



## RESEARCH PAPER

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## Profile of Irrigated Rice Farmers in the Province Of Northern Philippines

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### Abstract

This study was conducted to determine the socio-demographic profile of farmer respondents, farm resources utilized, tenurial status, farm financing strategies and yield per hectare. A descriptive design was used. Nine municipalities and eighteen barangays were chosen considering the top three, middle three and the lowest three rice producers with a total of 395 respondents. Stratified random sampling and a semi-structured survey questionnaire were used. Descriptive statistics was employed in the analysis of data. Results revealed irrigated rice farmer-respondents have a mean age of 50, mostly males, with two decades farming experience, tilling an average of 2.64 hectares, reached high school level as their highest educational attainment. Most of them have availed NIA services as their source of irrigation water during the wet and dry season farm operations.

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## Introduction

All countries can benefit by using less of their land, labor, water and capital to meet their populations' basic food needs. This can permit them to redeploy freed-up resources to other, higher-value, and more-nutritious agricultural production. Any lowering of prices for staple foods that results from productivity gains will benefit consumers and especially the poor, both urban and rural. At the same time, even with lower commodity prices, producers can improve their net incomes because higher productivity reduces their costs of production. At macro level, improvements in agricultural sector productivity permit more of a nation's resources to go into its investments in other sectors, which produce widely distributed benefits (Sato & Uphoff, 2007).

A growing concern is that many countries are coming under pressure from declining water availability for agricultural cropping, and from increases in the number and severity of 'extreme events' associated with climate change (Rosenzweig *et al.*, 2001). How crop production can be made more compatible with greater variability in rainfall and temperature – droughts, flooding, heat spells, cold snaps, unseasonal extremes – is thus becoming an urgent issue. Efforts to raise productivity and reduce poverty concurrently now need to proceed with more attention to environmental and natural resource considerations than in the preceding century.

Rice being the staple food of Filipinos gained its top priority focus of the Philippine government. There is a need to increase rice production in the country to respond to the increasing populations' demand. Nevertheless, water is essential in rice production, the reason for massive irrigation development in support to rice farmers was initiated. Considering the support of the government, improvement in rice production is expected among irrigated rice farmers. In Cagayan province, about 94,470 hectares of irrigated land are planted with rice. Its average yield is 4.18MT/hectare during dry season and 3.84 MT /hectare during wet season. The combined rice productivity in Cagayan Valley Region is 4.2 MT/hectare making it the 2<sup>nd</sup> largest rice producer in the Philippines. However, in

2014, Cagayan province only placed no. 4 in the Top Ten Rice producing provinces in the Philippines with a total rice yield of 895, 580 metric tons (PhilRice-BAS 2014). Generally this research determined the profile of irrigated rice farmers in Cagayan province. Specifically it described the: (1) Socio-demographic profile of farmer respondents; (2) Farm resources utilized in their farming operation; (3) Tenurial status; (4) Farm financing strategies; and (5) Yield in tons per hectare.

## Materials and methods

### *Research Design*

A descriptive survey research design was used in the study to profile the irrigated rice farmers in Northern Cagayan, Philippines.

### *Respondents*

There were nine (9) municipalities and eighteen (18) barangays chosen considering the top three, middle three and the lowest three rice producers based on the data provided by the DA-Provincial Office and the DA- Regional Field Office 02 with a total of 395 respondents. The stratified random sampling was employed in drawing the number of respondents determined using the Slovincs formula.

### *Instrumentation*

A semi-structured survey questionnaire was used to aid the gathering of data through personal interview.

## Results and discussion

### *Socio-Demographic Profile Of Respondents*

All the top 3, middle 3 and bottom 3 irrigated rice farmer respondents have a mean age of 50, the top 3 irrigated rice farmer respondents are a little younger in few months compared to the middle 3 and bottom 3. They have been engaged in farming with an average of 22 years for the top 3, 23.6 years for the middle 3 and 22.4 years for the bottom 3 respectively. Generally the irrigated rice farmer respondents are in the farming business for more than two decades.

The farmer respondents are tilling a mean of 2.64 hectares by the top 3, 1.8 hectares by the middle 3 and another 1.8 hectares by the bottom 3.

**Table 1.** Average age, household size, number of years in farming and area cultivated by irrigated rice farmer respondents according to yield performance classification.

