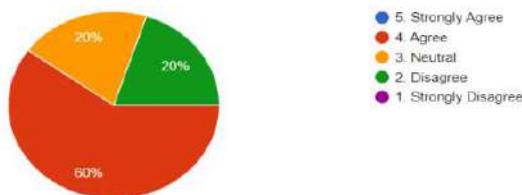
Fig.2. Result of Question No. 2

Although users have had difficulties accessing the PHilGEPS, the majority of the respondents totalling 60% have answered that they agree that the site is accessible at any time of the day. However, a percentage of 20% disagreed while the remaining percentage remained neutral.

3. PHilGEPS is convenient and easy to use.
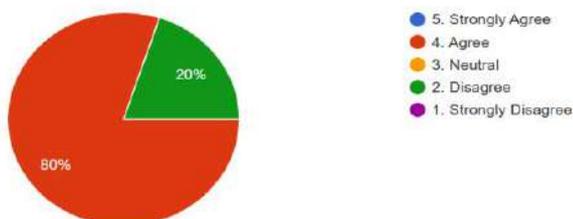
Fig.3. Result of Question No. 3

80% of the respondents agreed that the PHilGEPS Website is convenient and easy to use. However, 20% of the respondents disagreed.

4. PHilGEPS has greatly improved in the course of my use.
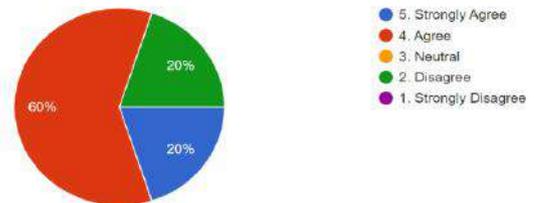
Fig.4. Result of Question No. 4

Despite the difficulties in using the website, 80% of the respondents answered that they agree that PHilGEPS have greatly improved in the course of their use.

5. What are usually the errors encountered in using the PHilGEPS Website?

The question of the causes of the misuse of the PHilGEPS website has varying answers, such as portal user traffic as only one user at a time can access an account. Website unavailability, connection errors, unresponsive website, lagging and irreversible data entry were also stated as the cause of misuse.

II. ASSESSING WHETHER THERE ARE TRAININGS AND SEMINARS RELATED TO THE USE OF PHilGEPS

1. I have had training related to PHilGEPS in the last year.
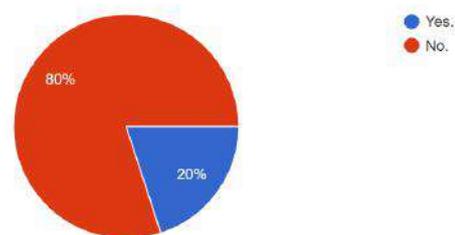
Fig.5. Result of Question No. 5

4 out of 5 respondents answered that they have had no training related to the use of PHilGEPS in the past year.

2. If you have had training/seminars related to the use of PHilGEPS, what are the improvements, additions and/or changes that have been made?

Out of five respondents, only one answered that they had training related to the use of the website. In this question, the respondent answered that they have learned about the different features of PHilGEPS, postings of direct contracting/negotiated procurement.

III. ASSESSING THE EFFECT OF PHilGEPS IN THE PROCUREMENT SYSTEM OF PHilMech

1. What are the effects of using PHilGEPS in the procurement process and the repercussions of not using the system?

There were five answers to the question; however, the common denominator between the answers is that PHilGEPS promotes transparency and efficiency in the procurement process of PHilMech. An answer also emphasizes that not using the system will lead to sanctions as it is a law that needs to be followed.

IV. CONCLUSION AND RECOMMENDATION

Along with the strengthening of transparency in government procurement, it is important to understand and unravel the challenges and malpractices in the use of the PHilGEPS Website. The following conclusions were made based on the results and discussion, to wit:

1. Through the perspective of PHilMech employees whose work is particular with the use of the system, this study established that the challenges faced by the users of PHilGEPS are caused by both human and system errors –these challenges are usually portal user traffic as only one user at a time can access the website, irreversible data entry and website unavailability.

2. In terms of human errors in the misuse of the website, it is essential that proper training and seminars are provided to enhance each user's knowledge of the use of the system.

3. Improper use of the website will lead to sanctions as it is under the Republic Act No. 9184.

4. Strengthening and sustaining PHilGEPS operations and maintenance is essential in the use of the system, as well as, providing sufficient knowledge and expertise to its users.

Based on the findings and conclusions, the following are recommended:

1. Strengthening and continuous improvement of PHilGEPs must be prioritized to avoid errors and transgressions in required postings;

2. Training, seminars and other measures should be provided to the users of the website to minimize human errors;

3. Sanctions against the improper use of the website must be strictly implemented;

4. A proper and more efficient monitoring system of all the required postings must be implemented;

5. Future researchers can expand this study by increasing and seeking respondents from other agencies.

REFERENCES

[1] Handbook on Philippine Government Procurement, 6th ed. Revised Implementing Rules and Regulations, Republic Act 9184, August 2016, 8th edition

[2] Philippines: Country Procurement Assessment Report 2012. (2013). Asian Development Bank.

[3] Government Procurement Policy Board Technical Support Office. (2021, December 17). NPM No. 068-2017. Philippine Government Electronic Procurement System (PHilGEPS) Registration. GPPB NON-POLICY MATTER OPINIONS. https://www.gppb.gov.ph/nonpolicyopinions.php

[4] Government Procurement Policy Board Technical Support Office. (2018, January 30). NPM No. 005-2018. Non-Compliance with the Advertisement Requirement. GPPB NON-POLICY MATTER OPINIONS.https://www.gppb.gov.ph/nonpolicyopinions.php

[5] Government Procurement Policy Board Technical Support Office. (2022, January 17). Submission of Annual Procurement Plan and Conduct of Early Procurement Activities As Requirements for the Grant of Performance Based Bonus. GPPB NON-POLICY MATTER OPINIONS. https://www.gppb.gov.ph/nonpolicyopinions.php

[6] Government Procurement Policy Board Technical Support Office. (2012, April 19). NPM 037-2012. Posting of Notice of Award and Notice to Proceed in the PhilGEPS Website. GPPB NON-POLICY MATTER OPINIONS. https://www.gppb.gov.ph/nonpolicyopinions.php

[7] Government Procurement Policy Board. (2021, March 30). PHILGEPS SYSTEM UPDATE. ps-philgeps.gov.ph. Retrieved 2022, fromhttps://ps-philgeps.gov.ph/home/index.php/about-ps/news/4445-adv-2021-018-philgeps-system-maintenance

[8] Bombay, N. M. (2011). PHILIPPINES: Case Study on The Philippine Government Electronic Procurement System (PhilGEPS) (Financed by R-CDTA 7437: Asia Pacific Procurement Partnership Initiative), pg. 8. https://doi.org/https://www.adb.org/sites/default/files/project-document/61348/43149-012-reg-tacr-01.pdf

[9] ADV 2022-009: SYSTEM MAINTENANCE. (2022, March). PROCUREMENT SERVICE. https://ps-philgeps.gov.ph/home/index.php/about-ps/news/4724-adv-2022-009-system-maintenance

[10] ADV 2022-032: PS-PHILGEPS SYSTEM MAINTENANCE (2022, September). PROCUREMENT SERVICE. https://ps-philgeps.gov.ph/home/index.php/about-ps/news/publications/advisories/

[11] Asian Development Bank. Procurement Guidelines. Mandaluyong City, Philippines: Asian Development Bank, 2015

[12] Case study on Procurement strategy, (2019, Aug. 20) Case Study on Procurement Strategy (lawteacher.net)

[13] Government Procurement Policy Board Technical Support Office (2015, Nov 27) NPN 148-2015), Award Contract, Government Procurement Policy Board - Technical Support Office (gppb.gov.ph)

[14] The Procurement Classroom. 8 Causes of Delays in the Public Procurement Process and How to Avoid Them – The Procurement ClassRoom, 5 Questions on Delays in the Procurement Process (procurementclassroom.com)

[15] Government Procurement Policy Board Technical Support Office (2005, May 23)Clarification on the provisions of R.A. 9184 and its IRR - NPN 027-2005, Government Procurement Policy Board - Technical Support Office (gppb.gov.ph)

[16] PHilMech - Transparency seal, Bids (The posted year 2019-2021)

Rice Value Chain Analysis: Rice Seed Production as a Profitable Agribusiness in Nueva Ecija

Angie Rose A. Hilado[1], Jayries S. Hugo[2], Hikari D. Kodama[3], Jerald P. Lebite[4], Jennifer G. Fronda[5]

[1]RCEF Seed Inspector, Philippine Rice Research Institute
[2]Sales Manager, Hino Nueva Ecija, Inc.
[3]Account Assistant, Land Bank of the Philippines
[4]Senior High School Teacher, Manuel V. Gallego Foundation Colleges Incorporation
[5]Business Administration, Graduate School Faculty, NEUST

Abstract— This study explored the rice value chain (RVC) in Nueva Ecija, value additions, found restrictions, and offered to upgrade solutions to improve the competitiveness of the rice industry and specific segments in the RVC using the value chain analysis (VCA) methodology. Farmers, paddy dealers, millers, wholesalers, wholesaler-retailers, and retailers in Nueva Ecija provided primary data. Workshops with stakeholders were also held to validate preliminary findings and identify upgrading strategies. The RVC begins with the provision of inputs for paddy production and concludes with the consumption of milled rice. The RVC is dominated by a traditional multi-layered supply chain with interconnected chain actors consisting of competing farmers, paddy traders, millers, and rice traders in each segment and, frequently, with the involvement of brokers in both paddy aggregation and rice distribution, thereby increasing marketing cost. The major constraints identified in the RVC included high production and marketing costs of paddy and rice due to low yield, high labor and material inputs, and a lack of critical infrastructure and market facilities (e.g., modern mills, dryers, cheap transport, and energy), resulting in high domestic paddy and rice prices and low competitiveness of the entire rice VC. To improve competitiveness, the rice industry should focus on developing and promoting yield-increasing, postharvest loss-reducing, and cost-cutting technologies, as well as those that improve overall RVC efficiency, such as investments in enabling infrastructure and facilities for transport, handling, storage, drying, and milling.

Keywords— Aggregation, Agribusiness, Hybrid Seeds, Millers, Retailers, Rice Value Chain

I. INTRODUCTION

Rice is one of the most important crops in the Philippines, not only because it is the staple food of the majority of Filipinos, but also because it provides a source of income to a large chain of stakeholders on both the demand and supply sides. More than three million farmers and their families work in the rice industry, as do thousands of traders, millers, retailers, and individuals involved in the production, processing, and marketing of rice-related products. Due to the sheer rice sector's significant contribution to the country's economic development, the government has launched programs to boost productivity and competitiveness.

Rice is the most common staple food in the Philippines. It can be found in almost every Filipino household's meal. Rice is the most important industry in Philippine agriculture in terms of employment and income. It accounts for approximately 35% of the gross output of the crop's subsector and 16% of the total value of agricultural production. For these reasons, the government is constantly investing in a variety of programs aimed at increasing palay productivity.

Seeds are an important part of agricultural production. To increase agricultural productivity and product quality, new excellent plant varieties, as well as superior-quality seeds, must be developed and distributed. Cultivar development, in particular for major crops, takes a long time, a lot of effort, and a lot of money. Furthermore, the development necessitates the use of a custom-designed system, organization, and manufacturing technology. Seed farming is a promising business that can help farmers increase their income. Farmers, particularly small farmers, face numerous challenges in running their businesses due to a lack of capital, land, human resources, and technology. Patterns of collaboration between rice seed farmers and partner companies may provide a solution to these issues (Bordey et al. 2016).

This paper recognizes the significance of agricultural productivity and its impact on postproduction activities in the rice value chain, such as processing and trade, particularly in terms of job creation or agribusiness. It attempts to determine whether or not increased agricultural productivity creates jobs, not only in the rice seed production chain but also in processing and trade. It also intends to investigate how issues in the rice value chain, aside from those affecting agricultural productivity, affect job generation potential and job quality.

The purpose of this research is to determine whether the rice value chain and rice seed production as profitable agribusiness in Nueva Ecija. This study specifically sought to answer the following questions:

1. What is the nature and structure of the rice value chain, indicating the paddy and milled rice marketing channels, as well as the nature, function, and economic analysis of chain actors?

2. What are the value addition and financial condition of the chain actors in each of the RVC's individual segments?

3. What are the constraints and draws specific policy initiatives and actions being developed to improve the competitiveness of the rice industry and certain areas of the RVC?

The analysis of the rice value chain is limited only to rice seed production as a profitable agribusiness in Nueva Ecija based on the survey data gathered from VC actors in the top major rice seed production. Moreover, results were presented as averages, such as yields, prices, and costs, which obscured some critical information about the complete and real situation of domestic rice VCs.

II. METHODOLOGY

Purposive sampling was used by the researchers to conduct face-to-face interviews. Purposive sampling is the best method to use because it allows the researchers to collect qualitative responses, which leads to more accurate research results and better insights. The results are relevant to the research context because the researchers collect information from the best-fit participants. This study was conducted in the City of Nueva Ecija. The farmers and other value chain actors of Nueva Ecija were the respondents for this study.

The respondents are made up of 50 farmers from Nueva Ecija and 10 other value chain actors (paddy traders/assemblers, millers, wholesalers and retailers). The researchers chose the participants using the purposive sample technique in qualitative data, which can provide in-depth and relevant information; also, it is very subjective, which provides meaningful information about their own experiences. The researchers chose participants based on the criteria that each participant had to meet in order to be selected for the study. Furthermore, the researchers interviewed sixty (60) individuals for in-depth interviews (IDI), which considerably aided the study.

The descriptive analysis used tabulated statistics such as sums, means, averages, and frequencies, whereas the economic analysis of costs and returns examined the profitability of rice production, aggregation, processing, and marketing. It also evaluated the overall VC's value addition, as well as the value-added and margins for each actor in a specific segment of the chain. A farm budget structure was specifically designed for the profitability of rice farming using actual and imputed prices.

Using the value chain analysis (VCA) framework, this study examined the rice value chain (RVC) in Nueva Ecija, looked at the value additions, identified constraints, and proposed upgrading strategies to improve the competitiveness of the rice industry and specific segments in the RVC. Key informant interviews in government and non-government organizations (NGOs), as well as surveys of farmers, paddy traders, millers, wholesalers, wholesaler-retailers, and retailers, were used to collect primary data. Workshops with stakeholders were also held to validate preliminary findings and identify upgrading strategies. In data analysis, descriptive and economic approaches were used. RVC in the country begins with the provision of inputs for paddy production and ends with the consumption of milled rice.

Before collecting field data, an ethical clearance from the research ethics committee was sought. This ensured that adequate safeguards were included in the study design to protect the interests of study participants across all

study sites. The Research Ethics Committee approved the plan after receiving a detailed field data collection plan. During the field data collection, participants were given an introduction letter that explained the entire purpose of the research so that they knew what they were getting into before agreeing to participate. The main message of the consent letter emphasizes the participants' commitment to their privacy.

In this study, the researchers used different and appropriate statistical measures to treat the data collected. All the data were carefully read and examined for analysis. They were tallied and entered into a master list of the data collection sheet.

III. RESULTS AND DISCUSSION

Table 1. Demographic Profile of Respondents

1.1 Age and Sex of Respondents

Male	Female	Age			
		20-25	26-35	36-45	46 and above
50	10	1	8	10	41

Respondents of all ages (20 through to over 46 and above) were represented, with the lowest numbers in the lowest age bracket 20-25 accounting for 1 (1%), categories for 26-35 accounting for 8 (13%), categories from 36-45 accounted for 10 (15%), and the oldest age bracket was for 46 and above accounted for 41 (71%) of the respondents. The proportion of ages of males to females was about 90% and 10% in all age groups. Male participants are 50 numbers of respondents while female is 10.

1.2 Highest Educational Attainment, Salary Range, and Years in Service

Highest Educational Attainment					Salary Range					Years in Service			
Elementary Level	High School Level/ Graduate	Vocational	College Level/	Post-Graduate	Less than P15,000	P16,000-P30,000	P31,000-P45,000	P46,000	1-5 years	6-10 years	11-15 years	16 years and above	
50	5	2	3	0	42	7	3	8	6	12	20	22	

Table 1.2 shows the highest educational attainment, salary range, and years in service of farmers and other value chain actors. The highest education of the respondents is elementary level with accounted for 90%. While in the salary range, the participants answered less than 15 thousand of their income accounted with 42 respondents, and in years of service participants got the highest answered in 16 years and above accountable of 22 respondents.

Table 2. No. of Hectare Planted with Palay for Seed Production

Item	No. of Hectare
Hybrid	65.93
Inbred-Modern Certified	57.85
Inbred-Modern Farmers' seeds	76.92

Table 2 shows that hybrid, inbred-modern certified, and inbred-modern farmers' seeds are the most common seed types planted in Nueva Ecija. According to the data, the number of hectares planted with hybrid is 65.93 hectares, while the number of hectares planted with inbred-modern certification is 57.85 hectares. And 76.92 hectares are planted with inbred-modern farmer seeds.

Table 3. No. of Farmers Engaged in Rice Seed Production

No. of Farmers	Rice Processor			Paddy-Rice Trader	
	Cooperative miller-trader	Custom miller	Miller- trader	Paddy-rice trader wholesaler	Paddy-rice trader wholesaler-retailer
30	12	3	5	6	4

Table 3 shows that 30 farmers and other value chain actors (paddy traders/assemblers, millers, and wholesalers and retailers) engaged in rice seed production in Nueva Ecija. According to the findings, there are 12 cooperative miller traders, 3 custom millers, and 5 miller traders among the rice processors. While there are six paddy-rice trader wholesalers and four paddy-rice trader wholesaler-retailers in the paddy-rice trader.

Table 4. Supply VS Demand

Year	Certified hybrid			Certified non-hybrid			Total		
	Demand	Supply	%	Demand	Supply	%	Demand	Supply	%
2018	123,777	35,244	28	629,422	205,680	33	753,199	240,924	32
2019	143,847	86,787	60	841,458	246,051	29	985,305	332,838	34
2020	193,079	95,735	50	737,992	278,353	38	931,071	374,088	40
2021	333,249	168,123	50	723,588	433,049	60	1,056,837	601,172	57
2022	432,648	365,335	84	930,980	716,512	77	1,363,628	1,081,847	79

As shown in Table 4, the trend in both seed demand and supply has been increasing since 2018. Similarly, the percentage of supply to revealed demand for both hybrid and non-hybrid seeds is steadily increasing. In the 2022 production season, there is a significant increase in supply. This is closely related to the rice seed multiplication program that has been in place in Nueva Ecija. The seed production has significantly boosted the supply to more than one million quintals of seed, which is approximately 80% of the stated demand for the 2022 production season from the various regions.

