

*REGION I*  
**RICE**  
**INDUSTRY**  
*PRIMER SERIES*



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ISSN 2244-6850

# PHILIPPINE RICE INDUSTRY PRIMER SERIES

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I l o c o s



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## ABBREVIATIONS AND ACRONYMS USED

BAS	Bureau of Agricultural Statistics
BSWM	Bureau of Soils and Water Management
CIS	Communal Irrigation System
DA	Department of Agriculture
ha	hectare
kg	kilogram
km <sup>2</sup>	square kilometer
LGU	Local Government Unit
LSU	Louisiana State University
M	million
mm	millimeter
MPDP	Multi-Purpose Drying Pavement
mt	metric ton
NIS	National Irrigation System
NFA	National Food Authority
NIA	National Irrigation Administration
NPK	Nitrogen, Phosphorus, Potassium
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PhilMech	Philippine Center for Postharvest Development and Mechanization
PhilRice	Philippine Rice Research Institute
PhP	Philippine Peso
RFO	Regional Field Office
SFR	Small Farm Reservoir
STW	Shallow Tube Well
SWIP/DD	Small Water Impounding Project/Diversion Dam

# FOREWORD

Sufficient and affordable rice for the people is the key component of our nation's goal toward food security. Since 1960s, self-sufficiency had been the predominant theme of the rice programs. However, achieving a more sustainable growth in rice production continues to be a major challenge.

For decades now, rice sufficiency programs emanated from the national government implementing broad interventions with little regard to variation in production and consumption conditions in different localities. On the other hand, policy makers in the local government are diffident to craft local rice programs. This is partly due to lack of better understanding of the local rice industry status, which in turn driven by scattered information that are often aggregated at the national level.

This regional rice industry profile, inked in collaboration between PhilRice and the regional field offices of DA across the country, and with support from BAS, NFA, PAGASA, and PhilMech, compiled important descriptions and discussions of the factors that affect the rice industry at the regional and provincial levels. The profile contain information and trends on rice area harvested, yield, input uses, seed technology adoption, agro-climatic conditions, availability of postharvest facilities, prices, and consumption patterns which aptly represents the conditions of the region's rice production and consumption system.

This profile can be a handy reference for regional and provincial policy makers in planning for program interventions suited to their local circumstances. For example, the information on level of seed technology adoption can be used in prioritizing provinces in terms of increasing farmer's access to seed. The information on inventory of existing postharvest facilities, be it threshers, mills, or warehouses can help in deciding whether a particular province still needs more capital investment. By understanding the trends in their local rice production and consumption, local policy and decision makers can make the first step in defining a course toward sustainable and sufficient regional rice industry.

We in government firmly believe that these regional industry profiles will help us plan more efficiently and effectively in future.

Given the thrust of the government to promote responsible rice consumption for better health, less rice wastage, and productive farming through the promotion of efficient rice technologies, we hope to inspire our farmers to do better by sifting through these profiles – their own – as we intensify our advocacy to achieve rice self-sufficiency beginning this 2013, which has been declared as National Year of Rice. *Sapat na bigas, kaya ng Pinas!*

**Eufemio T. Rasco Jr, PhD**  
Executive Director

## REGIONAL BACKGROUND

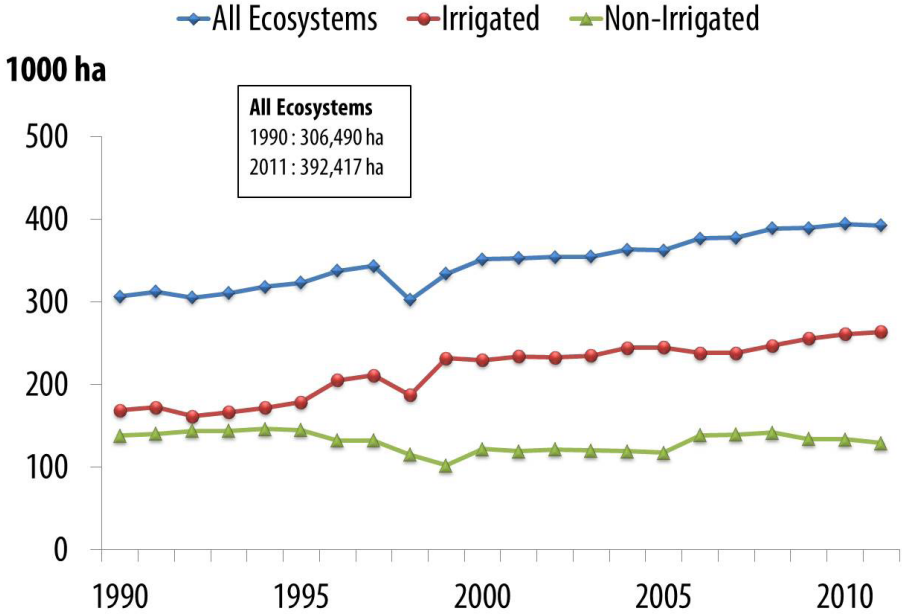
Located on the northwestern coast of Luzon, Ilocos is one of the smallest regions in the country with its four provinces covering merely 12,974 km<sup>2</sup> (BAS, 2012). Predominantly mountainous, the provinces of Ilocos Norte, Ilocos Sur and La Union occupy the narrow plain between the Cordillera Mountain Range and the West Philippine Sea. The province of Pangasinan lies in a vast plain northwest of Central Luzon and northeast of the Zambales Mountain. San Fernando serves as its regional center. As of 2010, Ilocos had a population of 4.75 million (BAS, 2012).

The region generally falls under type 1 climate with two pronounced seasons, dry from November to April, and wet during the rest of the year. Northeastern Ilocos Norte, however, belongs to type 3 climate with no pronounced maximum rain period, and a short dry season lasting only from one to three months from March to May (Crops Review, 2012). Temperature is cooler from December to February. The hottest months are April and May.

In spite of the scarcity of arable land due to its rough terrain, the region has prime agricultural land making agriculture a major economic activity in the northern portion of the region. On the other hand, the economy in the southern portion of the region, especially Pangasinan, is anchored on agro-industrial and service industry. In 2011, agriculture contributed 25% of the total gross domestic product of the region, employing 39% of its people (BAS, 2012).