Variables (Mean)	Classification		
	Top 3	Middle 3	Bottom 3
Age	49.8	50.4	50.2
Household size	4.7	4.8	4.9
Number of Years in Farming	22.0	23.6	22.4
Mean Area Cultivated	2.64	1.8	1.8

The table below presents the educational attainment of the respondents, the top 3 irrigated rice farmer respondents exhibited the highest percentage(23.1%) of college graduates, followed by elementary graduates (21.5%) then high school graduates with 20%, elementary level of 13.1%, high school level of 11.5% and college level of 10.8%. The middle 3 irrigated rice yield performing respondents have the

biggest share of elementary graduates of 26.9%, followed by high school graduates with 23.1%, elementary level with 17.5%, college graduates 10.6%, and college level 10.1% and the least is high school level of 9.6%. The bottom 3 respondents are composed of 35.1% high school graduates, 17.5% elementary level, 15.8% college graduates, with an equal 12.3% elementary graduates and high school level and 7% are college level. Generally, the respondents attained high school level as their highest educational attainment.

Majority of the respondents are males with 69.2% in top 3, 80.3% in the middle 3 and 77.2% in the bottom 3. While 30.8% female respondents are in the top 3, 19.7% in the middle 3 and 22.8% in the bottom 3. Findings reveal however, the noticeable female participation in rice farming.

**Table 2.** Highest educational attainment of irrigated rice farmer respondents.

Educational Attainment	Classification					
	Top 3		Middle 3		Bottom 3	
	Frequency	%	Frequency	%	Frequency	%
Elementary level	17	13.1	41	19.7	10	17.5
Elementary graduate	28	21.5	56	26.9	7	12.3
High school level	15	11.5	20	9.6	7	12.3
High school graduate	26	20	48	23.1	20	35.1
College level	14	10.8	21	10.1	4	7.0
College graduate	30	23.1	22	10.6	9	15.8
Total	130	100	208	100	57	100
High School level	3.6		3.1		3.6	
Std.	1.8		1.6		2.5	

**Table 3.** Sex of irrigated farmer respondents.

Sex	Classification					
	Top 3		Middle 3		Bottom 3	
	Frequency	%	Frequency	%	Frequency	%
Male	90	69.2	167	80.3	44	77.2
Female	40	30.8	41	19.7	13	22.8
Total	130	100	208	100	57	100

Most (79.2%) of the top 3 and majority of the middle 3 (58.7%) and bottom 3 (63.2%) yield performing irrigated rice farmer respondents are land owners. While 26.9% of the top 3, 31.7% of the middle 3 and 29.8% of the bottom 3 irrigated rice farmer respondents are shareholder tenants. There are also 11.5% of the top 3, 14.9% middle 3 and 26.3% bottom 3 who are leaseholder tenants. Only 1 of the top 3, 2 of

the middle 3 and 1 of the bottom 3 yield performing irrigated rice farmer respondents are amortizing owners. And 3 of the middle 3 farmer respondents are settler farmers. Most (89.2%) of the top 3, 77.4% of the middle 3, and 71.9% of the bottom 3 yield performing irrigated rice farmer respondents claimed to have availed the NIA services as their source of irrigation water during the wet and dry season farm

operation. While 10.8% of the top 3, 8.3% of the middle 3 and 22% of the bottom 3 revealed to have used deep well irrigation water in their wet and dry

season farm operation. Moreover, 3 or 5.3% of the respondents are cultivating a saline communal irrigated rice farm both in the dry and wet season.

**Table 4.** Tenurial status of rice farmer respondents.

Tenurial Status	Classification					
	Top 3 n=130		Middle 3 n=208		Bottom 3 n=57	
	Frequency	%	Frequency	%	Frequency	%
Land owner	103	79.2	122	58.7	36	63.2
Amortizing owner	1	0.8	2	1.0	1	1.8
Shareholder tenant	35	26.9	66	31.7	17	29.8
Leaseholder tenant	15	11.5	31	14.9	15	26.3
Settler farmers	0	0	3	1.4	0	0
Total	153		224		69	

\*multiple responses

**Farm Resources**

**Table 5.** Type of rice farm cultivated by the rice farmer respondents.

Type of rice farm	Classification					
	Top 3 n=130		Middle 3 n=208		Bottom 3 n=57	
	Frequency	%	Frequency	%	Frequency	%
Upland Deep well irrigated Wet Season	14	10.8	47	8.3	13	22.8
Lowland Deep well Irrigated Dry Season	14	10.8	47	8.3	13	22.8
Lowland NIA Irrigated Wet Season	116	89.2	161	77.4	41	71.9
Lowland NIA Irrigated dry season	116	89.2	161	77.4	41	71.9
Saline Communal Irrigated dry	0	0	0	0	3	5.3
Saline Communal Irrigated wet	0	0	0	0	3	5.3
Total	260		416		114	