Table 5. Costs and Returns per Hectare to Produce Rice

Item	2021 WS	2022 DS	Average	Cost Share (%)
Returns				
Yield (kg/ha)	4,535	4,567	4,551	
Price of paddy (PHP/kg)	17.69	15.39	16.31	
Gross Returns (PHP/ha)	80,240.00	70,307.00	74,230.00	
Costs (PHP/ha)				
Seed	2,531.00	2,190.00	2,361.00	4.87
Fertilizer	4,770.00	4,584.00	4,677.00	9.65
Chemicals	1,298.00	1,248.00	1,273.00	2.63
Hired labor	19,705.00	18,172.00	18,939.00	39.07
Operator, family, and exchange labor	5,036.00	5,711.00	5,374.00	11.09
Animal, machine, fuel, and oil	2,019.00	2,337.00	2,178.00	4.49
Irrigation/drainage	548.00	751.00	650.00	1.34
Food	1,011.00	979.00	995.00	2.05
Transportation	180.00	166.00	173.00	0.36
Tax	193.00	185.00	189.00	0.39
Land rent	8,486.00	6,542.00	7,514.00	15.50
Interest cost	1,580.00	1,555.00	1,568.00	3.23
Other inputs	2,657.00	2,508.00	2,583.00	5.33
Total Costs (PHP/ha)	50,014.00	46,928.00	48,471.00	
Total Costs (PHP/kg)	11.03	10.28	10.65	

Net Profit (PHP/ha)	30,226.00	23,379.00	26,806.00	
Net Profit (PHP/kg)	6.66	5.12	5.66	
Net Profit-Cost Ratio	0.60	0.50	0.53	

With an average output (fresh weight) of 4.551 t/ha and a price of PHP 16.31/kg, gross profits on rice production would be PHP 74,230/ha. The average production cost is PHP 48,471/ha, which equates to PHP 10.65/kg. Among production cost components, labor has the largest percentage (50%)—hired labor accounts for 39 percent of overall production expenses due to the frequent practice of labor-intensive manual transplanting. Harvesting and threshing work is typically compensated on a crop-share basis, with wages increasing as paddy production and price grow. Land rent has a cost share of roughly 16%, owing to increased land demand from non-agricultural industries and high-value crops, as well as a loss in productive land. Fertilizers accounted for 9.7 percent of the cost share due to their high price, while seeds accounted for 5% due to farmers' high sowing rate practices. The relatively low yield also contributed to the high unit production costs, with most farmers still achieving yields less than the national average of 4 t/ha (at 14% MC). The average net return was PHP 25,759/ha, or PHP 30,226/ha (WS) and PHP 23,379/ha (DS), resulting in a net profit of PHP 5.66 per kilogram paddy (PHP 6.66/kg [WS] and PHP 5.12/kg [DS]). The profit-to-cost ratio was 0.53. (Table 5).

Table 6. Financial Statement

Financial Statement for Rice Seed Production as a Profitable Agribusiness in Nueva Ecija for the Period Ending 31st of December 2022		
INCOME STATEMENT		
Revenue	Sales of rice seeds	PHP 1,000,000
	Contract farming	PHP 500,000
	Total Revenue	PHP 1,500,000
Expenses	Labor	PHP 200,000
	Electricity	PHP 50,000
	Water	PHP 50,000
	Fertilizers and pesticides	PHP 100,000
	Land lease	PHP 100,000
	Transportation	PHP 50,000
	Total Expenses	PHP 550,000
Net Income		**PHP 950,000**
BALANCE SHEET		
Assets	Cash	PHP 500,000
	Receivables	PHP 100,000
	Inventories	PHP 250,000
	Land and buildings	PHP 500,000
	Equipment	PHP 200,000
	Total Assets	PHP 1,550,000
Liabilities	Short-term debt	PHP 100,000
	Long-term debt	PHP 250,000
	Total Liabilities	PHP 350,000
Equity	Capital stock	PHP 500,000
	Retained earnings	PHP 700,000

	Total Equity	PHP 1,200,000
Total Liabilities and Equity		**PHP 1,550,000**
STATEMENT OF CASH FLOWS		
Cash Flows from Operating Activities	Net income	PHP 950,000
	Depreciation	PHP 50,000
	Changes in working capital	PHP 50,000
	Total Cash Flows from Operating Activities	PHP 1,050,000
Cash Flows from Investing Activities	Purchase of land and buildings	PHP 250,000
	Purchase of equipment	PHP 200,000
	Total Cash Flows from Investing Activities	PHP 450,000
Cash Flows from Financing Activities	Issuance of capital stock	PHP 500,000
	Repayment of long-term debt	PHP 50,000
	Total Cash Flows from Financing Activities	PHP 450,000
Net Increase in Cash		**PHP 200,000**

Table 7. Other Factors

7.1 The Competitiveness of the Rice Industry and the Specific Segments in the RVC

The Competitiveness of the Rice Industry and the Specific Segments in the RVC					
	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
Q1	16	33	6	5	0
Q2	13	27	16	4	0
Q3	14	31	13	2	0
Q4	17	28	15	0	0
Q5	14	21	15	10	0
Q6	16	27	11	6	0
Q7	26	34	0	0	0

The competitiveness of the rice industry and the specific segments in the rice value chain shows 33 numbers of respondents answered agree in the rice value chains in Nueva Ecija and the Philippine rice industry are structurally transforming. Rice value chain performance allows for the inclusion of small-scale farmers, midstream actors, and workers, resulting in lower food costs for consumers accounting for 27 numbers of respondents agreed. While the actions of rice value chain actors are constantly evolving got 31 numbers of the respondents agreed.

7.2 Traders, Millers, and Retailers Improve Rice Seed Production, Processing, and Marketing

Traders, Millers, and Retailers improve Rice Seed Production, Processing, and Marketing					
	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
Q1	16	33	11	0	0

Q2	16	18	17	9	0
Q3	15	30	8	7	0
Q4	23	20	11	6	0
Q5	14	31	12	3	0

Table 7.2 shows that the respondents agree when it comes to selling the crop, they rather have financial certainty than financial uncertainty which accounted for 33 numbers of respondents. While in taking greater financial risks in exchange for higher average returns, 18 numbers of respondents agreed, and trading properly in the market increases their returns compared to selling only in the cash market answered agree accounted of 30 numbers of respondents

7.3 Seed Farming Promising Business that can help Farmers Increase Their Income

Seed Farming Promising Business that can help Farmers Increase their Income					
	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
Q1	5	32	7	16	0
Q2	27	29	4	0	0
Q3	25	17	11	7	0
Q4	12	28	5	15	0
Q5	16	40	4	0	0

Table 7.3 shows that taking advantage of productive credit facilities offered by banks 32 numbers of respondents agreed, while accounted 29 agreed in keeping accurate records of agricultural expenditures and income. Before sowing, participants analyzed market trends to make profitable crop choices accounted 25 numbers of the respondent answered strongly agree.

7.4 Other Relevant Theme to The Study

Others					
Policy Support					
	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**
Q1	0	0	2	32	26
Q2	0	0	1	36	23
Q3	0	0	0	27	33
Q4	0	0	2	31	27
Agricultural Focus					
Q1	7	24	12	17	0
Q2	10	33	12	5	0
Q3	4	37	17	2	0
Q4	10	33	11	6	0
Locus of Control					
Q1	35	19	6	0	0
Q2	0	6	36	18	0
Q3	0	37	12	11	0

Table 7.4 shows the other relevant theme in the study such as policy support, agricultural focus, and locus control. The farmers should not receive any commodity price support accounting for 32 numbers of disagreed participants. As well as farmers should not receive any support for the farming area got 36 numbers of disagreed answers. While in terms of agricultural focus, the farmers should only produce food and fibre got 24 numbers of agreed participants. In locus control, farmers and actors need a piece of technical support information in irrigation practices in some irrigation crops accounted 35 numbers of the participants answered strongly agree.

IV.   CONCLUSIONS AND RECOMMENDATIONS

Farmers were the first value-added actors, producing and supplying paddy to markets. They barely covered their production costs. Farmers in the study region encountered a variety of challenges. As a result, average rice seed production was less than satisfactory. Other issues included a lack of input, a lack of irrigation power, excessive input costs, a lack of contemporary equipment, and a lack of timely finance. Farmers had the lowest share of all value-added players. Farmers added value by washing paddy, drying, storing, marketing at different times and in different markets, and processing seed and rice.

According to the study's findings, producers were unable to meet predicted net margins due to high production costs and low output prices. Farmers consumed the majority of the output. Paddy was stockpiled by some major farmers and afterwards sold in the market. Furthermore, a big number of people were involved in the production and marketing of the product. Farmers and middlemen would surely benefit financially if the rice production and marketing system was effectively developed. The price dropped dramatically during the harvesting season, but it skyrocketed prior to planting. Frequent price variations raise market uncertainty and increase risks in rice production. Rice price predictions and production should be done ahead of time before sowing to allow farmers to alter rice acreage properly. Rice farmers may receive the expected return if the value chain concept is implemented effectively. The value chain depicts the places where costs could be lowered. Market intelligence is critical for an efficient rice value chain. The value chain ensures product quality while lowering prices, ensuring paddy traders' predicted profit level.

Based on the findings, the following recommendations for improving the present production, marketing, and storage systems were made.

1. Farmers and other value-added operators should be given adequate credit and subsidies from the government.

2. The government should announce a minimum paddy price during harvesting to ensure that farmers can meet their production costs.

3. The government would obtain critical information and devise a method to monitor the market in order to reduce price swings.

4. Value chain analysis is an efficient method of gathering market information. As a result, the market data derived from it should be made transparent and easily accessible to all value chain actors.

5. To lower costs, uninterrupted electrical supply should be made available to paddy growers during the irrigation season, as well as rice millers.

6. vi. To keep rice prices within an acceptable range, needless value chain extension should be avoided.

7. To keep paddy and rice prices low, infrastructure and transportation systems should be established. However, if prices fall, farmers will suffer a loss. In this case, paddy input costs should be decreased or subsidized.

8. Farmers should be able to use rice in a variety of ways, and processing technologies should be made available to them.

9. The government should assist farmers both during paddy cultivation and after harvesting. This would lessen price volatility while also ensuring demand-supply equilibrium. Due to a lack of funds, most farmers were unable to store their paddy. As a result, there is an excess supply of rice during the peak season.

10. Finally, value chain actors must be informed about the value chain system, and other actors must be knowledgeable about it. If the actors were better informed about the value chain, the rice market would be more efficient, which would benefit all types of actors. Furthermore, rice millers will implement a grading system to maintain rice quality.

REFERENCES

[1] Balisacan, A., David, A., & Quibuyen, F. (2011). Warehouse receipts as a system for improving the efficiency of rice and corn marketing in the Philippines. Discussion Paper Series No. 2016–45. Manila: Philippine Institute for Development Studies.

[2] Bordey, F.H., P.F. Moya, J.C. Beltran, & D.C. Dawe (Eds.). (2016). Competitiveness of Philippine rice in Asia. Science City of Muñoz, Philippines: Philippine Rice Research Institute and Manila, Philippines: International Rice Research Institute.

[3] Casiwan, C., Delima, A., & Masangkay, E. (2013). Rice marketing systems in the Philippines and Thailand: Do large numbers of competitive traders ensure good performance? Food Policy, 33, 455-463.

[4] Dy, R. (2013, November 25). Job creation is not a walk in the park. Philippine Daily Inquirer. Retrieved from http://business.inquirer.net/153695/job-creation-is-not-a-walk -in-the-park

[5] Giddens, M. (2016). Assessment of the state and magnitude of the paddy grains postproduction losses in major rice production areas. PhilMech Journal, 2(1), 19-37.

[6] International Rice Research Institute (IRRI). (2015). Diversified cropping systems. Laguna, Philippines: IRRI. Retrieved from http://irri.org/our-work/research/rice-and-the- environment/diversified-cropping-systems

[7] Javier, E. (2014, October 21). Rice trade liberalization (Part 2). Philippine Rice Research Institute. Retrieved from http://www.philrice.gov.ph/rice-trade-liberalization-part-2/

[8] Morris, S. (2018). Rice functional properties and rice food products. Food Reviews International, 12(1), 71-103.

[9] Philippine Statistics Authority (PSA). (2015). Palay production data and area harvested. Quezon City, Philippines: PSA.

[10] Provincial Agriculture Office (PAGRO). (2014). North Cotabato rice production data. Provincial Government of North Cotabato.

[11] Riisgaard, L., Bolwig, S., Matose, F., Ponte, S., & Du Toit, A. (2008). A strategic framework and toolbox for action research with small producers in value chains. DIIS Working Paper No. 2008/17. Copenhagen, Denmark: Danish Institute for International Studies.

[12] Sunstar. (2014, November 17). DA Pinoy program. Manila, Philippines: SunStar Publishing, Inc.

[13] World Bank (WB). (2014). Rural connectivity and agricultural supply chain analysis in Mindanao, Philippines. Taguig City, Philippines: WB.

Tourism Brand and Strategy for Sustainable Tourism Development of Bongabon, Nueva Ecija

Rowie Grace O. Saclolo

Nueva Ecija University of Science and Technology, Philippines

Abstract— *This study identified problems encountered in tourism sustainability in Bongabon, Nueva Ecija. This covered the areas of economic, environmental and tourism managements aspects. Business' years of operation and services offered in tourist spots were also identified in this study. This research study used a descriptive research design, and a structured interview is used as data collection tool. Participants of the study were 5 selected owners or member of association in different tourist spots in Bongabon, Nueva Ecija. Based on the research study, tourism management aspect has the highest percentage of problems encountered, this includes the factors of crowd management and LGU and owner's participation; environmental aspect has the second highest percentage of problems encountered, this area includes nature deterioration and preservation, pollution, and construction of tourism facilities and infrastructure development; and economic aspect has the least percentage of problems encountered which includes the factors of livelihood, income and employment. Environmental Aspect is an element of an organization's activities, products or services that can interact with the environment. There are two types of environmental aspects: (i) Direct Environmental Aspect Activities over which a company can be expected to have an influence and control. For example, emissions from processes. (ii) Indirect Environmental Aspect Actual or Potential activities over which the organization can be expected to have an influence, but no control. The economic aspect refers to the importance of social responsibility, broad consideration of society and businesses, contribution to public interest, and corporate voluntary participation.*

Keywords— *Brand Tourism; Crowd Management; Place Product; Sustainable Tourism   Development; Strategic Plan, Tourist Destination*

I. INTRODUCTION

Tourism is extensively identified to be an effective medium for development. In many countries, tourism sector is contemplated as a powerful stimulator for national economies as it has a huge impact with economic sectors that is connected or associated with it (Sadiku, Selimi & Sadiku, 2017).   Tourism is one of the fast-growing industries nowadays. It has a positive implication on lives of local people that may result to increased income and employment opportunities, developed public infrastructure and facilities, boosting promotion and preservation of local culture (Magboo et al., 2019)

Sustainable tourism development, is a continuous process in which it analyzes and provide the needs of the present tourists and create opportunities in different areas such as economic, social and biological diversity my managing the resources for the future. Sustainability is envisioned as the answer for the problems in the negative impacts of tourism and through maximization of resources it holds long-term capability. The process of tourism development must cope up with the trend and match the demands and preferences of present and future tourist, as it also enhance the available tourism resources. Since tourism is a place product, it must contain three level of resources: (1) tourist attractions, which includes the natural, cultural and man-made attractions; (2) infrastructures and superstructure, that will provide support to different activities of tourism; and (3) the social and physical settings of the tourist destination, which includes the hospitality of the local people and community. The growth of tourism not only boost the economy of local government where the area

is located but it also creates opportunity for local businesses to boosts their sales on local goods and services (Liu, 2003).

Tourism as a place product, cannot stand with natural resources alone. It must be composed of three attributes: the natural resources, activities and services. These three attributes open the opportunity for business and tourism industry in the tourist destination. Sustainable tourism development, must not only focused on increasing the number of tourists who visits the destination but it must also consider the environmental and socio-cultural aspect. For sustainability, these three components must be balanced in the long-term. There are three areas in sustainable tourism development that needed to be considered: (1) Economic aspect, which includes business that operates in the tourist destinations that can provide employment to local people. (2) Environmental aspect, which includes the use and conservation of the resources from the environment; and (3) Tourism management, which includes factors that will provide tourists convenience and significant experiences. The satisfaction of the tourists is an important indicator of the sustainable development of tourism to a particular destination (Juandi, Andari & Setiyorini, 2018).

Creating the brand "tourism" and formulation of strategies for sustainable development into a place product, the town of Bongabon, a second-class municipality in the province of Nueva Ecija is widely known for its beautiful sceneries and mountain ranges one of the must-visit places is the "Labi river". According to the local tourism office of the town, over 300,000 tourists visit the place over time. With the help of the local government, these places are continuously being developed into attractions and building different activities that would be worth visiting.

Specifically, the study was intended to:

1. Describe the tourism industry in Bongabon, Nueva Ecija in terms of:
   1.1 Years of operation
   1.2 Services offered
2. Describe the problems encountered on tourism sustainability in terms of:
   2.1 Economic impact
   2.2 Environmental Impact
   2.3 Tourism Management
3. Propose a strategic plan for sustainable development.

II. METHODOLOGY

A descriptive research design was used for this study to gather pertinent information to arrive at the purpose of this research study. The researcher used a structured interview as a data collection tool as this method allowed the participants to elaborate, and with that provided more flexibility, range, and therefore the capacity to elicit more information from the participant. The participants of this research study are owners/members of the association of selected five (5) tourist spots in Bongabon, Nueva Ecija.

III. RESULTS AND DISCUSSION

This chapter contains a detailed presentation and discussion of data analysis and the results of this study. 3.1 Figure 1 presents the years of operation of five (5) tourist spots in Bongabon, Nueva Ecija.
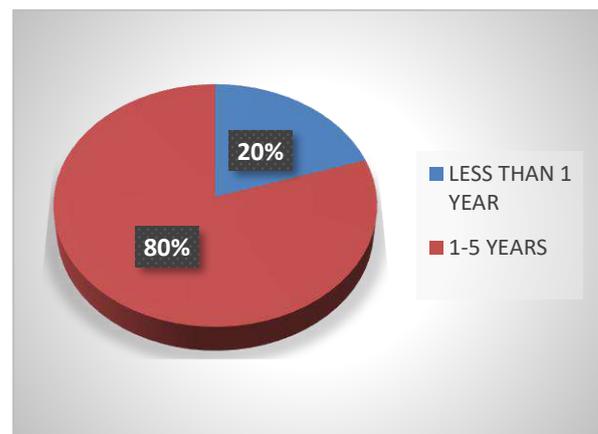
Fig.1. Tourist spots' years of operation

As shown in the figure above, among the 5 participants of the research study, 80% operates in the tourism spots for 1-5 years and 20% were operating for less than a year.

