Revista Review Index Journal of Multidisciplinary 2022; 2(1):01-09
eISSN: 2583-0031
Double-blind peer reviewed | Refereed Quarterly Online Journal

Farm Profile of Sugarcane Farmers in the Visayas, Philippines and their Productivity Level

[*1]Paulino A. Oñal, Jr., [2]Owen B. Buenafe and [3]Virgeun M. Eraldo

[1]*Ifugao State University, Ifugao, Philippines*
[2&3]*Sugar Regulatory Administration, Philippines*

Abstract

The present status of sugarcane farming in the Visayan area of the Philippines has very low productivity especially in areas with 10.0 hectares and below. Doloriel (2014) confirmed in his study that sugarcane farming is productive and profitable only for medium and large-sized farms with an area of 10.01 hectares and above. This confirmed that small sugarcane farming is not profitable which is 79% of 424,199 hectares, the total area planted sugarcane for the whole Philippines.

Using this descriptive method, we were able to determine the productivity of sugarcane farmers and farm profile in the Visayas, Philippines. The 400 sugarcane farmers have randomly selected the 10 mill districts in the Visayas area. The Extension Program Guidelines used by the agency measured productivity, sugarcane farmers, and farm profiles.

The results indicate that sugarcane farms in the Visayas area are highly productive, and there is a significant difference between the productivity of sugarcane farms when grouped by location. The level of productivity of sugarcane farming in the Visayas, measured by factors such as the size of farms, type of soils, land topography, average rainfall, distance to the sugar mill, farming innovations, worker's availability, and expenses per hectare, was low.

There is a significant difference in the productivity of sugarcane farming at the different mill districts in the Visayas area based on factors such as farm size, topography, distance to the mill, farming innovations, worker's availability, and expenses per hectare except for the type of soil and average rainfall.

Keywords: *Sugarcane, Productivity Level, Sugarcane Farmers, Farm Profile*

Article Publication

Published Online: 31-Mar-2022

*Author's Correspondence

Paulino A. Oñal, Jr.

Ifugao State University, Ifugao, Philippines

docpaulonal011260@gmail.com

1. Introduction

1.1 background

Like any other ASEAN country, the Philippines is not so prepared until now by the impact of 2015. The sugarcane industry has not been through in identifying the things to be done and must therefore be now on the implementation phase of appropriate programs and interventions to enable the industry to respond to threats and exploit opportunities created by trade liberalization, especially on increasing farm productivity.

The reduction of the tariff of imported sugar at 5% (which started last 2015) affects the Philippines. With the inevitable full integration of the ASEAN Economic Community (AEC) wherein the goods and services (including sugar) had flowed freely within the Region, the sugarcane industry in the Philippines will need to gear up competition against its neighbors in the AEC.

The Sugarcane Roadmap 2020 (CY 2014-15 to CY 2019-20 version, September 2015) prepared by the government, mentioned that the industry had increased its contribution to the national economy to as much as Php87 billion in the Crop Year 2013-14 from Php76 billion only in the Crop Year 2009-10 (The Sugarcane Industry Roadmap 2010, CY 2010-11 to 2015-16 version). The increase was from sales of raw sugar, molasses, and bioethanol, tolling fees on sugar refining, and VAT on refined sugar. In addition, it brought in US$ 111.76 million in CY 2013-14 through exports of sugar to the US and world markets. Moreover, the displacement of gasoline with 10% derived from sugarcane and molasses had generated savings of foreign currency reserves apart from contributing towards a cleaner and greener environment.

Under the current scenario, it was spelled out on the roadmap, the more productive and competitive sugarcane industry will further increase its contribution to about Php 100 billion through the opening of additional bio-ethanol plants and production of renewable power as well as other products from sugarcane like specialty sugars, bio-water, bio-plastics and more. The establishment of support industries will likewise contribute significantly to the revenue streams of an expanded sugarcane industry.

At present, sugar statistics show that there are more than 80,000 farmers who are tilling the 424,199 hectares (out of the total land area of 30 million hectares), (SRA Bulletin, March 04, 2018) of sugarcane fields all over the country with an average production of 59 tons per hectare and LKG/TC of 1.98 (CY 2016-17). The targeted production for 2019-20 is 70 tons per hectare and an LKG/TC of 2.00 (SRA Sugarcane Roadmap 2010). Of the total number of sugarcane farmers mentioned-above the majority of them are considered small (farms are 5 hectares or below). In Crop Year 2015-16: 79% are small farmers, 17% are cultivating 5.01 to 50.00 hectares and only 4% have 50.01 hectares and above (Overview of the Sugarcane Industry, updated October 2017).