\*multiple responses

Table 6 indicates the farm facilities and equipment owned and used by irrigated rice farmer respondents. As exhibited in the table, all the farmer respondents belonging to the top 3, middle 3 and bottom 3 yield performing irrigated rice producing respondents own knapsack sprayer. Most of the top 3 (72.3%), middle 3 (86.1%) and bottom 3 (73.7%) own hand tractor. Likewise the middle 3 have the highest percentage of carabao ownership (84.6%) compared to top 3 with 64.6% and bottom 3 with 50.9%.

Almost half of the middle 3 (42.31%), 8.8% of the bottom 3 and 38.5% of the top 3 own thresher. There are 43.1% of the top 3 and 20.2% of the middle 3 have solar drying pavement. Twenty percent of the top 3, 32.2% of the middle 3 and 17.5% of the bottom 3 own water pump while 40.3.1% of the top3 and 1 or 1.8% of the bottom 3 own 4-wheel tractor. Nine of the middle 3 and 2 of the top 3 own combine harvester-thresher and 2 of the top 3 respondents own hauling truck.

**Table 6.** Farm facilities and equipment owned and used by irrigated rice farmer respondents.

Farm facilities and equipment	Classification					
	Top 3 n=130		Middle 3 n=208		Bottom 3 n=57	
	Frequency	%	Frequency	%	Frequency	%
Storage	38	29.2	6	7.7	5	8.8
Solar drying pavement	56	43.1	42	20.2	0	0
Deep well	14	10.8	47	8.3	13	22.8
Farm to market road	59	45.4	131	63.0	51	89.5
Hand tractor	94	72.3	179	86.1	42	73.7
4-wheel tractor	4	3.1	0	0	1	1.8

Farm facilities and equipment	Classification					
	Top 3 n=130		Middle 3 n=208		Bottom 3 n=57	
	Frequency	%	Frequency	%	Frequency	%
Carabao	84	64.6	176	84.6	29	50.9
Carabao drawn plow	75	57.7	132	63.5	16	28.1
Harrow for carabao	62	47.7	125	60.1	14	24.6
Water pump	31	23.8	67	32.2	10	17.5
Hauling truck	2	1.5	0	0	0	0
Cart	16	12.3	44	1.9	6	10.5
Trailer	14	10.8	20	9.6	13	22.8
Thresher	50	38.5	88	42.31	5	8.8
Combine harvester and thresher	2	1.5	9	4.3	0	0
Knapsack sprayer	130	100	208	100	57	100
Total	740		1357		299	

#### Farm Financing

Most of the top 3 (73.8%) and bottom 3 (78.9%) respondents and only 37.5% of the middle 3 respondents claimed to have utilized their own money to finance their farm operations.

There are 87.7% of the bottom 3, 64.9% of the middle 3 and 53.8% of the top 3 revealed to have borrowed

capital from traders. Others sourced out capital from relatives, friends, agricultural supplier, bank, cooperatives and 16 or 12.3% of the top 3 yield performing irrigated rice farmer respondents revealed to have borrowed from a Bombay. Finding indicates that though most farmer respondents are using their own money in farming, they also borrow capital for operation from different sources.

**Table 7.** Sources of capital by the irrigated rice farmer respondents.

Sources of Capital	Classification					
	Top 3 n=130		Middle 3 n=208		Bottom 3 n=57	
	Frequency	%	Frequency	%	Frequency	%
Own money	96	73.8	78	37.5	45	78.9
Trader	70	53.8	135	64.9	50	87.7
Agricultural Supplier	10	7.7	24	11.5	5	8.8
Bank	3	2.3	3	1.4	2	3.5
Cooperatives	5	3.8	0	0	1	1.8
Relatives	21	16.2	22	10.6	7	12.3
Friends	27	20.8	7	3.4	1	1.8
Bombay	16	12.3	0	0	0	0
Total	248		249		107	

\*multiple responses.

Of the respondents who borrowed capital from various sources, they revealed to have borrowed the highest average amount of P65, 232 with a standard deviation of P10, 565.09, followed by the middle 3 who borrowed an average amount of P40, 068.6 and a standard deviation of P5, 102. 14 and the bottom 3 yield performing farmer respondents who borrowed the least average amount of P23, 232.2 with a standard deviation of P3, 078.95 both in dry and wet season farming operations.

