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Production and Commercialism Practices of Two Different Rice Ecosystems in South District of Antique, Philippines

ALF LORENZ BARDENAS
https://orcid.org/0000-0001-5134-7029
alflorenz.bardenas@gmail.com
University of Antique- Hamtic Campus
Guintas, Hamtic, Antique, Philippines

CECILIA BASTIAN
https://orcid.org/0000-0003-1381-2238
ceciliabastian@yahoo.com
University of Antique- Hamtic Campus
Guintas, Hamtic, Antique, Philippines

LEONIE CONSABO
https://orcid.org/0000-0002-0560-0588
leonieconsabo@gmail.com
University of Antique- Hamtic Campus
Guintas, Hamtic, Antique, Philippines

CHRISTINE VIOLA GONZALES
https://orcid.org/0000-0002-4361-0827
christine.gonzales@gmail.com
University of Antique- Hamtic Campus
Guintas, Hamtic, Antique, Philippines

CHEMARIE LAMPREA
https://orcid.org/0000-0002-4438-6887
Cherimi21025@gmail.com
University of Antique- Hamtic Campus
Guintas, Hamtic, Antique, Philippines

ISAH LOU NOCAL
https://orcid.org/0000-0003-1907-0183
isahlou.nocal@gmail.com
University of Antique- Hamtic Campus
Guintas, Hamtic, Antique, Philippines

FELIX E. ARCILLA JR.
https://orcid.org/0000-0002-2669-2979
felixarcilla2@gmail.com
Saint Michael College of Caraga
Nasipit, Agusan del Norte Philippines

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ABSTRACT

Crop farming is considered as the primary source of income of the farmers. The main objective of the study is to determine the status of irrigated and rainfed rice production, marketing, processing, and other management aspects in these irrigated and rainfed rice industry in Antique, Philippines. The researchers used a quantitative type of research in conducting the study. The study's respondents were the irrigated and rainfed rice producing farmers of the municipalities in the South District of the Province of Antique. The findings revealed that the use of both hand tractor and carabao is more current in land preparation such as plowing, harrowing, and seedbed preparation. The application of commercial fertilizer and inorganic pesticides was observed as a major practice in the province. Also, a more significant part of the total palay produced in the province was consumed (45.09%), and the remaining were sold as a source of income. This indicates that a farmer's production level was more than enough to meet its

subsistence and food availability in the family. Moreover, the Majority of rainfed and irrigated growers were seriously affected by climate change during the entire cropping season due to the unavailability of water supply for rice growing both lowland and upland ecosystem. An infestation of rice bugs, rodents, stemborers, leafhoppers, weeds, and birds are the most encountered biotic problem of palay farmers in Antique. It was recommended that the Local Government Unit should be active in promoting rice production and support the appropriate technology needed by rural farmers to reduce cost and increase production level.

KEYWORDS

Climate change, commercialism, return of investment, rice ecosystem, Quantitative, Philippines

INTRODUCTION

The province lies along the narrow coastal plain, foothills, and mountains of the western part of Panay Island. It is a relatively undeveloped area and has a significant rainfed lowland area, which has not previously been supported by any intensive programs of research or development. The Antique Upland Development Project has assisted upland areas of the province.

Lowland rice is grown on all soil associations on the coastal plain and in the river valleys (Abe et al., 2010). In several of the larger valleys, crops are irrigated from public irrigation schemes; numerous small rice areas are irrigated from private pumps and wells (Totin et al., 2012). Rainfed rice is grown in all 18 municipalities of the province. Yields of lowland rice for the province from 1980-1984 have been reported by the Bureau of Agricultural Statistics (2017).

The province's 2017 rice production output increased by 6.6 percent or 291,098 metric tons compared to the 274,929 metric tons output recorded for the year 2016. The press report of the Philippine Statistics Authority (PSA) Antique office disclosed that the production accounted for 13.1 percent of Western Visayas' total production during the year of 2.2 million metric tons. Of the total rice production during the year, 62.2 percent (182,215 MT) were produced from irrigated farmlands, while 37.8 percent (110,883 MT) are from rainfed farms. Data presented by several authors and agencies are concrete in themselves. Yet, additional information is a must to authenticate or verify these

to further inform the researchers about the status of the two rice production systems in the irrigated and rainfed areas of the province, hence this study is pursued.

OBJECTIVE OF THE STUDY

The main purpose of the study is to determine the status of irrigated and rainfed rice production, marketing, processing, and other management aspects in these irrigated and rainfed rice industry in Antique, Philippines.