The total number of agricultural and industrial workers directly employed in the industry is about 700,000. Furthermore, under the industry are 27 operating sugar mills, 13 operating sugar refineries, 10 operating bio-ethanol fuel distilleries, and 6 biomass-generating plants as of the Crop Year 2015-16 (Executive Summary, DRRM Plan for the Sugarcane Industry 2017-2022).

Relatively, the latest survey mentioned by Crisostomo (2018), indicates that sugarcane farms have 32,000 laborers, which is second to the banana plantation with 49,866 workers. An estimated 700,000 "sacadas" (seasonal plantation workers) are working in sugar and other haciendas (estates) nationwide, it mentioned further.

Talking about mill district, a "Mill District" refers to a centrifugal (raw) sugar mill together with the sugarcane plantations adherent thereto. A plantation is deemed adherent by sugarcane being delivered to a mill regardless of contract relation between the mill and the plantation owner and/or any other person cultivating sugarcane in the plantation contiguous to the mill (as defined on the Implementing Rules and Regulations of RA 6982).

On the production side, the total volume of sugar produced by the 14 Mill District in the Visayas, Philippines was 1.65 million metric tons, which is 66.00 percent of the total production of the country (2.50 million metric tons) for the Crop Year 2016-17 (Extension Services-Visayas, 2018).

Services of the Philippine government can be attuned now on the needs of farmer-clients so that the impact of 2015 on the forthcoming year will be minimal. The advocacy on the preparation of farm plans and budget documents should be given impetus. Sustaining the increase of productivity of the sugarcane industry in the Philippines for all farmers, especially those who are cultivating an area of 10 hectares and below.

Climatic factors that influence sugar yields are rainfall precipitation (greatly affects soil moisture), temperature range, light intensity, and duration, photoperiod, and occurrence of typhoons or long drought. Likewise, for edaphic or soil factors are soil type, pH, and organic matter content (Alulod & Cerbo, 2009).

To keep the sugarcane industry sustainable, the government must eliminate the tariff on inputs to reduce the costs of production such as fertilizers. The reason why the local sugar industry is in a state of disarray is that local sugar is priced higher than imported sugar. This is due to the high cost of inputs. Lowering the domestic costs of production would make the price of local sugar competitive in the world market, this was the conclusion of the study conducted by Doloriel last 2014.

She further concluded that sugarcane farming is productive and profitable only for medium and large-sized farms with areas ranging from 10.01 hectares and above. This means that small sugarcane farming is not profitable.

Doloriel had further observed that the first ratoon cropping in sugarcane production is the most productive and profitable. The technical explanation was cited on the Philippines Recommends for Sugarcane that first ratoon crops were considered as secondary tillers. Earlier flushes of tiller competition were desirable because they gave more uniform plants resulting in less tiller competition. Besides, secondary tillers were closer to the soil. Therefore, the roots could penetrate deeper into the soil and could absorb more nutrients compared to those of the preceding ratoons.

Presenting the present status of the sugar industry in the Philippines, specifically at the area in the Visayas that has low productivity, there is a need to improve the services and more assistance be extended to the farmers. Hence, the study will give us the relation of factors that affects the productivity of farmers viz-a-viz the farm profile.

1.2 objectives

1.2.1 The general objective of the study is to determine the importance of increasing the sugarcane farm productivity of small farmers.

1.2.2 Specific objectives

1.2.1.a. The productivity of sugarcane farmers in a specific location

1.2.1.b. Factors affecting the productivity of sugarcane farmers

1.2.1.c. The productivity and farm profile

1.3 statement of the problem

The sugarcane industry is one of the major dollar income industries in the Philippines. The productivity however and profitable only for medium and large-sized farms with an area of 10.01 hectares and above. This means that small sugarcane areas are not profitable, which is 79% of the total national area of 424,199 hectares. This study aims to improve the level of productivity of sugarcane farmers and farm profile in the Visayas, Philippines

2. Materials and Methods

2.1 research method

The descriptive correlational method was used in this study. It focuses on the sugarcane farmers' areas, farm profile, and level of productivity among others, to the different Mill Districts in the Visayan area of the Philippines.