It is claimed by the respondents that they have a loan maturity for as short as 1 month and as long as 6

months duration. 38.5% of the irrigated farmer respondents belonging to the top 3 yield performing municipalities revealed to have a loan maturity of 3-4 months both in the dry and wet season, 33.1% in the dry season and 31.5% in the wet season claimed to have a loan maturity of 5-6 months with a standard deviation of 0.8 of a month in the dry and wet farming seasons. While 45.4% in the dry season and 46.1% in the wet season revealed to have borrowed capital with no specific maturity period of the loan availed (pay when able). The farmer respondents belong to the middle 3 yield performing municipalities likewise revealed that 43.8% in the dry

season and 62.3% in the wet season have a loan maturity of 3-4 months, 24.5% in the dry season and 23% in the wet season have a loan maturity of 5-6 months. Few (1.4%) in the dry season have a loan maturity of 1-2 months. The rest with 22.1% in the dry season and 38.5% in the wet season declared to have no specific maturity as borrowed capital both in the dry and wet season farm operations with a standard deviation of 0.8 of a month both in the dry and wet farming seasons. The farmer respondents belonging to the bottom 3 yield performing municipalities revealed to have a 5-6 months loan maturity by 40.4% during the dry season and 38.6% during the wet season. There are 28.1% in the dry season and 31.6% in the wet season claimed to have 3-4 months loan maturity while the 40.4% during the dry season and 38.6% during the wet season are not given specific loan maturity period. The respondents belonging to

the top 3 yield performing municipalities have a mean loan maturity of 5.5 months in the dry and wet season, 5.4 months for the middle 3 farmer respondents both in the dry and wet season whereas the bottom 3 have a mean loan maturity of 4.9 months in the dry season and 4.8 months in the wet season with a standard deviation of 0.9 month in both the 2 farming seasons.

As to the interest rate paid by respondents on their borrowed capital, all the respondents belonging to the 3 category municipalities are paying interest rates as low as 1% and as high as 12% within the maturity period set by their creditors with a mean interest rate of 5.8% in the dry season and 5.7% in the wet season paid by the farmer respondents in the top 3 municipalities with standard deviation of 1.7% in the dry season and 1.5% in the wet season.

**Table 8.** Principal amount borrowed of irrigated rice farmer respondents during dry and wet seasons.

Principal amount Borrowed	Classification					
	Top 3 n=130		Middle 3 n=208		Bottom 3 n=57	
	Mean	SD	Mean	SD	Mean	SD
Dry Season	24,921.8	11,0853.9	30,397.1	4,199.2	19,086.2	10,206.2
Wet Season	25,232.5	10,565.09	20,068.6	5,102.14	23,232.2	3,078.95
Maturity (in months)						
Dry Season	4.5	.8	4.4	.8	4.9	.9
Wet Season	5.5	.8	5.4	.8	4.8	.9
Interest Rate						
Dry Season	5.8	1.7	5.3	1.5	5.4	2.6
Wet Season	5.7	1.5	3.8	1.6	5.4	2.7

#### *Yield Per Hectare (In Kilogram)*

Table 9 presents the yield per hectare of the irrigated rice farmer respondents during the wet season of 2013 and dry season of 2014 farming operation. The Top 3 farmer respondents generated a mean yield of 4072.5269 kilogram per hectare, 3814.1359 kilogram per hectare by the Middle 3 and 3333.729 kilogram per hectare by the Bottom 3 during the dry season. While the Top 3 generated an average yield of 3540.41 kilogram per hectare, 4072.57 kilogram per hectare by the Middle 3 and 3476.2931 kilogram per hectare by the Bottom 3 during the wet season farming operation.

#### *Technical Assistance*

For those who claimed to have received assistance, they mentioned the following: seed selection, land preparation techniques, soil nutrient management,

pest and disease control, organic farming, provision of material inputs like seeds and trainings by the Department of Agriculture Regional Office, Farmer Led Extensionist, Provincial LGU Technician and Municipal LGU technician. The farmer respondents in the middle 3 municipalities have a mean interest rate of 5.3% and a standard deviation of 1.5% in the dry season and 3.8% in the wet season with a standard deviation of 1.6%. The bottom 3 municipalities' farmer respondents have a mean interest rate of 5.4% in the dry season with a standard deviation of 2.6% and 5.4% interest rate in the wet season with a standard deviation of 2.7%. Findings on table 15 indicates that the top 3 farmer respondents borrowed capital with the highest interest rate in the wet and dry season followed by the bottom. While the middle 3 farmer respondents paid the lowest interest rates both in the dry and wet season.