METHODOLOGY

Research Design

The researchers used quantitative research design in conducting the study.

Locale of the Study

The research was conducted on the irrigated and rainfed municipalities in the South District of Antique. The irrigated municipalities were San Jose de Buenavista, Sibalom and Belison while the rainfed areas were Anini-y, Tobias Fornier, Hamtic, Valderamma, and San Remigio.

Respondents of the Study

The respondents were the irrigated and rainfed rice producing farmers of the municipalities in the South District of the Province of Antique.

Sample Size and Sampling Technique

Table 1. Sample size of respondents from each municipality based on the farmers' population.

Irrigated Rice Farm				
Municipalities	Farmers Population	Percentage	Sample Size	Found By
Belison	835	11.256	11	100 x .11256
San Jose	1,504	20.275	20	100 x .20275
Sibalom	5,079	68.468	69	100 x .68468
Total	7,418	100	100	

Rainfed Rice Farm				
Municipalities	Farmers Population	Percentage	Sample Size	Found By
Anini-y	1 128	8.613	8	100 x .08613
Hamtic	2,839	21.678	22	100 x .21678
San Remigio	3,400	25.962	26	100 x .25962
Tobias Fornier	2,889	22.060	22	100 x .22060
Valderrama	2,840	21.686	22	100 x .21686
Total	13,096	100	100	

The researchers targeted 200 sample respondents for the study. There were 100 respondents in irrigated and 100 respondents in rainfed rice producing areas. From each of the identified municipalities, the number of respondents varied based on their farmers' population.

Data Analysis Procedure

All data collected were analyzed and interpreted using frequency and percentage, mean, range, and standard deviation.

RESULTS AND DISCUSSION

Table 2. Socio-economic profile of farmers

	Variables								
	Age				Sex		Civil Status		
Municipalities	Mean	Minimum	Maximum	SD	Male	Female	Single	Married	Widow
Belison	52.19	42	64	6.49	5	6	1	9	1
San Jose	54.25	35	71	10.14	14	6	6	14	0
Sibalom	50.19	20	79	11.97	44	25	5	64	0
Anini-y	58.50	23	78	16.46	4	4	0	6	2
Hamtic	53.95	32	83	12.97	17	5	1	18	3
San Remigio	52.88	29	83	13.26	19	7	2	23	1
Tobias Fornier	55.05	37	78	10.68	18	4	4	17	1
Valderrama	53.50	38	67	8.51	14	8	2	16	4
Total	52.70	20	83	11.60	135	65	21	167	12
Percentage					67.50	32.50	10.50	83.50	6.00

Table 2 shows the Socio-economic profile of farmers. The farmers in Antique were generally in the '50s, with an average age of 52.70 years old. The age profile of farmers in all research areas was similar to that of farmers in irrigated and rainfed growers. Rice growers in Antique are heterogeneous, which composed two-thirds of the farmers in the province were males 67.50, and 32.50% were female. Most of the rice farmers were married at 83.50%.

Table 3. Average Yield tons/ha and tons/farm

	Yield tons/ha			**Yield tons/farm**		
Municipalities	1st	2nd	3rd	1st	2nd	3rd
Belison	3.95	2.49	0.89	4.21	2.41	0.68
Sibalom	4.28	2.85	0.60	7.71	5.24	0.60
San Jose	4.23	3.57	0.59	4.98	4.16	0.68
Irrigated	**4.15**	**2.97**	**0.69**	**5.63**	**3.93**	**0.65**
Anini-y	3.00	0.83	0.00	1.79	0.21	0.00
Hamtic	2.95	2.01	0.00	3.91	2.80	0.00
San Remigio	2.49	1.49	0.65	2.21	1.09	0.39
Tobias Fornier	2.86	0.44	0.00	2.56	0.40	0.00
Valderrama	2.75	1.39	0.12	2.13	1.17	0.06
Rainfed	**2.81**	**1.23**	**0.15**	**2.52**	**1.13**	**0.09**
Total	**3.31**	**1.88**	**0.35**	**3.68**	**2.18**	**0.30**

Table 3 shows the Yield per tons in hectare and farm as reflected averaged 3.31 tons per hectare during the first cropping, and it lowers during the second cropping at 1.88 tons per hectare. In terms of per farm basis, this is equivalent to 3.68 tons per farm during the first cropping and 2.18 tons per farm during the second cropping.