2.2 research environment

The study was conducted at the 10 Mill Districts in the Visayas area. The Visayas area was composed of six provinces namely: Negros Occidental, Negros Oriental, Capiz, Iloilo, and Leyte.

Specifically, the study covered the following Mill Districts, namely: San Carlos and Victorias for the northern portion of Negros Occidental. The La Carlota-Ma-ao and BISCOM for the southern portion of Negros Occidental; Tolong and Bais-URSUMCo for Negros Oriental; Iloilo and Capiz for the Island of Panay; Bogo-Medellin/Durano for the Island of Cebu; and, for Island of Leyte its Ormoc-HIDECO Mill District.

2.3 respondents

The respondents of the study were the sugarcane farmers in the Visayan area with 10 hectares and below.

Employing the *Slovins* formula, out of 29,151 sugarcane farmers from the 10 Mill Districts mentioned above, selected randomly were the 400 farmers as the actual respondents of the study. Shown in Table 1 is the distribution of the respondents and the sample per Mill District.

Table 1. Distribution of Respondents per Mill District

Location (mill district)	Number of farmers	Percentage
ILO - Iloilo Mill District	60	15.00
CAP - Capiz Mill District	30	8.00
BOG - Bogo-Medellin/Durano MD	20	5.00
ORM - Ormoc-HIDECO MD	20	5.00
TOL - Tolong Mill District	50	13.00
BAS - Bais-URSUMCO MD	70	18.00
BIS - BISCOM Mill District	55	14.00
LAC - La Carlota/Ma-ao MD	35	8.00
VIC - Victorias Mill District	35	8.00
SAC - San Carlos Mill District	25	6.00
Total	**400**	**100.00**

2.4 research instrument

The instrument used to gather data was the agency Extension Program Guidelines with eight parts. It includes the farmers' profile, farm profile, and productivity among others.

2.5 data gathering procedure

The researcher had personally administered the questionnaire to the respondents with the assistance of government Technical Personnel/Junior Agriculturist at the different Mill Districts in the Visayas. Upon retrieval of the accomplished research questionnaire, the researcher had tallied and analyzed the data using the Statistical Package for Social Sciences (SPSS) software under the closed supervision and guidance of the statistician.

2.6 statistical tool

In the analysis of data, the following statistical tools were used in accordance with the nature of the specific problems raise and their corresponding hypotheses.

Frequency and percentage were used to describe the profile of the sugarcane farmers and of the farms.

The mean was used to determine the level of productivity. The mean was solved using the following procedures, the highest and lowest rating was determined first.

Then the lowest score of 1 was deducted from the highest rate of 5. The subtrahend was divided by 5 which was adapted from Likert's rating. The addition of quotient started from the lowest rate and ended at the highest rate. The numeral ranges and corresponding verbal description, 5.00 being the highest interpreted as "Very High" and 1.00 being the lowest interpreted as "Very Low".

One way Analysis of Variance (ANOVA) was used to determine the difference in the level of productivity, when respondents are grouped according to the location of the farm, the average size of landholding, type of soil planted to sugarcane, the topography of the area, average rainfall received and distance of farm to the sugar mill.

Pearson r Moment Correlation was used to determine the significant relationship between the level of productivity, sugarcane farmers, and farm profile.

3. Results and Discussions

Profile of farmers

Table 2 revealed the farmers' profile at the different Mill Districts in the Visayas in terms of gender, age, level of education, and the number of years in sugarcane farming, the Crop Year 2016-2017.

The findings reveal that out of 400 farmers involved in the study, there were more males (f=229, 57%) than females (f=171, 43%) as shown in Table 2.

Furthermore, the findings show as revealed that the majority of the farmers were either medium-aged or old 36-60 years old (f=204, 51%), young farmers aged 35 years old and below (f=41, 10%), and those aged 61 years old and above labeled as old (f=155, 38%).

As to the educational attainment, the majority of the farmers were high school level (f=225, 56%) and the least had vocational attainment (f=2, .5%) as shown in Table 1.2.3.

For the number of years in sugarcane farming, most of the farmers were considered as a medium for 11 to 20 years (f=173, 43%), and few belonged to old as 20 years and above (f=93, 23%).