Table 1. Services offered in the tourist spots

Services Offered	Tourist Spot (Participants)					Total (f)
	1	2	3	4	5	
Venue and Accommodation	1	1	1	1	1	5
Restaurant or Food Services	1	1	0	0	0	2
Recreation	1	1	1	1	1	5
Nature Tripping	1	1	1	1	1	5

The Table 1 above shows the responses of the participants in different tourist spots with the services they offered. Venue and accommodation, recreation and nature tripping were all offered by the tourist spots, while only 2 tourist spots offer restaurant or food services.
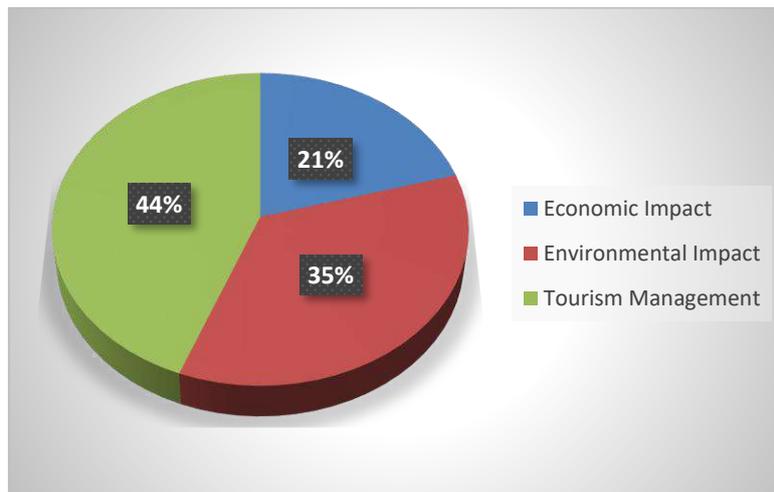
Fig.2. Problems encountered in tourist spots

3.2 The Figure 2 above shows the responses of the participants in different tourist spots with the problems they encountered. A total of eight questions were asked to the participants; 3 in economic area, 3 in environmental and 2 in tourism management. Responses are tallied and average score of responses from 5 participants is presented in figure 3 above. The result are as follows: (a) Economic Impact. This area includes the livelihood and income and employment to different tourist spots. With 21% of total tallied score, this area has the least percentage of problems encountered. According to the participants, tourism in Bongabon, Nueva Ecija is growing as it provides opportunities for the locals to be employed, and have source of livelihood. Though the volume of tourists differs in months, different business strategies were used by business owners to ensure income throughout the year. (b) Environmental Impact. This area includes three factors; (1) Nature deterioration and preservation (2) Pollution (3) Construction of tourism facilities and other infrastructures. With 35% of percentage score, environmental aspect is the second highest of problems encountered. Issues were addressed to the participants of this research study with regards to factors concerning the environmental aspect of the tourist spots. Nature deterioration and preservation, tourism indeed affect nature greatly that in order to give way for the construction of tourism facilities and other infrastructures, forest and wildlife were harmed. Environmental permits were needed to be secured by the business owners before any land, facilities and other infrastructure developments were made to the business areas. The pollution brought by solid wastes and littering is another issue concerning the environmental aspect of the

tourist spots. (c) Tourism Management. This area has the highest percentage of problems encountered with 44%. This includes Local Government Unit (LGU) and owners' participation, and crowd management. Communication between LGU and business owners is included in this aspect especially during peak seasons and calamities.

IV.   CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the data gathered in the research study of tourism brand and strategy for sustainable tourism development of Bongabon, Nueva Ecija it is concluded as follows: Tourism can be sustainable if (1) the economic aspect of the tourist spots benefits its local community and its local people; it must not only generate income but will also provide employment to local people that may be the source of their livelihood (2) reduce the negative impact of tourism in its environment by seeking a way to reduce and avoid water, air and soil emissions and wasteful consumption of scarce resource; various developments in tourist destination has negative impact in natural resource thus, continuous effort by the owners and tourist must be present for its preservation and protection (3) proper management in different tourist spots with the participation of both government and private individuals.

The following recommendations is given based on the result and analysis of the responses of the participants of this research study:

- Tourism is a growing service industry and boosts the economy by creating many businesses, and

employment opportunities which may be a relief for poverty reduction in a tourist destination. Peak seasons like holidays, weekends, and summer break is when there is an increased number of tourists in the destinations. Tourist spots require more manpower in order for them to accommodate the tourists. Private sectors and members of associations may consider, hiring more people during those seasons.

- Market research may also help to identify various opportunities for what the tourist spots may offer during rainy seasons when there is low number of visitors. Consumers always demand for leisure or other recreational activities. Tourist spots through market research may identify what leisure or recreational activities they can offer during those seasons to ensure the visits of the tourists.

- Various policy and regulatory measures may implement to different tourist spots to ensure the proper managing of environmental resources. Since increase in number of tourists may result to greater risk of damaging the environment. These policies may include limit to the number of visitors, or restricted areas where there is great risk of damaging the environment.

- Tourists' participation must be present in nature preservation of different tourist spot areas, including private and managed by an association. It is to reduce the risk of environment deterioration. This can be done through orientation to the tourists before entering the tourists spots the proper waste disposal. Business owners must provide garbage bags and locate the proper area where it should be placed before they leave the destination. To lessen the negative impact of tourism to environment, business owners and tourist must be both participate.

- Coordination between government, public and private sectors when it comes to development planning is needed in sustainable tourism development. There is unending need for development when it comes to tourism. It is a continuous process of building both private and public infrastructures on what may drive tourists into it. Tourist spots must provide all the convenience to its tourists, the partnership of these three sectors must ensure that water and energy needs must be available. Even in waste management in tourist destinations, government participation must be present through the scheduled waste collection. Proper communication between private and government sectors must be

secure especially when there are natural calamities when the roads are not accessible to the tourists. Government sectors must provide the information to the private sectors, for them to inform their expected tourists.

- Continuous marketing efforts is also recommended since there are lots of place product available, where participation of private, public, and government must be present. A tourist destination must enhance its competitive advantage so the tourists will be attracted to visit the destination.

REFERENCES

[1] Azam, M., Alam, M., Hafeez, M., (2018). Effect of Tourism on Environmental Pollution: Further Evidence from Malaysia, Singapore and Thailand.

[2] Juandi, V., Andari, R., Setiyorini, H., (2018). *The Influence of Sustainable Tourism Development towards Tourists' Satisfaction in Saung Angklung Udjo.*

[3] Liu, Z. (2003). *Sustainable Tourism Development: A Critique.*

[4] Magboo, N., Blay, M., Balbastro, L., Landicho, M., Marasiga, H., Villaseñor, A., Felicen, S., *(2019) Impacts of Tourist Attraction in the Community of one City in the Philippines.*

[5] Sadiku, L., Selemi, N., Sadiku, M., (2017). The Impact of Tourism on Economic Growth in the Western Balkan Countries: *An Empirical Analysis.*

[6] Sunlu, U. (2003). *Environmental Impacts of Tourism.* United Nations Environment Programme. (2001). Environmental Impacts of Tourism.

Effects of Perceived Billing System on Customers' Preference for Pre-Paid Electricity Metering System in Ekiti State, Nigeria

T. R. Ibijoju[1,*], O. F. Babatunde[2], P. F. Ajetunmobi[3]

[1]Department of Business Administration, Faculty of Management Sciences, Ekiti State University, Ado-Ekiti.
Corresponding Author: pipeloluwa2018@gmail.com
[2]Department of Management Sciences, Bamidele Olumilua University of Education, Science and Technology, Ikere Ekiti, Ekiti State, Nigeria
babatunde.olayinka@bouesti.edu.ng
[3]Department of Management Sciences, Bamidele Olumilua University of Education, Science and Technology, Ikere Ekiti, Ekiti State, Nigeria
ajetunmobi.precious@bouesti.edu.ng

Abstract— *This study examined how customers' preferences for pre-paid power metering systems in Ekiti State, Nigeria, were influenced by their perceptions of the billing system. Primary method of data collection was used. Data were obtained via a structured questionnaire that was given to a carefully chosen sample of 381 electricity users in the Ado-Ekiti metropolitan, the state capital of Ekiti, using a systematic sampling technique. The extent to which customers' preferences are impacted by how they perceive the billing system was examined using the Pearson product moment correlation method. The findings showed that customers' preferences for pre-paid power metering systems are positively and significantly influenced by how they view the billing system. The findings showed that customers' preferences for pre-paid power metering systems are positively and significantly influenced by how they view the billing system.*

Keywords— *Electricity Metering System, Billing System, Pre-paid metering, Customers' Preference.*

I. INTRODUCTION

In the past, electricity was seen as a public utility in the Nigeria society, hence, considered a free gift from government. Its generation, transmission and distribution were the sole responsibilities of the Federal Government with little complements from state and local governments; whereas, citizens consider it a social amenities and part of the feedback from the payment of their taxes. In this wise, it was so unusual for the then electricity supplying organisation (the defunct Electricity Corporation of Nigeria (ECN), (1950-1972), National Electric Power Authority (NEPA), (1972-2005)) to bill their customers for payments, and even, if customers were billed at all, there were no embarrassingly aggressive pursuits by the Authority in collecting the bills from the customers despite the relative stability of the supply during the period

compared to the present days. In all spheres of human endeavor administrative, industrial, commercial, and residential electricity has grown increasingly prevalent throughout the years (Azodo, 2014).

The list of established sectors where the use of electricity has become standard practise includes everything from residences, social services, industry, education, and agriculture to defence and, of course, transportation in some countries (Olokoba, Ibrahim & Abdulraheem-Mustapha, 2010). After air and water, energy supply has taken the place of importance as a vital component of life (Abayomi, 2012). Numerous research found in the literature support the idea that one of the most crucial requirements for sustaining life is electricity (Azodo & Adejuyigbe, 2013; Isola, 2007; Makoju, 2002). Cooking, refrigeration, washing, ironing, lighting, entertainment, air

conditioning, and water pumping are just a few of the household chores that require electricity (Ekpo, Chuku, & Effiong, 2011).

Despite this, Nigeria's power system is characterised by irregular behaviour, frequent interruptions, total blackouts, an inadequate and epileptic supply of electricity, etc. Nigeria experiences power disruptions for roughly 26 days every month. The eight-hour daily power interruptions that Nigeria experiences are significantly worse than the regional and global average records (Moyo, 2012). Yet, customers are still being forced to pay for the poor service quality through arbitrary billing system (Azodo, 2014).

However, with the poor performance of the sector, over a decade ago, the Federal government of Nigeria, considering the sector as not being effectively managed and the inability of NEPA to cope with the modern challenges thereby recommended it for privatization. To achieve this, the Bureau of Public Enterprises (BPE) was tasked with the responsibility. This brought about the handing over of the sector to an Initial Holding Company (IHC) known as Power Holding Company of Nigeria (PHCN) Plc on 31st May, 2005 and its subsequent unbundling of the sector into 18 successor companies as a result of Electricity Power Sector Reform (EPSR) Act signed into law by former President Olusegun Obasanjo on March 11, 2005. Despite the privatization of power sector, there were still cases of poor service delivery as a result of inefficiency of the private investors. Customers were being unjustly estimated, they were being charged for service they did not enjoy, the outstanding bills became uncollectible for the company on daily basis because of its post-paid nature. Customers were ready to lynch the officials of the company if they (customers) were forced to pay for what they did not consume. However, the company saw the indebtedness as their assets, hence, ready to deploy every strategy in making sure the debts were recovered.

This trade-off brought as regards the commencement of pre-paid metering system in the year 2006 to relief customers from estimated and crazy bills as well as to aid and ease revenue collection by the company; an operation which is comparable to how a recharge card is loaded using the Global System for Mobile (GSM) technology. Pre-paid metering system enables the customer to pay for his/her electricity before being consumed. With the use of pre-paid energy meters, power utilities can collect electricity bills from customers before their consumption (Bourdillon & Godwin, 2013). The convenience and safety from embarrassments being witnessed by customers have made majority develop strong preference for pre-paid metering system. The customers are likely to have

developed preference for pre-paid meter/metering (PPM) as a result of perceived billing system.

The privatization process brought about the emergence of eleven distribution companies (known as DISCOs) (based on the existing distribution zones during the days of NEPA and PHCN) of which BEDC Electricity Plc is inclusive on November 1, 2013 (Usman, 2013). BEDC Electricity Plc was formerly Benin Distribution Zone of NEPA and PHCN. BEDC is used as a case in this study because it is the distribution company that supplies Ekiti State (area of study) with electricity. The fact that the privatized companies continue with the pre-paid metering process as introduced by the then PHCN in 2006 (during the government ownership of the sector) has made it worth of study.

Statement of the Problem

A lot of empirical studies have been carried out on the concept of pre-paid electricity metering system by many foreign authors including Neenan (2010), Jean-Noel (2010) as well as Alam and Shahriar (2012) while in the developing nations, studies on the concept were also carried out by several authors including Kioko (2012), Miyogo, Nyanamba and Nyangweso (2013), Mburu and Sathyamoorthi (2014) among others as well as other few authors in Nigeria such as Usman (2013), Azodo (2014), and Damian, Uchechukwu and Euphenmia (2015).These researchers have concentrated their investigations on major cities and other urban areas while neglecting Ekiti State, hence, creating a gap in literature. They have also based their studies on various aspects of electricity pre-payment system but not dwelling deep into such area like perceived billing system, thereby creating another gap in literature. Moreso, they have all come out with different findings suitable to their environment but in conflict with othershence, these findings cannot be used to generalize the opinion of a peculiar state like Ekiti, therefore, the need for this study in order to guide the respective stakeholders with the result that would reflect the environmental peculiarity of the area of study (Ekiti State).

II.   LITERATURE REVIEW

Pre-paid Electricity Metering System

Pre-payment metering allows electricity users to only use energy when they have credit in an electricity account because electricity "self-disconnects" when credit is depleted, in contrast to credit metering, whose billing system is based on the electricity units (kilowatts) that have already been consumed by the customer (Casarin & Nicollier, 2009). The number of clients who prefer to utilise pre-paid metres has increased globally (Jain, 2011).

Pre-paid metering, for instance, has long been an option provided to clients in the United Kingdom. A maximum of 15-20% of customers have chosen the option (Chisanga, 2006). In furtherance to this, Kettles (2004) claims that the system was created as a method of handling bad loans. In the 1980s, South Africa was the first country in Africa to implement electricity pre-payment meters in order to efficiently increase supplies to rural low-income homes and geographically dispersed users (Miyogo, Nyanamba & Nyangweso, 2013).

PPM was favoured by certain commercial customers who understood it over the post-paid billing method, which they claimed was expensive and had numerous hidden fees. ESKOM South Africa's energy utility firm had seen that providing service to remote areas under the post-paid billing system entailed considerable administrative costs before PPMs were introduced (Albert, Priscilla, Austine, Lilias, & Henry (2014). Additional service issues included the lack of postal addresses where energy bills could be sent, high rates of illiteracy among low-income households, which prevented them from fully understanding the post-paid billing system, and other issues (Tewari & Shah, 2003) and the inability to pay for accumulated electricity expenses brought on by employing a post-paid scheme (Miyogo, *et. al.,* 2013). Since that time, the pre-paid power billing system has gained popularity in a number of nations, including Argentina, Australia, Ghana, India, Kenya, Nigeria, Sierra Leone, Turkey, and many more (Albert, *et. al.,* 2014). Pre-payment enrollment with Northern Ireland Electricity has climbed to 25% thanks to the company's customer-friendly pre-payment system (Mburu & Sathyamoorthi, 2014). At Arizona's Salt River Project, more than 50,000 customers (about 6 percent) are on PPMs (Chisanga, 2006). According to Woodstock Hydro, 25% of residential consumers in Ontario have chosen to adopt the pre-paid scheme (Jain, 2011).

According to Chisanga (2006), the implementation of PPMs in the United Kingdom has significantly improved their efficiency in collecting money and decreased overheads, which has raised profitability. Customers using the pre-paid model consume 4.9 percent less electricity on average than post-paid customers, according to Northern Ireland Electricity (Jain, 2011). Pre-payment systems gained enormous traction in India and other developing nations by the late 2000s (Estache, Antonio, Foster, Viven, Wodon & Quentein, 2012). They might have attained their pinnacle growth in Great Britain (King, 2012). Pre-payment technology was first initiated in South Africa in the late 1980s with the intention of distributing energy to a sizable population of low-income and dispersed users in Africa.The method was primarily designed to reduce the challenges posed by users' erratic revenues and the sparse infrastructure required for the delivery and receipt of credit slips (Tewari& Shah, 2003). The majority of energy supply businesses have been found to have significant customer debts, despite the fact that PPM usage among consumers has been rising across the continent.This makes it more difficult for them to provide high-quality service and effectively collect revenue.Some businesses used Revenue Cycle Management (CRM), a network operator cash policy that entails hiring private entities to recover outstanding debts from clients, as a solution to this issue; nevertheless, this strategy did not appear to have the desired impact (Annon, 2001).

Similar to this breakthrough, Power Holding Company of Nigeria (PHCN) Plc developed digital pre-paid meters in 2006; these meters operate similarly to how a recharge card works in a GSM phone (Emmanuel & Paul, 2010). In Kenya, such a system has been implemented (Jain, 2011). By June 30, 2012, around 123,000 PPMs had been placed throughout the nation (Kenya), with the majority of them being installed in Nairobi homes. In order to solve important issues including consumer education, logistics, and defective meters, the installation project was delayed. For other clients, the expectations, however, did not materialize. Some customers have expressed dissatisfaction over the fact that this pre-paid scheme is less effective than the previous one. Accordingly, Jain (2011) beliefs that faulty gadgets, poor consumer knowledge on how to use the new technology and confusing billing irked some consumers. Several households using pre-paid meters across the country elicited mixed reactions. While some users testify that the meters save electricity and costs, others have expressed dissatisfaction, citing various concerns.

Perceived Billing System

There are many different uses for electricity (Alam & Shahriah, 2012). Electric utility authorities have historically used an average cost basis to recoup their installation, generating, transmission, distribution, system management, and return on asset costs (Alam & Shahriar, 2012). Time-dependent level power billing is the most popular method of electricity billing under the post-paid system. This is a billing system under which customers are being billed on an aggregate basis over the billing period usually a month. With this method, customers are responsible for paying for all of their kilowatt-hour (or kwh) consumption during the billing period, regardless of when the electricity is used (Alam & Shahriah, 2012). Usman (2013) believed that post-paid billing may in many circumstances not be the true/fair reflection of customers' consumption for the period but estimation.

Some pre-paid meter (PPM) customers are required to pay for all of their kilowatt-hour (kwh) consumption during the billing period under this arrangement, regardless of when the electricity is used (Albert, *et. al.,* 2014). Chisanga, (2006) demonstrated that because the tariffs on the new system were lower, users using the prepayment system were paying less for electricity than those using the old method. Due of the decreased tariffs in this specific instance, the bills were cheaper. Under the post-paid billing system, clients frequently complain about receiving overestimated amounts or occasionally no bills at all (Mburu & Sathyamoorthi, 2014).

Also, before the introduction of PPM in Nigeria in 2006 (Usman, 2013), perceives that customers are being faced with those problems such as inability to avoid large unpaid bills, un-easy resolution of disputes with the service provider officials, un-easy monitoring of their consumption and inability to budget in advance for electricity consumption. When the current credit limit is reached, a PPM disconnects itself; when the credit is replenished, it reconnects without charging a disconnection or reconnection fee. These savings are important because under post-paid service, disconnected customers must pay reconnection fee before he could be reconnected. They must also pay a deposit to establish service. These are significant financial hurdles. Customers with pre-paid service often cite these savings as benefit (Albert, *et. al.,* 2014). It was argued further that post-paid billing system has those disadvantages, among others, such as late delivery of bills to households resulting in debt accruals on the part of households combined with limited customer relations in the event of incorrect billing throughout the process of disconnecting and reconnecting (Chisanga, 2006).

A small number of customers, however, are vehemently opposed to PPM implementation because they believe it would unfairly push low-income customers into power outages. (Neenan, 2010). More so, it has been gathered through researches that most customers that enjoy relatively stable power supply, using heavy electric/electronic gadgets and having intention to evade full payments on these have really stood as oppositions to the adoption of PPM system (Usman, 2013). Most of these categories of customers often bye-pass the PPM in their premises, this is because it will force them to pay what they consume. This might have been perhaps, under-estimated or the bill left un-paid under post-paid billing system (Neenan, 2010).