Table 4. Percent Consumed and Sold

Municipalities	Percent of Product							
	Consumed				Sold			
	Mean	Minimum	Maximum	SD	Mean	Mini-mum	Maxi-mum	SD
Belison	56.64	20	100	27.90	38.00	0	78	25.53
San Jose	38.75	0	100	36.49	42.45	0	80	35.18
Sibalom	37.20	0	100	29.25	45.28	0	100	28.37
Anini-y	78.75	40	90	21.00	10.00	0	40	18.52
Hamtic	35.86	0	100	31.55	44.47	0	95	28.72
San Remigio	26.15	1	80	25.01	22.00	0	70	24.14
Tobias Fornier	66.95	1	98	29.94	17.64	0	60	22.78
Valderrama	67.36	0	90	30.80	18.09	0	6	26,82
Total	45.09	0	100	33.09	34.04	0	100	29.88

Table 4 shows a greater part of the total palay produced in the province was consumed, and the remaining was sold as a source of income, and other produced were stock for another cropping season. This indicates that a farmer's level of production was more than enough to meet its subsistence and food availability in the family (Anderman, 2010).

Table 5. Time of selling rice product.

Municipalities	f/%	When the rice is sold after Harvest			
		Immediately	1 week after harvest	2 weeks	others
Belison	F	7	1	1	2
	%	63.64	9.09	9.09	18.18
San Jose	F	17	0	0	3
	%	85.00	0.00	0.00	15.00
Sibalom	F	58	2	1	8
	%	84.06	2.90	1.44	11.60
Irrigated	%	82.00	3.00	2.00	13.00
Anini-y	F	2	0	0	6
	%	25.00	0.00	0.00	75.00
Hamtic	F	18	0	0	4
	%	81.82	0.00	0.00	18.18
San Remigio	F	16	1	0	9
	%	61.52	3.85	0.00	34.62
Tobias Fornier	F	9	0	2	11
	%	40.90	0.00	9.10	50
Valderrama	F	7	1	2	12
	%	31.82	4.55	9.10	54.55
Rainfed	%	52.00	2.00	4.00	42.00
Total	%	67.00	2.50	3.00	27.50

Table 5 shows the rainfed and irrigated rice growers sold their palay immediately to local buyers. The produce was picked up at a farmer's place by truck or motorcycle vehicle in a cash payment. Those who delivered their produce to the trader's buying station spent an average cost of Php 6.28 in irrigated areas and Php 11.83 in rainfed area per Cavan of palay, as presented in Table 6.

Table 6. Transportation cost of rice produce.

Municipalities	Average Transportation Cost (Php)
Belison	8.91
San Jose	4.75
Sibalom	5.20
Irrigated	**6.28**
Anini-y	1.25
Hamtic	11.36
San Remigio	12.69
Tobias Fornier	8.41
Valderrama	25.45
Rainfed	**11.83**
Total	**9.44**

Table 7. Cost and return analysis of rice production per hectare (first cropping).

Item	Belison	San Jose	Sibalom	**Irrigated**	Anini-y	Hamtic	San Remigio	Tobias Fornier	Valderrama	**Rainfed**
	n=11	n=20	n=69	n=100	n=8	n=22	n=26	n=22	n=22	n=100
Income	216,400	1,262,380	2,639,632	4,118,412	24,400	614,232	199,520	95,340	104,650	1,038,142
Expenses										
Labor Cost										
Land Preparation	44,700	84,399.95	272,800	133,966.65	22,800	82,600	117,650	65,250	58,520	69,364
Planting	2,800	65,150	80,290	49,413.33	9,200	7,300	8,300	3,150	3,950	6,380
Subtotal	47,500	149,549.95	353,090	183,379.98	32,000	89,900	125,950	68,400	62,470	75,744
Farm Inputs										
Seeds	8,449	138,560	231,260	126,089.67	560	60,330	41,950	32,985	26,700	32,505
Fertilizer	89,217	205,532	421,205	238,651.33	32,020	81,330	101,930	88,890	77,998	76,433.60
Chemicals	32,126.25	68787.50	184,112	95,008.58	6,965	58,198.5	61,055.50	38,700	26,026.25	38,189.25
Subtotal	129,792.25	412,879.50	836,577	459,749.58	39,545	199,858	204,935.50	160,485	130,724.25	147,127
Total Expenses	177,292.25	562,429.45	1,189,647	643,129.56	71,545	289,758	330,885.50	228,885	193,194.25	222,871
Net Income	17,341.82	58,495	38,255.54	114,092.36	3,050	25,701	7,674	5,788.18	4,756.82	46,970.45
ROI (%)	9.78	10.40	3.22	17.72	4.26	8.87	2.32	2.53	2.46	21.08

Table 7 shows the Gross income from rice production for the irrigated areas was Php4,118,412 while Php1,038,142 in rainfed rice farm during the first cropping. The highest net income was in San Jose de Buenavista at Php58,495, and lowest in Belison at Php17, 341.82, for irrigated areas. Hamtic was noted to

be the highest net income in rainfed areas, and Anini-y was the lowest net income for the first cropping season.