Rice is grown only once in many parts of the region. The long pronounced dry months limit supply of irrigation water that can sustain rice growing. Other crops are grown during the dry season, making Ilocos a surplus producer of corn, vegetables, and root crops (DOT, 2012).

## TRENDS IN RICE HARVEST AREA, 1990-2011



Source of basic data: BAS, 2012  
Processed by: PhilRice

Rice harvest area in Ilocos rose by 28%, up from 306,490 ha in 1990 to 392,417 ha in 2011. As of 2011, about 67% of the region's rice harvest area is irrigated, while 33% is rainfed. In the same year, Ilocos ranked 4<sup>th</sup> among the 16 rice-producing regions, contributing 9% of the nation's harvest area.

Harvest area in Ilocos grew steadily from early 1990s to 2011, except during the 1998 El Niño occurrence, brought about by provision of irrigation facilities in many rainfed rice areas that allowed more intensive farming.

## GROWTH IN RICE HARVEST AREA, 1990-2011

<b>ecosystem/ Period</b>	<b>January- June</b>	<b>July- December</b>	<b>January- December</b>
<b>All Ecosystems (ha)</b>			
1990-2000	2,311	1,205	3,515
2001-2011	2,166	2,649	4,815
<b>Irrigated (ha)</b>			
1990-2000	2,290	4,474	6,764
2001-2011	2,166	774	2,940
<b>Non-Irrigated (ha)</b>			
1990-2000	21	(3,270)	(3,249)
2001-2011	(n)	1 875	1 875

Source of basic data: BAS, 2012

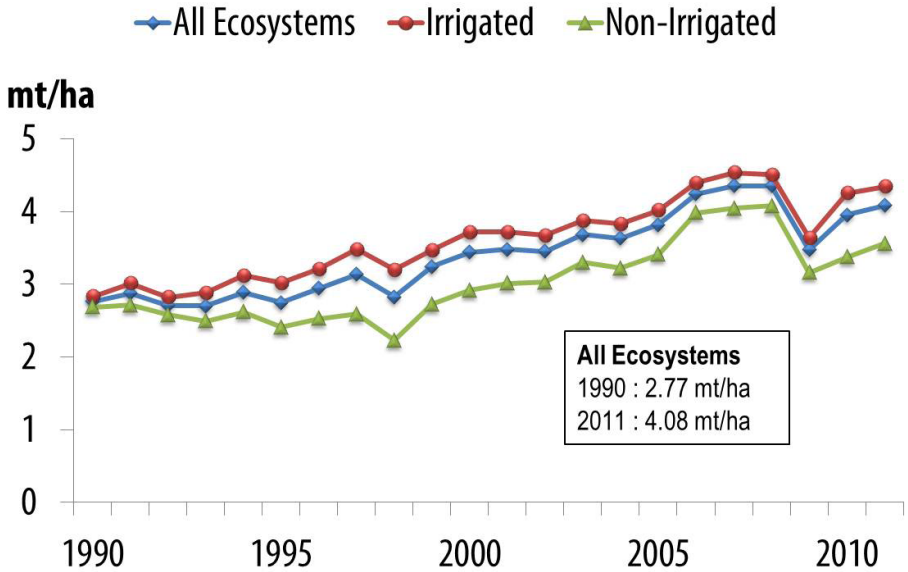
Processed by: PhilRice

Rice harvest area in Ilocos grew by 4,815 ha annually in 2001-2011, which was higher than the 3,515 ha annual growth posted in 1990-2000. The expansion of irrigated harvest area resulted in growth in harvest area during the earlier period, thus compensating for the decline in non-irrigated harvest area.

Growth in irrigated harvest area, however, slowed down from 6,764 ha annually in 1990-2000 to only 2,940 ha in 2001-2011. In contrast, non-irrigated harvest area shrank by 3,249 ha every year during the first period, but posted a 1,875 ha positive annual growth during the second period.

From 1990 to 2000, growth in irrigated harvest area was noticeably higher during the second semester because of the provision of irrigation systems in rainfed areas. This was reversed in the second period, which indicates improved irrigation facilities that sustained rice growing during the first semester. The marked positive growth in harvest area from non-irrigated ecosystems implies opening of new rice areas, particularly in the uplands.

## TRENDS IN RICE YIELD, 1990-2011



Source of basic data: BAS, 2012

Processed by: PhilRice

Average yield in Ilocos from all ecosystems grew by 48%, up from 2.77 mt/ha in 1990 to 4.08 mt/ha in 2011, making Ilocos the third highest yielding region in the country that year. Since 1990, the highest average yield in all ecosystems was attained in 2007 and 2008 at 4.35 mt/ha while the minimum yield was obtained in 1993. A sharp decline in yield was experienced again in 2009 due to the effects of typhoons Ondoy and Pepeng, which heavily damaged the standing rice crop in the region during the fourth quarter of the year.

Between 2000 and 2011, yield from irrigated areas increased by 53%, up from 2.83 mt/ha in 1990 to 4.34 mt/ha in 2011. Yield from non-irrigated areas grew a little slower at 33%, from 2.69 mt/ha in 1990 to 3.56 mt/ha in 2011. On average, irrigated yield in Ilocos was higher by 590 kg/ha than rainfed yield.

## GROWTH IN RICE YIELD, 1990-2011

<b>Ecosystem/ Period</b>	<b>January- June</b>	<b>July- December</b>	<b>January- December</b>
<b>All Ecosystems (kg/ha)</b>			
1990-2000	87	47	55
2001-2011	71	53	58
<b>Irrigated (kg/ha)</b>			
1990-2000	88	75	79
2001-2011	71	55	60
<b>Non-Irrigated (kg/ha)</b>			
1990-2000	(21)	2	2
2001-2011	78	55	55