The findings in Table 2, implies that the farmers at the different mill districts in the Visayan area were majority male, aged 36-60 years old, high school level, and have been in sugarcane farming for 11 to 20 years.

In connection with this finding, a study by Gallen (2015) which is using Danish matched employer-employee data, the paper estimates the relative productivity of men and women and finds that the gender "productivity gap" is 8 percent implying that just under two-thirds of the residual wage gap can be accounted for by productivity differences between men and women. The productivity gap was measured by estimating the efficiency units lost in a firm-level production function if a worker is female, holding other explanatory covariates such as age, education, experience, occupation, and hours worked constantly. Furthermore, both mothers and non-mothers were paid less than the male but the (low) relative pay of mothers is completely explained by productivity for women without children.

Table 2. Farmer's socio-economic profile

Variables	Number of Farmers	Percentage
Gender		
Male	229	57.00
Female	171	43.00
Age		
Young (35 yrs old and below)	41	10.25
Medium (36 - 60 years old)	204	51.00
Old (61 yrs old and above)	155	38.75
Level of Education		
Elementary	87	21.75
High School	225	56.25
College	86	21.50
Vocational	2	00.50
Number of Years in Sugarcane Industry		
New (10 yrs and below)	134	33.50
Medium (11 - 20 years)	173	43.25
Old (21 yrs and above)	93	23.25
Total	**400**	**100.00**

The difference in the level of productivity of the sugarcane farms in the Visayas when grouped by Location

The data in Table 3 presents the difference in the level of productivity of sugarcane farms in the Visayas when grouped by location using One-way ANOVA. It further revealed that there is a significant difference in the level of productivity of sugarcane farms in the Visayas when grouped by location ($F=3.482$, $p=0.000<0.05$).

This means that the level of productivity of sugarcane farms in the Visayas when grouped by location are not comparable.

Table 3. One-way ANOVA Test Result on the Difference on the Level of Productivity of the sugarcane farms in the Visayas when grouped by Location

Location	Mean	F	Sig.	Decision
Mill Districts	**3.46**	3.482	0.000	Reject H_o
1. Iloilo	3.47			
2. Capiz	3.45			
3. Bogo-Medellin	3.46			
4. Ormoc-HIDECo	3.45			
5. Tolong	3.44			
6. Bais-URSUMCo	3.45			
7. BISCOM	3.46			
8. La Carlota/Ma-ao	3.48			
9. Victorias	3.47			
10. San Carlos	3.46			

Level of productivity on sugarcane farming of the different Mill Districts in the Visayas in terms of indicators

Table 4 shows the level of productivity of sugarcane farming in the different Mill Districts in the Visayas in terms of indicators such as the size of the farm, type of soil, land topography, average rainfall receive, the distance of the farm to the sugar mill, farming innovations, workers' availability and expenses per hectare using the mean. It further revealed that the level of productivity of sugarcane farming in the different Mill Districts in the Visayas (M=1.98) was at "low productivity". This means that the productivity of sugarcane farming in the different Mill Districts in the Visayas was below average.

Specifically, the level of productivity of sugarcane farming at the different Mill Districts in the Visayas, was at "low productivity" when grouped to the different factors. Such as the size of farm (M=1.95), type of soil (M=1.95), land topography (M=1.95), average rainfall received (M=1.95), the distance of the farm to the sugar mill (M=1.95), farming innovations (M=2.11), workers' availability (M=2.01) and expenses per hectare (M=1.96).

Table 4. Mean result on the Productivity of Sugarcane Farming at the Different Mill Districts in the Visayas in terms of Indicators

Mill Districts	Mean	Description
Size of Farm	1.95	Low Productivity
Type of Soil	1.95	Low Productivity
Topography of the Land	1.95	Low Productivity
Average Rainfall Received	1.95	Low Productivity
Distance of the Farm to the Sugar Mill	1.95	Low Productivity
Farming Innovations	2.11	Low Productivity
Workers Availability	2.01	Low Productivity
Expenses per Hectare	1.96	Low Productivity
Total Mean	**1.98**	**Low Productivity**

The difference in the level of productivity of the sugarcane farmers (in tons/hectare) among the different mill districts when grouped according to indicators

Table 5 presents the difference in the levels of productivity at the different mill districts in the Visayas for Crop Year 2016-2017 when they are grouped according to the different factors. Such as the size of the farm, type of soil, land topography, average rainfall received, the distance of the farm to the sugar mill, farming innovations, workers' availability, and expenses per hectare using a One-way Analysis of Variance.