**Table 9.** Yield per hectare of the rice farmer respondents during dry season of 2014 and wet season of 2013.

Yield per hectare in kilogram	Dry Season						Wet Season					
	Classification											
	Top 3 n=130		Middle 3 n=208		Bottom 3 n=57		Top 3 n=130		Middle 3 n=208		Bottom 3 n=57	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
550-1,250	7	5.4	6	2.8	3	5.3	3	2.3	11	5.3	4	7.0
1300-2,500	12	9.2	22	10.8	15	26.3	23	17.7	38	18.3	21	36.8
2,550-3,750	33	25.4	39	18.8	20	35.1	45	34.6	48	18.3	13	22.8
3,800-5,000	43	33.1	86	41.3	14	24.6	44	33.8	69	33.2	11	19.3
5,5050-6,250	27	20.8	38	18.3	3	5.3	13	10	29	13.9	5	8.8
6,300-7,500	6	4.6	8	3.8	1	1.8	1	.5	5	2.4	3	5.3
7,550-8,750	2	1.5	6	2.9	1	1.8	1	.5	1	.5	0	0
8,800-10,000	0	0	1	.5	0	0	0	0	5	2.4	0	0
Mean	4072.5269		3814.1359		3333.729		3540.41		4072.57		3476.2931	
SD	1659.98		2495.5866		1142.2229		1534.72		2393.41		3007.62344	

**Table 10.** Type and sources of rice support services provided to the irrigated rice farmer respondents during dry and wet season.

Type and sources of assistance provided Description of services delivered	Classification							
	Wet and dry season							
	Top 3		Middle 3		Bottom 3			
	Freq.	Percent	Freq.	Percent	Freq.	Percent		
<b>1. Department of agriculture</b>								
Seed selection	0	0	12	5.8	6	10.5		
Land preparation	3	2.3	8	3.8	1	1.8		
Soil nutrient management	9	6.9	6	2.9	9	15.8		
Pest and diseases control	9	6.9	5	2.4	9	15.8		
Irrigation management	0	0	0	0	0	0		
Post harvest management	0	0	0	0	0	0		
Organic farming	10	7.7	15	7.2	9	15.8		
Provision of farm inputs	1	0.8	9	4.3	12	21.1		
<b>2. Farmer Led Extensionist</b>								
Seed selection	0	0	0	0	12	21.1		
Land preparation	0	0	0	0	8	14.0		
Soil nutrient management	10	7.7	10	4.8	9	15.8		
Pest and diseases control	10	7.7	10	4.8	9	15.8		
Irrigation management	0	0	0	0	0	0		
Post harvest management	0	0	0	0	0	0		
Organic farming	10	7.7	10	4.8	1	1.8		
<b>3. Provincial LGU technician</b>								
Seed selection	1	0.8	3	1.4	0	0		
Land preparation	2	1.5	1	0.8	2	3.5		
Soil nutrient management	11	8.5	5	2.4	5	8.8		
Pest and diseases control	11	8.5	5	2.4	5	8.8		
Irrigation management	0	0	0	0	0	0		
Post harvest management	0	0	0	0	0	0		
Organic farming	11	8.5	5	2.4	5	8.8		
<b>4. Municipal LGU Technician</b>								
Seed selection	3	2.3	12	5.8	4	7.0		
Land preparation	3	2.3	7	3.4	1	1.8		
Soil nutrient management	19	14.6	15	7.2	9	15.8		
Pest and diseases control	19	14.6	15	7.2	9	15.8		
Irrigation management	0	0	0	0	0	0		
Post harvest management	0	0	0	0	0	0		
Organic farming	19	14.6	7	3.4	0	0		
Provision of farm inputs	1	.08	4	1.9	5	8.8		

## Conclusion

The irrigated rice farmers in Northern Cagayan, Philippines is male dominated, with a mean age of 50 and family size of 5. They attained high school level in their formal schooling. They tilling an average of

barely 2 hectares for more than two decades. The farmers developed self-reliance for using their own money in financing their operation, only few availed credit on a cropping season basis. The mean age of the respondents is 50 with They have been engaged in

farming for an average of 22 years and most of them availed the services of the National Irrigation Administration as their source of irrigation water.

### Recommendation

Basing from the conclusions of this study, it recommended that there is a need to intensify efforts of the government giving preferential attention to increase irrigated rice productivity to attain food safety and security. Likewise, Provision of technical and financial assistance to irrigated rice farmers to attain optimum productivity.

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