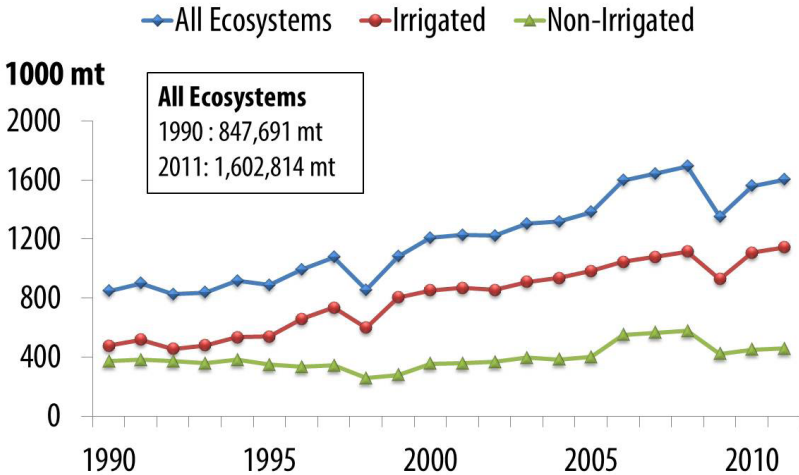
Source of basic data: BAS, 2012

Processed by: PhilRice

Yield from all ecosystems in Ilocos increased by 58 kg/ha yearly in 2001-2011, which was not far from the annual growth of 55 kg/ha in 1990-2000. Growth during the second period was almost equally contributed by the irrigated and non-irrigated areas. Irrigated areas contributed largely to the growth in first period as the non-irrigated contributed a negligible 2 kg/ha annually. In the two periods, yield growth was more prominent in the first semester.

In both periods, yield growth in irrigated areas was consistently more prominent during the first semester when Ilocos has a drier climate, with yield growth larger during the first period. The non-irrigated areas posted contrasting scenarios. During the earlier period, the second semester posted a positive growth though a meager amount while the first semester showed a negative annual growth of 21 kg/ha. In 2001-2011, however, both semesters reflected significant positive growth.

# TRENDS IN RICE PRODUCTION, 1990-2011



Source of basic data: BAS, 2012  
Processed by: PhilRice

From 1990 to 2011, paddy rice production in Ilocos increased by 89% from 847,691 mt to 1,602,814 mt. Ilocos contributed 10% to the national production, ranking 4<sup>th</sup> in 2011 among the 16 rice-producing regions. Production slowly rose in the 1990s, interrupted by a sharp decline in 1998 due to El Niño. Since then, production rapidly rose until 2008. Another slump occurred in 2009 because typhoons Ondoy and Pepeng destroyed standing crops in Pangasinan, the region’s largest rice-producing province. Production recovered in 2010 and 2011. The good production performance of Ilocos since 1999 can be partly attributed to the government’s seed subsidy program, which boosted the adoption of both hybrid and certified inbred seed. As of 2011, 71% of the paddy rice in Ilocos was produced from irrigated areas.

## GROWTH IN RICE PRODUCTION, 1990-2011

<b>Ecosystem/ Period</b>	<b>January- June</b>	<b>July- December</b>	<b>January- December</b>
<b>All Ecosystems (mt)</b>			
1990-2000	12,440	16,381	28,821
2001-2011	14,082	25,662	39,744
<b>Irrigated (mt)</b>			
1990-2000	12,396	24,719	37,115
2001-2011	14,051	12,366	26,417
<b>Non-Irrigated (mt)</b>			
1990-2000	44	(8,338)	(8,294)
2001-2011	31	13,295	13,327

Source of basic data: BAS, 2012

Processed by: PhilRice

Growth of production from all ecosystems in Ilocos was faster in 2001-2011 at 39,744 mt per year relative to the 28,821 mt annual increase in 1990-2000. Technology interventions and provision of support systems contributed to the higher production growth in the latter period. Growth in production was consistently greater during the second semester and largely contributed by the irrigated areas.

The irrigated ecosystem posted positive production growth in both periods with larger annual increase in 1990-2000. Growth in production from irrigated areas was higher during the second semester in the earlier period, but the condition reversed in the latter period. In 1990-2000, the non-irrigated areas showed a negative growth but it turned positive in the latter period at an annual increase of 13,327 mt, a tremendous second semester production growth.

## AREA AND YIELD CONTRIBUTION TO PRODUCTION GROWTH, 2001-2011

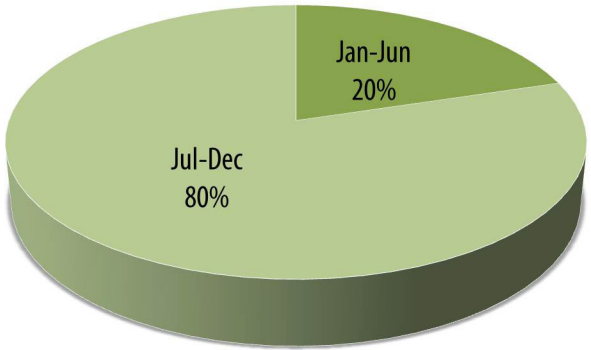
<b>Ecosystem/ Period</b>	<b>Production Growth (%)</b>	<b>Area Contribution (%)</b>	<b>Yield Contribution (%)</b>
All Ecosystems	2.8	46.0	54.0
Irrigated	2.7	44.7	55.3
Non-Irrigated	3.1	47.7	52.3

Source of basic data: BAS, 2012

Processed by: PhilRice

From 2001 to 2011, production grew by 2.8% in all ecosystems, 54% of which was contributed by yield improvement, a trend consistent in both irrigated and non-irrigated areas. This means that while harvest area likewise contributed significantly to production growth, yield growth served as the stronger driver.

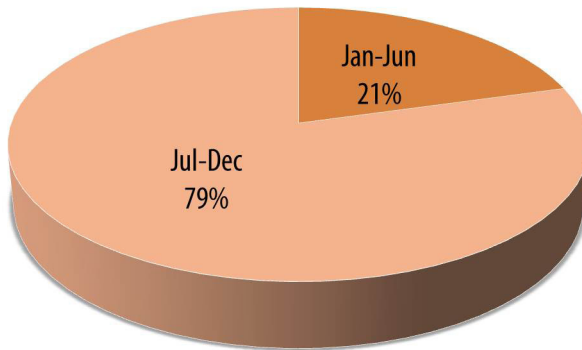
# RICE HARVEST AREA BY SEMESTER, 2000-2011



Source of basic data: BAS, 2012  
Processed by: PhilRice

From 2000 to 2011, 80% of the rice areas in Ilocos were harvested from July to December. Ilocos showed the biggest discrepancy in harvest area between seasons among the 16 rice-producing regions in the country. The very distinct dry season in the region limits rice production during the first half of the year. Only 31% of areas with irrigation systems during the wet season or second semester were planted with dry season second crop.