H₁ = Perceived billing system does not significantly influence customers' preference for pre-paid electricity metering system

Empirical Literature

Neenan (2010) in his research conducted in Arizon's Salt River Project (SRP) in United States of America on paying upfront: A review of salt river project's M-Power pre-paid program, focus group survey method was adopted as an instrument of data collection, it was deducted that Arizon's Salt River Project (SRP) has operated M-Power, the largest electricity prepayment program since 1993 in the United States. In addition to the initial target population of customers with arrears facing service terminations and low-income customers, the customer population has increased to about 100,000 (or roughly 12% of all residents served by SRP), and it now includes customers with a variety of expectations from M-Power service. According to the researcher's findings, consumers' preferences for the adoption of PPMs are highly influenced by the following characteristics, among others: educational awareness, a sense of budget and control, savings, protection from embarrassments, and avoidance of monthly arbitrary costs.

Alam and Shariar (2012) conducted research on home power billing systems in Sylhet, Banglades: Is pre-paid system perceived as a better option by the subscribers? 50 customers from Sylhet city's post-paid and pre-paid systems participated in the survey, which was done in Bangladesh. questionnaires were used to collect the needed data. The results showed that the introduction of pre-paid billing for energy at homes is claimed to increase subscriber convenience, particularly by removing the inconveniences of bill payment associated with the post-paid system. User control over electricity consumption is one of the prepaid system's additional advantages, according to the findings. The study came to the conclusion that these benefits of pre-paid billing have greatly increased subscriber satisfaction levels when compared to those on post-paid billing.

Mburu and Sathyamoorthi (2014) carried out a research on switching form post-paid to pre-paid models: Customer perception and organisational role in managing the change: A case study of Botswana Power Corporation. 223 complete and useable questionnaires were received by the researcher, including 107 male and 116 female respondents. Of these, 27.3 had a secondary education, while nearly 70% had a higher education. A year ago, all of the aforementioned switched to pre-paid power, with about 73% of them living in Gaborone City and 27% in peri-urban areas. Approximately 12% of the respondents were self-employed, while about 82%, were government employees. This had an impact on responders who bought electricity at the end of the month or at the very least recharged monthly. A non-probability sampling method

was used. The results showed that buyers had accepted the pre-paid model. The authors emphasized further that these advantages, which significantly affect customers' preference for pre-paid models, include lower electricity costs with PPMs, customer fairness, health and safety, meter reliability, and user friendliness.

Albert, et. al. (2014) also carried out their research in Zambia based on the effects of the introduction of pre-paid meters on energy usage behaviour in different housing consumer groups in Kitwe, Zamba. The study identified some key issues vis-à-vis behavioural changes as a result of the introduction of PPMs, debt recovery and reduction of pilferage, disconnection of customers and alternative energy sources and feed-back. The data were collected in Kwacha (low income), Ndeke (medium income) and Parklands (high income). Both quantitative and qualitative data were employed. Through the use of 151 different structured questionnaires, quantitative data were gathered in the following ways: 42 high income, 50 medium income, and 59 low income individuals. Four households from each of the three household categories were subjected to in-depth interviews to gather the qualitative data. The key conclusions are that households are generally satisfied with the introduction of PPMs, with control over spending and no disagreements over bills cited as the main reasons. Numerous households claimed that their budgeting for energy has improved, and it appears that the proportion of households with previous debts has decreased. Finally, the study discovered that charcoal is now used for cooking in 21% of all households rather than electricity. The environment is likely to suffer as a result of this since deforestation may result. In order to eliminate the negative effects of homes moving from electricity to charcoal, the study highly advised that further research be done on the matter.

III. RESEARCH METHODS

Research Design and Sample Size

Using the Yamane (1964) paradigm, a descriptive survey study methodology was used to administer mailed questionnaires to a sample of 381 BEDC power users in the Ado-Ekiti metropolitan. A total of 209 (54.8%) of the distributed questionnaires were successfully completed, returned, and compiled for the study. The questionnaire was divided into four (4) sections: Section (A) included sociodemographic information about respondents, as indicated in Table 2, and Section (B) included information about perceived product quality, which was taken from Garvin (1998) and Jarkpar, Na, Johari, and Myint, (2012);

variables related to perceived service quality were found in Section (C), which was adapted from Parasurama, Zeithaml & Berry (1998) and Carvalho and Leite (1999); additionally, variables related to customers' preferences were included in Section (D), which was adapted from Usman (2013). Customers' preferences are the dependent variable in this study, whilst perceived product quality and perceived service quality are the independent factors.

Every 21st customer on the BEDC list using pre-paid meter as derived through systematic sampling technique was administered a questionnaire through self-addressed envelope to their respective mail address extracted from the BEDC records. In order to encourage their commitment to participating in the survey and ensure that the completed questionnaire was returned to the attached address in the letter within two weeks, telephone courtesy calls were also employed as a follow-up method. Validities for both face and content were used. The research instrument was handed to subject-matter experts for them to evaluate the suitability of each instrument item based solely on appearance in order to guarantee its face validity. Their feedback together with that of the supervisors was utilised to create the final items, which were then put through content validity testing by the same experts, who ultimately determined the applicability of each item to the attributes being measured.

Both descriptive statistics (like rates and percentages) and inferential statistics (like correlation) were employed in the analysis.

IV. RESULTS AND DISCUSSION

According to the results of the demographic section, which are shown in Table 1, there were 133 (63.35%) male respondents and 76 (36.4%) female respondents. Additionally, 50 (23.9%) and 40 (19.1%) of the respondents were between the ages of 51 and 55 and 46 and 50, respectively. Over 70% (151) of the respondents were married at the time of the examination, and 141 (67.5%) had completed tertiary education. Additionally, according to the demographic results, 121 (58%), 61 (29%) and 27 (13%) respondents were, respectively, residential, commercial, and special users.

According to the extracted data, the majority of pre-paid meter users in the Ado-Ekiti metropolis are adults who are married, educated, and who are in charge of paying the power bills for their individual apartments. As a result, information gathered from this group of people can be trusted and taken seriously when supporting the study's findings.

Table 1: Demographic Distribution of Respondents

Variables	Frequency	Percent
Gender Distribution		
Male	133	63.6
Female	76	36.4
Total	**209**	**100.0**
Age Distribution		
30-35 Years	44	21.1
36-40Years	37	17.7
41-45 Years	33	15.8
46-50 Years	40	19.1
51-55 Years	50	23.9
56Years and Above	5	2.4
Total	**209**	**100.0**
Marital Status		
Single	23	11.0
Married	151	72.2
Divorced	12	5.7
Widow	23	11.0
Total	**209**	**100.0**
Educational Qualification		
Informal Education	10	4.8
Primary	14	6.7
Secondary	44	21.1
Tertiary	141	67.5
Total	**209**	**100.0**
Customer		
Residential	121	57.9
Commercial	61	29.2
Special	27	12.9
Total	**209**	**100.0**

Source: Field Survey, (2023)

4.1 Statistical Testing of Hypothesis

4.1.1 H₁: Perceived Billing System and Customers' Preference of PPM

The correlation of two variables, perceived billing system and customers' preference were analyzed. Data were obtained from 209 respondents using Pearson Moment Correlation (PPMC). The result as presented in Table 2 shows that there is significant relationship between perceived billing system and customers' preference (r (209) = +0.358, p<0.05). Obtaining a probability of 0.000 which is less than 0.01 significance level for a two-tailed test, the perceived billing system and customer preference for pre-paid electricity metering system is significant.

Therefore, we reject the null hypothesis and accept the alternative hypothesis.

The result of this study support the findings of Albert, *et. al.,* (2014) who fund showed that households are generally satisfied with the introduction of PPMs, citing control over spending and the absence of bill disputes as the key reasons. Numerous households claimed that their budgeting for energy has improved, and it appears that the proportion of households with previous debts has decreased. The finding also supports the study of Alam and Shahriah (2012) who concluded that the introduction of pre-paid billing for energy at homes is claimed to increase subscriber convenience, particularly by removing the inconveniences of bill payment associated with the post-paid system.

The result could be because of the numerous benefits that customers derive from the pre-paid billing. The finding supports the study of Mburu and Sathyamoorthi (2014) who found that consumers have accepted pre-paid billing and are aware of its advantages. The authors emphasised further that these advantages, which significantly affect customers' preference for pre-paid models, include lower electricity costs with PPMs, customer fairness, health and safety, meter reliability, and user friendliness. The finding also supports the conclusion of Neenan (2010) that customers' preferences for the adoption of PPMs are highly influenced by the following criteria, among others: educational knowledge, a sense of budget and control, savings, protection from embarrassments, and avoiding monthly random fees.

Table 2: Correlation Co-efficient between Perceived Billing System and Perceived Customers' Preference

Variables		Perceived Billing System	Perceived Customers' Preference
Perceived Billing System	Pearson Correlation	1	.358**
	Sig. (2-tailed)		.000
	N	209	209
Perceived Customers' Preference	Pearson Correlation	.358**	1
	Sig. (2-tailed)	.000	
	N	209	209

**.Correlation is significant at the 0.01 level (2-tailed).

Source: Data Analysis (2023)

V.   CONCLUSION AND RECOMMENDATIONS

The study concluded that perceived billing system has significant influence on customers' preference for pre-paid electricity metering system. This implies that electricity customers in Ado-Ekiti, Ekiti state perceive avoidance of arbitrary billings as key parameters in accepting pre-paid meters while making their preferences. It further concluded that pre-paid system has brought with it some advantages like reduced/arbitrary power disconnections, no payment of reconnection fees. Besides, making customers to be more careful with their consumption and ability to budget for their electricity usages.

As a result of the multiple benefits connected with them, it is advised that BEDC's management make prepaid meters available to her many consumers at an affordable price. Also, since majority of the electricity customers in Ado-Ekiti metropolis found the introduction of PPM system useful, it is recommended to be extended to all the rural towns and villages of Ekiti State in order to save them

from arbitrary billing, indiscriminate disconnections and perpetual payments of reconnection fees.

REFERENCES

[1] Abayomi, S. O. (2012). Factors influencing households' willingness to pay for national health insurance scheme in Osun state, Nigeria. *Studies on Ethno-Medicine,* 2, 167-172.

[2] Albert, M., Priscilla, M., Austine, N., Lilias, M. & Henry, A.(2014). The effect of the introduction of prepayment meters on the energy usage behaviour of difference housing consumer groups in Kitwe, Zambia. *AIMS Energy,* 2 (3), 237-259.

[3] Alam, M. J.&Shahriar, F. M. (2012). Electricity billing systems at residential level in Sylhet City: Is pre-paid system perceived as a better option by the subscribers? *Industrial Engineering Letters,* 2 (3), 2012.

[4] Annon, O.(2001).Reliability-based electrical billing system. *Journal of Electrical/Electronics Engineering,* 11 (1), 22-29.

[5] Azodo, A. P. &Adejuyigbe, S. B. (2013).Examination of noise pollution from generators on the residents of Obantoko, Ogun State, Nigeria. *Asia Journal of Engineering, Services and Technology,* 3(1), 31-41.

[6] Azodo, A. P. (2014). Electric power supply, main source and backing: a survey of residential utilization features. *International Journal of Research Studies in Management,* 3(2), 87-102.

[7] Bourdillon, O. O.& Godwin, I. I.(2013). Design and stimulation of single phase intelligent pre-paid meter. *Innovation Systems Design and Engineering,* 4 (1), 17-23.

[8] Carvalho de, F. A. &Leite, V. A. (1999). Attribute importance in service quality: An empirical test of the PBZ conjecture in Brazil. *International journal of Service Industry Management,* 10(5), 487-504.

[9] Casarin, A. A., &Nicollier, L. (2009). Prepaid meters in electricity: A cost benefit analysis. *Working Paper Series, IAE Business School, Austral University.*

[10] Chisanga, K. I. (2006). 'An evaluation of the prepayment metering system: A case of Zesco Lusaka Division'. MBA dissertation. The Copperbelt University, Zambia.

[11] Damian, O. D.,Uchechukwu, A. O.&Euphenmia, C. N. (2015).Minimising household electricity theft in Nigeria using GSM based prepaid meter. *American Journal of Engineering Research,* 4 (1), 59-142.

[12] Ekpo, U. N., Chuku, C. A. &Effiong, E. L. (2011). The dynamics of electricity demand and consumption in Nigeria: Application of the bounds testing approach. *Current Research Journal of Economic Theory,* 3(2), 43-52.

[13] Emmanuel, A. O. & Paul. O. O. (2010). The impact of the pre-paid meter on revenue generation in Nigeria. *The Pacific Journal of Science and Technology,* 11(1), 138-142.

[14] Estache, A., Antonio, F. R., Forster, V., Viven, F. A., Wodon, Q. & Quentin, F. G. (2010). Infrastructure reform and the poor learning from Latin America's experience. *American International Journal of Contemporary Research,* 2(3),111-145).

[15] Garvin, D. A. (1998).Competing the eight dimensions of quality. *Harvard Business Review,* November – December, 1998, 101-109.

[16] Isola, W. A. (2007). *Development in the Nigeria electricity sector. In: Nigeria's development in time perspective: past, present and future.* Ibadan: NES.

[17] Jain, A. (2011). A prepaid meter using mobile telecommunication. *International Journal of Engineering , Science and Technology,* 3(3), 314-432.

[18] Jarkpar, S., Na, A. G. S., Johari, A. &Myint, K. T. (2012). Examining the product quality attributes that influences customer satisfaction most when price was discounted: A case study of Kuching Sarawak. *International Journal of Business and Social Sciences,* 3(23), 221-236.

[19] Jean-Noel, G. (2010). Are you ready for prepaid meter revolution? *International Journal of Service Industry Management,* 6 (5), 53-71.

[20] Kettles, P. M. (2004). *Prepayment metering systems for the low income groups.* London, PRI Ltd.

[21] King, C. (2012). Prepay electricity service: Smart grid-enabled customer choice. *Journal of Electricity Policy Research Group,* 3 (4), 1-12.

[22] Kioko, J. (2012). Effect of prepaid meters on revenue collection efficiency: A case of Nakuru Kenya Power Limited, Kenya. MBA dissertation, Kabarak University, Kenya.

[23] Makoju, O. (2002). Policy options for the attainment of sustainable electricity supply in Nigeria. *Bullion,* 26(4), 21-25.

[24] Mburu, P. T.&Sathyamoorthi, C. R. (2014). Switching from postpaid to prepaid models: Customer perception and the organisational role in managing the change: A case of Botswana Power Corporation. *Journal of Management Research,* 6 (3), 175-187.

[25] Miyogo, C. N., Nyanamba, S. O., &Nyangweso, G. N. (2013).An assessment of the effect of prepaid service transition in electricity bill payment on KP customers, a survey of Kenya Power, West Kenya Kisumu. *American International Journal of Contemporary Research,* 3(9), 88-97.

[26] Moyo, B. (2012). Do power cuts affect productivity? A case study of Nigerian manufacturing firms. *International Business and Economic Research Journal (IBER),* 11(10), 1163-1174.

[27] Neenan, B. (2010). *Paying upfront: A review of salt rivers project's M-Power prepaid program.* California, Electric Power Research Institute.

[28] Olokoba, S. M., Ibrahim, I. &Abdulraheem-Mustapha, M. A. (2010). Noise pollution: A catalyst to climate change and human health catastrophe. *Nigerian Journal of Food, Health and Drug Law,* 3(1), 23-38.

[29] Parasurama, A., Zeithaml, V. A. & Berry, L. L. (`1998). SERVQUAL: A multiple scale for measuring consumer perceptions of service quality. *Journal of Retailing,* 64(1), 12-40.

[30] Usman, A. (2013). Determinants of electricity consumer satisfaction in selected electricity distribution zones in Nigeria: Implication for regulatory activities. *Journal of Asian Business Strategy,* 3(6), 103-124.

[31] Tewari, D. D.& Shah, S. T. (2003). An assessment of South African prepaid electricity experiment, lessons learnt, and their policy implications for developing countries. *Journal of Energy Policy,* 3 (9), 911-927.

The Viability of Agricultural Value Chain Financing in the Province of Nueva Ecija

Zia Nicole V. Magsilang[1], Aimee Lyn DG. Manalese[2], Patricia Camille G. Mariano[3], Ivan Andrei R. Morada[4], Arjhel V. Domingo[5]

[1]Administrative Officer II, Department of Education – Division of Nueva Ecija
[2]HR and Admin Assistant - Encore Leasing and Finance Corp.
[3]Account Officer, Landbank of the Philippines – Nueva Ecija Lending Center
[4]AVP & Head of Branches Operations, New Rural Bank of San Leonardo (N.E.), Inc
[5]Graduate School, Business Administration Faculty, NEUST

Abstract— Agriculture is one of the main industries in the Philippines, and Nueva Ecija is known as the country's "Rice Granary." However, many farmers in the province face financial constraints that limit their ability to invest in their farms and improve their yields. This descriptive study aimed to explore the viability of agricultural value chain financing in Nueva Ecija. The researchers used convenience sampling and a survey questionnaire with a consent form to collect data from farmers, traders, and other actors in the agricultural value chain. The researchers analyzed the data using frequency count, percentages, and weighted mean. The study found that agricultural value chain financing is viable in Nueva Ecija, but only if there is an entity that can act as a link between the different actors in the chain. This could be a government agency, a non-governmental organization, or a private sector company. The link entity would need to provide financial and other support services to farmers, such as training and technical assistance, as well as facilitate connections between farmers and other actors in the value chain, such as traders and processors. This study provides valuable insights into the potential of agricultural value chain financing in Nueva Ecija. By highlighting the importance of link entities, the findings can inform the development of policies and programs that support agricultural development and poverty reduction in the province and beyond.

Keywords — Aggregator, agricultural value chain, agriculture, consolidator, farmers, financing.

I. INTRODUCTION

Agriculture is one of the major sectors of the Philippine economy. Crops like rice, coconut and sugar dominate the country's production. According to World Bank (2021), agriculture employs 23% of the Filipino workforce in 2021. When we talk about agriculture, Nueva Ecija is on its list. The Province of Nueva Ecija is recognized as the "Rice Granary" of the Philippines because it led to the production of the nation's food staple during the twentieth century (F.A. Santiago Jr., 2015). Philippines Statistic Authority (PSA) 2020 report on Palay production, Nueva Ecija alone produced up to 770,830 metric tons or 69.9% of the total Palay harvested in the whole of Central Luzon. Aside from rice, the province also produces a variety of vegetables. The Bangko Sentral ng Pilipinas

(2019) states that despite its important role in promoting inclusive economic growth, the agricultural sector faces persistent challenges in financing and is constraining its development. Farmers, traders, sellers, and buyers are facing capitalization problems and various challenges to sustain the agriculture sector such as limited buyers, storage problems and distributions, among others. Thus, a systematic approach is necessary to support the agricultural sector of the country.