Labor expenses per hectare were Php183, 379.98 in irrigated rice farm, while Php75 was 744 only in rainfed farms, but all of these expenses were more than one half went to land preparation.

During the first cropping, Farm inputs were revealed at Php459, 749.58 in irrigated rice ecosystem while Php147, 127 in rainfed areas. A little over one-half of this went to inorganic fertilizers and the cost of seeds. Total expenses per cavans both labor and farm inputs in irrigated and rainfed averaged at Php643, 129.56 and Php222, 871, respectively.

Net income was found to be 17.72% return of investment (ROI) of total expenses per Cavan of palay, and lowest was in Sibalom at 3.22%, and San Jose got the highest ROI 10.40%. Likewise, 21.08% ROI in rainfed areas, San Remigio were noted as the lowest percentage, and Hamtic farms were the highest ROI percentage.

Table 8. Cost and return analysis of rice production per hectare (second cropping).

Item	Belison	San Jose	Sibalom	**Irrigated**	Anini-y	Hamtic	San Remigio	Tobias Fornier	Valderrama	**Rainfed**
	n=11	n=20	n=69	n=100	n=8	n=22	n=26	n=22	n=22	n=100
Income	149,900	1,006,940	2,400,800	3,557,640	0	397,850	118,300	7,300	55,000	578,450
Expenses										
Labor Cost										
Land Preparation	33,750	83,799.95	250,450	201,033.28	5,600	81,350	51,900	13,650	50,970	40,694
Planting	2,500	62,700	62,290	42,496.67	600	6,950	4,250	5,700	3,950	4,290
Subtotal	36,250	146,499.95	312,740	243,529.95	11,600	88,300	56,150	19,350	54,920	44,984
Farm Inputs										
Seeds	8,840	126,069	169,197	101,377.67	0	57,350	17,900	10,990	2,500	17,748
Fertilizer	87502	150682	435785	224,656.33	20740	83130	104030	86270	75218	73,877.60
Chemicals	26226.25	51877.50	182492	86,865.25	475	47588.75	57390	24177	18576.25	29,641.40
Subtotal	122,568.25	331,628.50	787,474	412,899.25	21,215	188,068.75	179,320	121,437	96,294.25	121,267
Total Expenses	158,818.25	478,128.45	1,100,214	656,429.20	32,815	276,368.75	235,470	140,787	151,214.25	166,251
Net Income	12,809.09	50,347	34,130.72	97,286.81	0	18,084.09	4,427	331.82	2,500	25,342.91
ROI (%)	8.07	10.53	3.10	14.82	0	6.54	1.88	0.24	1.65	15.24

Table 8 shows during the second cropping, cost, and return values were observed to be lower than the previous cropping season. These were primarily due to lower production and brought about the non-availability of water supply in rainfed areas. Gross income averaged revealed that 3,557,640 in irrigated areas compared to 578,450 in the rainfed ecosystem.

Irrigated farms have total expenses averaged at Php656, 429.20 with labor cost constituting at Php243, 529.95 while Php166, 251 in rainfed communities having 44,984 total labor cost. Farm inputs of Php412, 899.25 and Php121, 267 in irrigated and rainfed farms respectively. Return of investment was closely noted in both rice ecosystems, but the net income was highly comparable because of inputs and other expenses (Ly et al., 2012).

Table 9: Problems of farmers related to rice production and marketing.