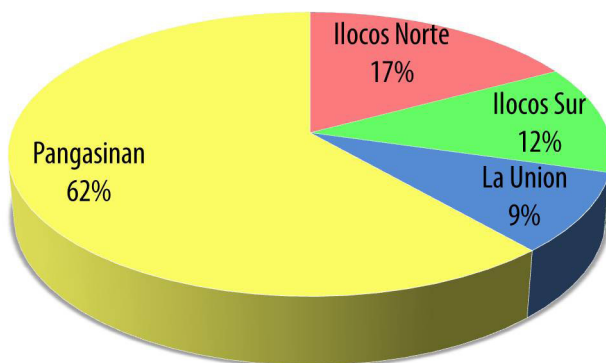
## RICE PRODUCTION BY SEMESTER, 2000-2011



Source of basic data: BAS, 2012  
Processed by: PhilRice

From 2000 to 2011, 79% of the paddy rice in Ilocos was produced during the second semester. The smaller share of production relative to harvest area in the second semester means lower land productivity than the first semester. The more favorable climate in the region during the first semester allowed better land productivity in areas where dry season rice production was suitable. During the dry season, areas where rice was raised during the wet season were planted with vegetables, corn, garlic, onion, and tobacco, which require less water to grow.

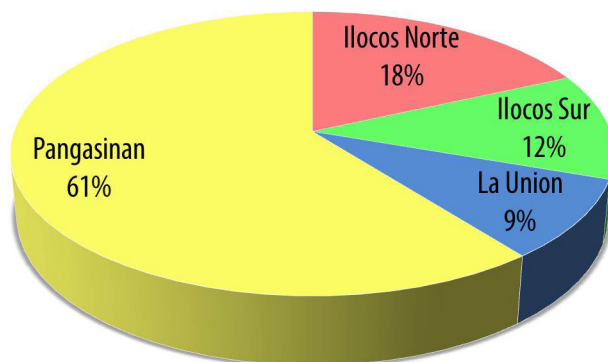
## RICE HARVEST AREA BY PROVINCE, 2000-2011



Source of basic data: BAS, 2012  
Processed by: PhilRice

From 2000 to 2011, Pangasinan contributed 62% of the harvest area in Ilocos. The rest was shared by the remaining provinces with Ilocos Norte contributing 17%, second to Pangasinan, which had the largest physical areas for rice production and second crop rice.

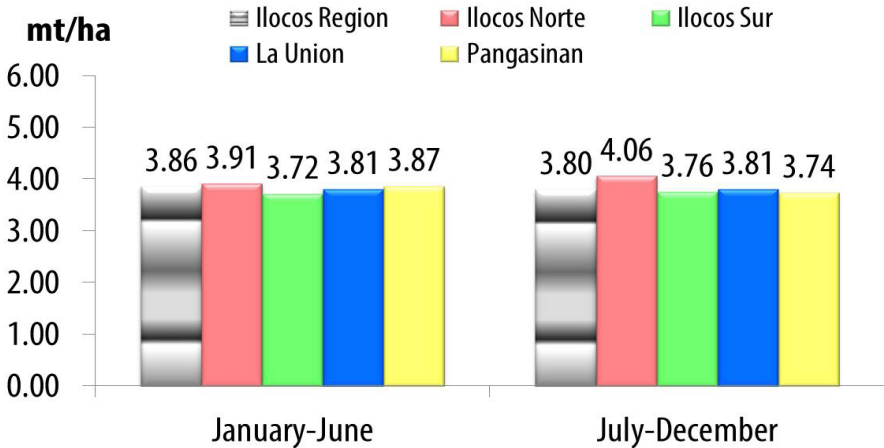
## RICE PRODUCTION BY PROVINCE, 2000-2011



Source of basic data: BAS, 2012  
Processed by: PhilRice

In 2000-2011, Pangasinan contributed 61% of the total production, lower than its share in harvested area. Ilocos Norte, on the other hand, provided 18% of total production from its 17% harvest area contribution. These mean that land productivity was higher in Ilocos Norte than in Pangasinan, the top two rice-producing provinces in Ilocos. The low land productivity in Pangasinan indicates that it still has a potential to further increase its production through yield improvement. Ilocos Sur and La Union had the same share in production and harvest area.

## RICE YIELD BY PROVINCE, 2000-2011



Source of basic data: BAS, 2012

Processed by: PhilRice

From 2000 to 2011, yield did not differ much among the Ilocos provinces. Ilocos Norte attained the highest yield in both semesters with slightly higher yield during the second semester. Pangasinan, which has the largest harvest area in Ilocos, was the second highest yielder during the first semester but the lowest during the second semester. Yields in Ilocos Sur and La Union did not vary much between semesters. The high rate of fertilizer application, as well as adoption of hybrid and certified inbred seeds could explain the good yield level in Ilocos.

## FACTORS AFFECTING YIELD: SHARE OF HYBRID SEEDS TO AREA AND PRODUCTION

Region/ Province	Area Share (%)		Production Share (%)	
	2008	2009	2008	2009
<b>ILOCOS</b>	<b>5.3</b>	<b>7.3</b>	<b>6.5</b>	<b>8.7</b>
Ilocos Norte	16.1	11.3	19.2	14.3
Ilocos Sur	8.2	2.4	10.5	3.3
La Union	7.5	5.7	9.6	7.3
Pangasinan	7.5	7.4	9.2	8.3

Source of basic data: BAS, 2012

Processed by: PhilRice

Among the provinces in the region, Ilocos Norte had the largest proportion of its harvested area planted with hybrid rice varieties at 16.1% in 2008, which contributed 19.2% of its total paddy rice production. The share of hybrid rice area to total harvested area in 2008 in the other provinces was only about half that of Ilocos Norte. However, this share dropped in 2009 in all provinces, which may be due to the government's gradual withdrawal from providing hybrid seed subsidy. The decline in Pangasinan, however, was very minimal, implying that farmers continued to plant hybrid varieties even without government subsidy.

The consistently higher share of hybrid varieties to production than its share to area in both years for all the provinces indicates a higher land productivity than the overall average from all seed types used.