The Bangko Sentral ng Pilipinas (2016) issued Circular No. 908 entitled Agricultural Value Chain Financing Framework. The agricultural value chain is how the world of producing, buying, and selling agricultural products works. Agricultural Value Chain Financing (AVCF) is concerned with the flow of funds to and within

a value chain to meet the needs of chain actors for finance, to secure sales, to buy inputs or produce, or to improve efficiency. Due to the high exposure to credit risk, the agriculture sector is now among the least preferred by the financial institution. Agricultural Value Chain Financing is one of the strategies to sustain the continuous production of agricultural products. This sector requires constant funding and the stability of its cycle may serve as security in mitigating the risk of non-payment to its source of funds.

This study defined all the needed components of Agricultural Value Chain Financing as stated in BSP Circular No. 908. The goal is to determine if these components are present in the Province of Nueva Ecija. The degree of willingness of these components to participate in the Agricultural Value Chain Financing was integrated into the study.

II.   METHODOLOGY

The study is Descriptive in nature which focuses on determining the components needed in the development of agriculture value chain financing programs in the Province of Nueva Ecija. The instruments utilized were survey questionnaires with a consent form and snowball sampling wherein the method is purely based on referrals and extensively used when a population is unknown. Nevertheless, the researchers conducted the study with at least 10 rice farm workers per legislative district of Nueva Ecija. A total of 40 respondents were selected as samples of this study. Basic descriptive statistics such as frequency count, percentages, and weighted mean were used.

III.   RESULTS AND DISCUSSION

In order to establish the viability of AVCF in the province of Nueva Ecija, the researcher must first determine the components needed in the framework as well as its existence in the province. After that, an analysis of the workflow must be laid down in order to understand the role of each component and determine its viability.

Presented below are the data gathered:

a.   Existence of AVCF Component in the Province of Nueva Ecija

Farmers/fisherfolks are the fuel of the AVCF. The crops and produce will start with the farmers/fisherfolks. As per Philippine Crop Insurance Corporation (2017), there are 265,200 farmers/fisherfolks in Nueva Ecija that are logged

at the Registry System for Basic Sectors in Agriculture (RSBSA).

Table 1 - Components of AVCF and the reported number of existing in Nueva Ecija

Component	Count
Farmer/ Fisherfolks	265,200
Value Chain Aggregators/ Consolidators	20
Agricultural Input Suppliers	22
Government Agricultural Credit and Financing Programs	6
Financial Institutions	190

Another component needed is the value chain aggregators. This component initiates the formalization and/or organization of a value chain and/or offers services that aim to strengthen existing value chains while consolidators are farm-equipment operators or traders who agreed to provide farm-level services (e.g tractor, thresher, freight, etc.) and to facilitate the handling of harvested crops and coordination with possible buyers during harvest. In Nueva Ecija, these components are commonly performed by agriculture/multi-purpose cooperatives duly registered with the Cooperative Development Authority. Per CDA (2018), there are more than 900 registered cooperatives in Nueva Ecija, but in 2020, there are only thirty-eight (38) Cooperatives that became operational during the pandemic. Of these, twenty (20) Coops are engaged in the agriculture business that can be part of the value chain as aggregators/consolidators. As to the agricultural input suppliers, they will serve as sources of production input supplies and in Nueva Ecija, there are 22 business establishments, of medium size, offering agricultural supplies.

Government agricultural credit and financing programs will also play a vital role in the AVCF. As most banks treated farmers with high credit risks, these government programs will serve as a cushion for banks to reduce the impact of non-payment in the event of natural calamities and the inability of the farmers to pay their loans. For the fiscal year 2020, the Department of Agriculture, through the Agriculture Credit Policy Council was able to release a total of P5.3 million funds to farmers/fisherfolks as a loan through their partner lending conduit.
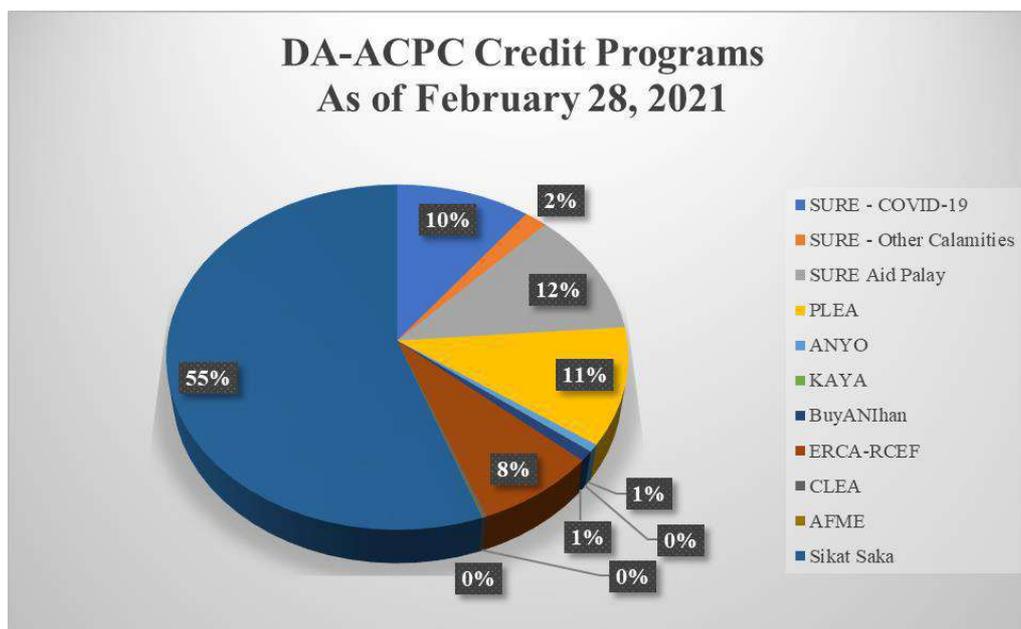
Fig.1 – DA-ACPC distribution of credit programs

Presented in Figure 1 is the distribution of DA-ACPC's credit program through their partner lending conduit. Findings show that a total of P21,314,233,499.00 was disbursed to 333,780 borrowers. Data shows that the 'Sikat Kaya' program had 55% or P11,823,700,000.00 of the total disbursed funds.

The DA-ACPC has their Partner Lending Conduit in Nueva Ecija, most were rural banks and credit cooperatives. For purposes of this study, the researcher's focus is on the rural banks. Per the BSP website (2022), there are eleven (11) rural banks with head offices within Nueva Ecija. These rural banks mainly cater to agriculture clients up to the far-flung municipalities of the province. As of the June 30, 2022 report of the BSP, all cities and municipalities in the province of Nueva Ecija have banks.

The researchers were able to determine the components present in the province of Nueva Ecija. Identified were the number of farmers/fisherfolks enrolled in RSBSA, the potential aggregators and consolidators as well as input suppliers. Also identified were the various government support programs that can cater for the identified components in funding through loans. Finally, the partner lending conduits were also identified to serve as a medium for the release of government financing support programs.

b. **Understanding the Agricultural Value Chain Financing (AVCF) Flow**

A sort of financing specifically created to help the agricultural value chain is called agricultural value chain financing (AVCF). It aims to make it easier for smallholder farmers, agribusinesses, and other players in the agricultural value chain to access financing. A variety of activities, including funding for inputs, farm equipment, agricultural training, and post-harvest handling and storage, can be included in AVCF. It is frequently used to support smallholder farmers in raising their output, enhancing the quality of their goods, cutting expenses, and expanding access to markets. Additionally, AVCF can give farmers access to technical support and aid in enhancing their ability to conduct business.

As illustrated above, the actors/components have their distinct roles in the value chain. The production will start with the farmers/fisherfolks that are responsible for producing raw agricultural products such as crops, livestock, and other agricultural inputs. The aggregators, consolidators and cooperatives will process such and are responsible for transforming the raw agricultural products into value-added products such as canned fruits, dried grains, and milk powder. This also includes transporting the value-added products to retailers, wholesalers, and other buyers. Lastly, retailers are responsible for selling value-added products to consumers. Consumers can be cooperative members also together with the regular consumers of agriculture products.
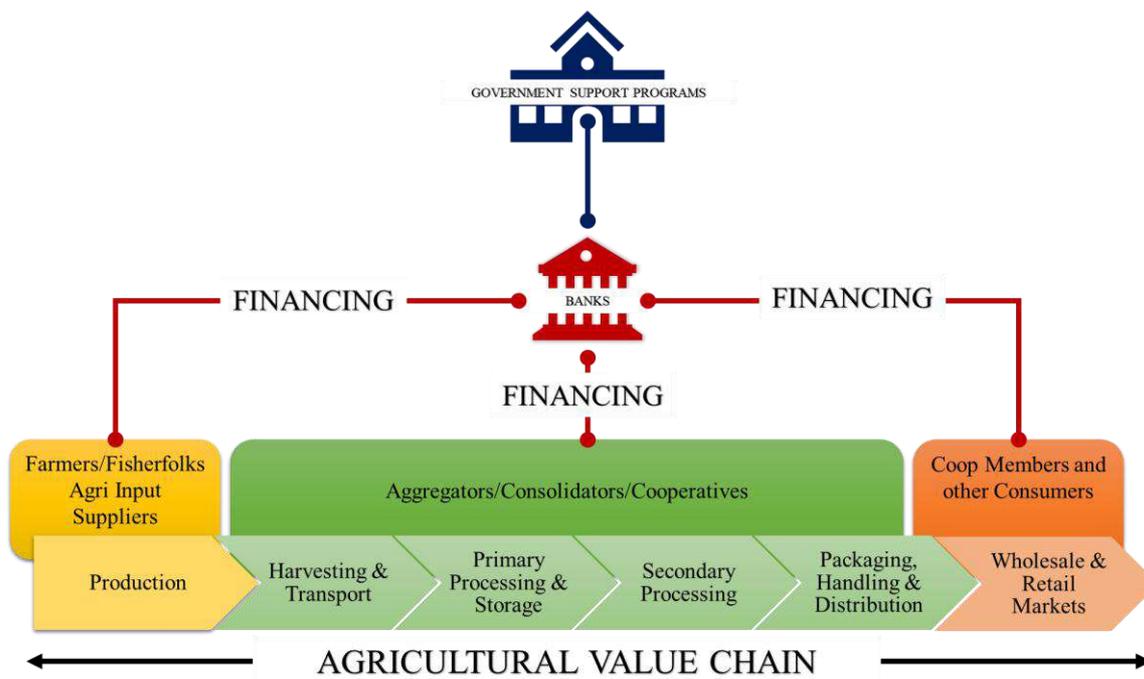
Fig.2 – Business Model of Agricultural Value Chain Financing

IV.   CONCLUSIONS AND RECOMMENDATIONS

Farmers, agribusinesses, and financial institutions can all benefit from agricultural value chain finance in a variety of ways. It can improve food security, lower post-harvest losses, and increase farmer incomes. Financial institutions gain from expanding their clientele, lowering risk, and improving profitability. Value chain financing can help reduce poverty and open up prospects for economic growth by facilitating access to funding. The creation of successful collaborations between financial institutions, farmers, and agribusinesses is the key to value chain financing success. Value chain financing can have a hugely positive effect on the agricultural industry with the appropriate relationships in place.

In the province of Nueva Ecija, the researchers determined that the agricultural value chain is viable and can be initiated by financial institutions. Although there is a limited aggregator/consolidator, this can be worked out by government support programs, training, and information dissemination. In addition, the rural banks in the province have a strong client pool which covers all the components of the chain. It is convenient to consolidate this pool of clients to collaborate for the agricultural value chain with the help of the bank through financing.

The researchers recommend the following based on the findings and conclusions of this study:

a. Risk assessment: Risk assessment involves understanding the risks associated with agricultural value chain financing, such as market price volatility, weather-related risks, and credit risk. It is important to understand the potential risks involved in agricultural value chain financing to ensure that all stakeholders understand the potential risks associated with the financing.

b. Financial instruments: Financial instruments such as loans, equity investments, and other forms of debt financing can be used to finance agricultural value chains. These instruments can provide both short-term and long-term financing, depending on the needs of the value chain.

c. Financial intermediaries: Financial intermediaries, such as banks, microfinance institutions, and credit unions, are necessary for the successful implementation of agricultural value chain financing. These intermediaries provide the necessary capital, liquidity, and risk management to ensure that the value chain is properly funded.

d. Capacity building: Capacity building is essential for the successful implementation of agricultural value chain financing. It involves providing training and technical

assistance to farmers, as well as providing access to financial services.

e. Stakeholder engagement: Stakeholder engagement is necessary for the successful implementation of agricultural value chain financing. This involves bringing together all the stakeholders in the value chain, including farmers

REFERENCES

[1] (n.d.). Agricultural Value Chain Finance. Assignment Point. https://assignmentpoint.com/agricultural-value-chain-finance/

[2] Shinozaki, S. (2017, October 30). Financing Agriculture Value Chains in the Digital Age. Asian Development Blog. https://blogs.adb.org/blog/financing-agriculture-value-chains-digital-age

[3] Farm Radio International (n.d.). An introduction to agricultural value chains. https://idl-bnc-idrc.dspacedirect.org/bitstream/handle/10625/52685/IDL-52685.pdf

[4] (2022, March 10). DA registers 5.4 M farmers, and fishers in RSBSA. Department of Agriculture. https://www.da.gov.ph/da-registers-5-4-m-farmers-fishers-in-rsbsa/

[5] (n.d.). Partner Lending Conduits (PLCs). Department of Agriculture. https://acpc.gov.ph/partner-lending-conduits-plcs/

[6] Cooperative Development Authority (2018, December 31). REGISTERED COOPERATIVES under R.A. 9520. https://cda.gov.ph/cooperative-masterlist/

[7] Cooperative Development Authority (2020, April 24). UPDATED LIST OF COOPERATIVES PROVIDING SERVICES TO THEIR RESPECTIVE MEMBERS AND COMMUNITIES DURING THIS TIME OF NATIONAL HEALTH EMERGENCY. https://cda.gov.ph/wp-content/uploads/2021/01/Updated_list_coops_ECQ_2020_April_24.pdf

[8] Department of Agriculture (2022, May 31). Status Update Report on DA-ACPC Credit Programs as of March 31, 2022. DA-ACPC. https://acpc.gov.ph/download/march-2022-status-update-report/?wpdmdl=9806&_wpdmkey=63ac15c26cda5&subscriber=pSXG4i7xi8SvlijccOD8CXfuq-0jv-yre35qLBFO5wTakzGl6paW5P_nSdtiT6FUHrjy-TF5O2kiCKa2PSN3jA

[9] Rural Bank Association of the Philippines (2016, April 25). BSP Circular No. 908: Agricultural Value Chain Financing Framework. RBAP. https://rbap.org/bsp-circular-no-908agricultural-value-chain-financing-framework/

[10] Bangko Sentral ng Pilipinas (2021, May 31). *BSP Circular No. 908: Agricultural Value Chain Financing Framework*. https://www.bsp.gov.ph/Lists/Directories/Attachments/6/demand.pdf

Hotel Room Sales Strategies in the New Normal: Basis for Sustainable Operation

Imeer Jeaisa L. Mauricio[1], Anastacia S. Mendoza[2], Xena Rose M. Muyot[3], Ara Venise C. Ocampo[4], Marilou P. Pascual[5]

[1]Faculty Instructor, College of Management and Accountancy, PHINMA-Araullo University
[2]Assistant Creative Lead, Brain Juice Collective, Singapore
[3]HR Development Analyst (Payroll), Nueva Ecija II Electric Cooperative, Inc.
(NEECO II – Area 2)
[4]Faculty Instructor, Hospitality and Tourism Management Coordinator, College for Research and Technology
[5]Graduate School Faculty, Business Administration, NEUST

Abstract— The Hospitality industry is one of the largest and fastest-growing industries in the world. As the pandemic hits, many areas of the hospitality industry have been greatly affected. One of the major establishments that struggled is the hotels. This research study titled "Hotel Room Sales Strategies in the New Normal: Basis for Sustainable Operation", aimed to identify the strategies of the hotels in terms of selling their hotel rooms in the new normal. Throughout the challenges, hotels created a way to remain on track and resume their operation. This research revealed that hotels in Cabanatuan City mostly utilized hotel group sales strategy, destination marketing sales strategy and guest reward sales strategy to increase hotel room sales as their basis for sustainable operation.

Keywords— Hotel, hotel rooms, new normal, sales strategies, sustainable operation.

I. INTRODUCTION

The hospitality Industry is a broad sector of the economy that is service oriented which comprises accommodation, food and beverage services, and other guest-related services. In the midst of the pandemic, such businesses struggled and were greatly affected. The global pandemic has affected many businesses that operate on a daily basis. Hotels are one of the businesses that have been greatly affected by the pandemic; most hotels temporarily stop their operation to pave the way to the regulations imposed by the government thereby affecting the room sales of the establishment, their guests and the welfare of its employees. As years went by, the Philippines slowly opened several industries to operate and help the economy, most hotels managed to adhere to the requirements, for them to be accredited by the Department of Tourism and then later on gained a license to resume operation.

As the hotel industry tries to recover, it is important for these hotels to plan and create sales strategies to cope with the situation, especially in the new normal. As hotel rooms are the main product of the hotel, the sales department thinks of many ways to develop strategies to further boost the profitability of the hotel.

From a hotel perspective, Marketing and sales are important areas within the hospitality industry as they directly correlate to the profitability of a business. The Marketing and Sales team is responsible for maximizing a hotel's revenue by developing strategies and business plans to increase revenue. (Sri Lanka Tourism Alliance, 2020)

The hotel industry is one of the wider segments of the hospitality industry that focuses on the provision of accommodation or lodging to travellers. Hotel room sales are more than just promoting or advertising the different types of rooms to the guests, it is more than that, hotel sales can be complicated, depending on the profile of the property such as the hotel size, the sales team handling the work and the hotel operation itself (HospitalityNet, 2022). In this competitive industry where vast hotel brands are

everywhere, marketing and sales itself is not enough, hotels needed to formulate and implement smart hotel room sales strategies to increase their room occupancy and revenue. The deep understanding of these details and evaluation of the data focusing on the hotel room sales strategies utilized by the hotels in Cabanatuan City as their basis for sustainable operation will provide valuable insight into how hotels in the local area of Cabanatuan City sell their rooms, build a steady income source despite of the ever-changing market situations. Moreover, hotel room sales are more than just getting another guest to walk through the doors of the property. If done right, room sales can significantly improve the hotel business in its entirety. In this manner, the results and findings of this study will give ideas to hoteliers about the value and importance of hotel room sales.

In this competitive industry, it is important to be innovative and develop strategies that can help the sales growth of the establishment. This research described the socio-demographic characteristics of the population in terms of years of operation, type of hotel, and a number of hotel rooms and identify the hotel room sales strategies utilized by the hotels in Cabanatuan City in the New Normal as a basis for sustainable operation.

II. METHODOLOGY

This section presents the research design used, the respondents of the study, the instruments, and the analysis of the data. The descriptive research design was utilized in this study to describe the characteristics of a population. According to ResearchConnections.Org, Descriptive Research collects data that are used to answer a wide range of what, when, and how questions pertaining to a particular population or group. Moreover, descriptive research is often used as a precursor to quantitative research designs, the general overview giving some valuable pointers as to what variables are worth testing quantitatively. There are 5 respondents which are the hotels in Cabanatuan City gathered in this study through the use of purposive sampling method, a non-probability sampling also known as selective sampling, where the researcher selected the sample based on the characteristics of the population and the objective of the study. The researcher used survey questionnaires to distribute to the respondents. The researcher used these to collect data, tabulate and subject for statistical analysis for interpretation and presentation. For the Statistical Treatment of Data, this research used a percentage distribution formula P = F / N x 100, to determine the percentage of the findings from the socio-demographic profile of the respondents and the weighted mean formula WM=TWF/N. Lastly, this research utilized a 5-point Likert Scale which was rated as 5- Very Highly Utilized, 4- Highly

Utilized, 3-Moderately Utilized, 3-Sometimes Utilized and 1-Never Utilized to determine the hotel room sales strategies that hotels in Cabanatuan City used in the new normal.