Results revealed that there is a significant difference in the level of productivity when grouped as to the average size of the farm ($F=40.857$, $p=0.000<0.05$). The land topography ($F=7.784$, $p=0.000<0.05$), the distance of the farm to the sugar mill ($F=18.293$, $p=0.000<0.05$), farming innovations ($F=12.194$, $p=0.000<0.05$), workers' availability ($F=6.921$, $p=0.000<0.05$), and expenses per hectare ($F=6.864$, $p=0.000<0.05$). Thus the levels of productivity in the different mill districts in the Visayas for Crop Year 2016-2017 when they are grouped according to the size of farm, land topography, the distance of the farm to the sugar mill, farming innovations, workers' availability, and expenses per hectare vary.

On the other hand, the results implied that there is no significant difference in the level of productivity when grouped as to the soil type ($F=0.137$, $p=0.999>0.05$) and average rainfall received ($F=1.834$, $p=0.061>0.05$). Hence, the levels of productivity in the different mill districts in the Visayas for Crop Year 2016-2017do not vary when they are grouped according to the type of soil and average rainfall received.

Table 5. ANOVA results in the Level of Productivity among the Different Mill Districts in terms of Indicators

Indicators	F	Sig	Description
Size of Farm	420.857	0.000	Reject Ho
Type of Soil	0.137	0.999	Accept Ho
Land Topography	7.748	0.000	Reject Ho
Average Rainfall Received	1.834	0.061	Accept Ho
Distance of the Farm to the Sugar Mill	18.293	0.000	Reject Ho
Farming Innovations	12.194	0.000	Reject Ho
Workers Availability	6.921	0.000	Reject Ho
Expenses per hectare	6.864	0.000	Reject Ho

Relationship between the level of productivity and farm profile

The data in Table 6, showed the relationship between the level of productivity and farm profile in the different Mill District of Visayas using Pearson's r. It further revealed that there was no significant relationship between the level of productivity and the farm profile ($r=0.097$, $p=0.756>0.05$).

The findings implied that the level of productivity does not significantly influence the farm profile such as the size of the farm, type of soil, land topography, average rainfall received, the distance of the farm to the sugar mill, farming innovations, workers' availability and expenses per hectare.

About the findings of the study, Kaur of India (2018) had discussed in his study that the public agricultural extension system is one of the largest knowledge and information dissemination institutions. In the last 15 years, agricultural production has stagnated, and this calls for a system based on an interdisciplinary holistic approach not only to develop ecologically sound technologies for different areas but also to facilitate their utilization at the grass-root level.

Table 6. Correlation analysis between the level of productivity and farm profile

Variables Compared	Pearson r	Sig	Description	Strength of Relationship
Level of Productivity Farm Profile	0.097	0.756	Accept Ho	Very Low

4. Conclusions

1. Significant difference was noted on the level of productivity of sugarcane farms in the Visayas when grouped as to location.
2. The level of productivity of sugarcane farming at the different Mill Districts in the Visayas in terms of indicators such as the size of the farm, type of soil, land topography, average rainfall received, the distance of the farm to the sugar mill, farming innovations, workers' availability and expenses per hectare was at low productivity.
3. There is no significant difference in the productivity of sugarcane farming in the different Mill Districts in the Visayas in terms of the type of soil, and average rainfall received. Though, there is a significant difference in the productivity of sugarcane farming in the different Mill Districts in the Visayas in terms of indicators such as the size of farm, land topography, the distance of the farm to the sugar mill, farming innovations, workers' availability, and expenses per hectare.

5. Recommendations

1. The sugarcane farmers should also be responsible for reporting some instances that would probably hinder the better yield and production of sugarcane in the region.
2. The Local Government Unit must also help the sugarcane farmers by catering to their needs and providing helpful benefits to them.
3. The association/cooperatives of sugarcane planters may come up with long-term plans that would help farmers increase productivity.

Acknowledgment

Our deepest gratitude to the sugarcane farmers and the technical personnel who were involved during the data gathering.

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