## FACTORS AFFECTING YIELD: SHARE OF CERTIFIED SEEDS TO AREA AND PRODUCTION

Region/ Province	Area Share (%)		Production Share (%)	
	2008	2009	2008	2009
<b>ILOCOS</b>	<b>26.4</b>	<b>46.0</b>	<b>28.3</b>	<b>47.8</b>
Ilocos Norte	27.6	38.3	29.2	39.5
Ilocos Sur	29.7	35.1	29.9	37.9
La Union	13.7	18.6	14.6	21.5
Pangasinan	40.9	54.5	44.3	56.7

Source of basic data: BAS, 2012

Processed by: PhilRice

In 2008, Pangasinan posted the largest proportion of its harvested area planted to certified inbred varieties at 40.9%, while La Union was the most conservative user of certified inbred seeds at merely 13.7%. In 2009, the proportion of areas planted to certified inbred seeds improved in all provinces, which indicates a shift to using high quality inbred seeds among farmers who could not afford hybrid seeds without subsidy.

The consistently higher share of certified inbred varieties to production than its share to area in both years for all the provinces indicates a higher productivity than the overall average from all seed types used.

## FACTORS AFFECTING YIELD: AVERAGE YIELD OF HYBRID AND CERTIFIED SEEDS

Region/ Province	Hybrid Seed		Certified Seed	
	2008	2009	2008	2009
<b>ILOCOS</b>	<b>5.3</b>	<b>4.1</b>	<b>4.7</b>	<b>3.6</b>
Ilocos Norte	5.4	4.9	4.8	4.0
Ilocos Sur	5.5	4.9	4.3	3.9
La Union	5.6	4.4	4.7	4.0
Pangasinan	5.3	3.7	4.7	3.5

Source of basic data: BAS, 2012

Processed by: PhilRice

In 2008, the yield performance of hybrid varieties was fairly the same in all provinces, with La Union posting the highest at 5.6 mt/ha. The yield, however, attained by the hybrid varieties in all provinces dropped the following year, with Ilocos Norte and Ilocos Sur posting the highest at 4.9 mt/ha, and Pangasinan, with the lowest yield.

Certified inbred varieties performed best in Ilocos Norte at 4.8 mt/ha in 2008, followed closely by La Union and Pangasinan. In 2009, yield plunged in all provinces.

The strong typhoons that damaged standing crops in 2009 resulted to more than 1 mt/ha discrepancy between years. Overall, the yield advantage of hybrid varieties over certified inbred varieties was 0.6 mt/ha in 2008 and 0.5 mt/ha in 2009 in the region.

## FACTORS AFFECTING YIELD: FERTILIZER USE, 2009

Fertilizer Grade	Fertilizer Rate			
	Irrigated		Rainfed	
	Jan-Jun	Jul-Dec	Jan-Jun	Jul-Dec
<b>Fertilizer (50-kg bag/ha)</b>				
Urea	3.94	3.91	1.07	2.64
Ammosul	0.24	0.24	0.00	0.75
Ammophos	0.23	0.30	0.20	0.17
Complete	1.96	2.26	1.84	1.74
<b>Component Nutrients (kg/ha)</b>				
Nitrogen	109	111	39	82
Phosphorus	16	19	15	14
Potassium	14	16	13	12

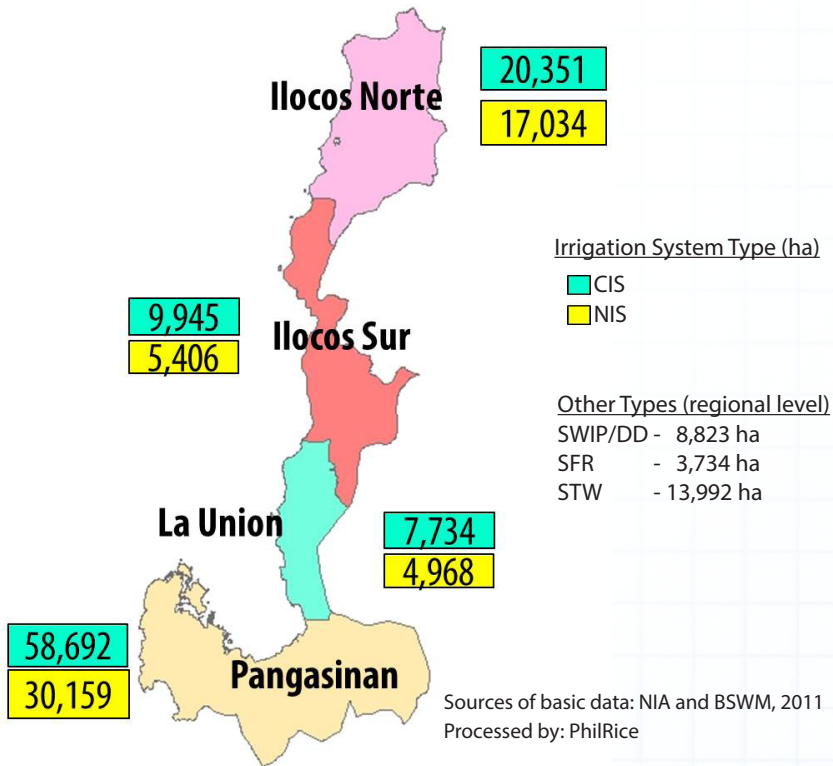
Source of basic data: BAS, 2012

Processed by: PhilRice

The PalayCheck System generally recommends application of 75-30-40 and 108-41-62 NPK (nitrogen/phosphorus/potassium) in irrigated areas for wet and dry seasons, respectively, with two topdress application of nitrogen (PhilRice, 2007).

Farmers in Ilocos applied higher rates of nitrogen for their irrigated rice than the recommendation during dry and wet seasons, respectively. The amount of nitrogen applied in rainfed areas during wet season was far greater than that applied during the dry season. The very high rate of nitrogen applied during wet season may have been useless as yield levels were not at par with the dry season. The amount of phosphorus and potassium used, however, was lower than the recommendation. Urea and complete fertilizer were the common fertilizer grades used in region.

# FACTORS AFFECTING AREA: SERVICE AREA OF IRRIGATION FACILITIES, 2010



Communal (CIS) and national irrigation systems (NIS) were present in all Ilocos provinces. Based on the 2010 inventory of NIA, CIS serviced roughly 96,000 ha while NIS serviced more than 57,000 ha.

As of 2011, the Small-scale Irrigation Project (SSIP) of the Bureau of Soils and Water Management (BSWM) had constructed small water impounding systems and diversions dams (SWIP/DD) with a total service area of almost 9,000 ha. Shallow tube wells (STW) and small farm reservoirs (SFR) were prevalently installed by the BSWM covering almost 14,000 ha and 4,000 ha, respectively.