III. RESULTS AND DISCUSSION

Table 1.1 Company Profile in terms of Years of Operation

YEARS OF OPERATION	FREQUENCY	PERCENTAGE
1 year below	0	0%
1-3 years	0	0%
4-6 years	0	0%
7-9 years	3	60%
10 years below	2	40%
	5	**100**%

As shown in Table 1.1., the majority of the hotels in Cabanatuan City operates for 7-9 years already with 60% and there are 40% of hotels that operate for more than 10 years. This implies that in terms of years of operation, the life cycle of most hotels is determined by its growth in terms of occupancy and net income during the course of the first five to ten years in the industry then later on stabilizes after 8 to 15 years opening. (Rushmore, 2004). According to Kalcevic, the typical hotel operators said that the hotel cycle occurs over a 7-10 year basis, as the lending market is the ultimate backbone of this cycle money becomes available in the market and new hotels are constructed and operated. (Kalcevic, 2018)

Table 1.2 Company Profile in terms of the Type of Hotel

TYPE OF HOTEL	FREQUENCY	PERCENTAGE
Corporate hotel	4	80%
Boutique hotel	0	0%
Bed and Breakfast hotel	1	20%
Apartment hotel	0	0%
	5	**100%**

As shown in Table 1.2., the dominant hotels in Cabanatuan City are corporate hotels with 80% and 20% being bed and breakfast. This implies that there is a popularity of corporate hotels in Cabanatuan City, as working remotely has become the common method for many employees. The hospitality industry is being used as make-shift offices for leisure (business-leisure) travellers that seek a new change in their working environment while also enjoying their leisure time. (Weisskopf & Masset, 2022).

Table 1.3 Company Profile in terms of the Number of Rooms

NUMBER OF ROOMS	FREQUENCY	PERCENTAGE
10-20 rooms	0	0%
21-40 rooms	1	20%
41-60 rooms	2	40%
61 rooms and above	2	40%
	5	**100%**

As shown in Table 1.3., the majority of the hotels in Cabanatuan City have 41-60 rooms with 40% and 61 rooms and above 40% and 20% of hotels with 21-40 rooms. According to Hospitality School, a hotel that has 26-100 rooms are considered a medium hotel and hotels with 101-300 rooms are considered large hotels. This implies that the majority of the hotels are corporate hotels and are categorized as medium hotels. (HospitalitySchool, 2013)

As shown in Table 2.1., in terms of the hotel room strategies utilized by the hotels in Cabanatuan City, it implies those Hotel groups' Sales Strategy, Destination Marketing Strategy and Guest Reward sales strategy are very highly utilized by these hotels with 4.40 weighted mean respectively. This implies that in terms of hotel group sales strategy, the sense of value-based selling is used mostly by the hotels where groups secure their bookings directly to the planners thereby creating a cost-effective way to sell rooms and meeting spaces to corporate groups. In terms of the Destination Marketing strategy, it implies that the hotel operator coordinates clearly with the tourism business professionals to promote the destination as a whole thereby creating an inbound tourism market. Lastly, the Guest reward strategy is also very highly utilized by the respondents; as the millennial generation rapidly exists as hotels wisely create reward programs for their frequent guests that later on generate repeat bookings. (SiteMinder, 2022)

While Cross Promotional Sales Strategy (4.20) weighted mean, Hotel Direct Sales strategy (4.00) weighted mean both interpreted as highly utilized. On the other hand, the Revenue Management sales strategy got the lowest weighted mean of (3.60) interpreted as highly utilized This implies that hotels in Cabanatuan City also come up with promotions that can match the events that can increase their sales; also some hotel prioritized earning through direct bookings online from as many guests as possible, thus this strategy favored the hotel due to the fact that no agents or distribution partners must be paid by commissions as the guest books directly online. (SiteMinder, 2022)

Overall, the average weighted mean is 5.00 which means that the hotel room sales strategies mentioned are very highly utilized by the hotels in Cabanatuan City.

Table 2 Hotel Room Sales Strategies

	5	4	3	2	1	WM	VERBAL INTERPRETATION
Hotel Room Sales Strategies	VHU	HU	MU	SU	NU		
1. Hotel group sales strategy	10	12	0	0	0	4.40	Very Highly Utilized
2. Hotel direct sales strategy	5	12	3	0	0	4.00	Highly Utilized
3. Destination marketing sales strategy	10	12	0	0	0	4.40	Very Highly Utilized
4. Cross-promotional sales strategy	5	16	0	0	0	4.20	Highly Utilized
5. Guest rewards sales strategy	15	4	3	0	0	4.40	Very Highly Utilized
6. Revenue management sales strategy	5	4	9	0	0	3.60	Highly Utilized
Overall Weighted Mean						5	Very Highly Utilized

Table 3 Strengths and Weaknesses

Hotel Name	Strengths	Weaknesses
Microtel by Wyndham Cabanatuan	Increase brand awareness Audience growth Increase sales	Harder to keep a consistent brand
Harvest Hotel	Revenue Management	Market Segmentation

	Yielding	
TopStar Hotel	Offering incentives, discounts or contracted rates Corporate hotel The only hotel in Cabanatuan City with Carpeted rooms	No leisure areas such as a swimming pool and gym Small Function room with low ceiling Has only 33 rooms
La Parilla	Improved Marketing Full Control of Guest Communications	Cannot prioritize all guests, especially during peak season
Sogo Hotel	High Guest retention Offering discounts on food and accommodation No expiration on the discount card 24/7 electricity due to the large generator area and fast Wi-Fi	Lack of manpower Extension of job duties Low productivity rate due to lack of manpower

As shown in Table 3, the hotels in Cabanatuan City listed the internal strengths and weaknesses of their establishments.

IV. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions were drawn from the above-mentioned results of the study: the hotels in Cabanatuan City are Selling rooms and meeting spaces to corporate groups, there are hotel operators collaborating with tourism business professionals to market the destination and thereby offering reward programs to their loyal guests to maintain connections, the abovementioned details are the hotel room sales strategies that are very highly utilized by the hotels.in Cabanatuan City in the new normal. Lastly, the following recommendations were drawn from the above-mentioned conclusions of the study: A high degree of utilization of revenue management sales strategy to further optimize business results and maximize revenue to create growth. Consider immediate hiring of employees to avoid labor shortage and entertain potential guests during peak season. Consider on-call employees to increase labor force in times of peak seasons.

REFERENCES

[1] Cloudbeds (2022). HospitalityNet website article on 12 essential strategies to boost your hotel sales (+how to build a hotel sales team). Online retrieved on https://www.hospitalitynet.org/news/4113927.html

[2] HospitalityNet (2021). HospitalityNet website, Hotelogix article on Hotel Room Sales Strategies: To increase Occupancy and Revenue. Online retrieved on https://www.hospitalitynet.org/news/4105385.html

[3] HospitalitySchool (2013). HospitalitySchool website article on Classification of Hotel: The Only Guide You Need to Read. Online retrieved on https://www.hospitality-school.com/hotel-classification-type/

[4] Kalcevic, L. STR (2018). TodaysHotelier website Article on The Hotel Lodging Cycle. Online retrieved on https://www.todayshotelier.com/2018/01/01/the-hotel-lodging-cycle/

[5] Research Connections (2013), ResearchConnections website article on Descriptive Research Studies. Online retrieved on https://www.researchconnections.org/research-tools/study-design-and-analysis/descriptive-research-studies#:~:text=Descriptive%20research%20is%20a%20type,a%20particular%20population%20or%20group.

[6] Revfine (2023). Revfine website article on What is Bleisure Travel? What Are Bleisure Travellers Looking For?. Online retrieved on https://www.revfine.com/bleisure-travel/

[7] Rushmore, S. (2004). Article on Hotel Life Expectancy. Online retrieved on https://www.hotel-online.com/News/PR2004_2nd/May04_HotelExpectancy.html

[8] SiteMinder (2022). SiteMinder website Article on Essential hotel sales strategies to increase occupancy and revenue. Online retrieved on https://www.siteminder.com/r/hotel-distribution/hotel-revenue-management/strategies-increase-hotel-room-sales/#-hotel-group-sales-strategy

[9] Sri Lanka Tourism Alliance (2019). Sri Lanka Tourism Alliance website article on Marketing and Sales in the Hotel Industry. Online retrieved on https://www.srilankatourismalliance.com/skills-centre/career-paths/marketing-and-sales-in-the-hotel-industry/#:~:text=Marketing%20and%20sales%20are%20important,business%20plans%20to%20increase%20revenue.

[10] Weisskopf,J et al.,2023. EHL website article on 2023 Top Hospitality Industry Trends. Online retrieved on https://hospitalityinsights.ehl.edu/hospitality-industry-trends

An Analysis of the Adaptation of Electronic new Government Accounting System (eNGAS) among Government Agencies in Nueva Ecija

Charyl M. Navarro[1], Jz Grace M. Nepomuceno[2], Maggie Mae C. Pascua[3], Rose Anne U. Rayos[4], Felipe E. Balaria[5]

[1]Teacher II School Division Office of Nueva Ecija
[2]Loan Specialists, Philippine Army Finance Center Producers Integrated Cooperative
[3]Administrative Officer II, Schools Division Office of Nueva Ecija-Aliaga District
[4]Budget Officer, Budget Office, Central Luzon State University
[5]Graduate School, Business Administration Faculty, NEUST

Abstract— The Philippine Government, specifically the Commission on Audit, has made efforts to develop an Accounting System called the e-NGAS. It has an objective to improve productivity, transparency and accountability in financial management. However, as a system was introduced for agency adaptation, after a decade many agencies have not yet adopted it and it includes some agencies in the Province of Nueva Ecija. The researcher believes that understanding the factors of not adapting to the said system is the first step for a successful system implementation. Thus, this study seeks to identify, summarize, and better understand the factors that could affect user resistance. Adapted from the Theory of resistance by Klaus and Blanton (2010), factors are classified into four determinants as Organizational, Individual, Technical and Process Factors. However, technical factors are not included in the analysis of this study and are recommended for future studies. A total of thirty Government Accounting Employees from agencies that do not yet adapt to the eNGAS have answered the given structured questionnaire. And as a result, it reveals that Organizational and Process factors significantly affect the users. The factors such as lack of communication, lack of top management support, lack of training, lack of resources, work inconvenience, needed changes in employee's jobs and skills and communication process are among the factors specifically identified by the respondents. Through the information brought about by these studies, the researcher aims that it can help the eNGAS Steering Committee to develop more comprehensive strategies that can address such said factors.

Keywords — Accounting, System, Adaptation, COA, eNGAS, Resistance

I. INTRODUCTION

Over the years, the Philippine government has faced pressure on how to improve its accounting system in order to become more efficient and effective in providing financial data. This is to promote greater transparency, on government expenditures, and accountability, on government officials. The overriding objective of Government Accounting, like in any other accounting of business entities is to provide useful information for decision making. They provide iiformation through financial reports that show the financial position, operating results, and cash flows for a particular period. This financial report utilizes a number of diverse objectives, including assessing the short-term liquidity, financial conditions, budget, legal compliance, capital, etc. Also, it may vary in format and details depending on the needs of the user.

The differences in financial information necessary for different users and the daily voluminous number of transactions in agencies create difficulties to provide the said needed data. The old Accounting System that was done manually was prone to material errors in recording the transactions and was ineffective to provide financial

information in a timely manner. It encountered issues such as late submission of financial statements to National Government Agencies and being unable to provide, track and record other relevant information for decision-making. Thus, to address the said problem and to achieve high-quality information, embracing the advantages of technologies as a tool for industrial and economic development, in July 2001, the Commission on Audit initiated their "Government Accounting Simplification and Computerization Project" to design a New Government Accounting System (COA, 2018).

The e-NGAS was developed by Information Technology (IT) experts from COA to simplify government accounting, conform to international accounting standards and generate periodic and relevant financial reports for better monitoring of national funds and agency performance (COA, 2018). Testimonials from the users said that through eNGAS they can easily generate trial balances, financial statements, and schedules of accounts receivable and payable resulting in quick, reliable, and well-documented information, this is from Mr. Romeo C. Cruz, State Auditor IV, COA and also operations became more efficient and errors were minimized, this is from Dir. Lucila M. Isidro, Director IV, COA. In this regard, different head and national agencies issued a memorandum with the purpose to inform and encourage their jurisdictional agencies on the availability and use of the said system in line with the thrust on good governance.

However, following the milestone of eNGAS system enhancement and COA nationwide rollout strategies for system adaptation, after a decade many government agencies have not yet adopted the said system and including some government agencies in the Province of Nueva Ecija. Thus, this study tries to uncover such factors that influence Agency users to not make use of the said system. Specifically, this study describes the financial systems currently in use by government agencies; describes the factors that affect users' resistance to implementing the eNGAS and describe the standpoint of government agency users in the future adaptation of eNGAS, if any resistance issue will be resolved. Understanding the factors that provoke their resistance can help the eNGAS Steering Committee pinpoint the problems that such agencies are dealing with, whether it is in terms of organizational, individual, technical or process factors. Overall, the assessment of this study is for the success of having an efficient and effective government accounting system in order to deliver better financial services to the general public.

II.   RESEARCH METHODOLOGY

This research utilized the descriptive research method because it was used to obtain information concerning the current status of the phenomena to describe 'what exists' concerning variables or conditions in a situation (Given, 2007). Secondary and primary data sources are used to collect data for the study. The researchers gathered data from eight selected government agencies in Nueva Ecija through a Convenience and Purposive Sampling method. The respondents answered a four-part survey form through Google and a hard copy form. Part 1 of the questionnaire was composed of questions about their socio-demographic profiles, Part 2 was composed of questions about the characteristics of the current system used by the respondents, Part 3 was composed of questions on factors that identify the causes of user's resistance towards the adaptation of eNGAS and Part 4 was composed of questions on the standpoint of government agency users in the future adaptation of eNGAS, if any resistance issue will be resolved. Part 2 and Part 3 were rated using a 4–point Likert scale which rated as 4 – Strongly agree, 3 – Agree, 2 – Disagree and 1 – Strongly disagree. To summarize and analyze the data gathered, for Part 1 and Part 4 a frequency percentage was used and for Part 2 and Part 3, a weighted mean computation was used, with a legend of 3.51 - 4.00 (Very high), 2.51- 3.5 (High), 1.51 - 2.5 (Low) and 1.00 - 1.5 (Very Low), where the degree of agreement was based.

III.   RESULTS AND DISCUSSION

Out of 40 distributed questionnaires only 30 had given voluntary consent and participated in the study. The majority of respondents are Female (73%) aged 20-30 years old (80%) with an educational attainment of a bachelor's degree (73%) and currently holding a position of Administrative Officer (53%) at their Agency. Educational Attainment is important in this study to emphasize that the users of the accounting system possess an academic background that allows them to be competent enough to understand matters related to their work. With regards to years of experience, most are in service for 1-5 years (57%).

1. **The Financial System currently in use by the government**

   1.1 Current Accounting System Used by Government Agencies

Table 1. Accounting System Currently used by Government Agencies

Accounting System	No. of Agencies	Percentage
Microsoft Office Excel	6	75%
GAAMS (Exclusive System for Agency)	1	12.5%
Financial Management Information System -FMIS (Exclusive System for Agency)	1	12.5%
Total	**8**	**100%**

Table 1 shows that out of the eight agencies being surveyed, 75% used the most accessible software program, Microsoft Excel, to record their agencies' daily financial transactions and to prepare the needed financial reports. On the other hand, 25% of the surveyed agencies used an exclusive system created or acquired for their Agency. GAAMS was used by the Local Government Unit of San Jose City and FMIS was used by the Philippine Rice Research Institute.

1.2 Characteristics and Functionality of Accounting Systems currently used by the Government

Table 2. Summary of Responses about the Characteristics and Functionality of the Accounting System Currently Used by the Government Agencies

Characteristic	Indicator	Mean	Level of Agreement
User-friendly	Current Accounting System caters for all types of users, simple and easy to navigate	3.42	Very High
Relevant	Current Accounting Systems can be used in making financial decisions	3.02	High
Automated	Current Accounting System can provide real-time updated reports	2.15	Low
Reliable	Using the current Accounting System data can present what it needs to represent	2.53	High
Accessible	Using the current Accounting System data can access quickly and efficiently	3.17	High
Enough Storage Capacity	The current Accounting System can store enough data needed by the Agency.	3.04	High
Verifiable	Current Accounting Systems can easily identify and reduce manual errors	2.21	Low
Secured data	Data in the current Accounting System are secured and can be retrieved	2.41	Low
Total		**2.74**	**High**

Table 2 shows that the participants of the study strongly agreed that the current system they are using is significantly user friendly having the highest weighted mean of 3.42. They also agreed that the current system is relevant, reliable, and accessible and has enough storage capacity to use. However, in some characteristics such as being automated, verifiable and secured data participants respond with low agreement. Overall, with a 2.74 total weighted mean, the current system used by the agencies is still useful and acceptable to the agency users.

2. The factors that affect users' resistance to implementing the eNGAS

2.1 Organizational Factors that Affect Government Agencies to Resist the Implementation of eNGAS

Table 3. Summary of Responses about Different Organizational Factors that Affect Government Agencies to Resist Implementation of eNGAS.

Dimensions	Indicator	Mean	Level of Resistance
Lack of communication	There is no discussion yet by the higher authorities at our agency regarding the implementation of eNGAS.	2.96	High
Organizational Mismatch	Our agency has a priority towards other objectives rather than paying attention to changes in the Accounting System.	2.89	High
Lack of Management Support	There is no guidance, support or allocation of necessary resources for the implementation of the new Accounting System.	2.75	High
	The department head of our Agency is not supportive of changes.	2.04	Low
Lack of Training	There is no training conducted regarding the use of the Accounting System for the past year.	2.79	High
Timing of Implementation	The timing for system training and implementation is postponed due to Covid19.	2.25	Low
Lack of Resources (Technology, People, Funds)	Our Agency has a lack of technological resources (Internet, high-speed computers etc.) to be able to implement a new Accounting System.	2.11	Low
	Our Agency has no IT or technical personnel knowledgeable about troubleshooting the Accounting System.	2.53	High
	Our organization believes that the implementation of eNGAS is too costly for the Agency.	2.5	Low
Peer Pressure	My colleagues are not supportive of the change and think that using eNGAS is not a good idea.	2.14	Low
	Total Mean	**2.53**	**High**

Table 3 shows that out of ten (10) indicators of organizational resistance half of it is highly agreed by the respondents. Specifically, these are the dimensions such as the lack of communication, lack of top management support, lack of training and lack of human resources (IT personnel) in the organization. And with a 2.53 weighted mean in total, it can be generalized that organizational factors contribute to the grounds for not implementing the eNGAS.

2.2 Individual Factors that Affect Government Agencies to Resist Implementation of eNGAS

Table 4. Summary of Responses about Different Individual Factors that Affect Government Agencies to Resist Implementation of eNGAS.