		Problem							
Municipalities	**f/%**	Climate Change		Pest and Diseases		Financial/ Capital		Price	
		Yes	No	Yes	No	Yes	No	Yes	No
Belison	f	11	0	10	1	7	4	10	1
	%	100.00	0.00	90.91	9.09	63.64	36.36	90.91	9.09
San Jose	f	18	2	20	0	17	3	15	5
	%	90	10	100	0	5	15	75	25
Sibalom	f	68.00	1.00	68.00	1.00	45.00	24.00	43.00	26.00
	%	98.55	1.45	98.55	1.45	65.22	34.78	62.32	37.68
Irrigated	%	97.00	3.00	98.00	2.00	69.00	31.00	68.00	32.00
Anini-y	f	8	0	6	2	5	3	3	5
	%	100.00	0.00	75.00	25.00	62.50	37.50	37.5	62.50
Hamtic	f	22	0	18	4	15	7	10	12
	%	100.00	0.00	81.82	18.18	68.18	31.82	45.45	54.55
San Remigio	f	23	3	25	1	20	6	16	10
	%	88.46	11.54	96.15	3.85	76.92	23.08	61.54	38.46
Tobias Fornier	f	22	0	21	1	13	9	13	9
	%	100.00	.00	95.45	4.55	59.09	40.91	59.09	40.91
Valderrama	f	17	5	20	2	16	6	16	6
	%	77.27	22.73	90.91	9.09	72.73	27.27	72.73	27.27
Rainfed	%	92.00	8.00	90.00	10.00	69.00	31.00	58.00	42.00
Total	%	94.50	5.50	94.00	6.00	69.00	31	63.00	37.00

Table 9 shows that Provincially, there were 94.50 % of rice farmers who cited primarily affected by climate change on their farming practices because of the scarcity of water supply for rice growing both irrigated and rainfed areas during the dry season planting and unavailability of irrigation system. The occurrence of pests and diseases was also a production problem encountered by 94% of rice farmers. The high cost of inputs, financial support also affect the production with 69%. Also, the price of palay with 63% affects the income of farmers. On the perceived effect of climate change, a decrease in yield was the leading effect, as shown on the average yield per hectare and cavans of palay in cropping seasons.

CONCLUSIONS

The average farm size in Antique was generally small at 1.04 hectares in irrigated farms at 1.48 hectares. Provincially, farmers at different rainfed and irrigated areas practiced two cropping seasons. The use of both hand tractor and carabao is more current in land preparation such as plowing, harrowing, and seedbed preparation, and the absolute majority experienced direct seeding method. The application of commercial fertilizer and inorganic pesticides was observed as a major practice in the province.

Ecologically, rainfed farms in Antique were just a little over one hectare in area, and an average of 1.04 hectares while irrigated farms posted at 1. 48 hectares. The average distance of farms from barangay road was .59 kilometers. A greater part of the total palay produced in the province was consumed (45.09%), and the remaining were sold as a source of income. This indicates that a farmer's production level was more than enough to meet its subsistence and food availability in the family.

Wet palay sold right after harvest was almost priced in Php 554.00 per sack during the first cropping and more or less Php 300.00 during second cropping in Antique. In both the first and second croppings highest price of wet palay was noted in Sibalom at Php 930 and Php 639 per sack, respectively.

Generally, rainfed and irrigated growers sold their palay immediately to local buyers, and this was picked up at farmer's place by truck or motorcycle vehicle in a cash payment. Those who delivered their produce to the trader's buying station spent an average of Php 6.28 in irrigated areas and Php11 in the rainfed area per Cavan of palay.

The majority of rainfed and irrigated growers were seriously affected by climate change during the entire cropping season due to the unavailability of

water supply for rice growing both lowland and upland ecosystem. An infestation of rice bugs, rodents, stemborers, leafhoppers, weeds, and birds are the most encountered biotic problem of palay farmers in Antique. The high cost of inputs, financial support, and the low price of palay in the province has constraints in production.

RECOMMENDATIONS

The following were the suggested recommendations based on the findings of the study.

1. Farmers need to follow appropriate technology to increase the level of production.
2. The farmer should plant some sequential crops like legumes for extra income and green manure.
3. The National Food Authority (NFA) and other government stakeholders should support the price of palay to increase farmer's production.
4. Farmers should involve and participate in agricultural training, seminars, or symposium to update their literacy and methodological practices in rice crop management.
5. Through the Municipal Agriculturist Office or Farm Technician, the Local Government Unit should be active in promoting rice production and support the appropriate technology needed by rural farmers to reduce cost and increase production level. The government and other agencies should focus or undergo research on drought-tolerant and early maturing rice varieties to support the rainfed rice industry and actively promote their distribution in rainfed rice farms.
6. The cooperatives or any lending sector make credit easier for farmers with low-interest rates and minimum collateral requirements to increase credit availments.
7. Since the RA 11023 (Rice Tarrification Act) was enacted, the Department of Agriculture and concerned government agencies such as National Economic Development Authority (NEDA), National Food Authority (NFA), Department of Agrarian Reform (DAR), National Irrigation Administration (NIA), Philippine Crop Insurance Corporation (PCIC), National Anti-Poverty Commission (NAPC), and Farmer Sectoral Council Representatives shall formulate and

adopt rice roadmap to restructure the government's delivery of support services for the agricultural rice sector.

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