## COST OF PADDY RICE PRODUCTION, 2010

Item	Irrigated	Non-irrigated (PhP/ha)	All Ecosystems	% Share to Total
<b>Variable Cost</b>				
Seed	1,728	2,538	2,002	6
Fertilizer	6,082	4,646	5,596	18
Pesticide	1,385	1,201	1,323	4
Labor	15,362	14,262	14,990	48
Machine and animal rental	204	1,225	549	2
Fuel and oil	1,114	412	876	3
Irrigation	563	-	373	1
Repairs and depreciation	2,532	2,584	2,550	8
Others	2,958	2,511	2,807	9
<b>Total Variable Cost</b>	<b>31,928</b>	<b>29,379</b>	<b>31,066</b>	

Source of basic data: BAS, 2012

Processed by: PhilRice

In 2010, Ilocos spent PhP 31,928 per ha to produce rice in irrigated areas and PhP 29,379 in non-irrigated areas. Almost half (48%) of the production cost was spent on labor, while the second primary expense went to fertilizers. Improving the efficiency of implementing activities from land preparation to harvesting can reduce the huge share of labor on total production cost.

## RETURNS TO PADDY RICE PRODUCTION, 2010

Item	All Ecosystems	Irrigated	Non-irrigated
Yield (kg/ha)	3,954	4,250	3,375
Farmgate price (PhP/kg)	15.42	15.42	15.42
Gross returns (PhP/ha)	60,971	65,535	52,043
Total variable cost (PhP/ha)	31,066	31,928	29,379
Returns to management* (PhP/ha)	29,905	33,607	22,664
Returns to land (PhP/ha)	8,919	9,312	8,152
Returns to capital (PhP/ha)	2,808	2,879	2,670
Variable cost per kg of yield (PhP)	7.86	7.51	8.70
Returns to land per kg of yield (PhP)	2.26	2.19	2.42
Returns to capital per kg of yield (PhP)	0.71	0.68	0.79

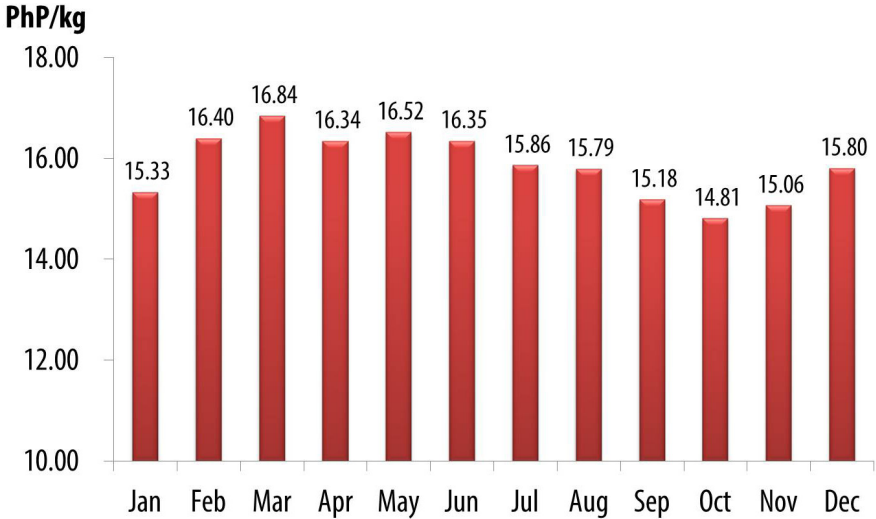
Note: \* returns above variable cost including returns to own labor and family labor

Source of basic data: BAS, 2012

Processed by: PhilRice

With an average yield of 4.25 mt/ha and a gross income of PhP 65,535 from irrigated areas, farmers from Ilocos spent PhP 7.51 to produce a kg of paddy rice. It cost farmers a bit more (PhP 8.70) to produce a kg of rice from non-irrigated areas. Overall, Ilocos farmers spent PhP 7.86 to produce a kg of paddy rice in 2010. At an average price of PhP 15.42 in 2010, farmers in the region earned PhP 7.56 for every kg of paddy rice they produced.

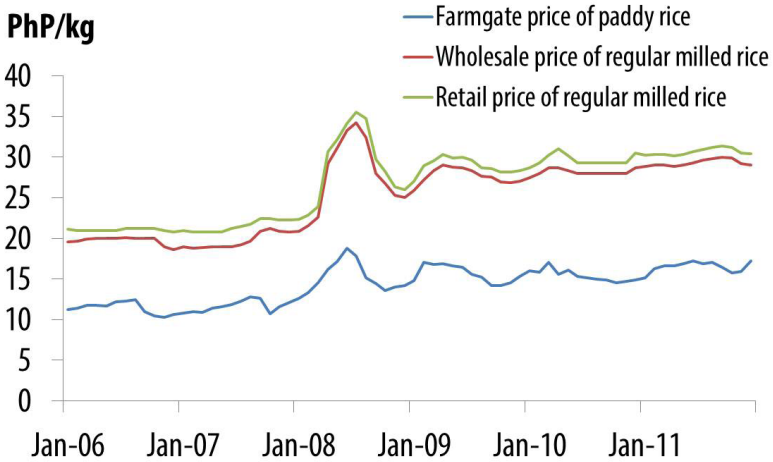
## AVERAGE MONTHLY FARMGATE PRICE OF PADDY RICE, 2009-2011



Source of basic data: BAS, 2012  
Processed by: PhilRice

From 2009 to 2011, the average farmgate price of paddy rice in Ilocos was highest in March. Prices slowly dropped every succeeding month, reaching its lowest in October, the peak of wet season harvesting. Thereafter, farmgate price progressively rose until it reached its peak in March, except for an abnormally high level in December. The gap between the highest and the lowest monthly price was roughly PhP 2.00 per kg.