Dimensions	Indicator	Mean	Level of Resistance
Routine seeking	I like to work with the current system rather than trying a new and different one.	2.44	High
Lack of awareness	I am not aware that there is a system called eNGAS.	1.68	Low
Lack of Control/Power, Change of Status quo	I would lose a lot in my work if a new accounting system is implemented.	2.00	Low

Uncertainty	I don't know how this Accounting System (eNGAS) can make my job efficient and effective.	2.44	Low
Conservatism Attitude	I don't think that changing our current system is necessary.	2.20	Low
Lack of capability	I am not capable of using another new Accounting System.	2.20	Low
Fear	If I were to be informed that there's going to be a change in the accounting system, I would probably feel stressed and tense up a bit.	1.92	Low
Negative attitude/ Inconvenience	Changing our current Accounting System seems like a real hassle to me.	2.08	Low
Cognitive Rigidity/ Fear / Uncertainty	I'm worried about how the new system will change my job.	2.12	Low
Lack of involvement	I do not want to be involved in using a new accounting system.	1.88	Low
	Total Mean	**1.85**	**Low**

Table 4 shows that participants have a low level of agreement in most of the Individual factors listed above. Only in statement number 1 stating "I like to work with the current system rather than trying a new and different one" where the respondents highly agreed. The results of the overall 1.85 weighted mean are definitely not significant to conclude that such individual factors contribute to and/or

effects the resistance to eNGAS implementation. There is no issue regarding the following factors such as lack of employee capability, lack of control/power and attitude and behavior of the employees.

2.3 Process Factors that Affect Government Agencies to Resist Implementation of eNGAS

Table 5. Summary of Responses about Different Process Factors that Affect Government Agencies to Resist Implementation of eNGAS.

Dimensions	Indicator	Mean	Level of Resistance
Inconvenience	Switching to the new way of working with the new Accounting System could result in unexpected hassles.	2.77	High
Reliability Issues	Implementing a new Accounting System can hamper the daily operation of the Agency.	2.5	Low
Non-readiness	There may be delays in the submission of reports during the period of implementing a new Accounting System.	2.57	High
Extra time for work	Implementing the eNGAS would make daily tasks longer as compared to using the current system.	2.37	Low
Invalidity	The availability of data at our Agency is not complete so implementing the eNGAS can be difficult to achieve.	2.17	Low
	Minimum technical and personnel requirements for eNGAS implementation are hard to achieve.	2.23	Low
Increase job complexity	Implementing the eNGAS would make the job complex and hard.	2.43	Low

Increase in Workload	Implementing the eNGAS means more work, to get the same information that we can have currently.	2.47	Low
Change in Job Contents	Implementing the eNGAS would require doing different and new tasks.	2.92	High
Lack of interaction (Between User and Developer)	Communicating with eNGAS developer/committee is hard since our Agency is located in the province.	2.8	High
	Total Mean	**2.52**	**High**

Table 5 shows the possible Process Factors that may affect the users to resist the implementation of eNGAS and its equivalent weighted mean based on participant's responses. As a result, and shown in the table, the four statements such as (1) switching to the new way of working with the new Accounting System could result in unexpected hassles, (2) there may be delays in the submission of reports during the period of implementing a new Accounting System, (3) implementing the eNGAS would require doing different and new tasks and (4) communicating with eNGAS developer/committee is hard since their Agency is located

in the province are highly agreed upon by the respondents. These put forward that there are some process factors that need to be resolved, such as inconvenience, non-readiness, changes in job/skills and communication process. Moreover, a total mean of 2.52 respondents highly agreed that such process factors affect the implementation of eNGAS.

3. The standpoint of government agency users in the future adaptation of eNGAS

Table 6. Summary of Responses about the Standpoint of Government Employees in the future adaptation of eNGAS

Statement	Frequency	Percentage
If the resistance factor has been resolved I agree to the implementation of the eNGAS.	25	83%
If the resistance factor has been resolved I still don't want to use the eNGAS, because I am very satisfied with the current system we've been using.	3	10%
I don't think the resistance factor will be resolved so I oppose the implementation of the eNGAS.	0	0%
Even if the resistance factor cannot be resolved, still I agree to the implementation of the eNGAS.	2	7%
Total	**30**	**100%**

Table 6 shows the summary of responses in the last section of the survey questionnaire with the aim to determine the standpoint of agency users about the future implementation of eNGAS. Most of the respondents with a percentage of 83% are in the implementation of eNGAS if the resistance factor has been resolved. While 10% of them respond that if the resistance factor has been resolved still, they don't want to implement the eNGAS, because they are very much satisfied with the current system they've been using. And last, only 7% of them agreed that even if the resistance factor cannot be resolved, they still agree with the implementation of the eNGAS.

IV. CONCLUSION

In conclusion, resistance to a system is a common problem which is difficult to avoid during the process of adaptation. For an organization, it is not only an opportunity but also a challenge. Based on the results and discussions the following conclusions were made:

1. Most Government Agencies used Microsoft Excel as an alternative accounting system to record transactions and make financial reports. For the users, despite some of the problems they encountered using it such as error and data loss it is still useful, reliable and acceptable for them to accomplish their task.

2. Among the three factors analyzed in this study, two have significantly affected the adaptation resistance of the users and these are the Organizational factors and

Process factors. For the Organizational factors users identified a specific cause such as the lack of communication, lack of top management support, lack of training, lack of human resources (IT personnel) in the organization, working inconvenience, non-readiness of agencies and changes in employee's job and skills are the factors that affect the users in resisting the implementation of eNGAS. On the other hand, Individual factors cannot be looked upon as a contributing factor that affects the user's resistance, there is no issue with regard to the employee's lack of capability, lack of control/power and attitude and behavior.

3. According to the results, agency users said that if the organizational factors and process factors enumerated above will be resolved they agree to the adaptation of the eNGAS in order to have a better government financial system.

Moreover, based on the results obtained and after a rigorous review of the literature, the researcher proposes the following areas for further research:

1. The Assessment of eNGAS Effectiveness and Efficiency as a Government Accounting System after Implementation.

2. A Comprehensive Study about User's Expectations and Fears in Using eNGAS.

3. Challenges and Problems Encountered Before and after the eNGAS Implementation Process.

REFERENCES

[1] Ali, Mahmood, Zhou, Li, Miller, Lloyd and Ieromonachou, Petros (2016), User resistance in IT: A literature review, DOI:10.1016/j.ijinfomgt.2015.09.007. From https://core.ac.uk/download/pdf/82894184.pdf

[2] Blanton, J Ellis and Klaus, Tim (2010), User Resistance Determinants and the Psychological Contract in Enterprise System Implementations, European Journal of Information Systems, volume 19, 625–636. From https://link.springer.com/article/10.1057/ejis.2010.39

[3] COA (2017), *E-ticketing – Commission on Audit*. Retrieved from https://gas.coa.gov.ph/eticket/.

[4] COA (2018), Updates on eNGAS, eBudget System and other related application systems [PowerPoint slides]. Retrieved from https://slideplayer.com/slide/7806868/

[5] COE-PSP (2022), Enhanced Financial Management Information System. From https://coe-psp.dap.edu.ph/compendium-innovation/enhanced-financial-management-information-system-fmis-2/

[6] Cosmin, C. (2015), 'Accounting Information System - Qualitative Characteristics and Importance of Accounting Information at Trade Entities', Annals of the „Constantin Brâncuşi" University of Târgu Jiu, Economy Series. From https://www.utgjiu.ro/revista/ec/pdf/2015-01.Volumul%202/26_Caraiman.pdf

[7] Darnelle (2014), '7 Features of a Good Accounting System', Business Technology Cloud Accounting From https://542partners.com.au/2014/09/7-features-good-accounting-system/

[8] Ginting A. (2022), 'Accounting system definition element benefits characteristic and feature', Business Tech Journal. From https://www.hashmicro.com/blog/accounting-system-definition-element-benefits-characteristic-and-feature/

[9] Given, Lisa M. (2007) Descriptive Research, In Encyclopedia of Measurement and Statistics. Neil J. Salkind and Kristin Rasmussen, editors. (Thousand Oaks, CA: Sage, 2007), pp. 251-254. From https://guides.library.txstate.edu/socialscienceresearch/types-of-research designs#:~:text=Descriptive%20research%20is%20used%20to,natural%20and%20unchanged%20natural%20environment

[10] Hirschheim, R. and Newman, M. (1988) Information Systems and User Resistance: Theory and Practice. The Computer Journal, 31, 398-408. From https://doi.org/10.1093/comjnl/31.5.398

[11] Kim, Hee-Woong and Kankanhalli, Atreyi (2009), Investigating user resistance to information systems implementation: a status quo bias perspective MIS QuarterlyVolume 33 pp 567–582. From https://dl.acm.org/doi/10.5555/2481626.2481634

[12] Jiang, J.J. et al. (1999), 'User resistance and strategies for promoting acceptance across systems types', Information Management. From https://www.scribd.com/document/498722840/User-resistance-and-strategies-for-promoting-acceptance-across-system-types-2000

[13] Markus, M. L. (1983), 'Power, politics, and MIS implementation', Communications of the ACM Volume 26 From https://dl.acm.org/doi/pdf/10.1145/358141.358148

[14] Oreg, S. (2006) Personality Context and Resistance to Organizational Change. European Journal of Work and Organizational Psychology, 15, 73-103. From https://www.academia.edu/12970919/Personality_and_resistance_to_changes

Management of Drought and Desertification for Sustainable Agricultural Development in Nigeria

Adeniji Olawale Aladelokun, PhD

Department of Geography and Environmental Management, School of Social and Management Sciences, College of Science, Bamidele Olumilua University of Education, Science and Technology, Ikere – Ekiti, Ekiti State. Nigeria
Email: aladelokun.adeniji@bouesti.edu.ng

Abstract— *It is no gain saying today that uncontrolled and uncoordinated roles of man are responsible for geo-environmental degradation in Nigeria, be it intentional or inadvertent. Take for instance, Nigeria which will be the focus of this paper has some conservation legislations currently in force and yet the state has not and may never recover from devastating drought years. Many failed measures have been advanced as efforts to improving the productivity of the needed potential of large expanse of land put under cultivation proved unsuccessful. That is, all the measures ever launched to improve agricultural output are not yielding much needed positive results. This is partly due to poor management during persistent drought spells. However, this paper sets to unravel the drought management skills that could be employed to actualise agricultural sustainability. Basically, literature search of information from articles from Google scholar, libraries, etc. as well as personal survey to federal and state ministry of agriculture were exploited. It may be safe to state, therefore, that designing strategies to control or curb drought should take advantage of archived data for present and future research studies that may help arrest the seemingly physical march of the Sahara Desert into West Africa.*

Keywords— *Agriculture, Desertification, Drought, Management, Nigeria, Sustainable.*

I. INTRODUCTION

Rural population through Africa are the de facto managers of renewable natural resources, and that, if existing system of resource management are to be improved and sustainability ultimately achieved, then the active participation and support of local communities are essential (Bourn et. al., 1991). The problem of Africa today is not caused by climate change but uncontrolled and uncoordinated roles of man as the major factor of geo-environmental degradation, be it intentional or inadvertent. The country has Laws and Acts covering all facets of conservation as contained in Table 1. Added to these are the establishments by decrees and Acts set up to enhance agricultural output such as the ADP, DFFRI, FACU, NALDA, FDALR, etc., all being subsidiaries of the Federal Ministry of Agriculture and Natural Resources while the RBDA, FEPA, NARESOON and others are watchdogs for Environmental protection and conservation.

Table 1: Conservation Legislations Currently in Force in Nigeria

S/N	Conservation Legislations	Establishment Year
1	Exclusive Economic Zone Cap 116 LFN	1990
2	River Basin Development Authority Act Cap 390 LFN	1990
3	Sea Fishermen Act Cap 404 LFN	1990
4	Territorial Water Cap 404 LFN	1990
5	Land Use Act Cap 202 LFN	1990
6	Natural Resources Conservation Council Act Cap 286 LFN	1990

7	Agricultural (Control of Importation) Act Cap 12 LF	1990
8	Pest Control of Produce Act Cap 349 LFN	1990
9	Guarantee Act Cap 384 LFN	1990
10	Bee (Import Control and Management) Act Cap 33 LFN	1990
11	Endangered Species Act Cap 108 LFN	1990
12	Life Fish (Control of Importation) Act Cap 209 LFN	1990
13	National Crop Varieties and Livestock Breed Cap 249 LFN	1990
14	The Forest Ordinance (chapter 75)	1937
15	The Eastern Forest Law	1955
16	The forestry Ordinance with Amendments, Northern Region	1960
17	The Forestry (amendment) Edict; Western State	1969
18	The Forestry (amendment) Edict; Western State	1973
19	The Wild Animals Preservation Law (Western Nigeria)	1959
20	The Wild Animals Law (Northern Nigeria)	1963
21	The Wild Animals Preservation Law (Lagos State)	1972

22	The Wild Animals Law (Eastern Nigeria)	1965
23	The Wild Animals Preservation Edict (NE States)	1972
24	The Wild Animals Preservation Edict (Kano State)	1972
25	The National Parks Governing Board Decree No. 36	1991

Source: National Conservation Centre, 1993

Nigeria went broke trying to import everything from seedlings to fertilizers without re-course to fundamentals of sustainable development rather than conducting research into drought effects and reverse the obnoxious legislations which discouraged the productive grassroots sector of the agricultural economy. It was as if money can buy back the lost glory in the agricultural sector without much thought given to the plight of peasant/rural farmers who constitute over 90% of the work force in agriculture.

It was still that same 'wild-goose' chase that led to the establishment of National Agricultural Land Development Authority (NALDA) as it pilot farms covering less than 3% of the total landmass of Nigeria (over 920,000km square) will do the 'miracle' without actually involving the grass-root farmer on non-pilot project basis of which extension service based on scientific and technological breakthrough is essential.

Institutionalisation of agriculture and centralisation of legislations at the Federal level began to take its toll following that 1969 – 73 drought as Nigeria export trade on the major cash crops – Cocoa, Palm produce, Groundnuts, etc., dropped to abysmally low-levels as shown in Table 2.

Table 2: Agricultural Exports of Nigeria (A Comparative Analysis)

Commodity	1960/66				1987/1991				Remarks
	A	B	C	D	A	B	C	D	
Cocoa	2nd	180	35	30%	16th	100	15	2%	E
Palm Produce	1st	617	38	35%	12th	22	0	0	F
Groundnut	1st	619	22	20%	8th	540	0	0	G
Rubber	1st	58	14	10%	5th	99	N/A	-	H
Cotton	N/A	151	5	6%	-	-	-	-	Not among first 18 Countries

Sources: FAO, 1991

Note:

A = position in the World.

B = Tonnage (x 10^3)

C = Earned Revenue ₦ (x 10^6)

D = Percentage (%) λ GPN

E = Leader are Cote D'Ivoire, Brazil, Ghana, Malaysia, Cameroon.

F = Leader in Malaysia (5 Million metric tonnes) which came to buy seedlings from Nigeria in Sixties.

G = Leading producers are India, China, USA, Senegal, World leaders are Chine, USSR, USA, Brazil.

II.   NATIONAL RE-ORIENTATION ON THE ENVIRONMENT

UNCED – 92, (Agenda 21), with its emphasis on the environment; poverty alleviation and economic development, opened the way to a more purposeful future in countries like Nigeria already side-lined by agriculture epileptic policies which hinge purely on economic rather than sustainable development – theories and techniques. The first and major attributes of the Rio Summit at the local level – as far as conservation is concerned – is the foundation of which was laid in 1993. Effectively, through the centre and in accordance with World Conservation Strategy, provisions are to be made for:

i.   Respect and care for ecosystem
ii.   Improvement in the quality of life
iii. Conservation of life support system and bio-diversity
iv.   Reduction in depletion of non-renewable resources
v.   Focus on sustainable agriculture for economic renewal poverty alleviation and conservation.

However, there are pre-requisites for the achievement of the above goods in view of repetitive drought, threats of desertification and failing surface and underground fresh water resources. The journey is far, for Nigeria has actually not started. An 'eye-opener' to the unpreparedness can be summed up in the report below which not only makes a mockery of the country's anxiety to join others in the quest for GIS data-base for sustainable development but also portrays her as a nation without vision in the area of science and technology.

Rainfalls and Enhanced Productivity

Drought has three components – Meteorological, Agricultural and Hydrological. Meteorological drought is the only aspect to which most establishment in Nigeria pay major attention. It is the simplest but most inconsequential in relation to plant life as it is a mere diminution in total annual rainfall amount normally received over a specific period. Soil moisture inadequacy or water below soil surface for nutrient intake by plants is not just a function of rainfall, but its spatial and temporal spread, distribution, and reliability (seasonality). Hence, the form and type of data presented is very important in drought research.

The problem of communication gap underscores the need to have relevant resource data that could be directly applicable to planning. That research results are not being effectively utilized in national development efforts stems also from the format of most of the research Reports and Results on very important topical issues. Many of them are 'shrouded' in technical languages that are difficult to translate for application. Others which are to be synthesis of large numbers of data like rainfall, may not be produced at a 'scale' commensurable with the problem at hand. Thus, although the data is available, it has not been transformed into a resource package that can be directly applied in planning and development.

To highlight the importance of resource data in sustainable development, an example that readily comes to mind, and which is relevant to the discussion here, is rainfall as a natural resource in Nigeria. Always taken for granted, over 1,000 rainfall stations for varying number of years are available. It will be cumbersome to use all these data for planning in their raw form. Appropriate statistical tools are, therefore, required to estimate the most important direct and derived parameters and present them in the best format either pictorial or digital (tabular) form. Where these are done, the utility value of such fundamental parameters of precipitation effectiveness will only be enhanced if and only if presentation of results: meets with requirements of the user; and is done with appropriate and convenient FORMAT for easy understanding and application.

Statement of the Problem

On observed and derived parameters of precipitation effectiveness that could enhance development, especially in the agricultural and water resources sectors. (in Nigeria) and guarantee a balanced ecosystem, the problem may not be lack of data but its adaptation from the raw to refined state suitable for particular 'goals'. Nigeria within the past two decades, starting with the global drought of 1969 – 1973, has experienced great difficulties in food production and a myriad of solutions have been advanced. It started with the importation of selected grains and meat in the mid-seventies to UN backed agrarian adventures through such agencies as World Bank, FAO, ADB, etc. Since the early 80's, emphasis has been shifted to dam construction for water conservation and mechanisation of agriculture as a way of bridging the gap between low rainfall expectations and sustained food production. Both decades (70s and 80s) saw the importation of fertilizer as a necessary corollary to any

efforts at improving the production potential of the large expanses of land put under cultivation. Despite those huge investments, the problem has persisted, partly due to poor management during persistent drought spells especially in the latter decade.

However, the most painful aspect of all the laudable programmes by Government was the resort to absolute rainfall amounts and total neglect of precipitation – which is known and recognised, a prior, as the 'pillar' of any agrarian venture for its character, type and spatial/temporal features. Even after 20years of programmes on drought mitigation (1969 – 1973), very little grass root information is available (Bourn, et. al., 1991). There is, however, hope in the well-informed HYDRONIGER programme which focuses attention on rivers Niger and Benue to carry out (among others) the following: Data Bank for Hydrological Information System (HIS); Early Warning System on drought; and Defining and delineating water-sheds.