## TRENDS IN PRICES OF PADDY RICE AND REGULAR MILLED RICE, 2006-2011

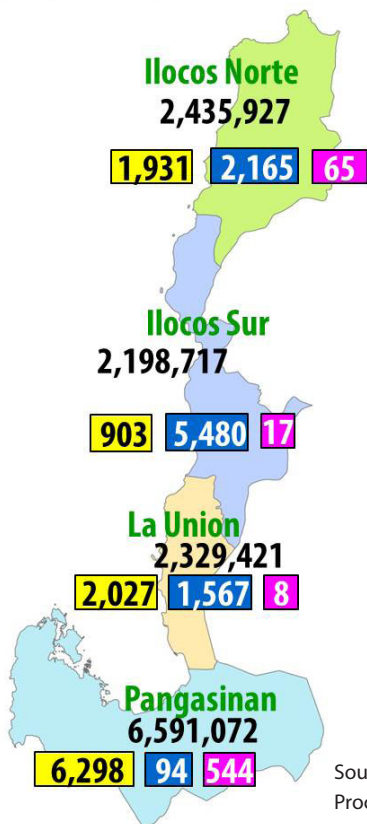


Source of basic data: BAS, 2012

Processed by: PhilRice

Farmgate price of paddy rice and wholesale and retail prices of milled rice were generally stable from January 2006 until the early part of 2008 when they sharply peaked because of the world market crisis. Prices receded toward the end of 2008 but did not drop back to pre-crisis levels. However, the gap between farmgate price and wholesale and retail prices widened after the crisis.

## POSTHARVEST FACILITIES: THRESHERS, 2009



### Type

- rice thresher
  - pedal thresher
  - multi-purpose (thresher/sheller)
- Values inside the colored boxes are no. of available units*

### Note:

- The name of province is in red font if it has deficit threshing capacity; green font if surplus capacity
- Values below the name of the province is its total threshing capacity (mt/yr)

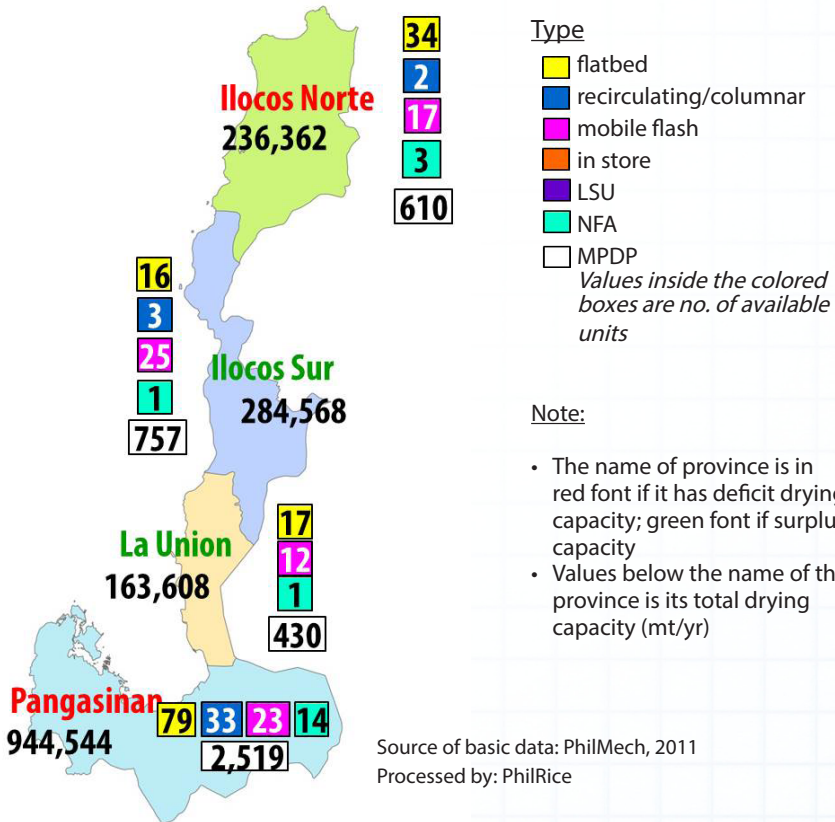
Source of basic data: PhilMech, 2011

Processed by: PhilRice

As of 2009, all provinces in Ilocos had surplus threshing capacity relative to their respective annual paddy rice production level. Although Pangasinan had the highest threshing capacity, the other provinces had surplus capacity of at least six times their respective production. It had the most number of rice and multipurpose threshers. Pedal threshers were popular in all provinces especially in Ilocos Sur, except in Pangasinan.

The existence of these threshing facilities in each province, however, does not mean that they were actually available and accessible to potential users at the time they were needed. Harvesting of rice is seasonal, hence, the high demand for and mobility of these facilities.

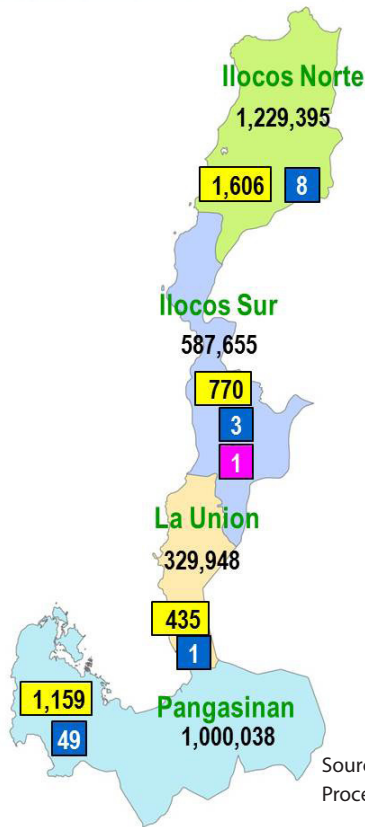
# POSTHARVEST FACILITIES: DRYERS, 2009



Ilocos Sur and La Union had surplus drying capacity vis-à-vis their volume of production in 2009, while the production of Pangasinan and Ilocos Norte, the two major rice producers in Ilocos, could not be all accommodated by their drying facilities. Pangasinan, however, was deficient by only 2% of its requirement but Ilocos Norte had a 24% shortfall.

Pangasinan had the highest number of flatbed dryers and multi-purpose drying pavements (MPDP). All provinces had similar types of drying facilities, except that there were no recirculating or columnar dryers in La Union.