There remain, however, a wide gap between the relevance of applied research in assessing the gravity of the problems and the indication of drought and desertification (Adefolalu,1991). It is certain that 'designing' strategies to control or curb drought should take advantage of archived data for present and future research studies that may help 'arrest' the seemingly physical march of the Sahara Desert into West Africa.

Aspects of Precipitation Effectiveness

Indicators of drought which have hitherto not been applied in control measures against desertification let alone their application for Early Warning System in crop production planning and water and geo-environmental conservation and preservation include the following: Onset, Cessation, and Length of Raining Season (LRS); Breaks in the course of a normal raining season; Seasonality Index of rainfall; Degree of wetness or dryness (Hydrological Ratio, λ) and Water equivalent to avert drought.

To the extent that precipitation ineffectiveness is a measure of drought, the parameters above will make for a better understanding and solution of those components of drought (Meteorological, Agricultural and Hydrological) which, 'couple' with human pressure, tend to aggravate the desertification of the semi-arid zones of West Africa.

Previous Classification Attempts

Classification of the drought-prone Sahelian belt of West Africa by adopting some critical rainfall limits (maximum and minimum) are varied. While Davy, et. al. (1976) suggest that 300mm to 650mm range describes the Sahel in general terms. However, Nimet (2009) has modified it to lie within the 400mm to 750mm isohyet.

These precipitation limits are based on the fact that 'drought-escape' perennial grasses in this belt, which are seasonal in nature, are capable of maintaining their luxuriant growth. However, 'drought-resistant' tree-plants such as Baobao, thorny and non-thorny shrubs can survive stresses due to soil moisture deficiency for considerable period during the October to April dry season when water demands are very high. It has been noted that potential evaporation of this belt, in Nigeria for example, ranges between 3.000mm and 4,500mm (Adefolalu, 1988).

The importance of the variable nature of the seasonal low precipitation has suggested as a contributory factor to the delicate ecosystem of the Sahelian belt. This is because of the variability of rainfall and time trends are important to plant development. Horowitz (1972) re-affirmed the importance of rainfall regime when he stated that rainfall may be evenly distributed throughout the four months of the rainy season in Sahel (June to September) or it may be concentrated in a few intense periods. For example, in 1968 – 1969, annual rainfall in Niamey (in the 'heart' of the Sahel) was 550mm – 600mm. but due to earlier than normal rains which terminated prematurely, plant wilted and were subsequently scorched by the sun later. The point has also been stressed by Adefolalu (1986b) to effect that while mean annual rainfall provides a useful guide on the boundaries of a stable ecosystem, the pattern and trends, both in space and time, affect the type of soil and consequently the vegetation in any region. Super-imposed on this is, of course, the constraints posed by increasing population pressure.

III.   THE NIGERIA SITUATION

The problem of desertification in Nigeria is no more an illusion. Adefolalu (1986,1990) confirmed that while Sahel-type vegetation (shrub/dry grassland) was almost non-existent up to about 1950, it has now spread southward to latitude 10°N in West Africa. With trends in desertification suggesting an increase in areas to be covered by 'treeless' desert conditions in the Sahel, it is only a question of time for such conditions to spread into the Sudan-Savanah belt further south.

The Sudano – Sahelian regions of Nigeria are the most vulnerable areas to drought and desertification processes. These regions already have low of biological productivity, organic matter and aggregate stability. Their vegetation and plant covers are relatively sparse, and soils are relatively more susceptible to accelerated erosion by water and wind. People at risk and at loss in the Sudano – Sahelian regions are more than 19million and 17milliom respectively. In Yobe State alone, the drought that occurred resulted in the

loss of about 3,142 metric tons of expected harvest (Abubakar and Yamuda, 2003).

It is perhaps the neglect of the land of result-oriented research on precipitation effectiveness that has been responsible for contradictory advice by eminent scholars in such areas as agro-ecological zoning and water resource development for control measures against rapid desert encroachment. This has resulted in a myriad of approaches including (and sadly) proliferation of research-oriented Federal Establishments all competing for the same and dwindling oil revenue with other organs of Government.

Apart from turning Federal Ministry of Agriculture into a 'parasite' – which for most times act as conduct pipes for funds to those Agencies, the only time one sees some bubble of life in that Ministry nowadays is during the Fertilizer 'season'. In addition to the pursuit of research problems in an orderly manner – as a follow-up to similar projects in the past (e.g. Obas, and Ebohon, 1996, Kowal, et. al., 2016), co-ordination of agro-related establishments will not only guarantee the collection of most up-to-date information necessary for a standard data-bank for solving geo-environmental problems, but will also conserve funds through avoidance of duplication of efforts and overlapping.

The severity of the incursion of desert conditions has reached such alarming proportions in relation to rural energy needs that palliative in terms of relief aids will not suffice. Globally, it has been stated that '350Billion Dollars' worth of agricultural products would be lost if current rate of desert encroachment is not stopped. In Nigeria, the World Bank (1991) estimated that 100Billion Naira or 40% of its GDP will be required to maintain the present levels of development not to talk of cost of sustaining it. These reasons, therefore, call for the advocating of multi-disciplinary approach to research as the only viable solution.

Environmental Hydrology

The major vulnerable sector to drought in Nigeria is the water resources. Water resources represent a major prerequisite and driver of socio-economic development and cater for other economic sectors such as domestic, agriculture and fisheries, industry, bio-diversity, power and energy generation (NiMet, 2014).

Precipitation is the most important element of climate in relation to water resources development in Nigeria and the key to understanding the precipitation regime is hydrologic cycle. While most of the southern parts of Nigeria have surplus surface flow, the drought-prone northern states suffered so much from drought in the seventies, that dam construction was adopted as 'the solution' with the major rivers as basis. However, the performance of the most open dams and reservoirs for water storage facilities have been so unsatisfactory to the extent that Government had to

institutionalise Directorate of Food Road and Rural Infrastructure (DFRRI) in 1986 to correct (among others tasks) the imbalance in water needs of rural dwellers by bore-hole drilling, well-digging etc. This approach has only temporary advantages as Sircoulon (1990) observed that daw-down of Lake Chad is not unconnected with large scale rapping of underground water coupled with poor rainfall replenishing in the area.

During drought spells experienced in Nigeria between 1969 and 1984, distance of perennial rivers like Niger and Benue (and their tributaries) has been minimal (Sircoulon, 1990). The dilemma for the country now relates to the prospects of sustaining developmental efforts in the water sector if decreased rainfall in drought-prone areas, as a result of climate change persists. For instance, it is not until recently that Government realised the advantages of inter-basin water transfer and has now committed substantial amount for applied research on the very important aspect of sustainable development in the water sector (Adeyemi and Akanbi,1991).

Although, the turn-round in relation to Government interest in research is laudable, there is no doubt that a comprehensive study involving the root causes of scarcity of water derivable from precipitation (among others) will, in long run, prove more beneficial to Nigeria. Because, while a single project on inter-basin transfer may serve the purpose of relieving pressure in a particular catchment basin, sustainable development as a function of long term planning should consider such components of the hydrologic cycle as surface flow, through-flow and evapotranspiration. Impact of global warming in relation to river regime in Nigeria should receive serious attention henceforth.

Bio-Diversity

A critical aspect of Bio-diversity relates to INPUTS (chemical additives) that are used in maximizing agricultural outputs which include fertilizer, pesticide, fungicide and herbicide. The level of bio-degradation of those inputs vary. Some of these inputs degrade easily while others are more persistent. Some others degrade to toxic substance which will pollute surface and sub-surface fresh water. Studies that have carried out on the persistence of these chemical in soils and plants and the attendant side-effects on the environment are mostly limited to pilot schemes with little or nothing at all from large river catchment basins or farmers' fields. There is, therefore, a need to generate substantial data on bio-chemical aspects of improved farming practices within the most arable but degradation-prone low-lying basins that have become the 'show-piece' of fresh water-related agricultural ventures.

At present, most streams and rivers face decline arising from the construction of dams, dredging and modification of natural channels. The lentic eco-systems on the other hand are ephemeral features of the landscape which fill-in, become smaller and finally are replaced by a terrestrial community. The degree to which these processes occur is to a large extent dependent on how adequate the water-shed is protected. For example, siltation is one of the most individual forms of river pollution. The silt, when toxic chemicals are present, destroys steam habitats and kills aquatic organisms while suspended clay particles prevent light penetration and growth of aquatic plants.

The net effect of these processes is a decrease in the diversity of ecosystem which results in a more unstable system. In such a situation, aquatic communities are usually subject to wide fluctuations in population of organisms and are easily influenced by the vagaries of weather and climate Aside from sea fishing which is dependent on plankton regeneration, fresh-water fish development which accounts for 30% of animal protein consumption in Nigeria is a 'climate-conscious' enterprise (Sikoki and Chinodah, 2004). It is recognized that the survival of any species in a seasonally unstable environment is only possible to a certain point. Beyond some critical climate condition, adjustments are impossible as reproduction may deterred. In Nigeria, local current production of about 0.5million tons falls short of the demand of 2.5millions tons. To meet such high demand, fish farming must be developed nationally to take advantage of the changing climates. Meanwhile, to-date, there no useful environmental data on the role of climate on local fish farming innovations. For instance, low-level fresh water which could lead to destruction of fish habitats, breeding grounds and the general well-being of and other aquatic animals has not been properly documented in Nigeria. The thrust of future projects in this respect should focus attention on base-line data on fresh water statistics.

With respect to animal production, environmental factors do also influence production capabilities. The degree of influence, observed in the overall productivity performance over a given period of time, is a function of fresh water availability and the production of fodder for both in-door experiments and pastoralism. It is regrettable to note that know that while 'cold' countries produce at enhanced levels despite limitations imposed by climate in available water-sheds, tropical countries like Nigeria depend on solely on pre-medieval pastoralism practiced by illiterate (although highly knowledgeable) herdsmen who themselves are few and have become endangered species. Production indices that are mostly affected include reproduction, milk-yield, weight gain and survival of young ones. Fresh water intake directly or from herbaceous plant is critical. Thus, data inventory on the most climatically-viable river catchment

basins in the highly productive belts of Nigeria (free of pest diseases) is expedient if rangeland management is ever to be given the over-due attention. Nigeria will be well advised to 'borrow' a leaf from New-Zealand which has well over 21million cows and 60million wool-producing sheep but do not suffer from over-grazing. She adopts 'Hi-Tech' which improves the carrying capacity of the land three-fold through 'lavish' use of breeding stock and gives emphasis to pasture management on intensive rotational (not wild and uncontrolled rangeland) grazing practices; careful conservation of herbage by mechanised hay-making and silage etc.

In agriculture which has been the major base of most 'south' countries (i.e. third world poorly industrialised countries), massive 'importation of technology (farming tractors, harvesters, etc.), and fertilizers was thought was thought to be the 'bridge' between lower crop yields and population demands. Nevertheless, the picture today is different. Having gone into huge debts, which can hardly be serviced, and faced with acute and perennial food shortages, south countries have had to rely on importation of food grains, thereby, compounding their economic woes, increasing poverty and neglect of the degraded environment. The problem of environmental degradation, relating to desertification, which is usually attributable to climate-induced drought is more man-made than natural, at least in the agrarian land-use sector. It is, therefore, expedient that management of drought and desertification has to do with effective utilization of resources without compromising future needs.

For any meaningful programme of economic development for poverty alleviation by enhancing food production, there is only one way to go – micro-scale surveys including carrying capacity of soils and fertility evaluation for planning.

IV.   AGRICULTURE ACTIVITIES AND MANAGEMENT

Agriculture remains the pivot of the common man in Nigeria whose livelihood depends on farming activities. Eighty percent of Nigeria's 85million odd people still live in rural areas toiling daily to produce raw food materials and engage in plantation agriculture to improve their economic base through production of cash (export oriented) commodities like cocoa, palm produce, groundnuts, soybeans, etc. However, as projections for a rise in staple food production are made, so also has demand (due to uncontrolled population growth) continue to outstrip production to the extent that a deficit of 35million tons is forecast for the year 2015. More serious, in the short-term is the shortfall of 11million tons forecast for the year 2000

– about eleven years from now (Federal Ministry of Environment, 2004).

Agriculture is one of the main economic activities in Nigeria that accounts for about 40% of the country's GDP and which employs about 60% of the active labour force, hence, drought would lead to catastrophe with unprecedented repercussions. During each period of drought, agricultural production is reduced. Majority of the people in the drought prone areas are peasant farmers, living on marginal lands in rural areas and practicing rain fed agriculture. Drought threatens agricultural production on these marginal lands, exacerbating poverty and starvation as agriculture is the mainstream of Nigeria's rural economy (Federal Ministry of Environment, 2012).

Without any expansionist tendencies, therefore, Nigeria has no alternative than to adopt 'high-tech' for staple food production (some have prescribed reduced population growth rates which may be more difficult to achieve). The most logical approach is to ensure high crop yield through scientific methods. High crop yields cannot be assured without a carefully planned improvement of impoverished soils – especially in erosion-prone and semi-arid environments. Firstly, the carrying capacity the land must be determined. To do otherwise and engage in arbitrary application of chemical activities will only worsen the degradation of top soils thus making it impossible to ensure sustainable development.

The 'high-tech' approach to animal husbandry by countries like New-Zealand is the only way out. Deliberate efforts must be made to (among others): breeding new and improved grasses for fodder; adopt alternative feed stuffs rather than allow nomads to continue roaming rangelands – setting fire to old grass-stocks to accelerate off-shoot growth; emphasise pasture management on intensive national growth; and careful conserve herbage by mechanised techniques.

Drought Management

While the first three sets of parameters above depict drought occurrence or non-occurrence, management is possible through Degree of Wetness or Dryness (λ) and water equivalent to avert drought. For optimum results, computations are best at micro-scale (sub-synoptic scale) grass root levels. In the examples for Ekiti State of Nigeria using 16stations, it is observed that the state can no longer depend on rain fed agriculture too much due to current trends of drought, although it is a remote possibility for desertification to affect the State at the level now currently being observed in the northern parts of the country. For amelioration, dams for irrigation agriculture must be introduced with precision in order to enhance the capability

of State as an agricultural area. Similar recommendation was made in the case of Niger State by Adefolalu (1990).

V. SUGGESTION FOR FUTURE CLASSIFICATION

Apart from mean rainfall amounts and variability, thereof, the measure of precipitation effectiveness are onset and cessation dates and length of the Hydrologic Growing Season (HGS) (Adefolalu, 1986a). On the nature of the Sahelian drought which contributes to the desertification process in West Africa, Adefolalu (1986b) has shown that consequences of precipitation deficiency with respect to these three parameters may over-weigh the damage done by actual deficient in rainfall amounts. Unfortunately, most studies in the SSR countries have paid little or no attention to them despite the overwhelming evidence confirming their relative merits in the tropics in general. It is, therefore, pertinent that future studies on management of desertification trends in the SSR and GSB countries, must concentrate on this badly neglected parameters of drought indicators in the tropics.

Furthermore, recent studies suggest that in order to cover more areas, satellite data can be used to derive precipitation rates from clouds quantitatively. This approach is highly recommended in the sub-region of West Africa where surface conventional stations are few especially in the Sahel and Sahel-Sahara belts.

REFERENCES

[1] Abubakar, L. U. & Yamuda, M. A. (2013). Recurrence of drought in Nigeria, causes, effects and mitigation. *International Journal of Agriculture and Food Science Technology.* 4(3), 169 – 180.

[2] Adeyemi, I. A. & Akanbi, C. T. (1991). Effect of soy friction on some functional and rheological properties of maize-banana mixtures. *Journal of Food Processing.* 15(1), 31 – 43.

[3] Adefolalu, D.O. (1984). Weather hazards in Calabar, Nigeria. *GeoJournal*. 9(4). 359 - 368

[4] Adefolalu, D. O., Senouci, M., Bonuola, A. & Bouki, A. (1984). Mean state during the onset of West African Monsoon in 1979

[5] Adefolalu, D. O. (1986a). Further aspects of sahelian drought as evident from rainfall regime of Nigeria. *Meteorology and Atmospheric Physics.* 36(3), 277 – 295

[6] Adefolalu, D. O. (1986b). Rainfall trends in Nigeria. *Theoretical and Applied Climatology*. 37(4), 205 -219.

[7] Adefolalu, D. O. (1988). Precipitation trends, evapotranspiration and the ecological zones in Nigeria. *Theoretical and Applied Climatology*. 39(2), 81 – 89.

[8] Adefolalu, D.O. (1990). Desertification studies. *Microwave remote sensing for oceanographic and marine-weather-forecast.* 223 – 323.

[9]   Adefolalu, D. O. (1991). *Towards combating drought and desertification in Nigeria*. A project proposal submitted to Federal University of Technology, Minna.

[10] Adefolalu, D.O. (2007). *Climate change and economic sustainability in Nigeria*. Paper presented at the International Conference on Climate Change and Economic Sustainability held at Nnamdi Azikwe University, Awka. Nigeria between 12th and 14th June, 2007.

[11] Budnukaeku, A. C., & Hyginus, O. (2021). Environmental laws and management agencies in Nigeria – what hope for desecrated landscape. *Biodiversity International Journal*. 5(1), 1 – 6.

[12] Davy, E. G., Mattel, F., & Solomon, S. L. (1996). *An evaluation of climate and water resources for development of agriculture in sudano-sahelian zone of West Africa. Geneva/ Switzerland*. World Meteorological Organization (WMO).

[13] F.A.O (1991). *Production year book, food and agricultural organisation*. Rome. Annual Report

[14] F.A.O (2020a). *The state of food and agriculture 2020: Overcoming water challenges in agriculture*. Rome. Annual Report

[15] F.A.O (2020b). *The state of agriculture commodity market 2020: Agricultural markets and sustainable development: Global value chains, small holder farmers and digital innovation*. Rome. Annual Report

[16] Federal Ministry of Environment (2004). *Nigeria national biodiversity strategy and action plan*. Abuja. FME Publications.

[17] Federal Ministry of Environment (2012). *Find report on the development of drought early warning system in Nigeria*. Abuja. FME Publications.

[18] Kowal, M., Ananieva, S., & Thum, T. (2016). Explaining anomalies in feature models. *ACIM Sigplan Notices*. 52(3), 132 – 143.

[19] NiMet (2014). *Monthly food and drought monitoring bulletin*. Hydromet Division of Directorate Applied Meteorological Services.

[20] Obas, S., & Ebohon, O. J. (1996). Energy, economic growth and causality in developing countries: A case study of Tanzania and Nigeria. *Energy Policy*. 24(5), 447 – 453.

[21] Oduro-Afriyie, K. & Adefolalu, D.O. (1993). Instability indices for severe weather forecasting in West Africa. *Atmospheric Research*. 30(1), 51 – 68.

[22] Sikoki, F. D., & Chinodah, A. C. (2004). Changes in haematological characteristics of a bony fish, tilapia guineensis exposed to common pesticides in the Niger Delta wetland, Nigeria. *Ghana Journal of Agricultural Science*. 37(1), 59 – 67.

[23] Sircoulon, C. L. (1990). The drought in West Africa 1982 – 1984 compared with 1972 – 1973. *FAO*. 21(4), 75 – 86.

[24] World Bank (1991). *World development report 1991; The change of development*. New York. Oxford University Press.