## POSTHARVEST FACILITIES: MILLS, 2009



### Type

rice mill (single-pass)

rice mill (multi-pass)

micromill

*Values inside the colored boxes are no. of available units*

### Note:

- The name of province is in red font if it has deficit milling capacity; green font if surplus capacity
- Values below the name of the province is its total milling capacity (mt/yr)

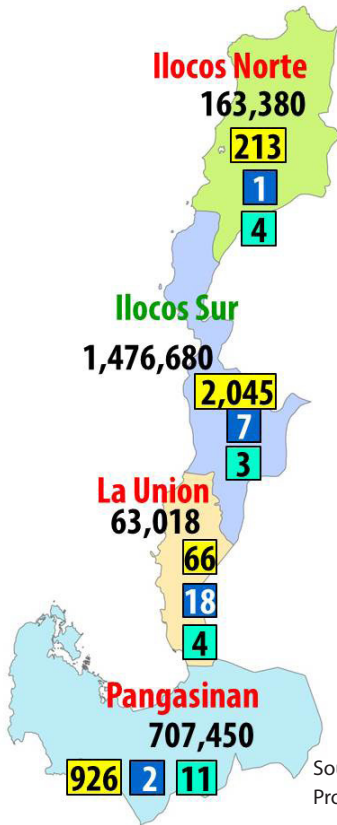
Source of basic data: PhilMech, 2011

Processed by: PhilRice

Every province in Ilocos had surplus milling capacity, indicating that the existing rice mills could process the respective paddy rice produced by each province. Although Pangasinan had been producing in the last decade roughly thrice the volume of paddy rice produced in Ilocos Norte, the milling capacity of the latter was higher by 23% resulting to a surplus of more than thrice its requirement.

Almost all rice mills in the region, however, were single pass which normally have low milling recovery. Ilocos Norte had the most number of single-pass rice mills. The number of the more efficient multi-pass rice mills in Pangasinan, however, was six times of that in Ilocos Norte. One unit of micromill is found in Ilocos Sur.

# POSTHARVEST FACILITIES: STORAGE, 2009



## Type

- warehouse
- outdoor storage
- bulk silo
- NFA

*Values inside the colored boxes are no. of available units*

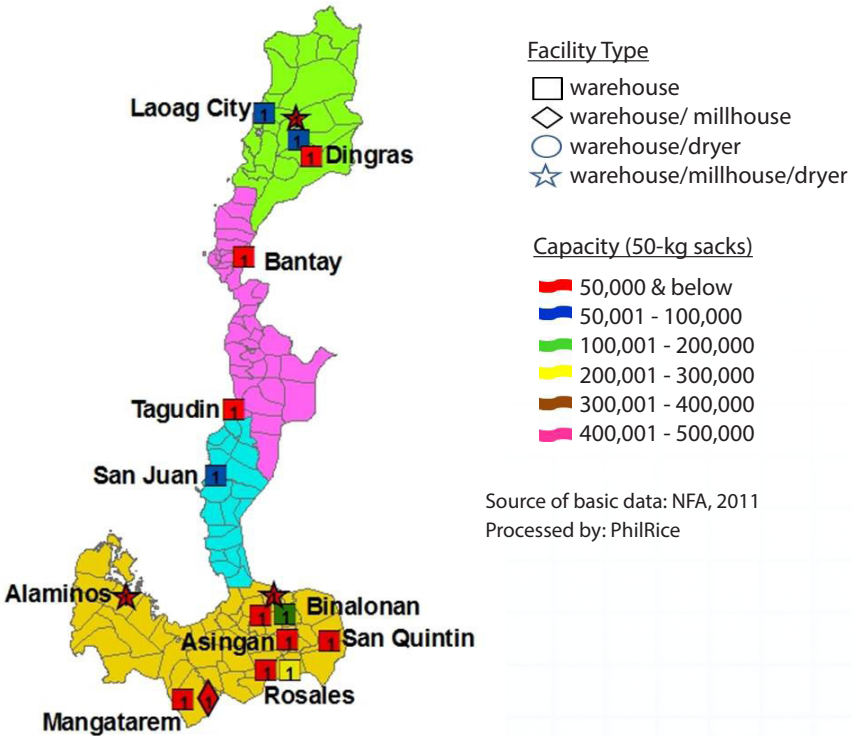
## Note:

- The name of province is in red font if it has deficit storage capacity; green font if surplus capacity
- Values below the name of the province is its total storage capacity (mt/yr)

Source of basic data: PhilMech, 2011  
 Processed by: PhilRice

As of 2009, rice storage facilities were adequate only in Ilocos Sur where its facilities could accommodate roughly 1.5 million mt throughout the year, affording the province a surplus capacity of almost eight times its requirement. Although Pangasinan had been the largest rice producer in the region, it lacked storage capacity to accommodate 12% of the rice it produced. Ilocos Norte was deficient by 36%, while La Union by 50%.

# POSTHARVEST FACILITIES: NFA, 2010



The National Food Authority (NFA) the government’s arm mandated to stabilize the supply and prices of rice in the country. As of 2010, it had at least one warehouse in every province in Ilocos. Pangasinan, the region’s primary rice producer, had the most number of warehouses strategically located in six municipalities. Two warehouses in Pangasinan and one in Ilocos Norte were equipped with dryers and mills. A warehouse in Pangasinan was equipped with mill only.

## PER CAPITA RICE CONSUMPTION, ALL BARANGAYS

Region/Province	1999-2000 (kg/year)	2008-2009 (kg/year)	Percent Change
<b>Ilocos</b>	<b>118</b>	<b>125</b>	<b>5.72</b>
Ilocos Norte	118	136	15.59
Ilocos Sur	128	128	(0.08)
La Union	109	120	9.46
Pangasinan	121	124	2.19

Source of basic data: BAS, 2012

Processed by: PhilRice

Per capita rice consumption in Ilocos increased by 5.72% between the 1999-2000 and 2008-2009 survey periods. Consumption increased in all provinces, except in Ilocos Sur, where it remained stable between the two survey periods. Ilocos Norte posted the highest increase at 15.59%.

Based on the 2008-2009 survey, all provinces in Ilocos consumed more than the government's target of 119 kg per capita per year (Department of Agriculture, 2012). The highest per capita consumer of rice was Ilocos Norte at 136 kg annually.

## PER CAPITA RICE CONSUMPTION, BY BARANGAY TYPE

Region/Province	Urban Barangays			Rural Barangays		
	1999-2000 (kg/year)	2008-2009 (kg/year)	Percent Change	1999-2000 (kg/year)	2008-2009 (kg/year)	Percent Change
<b>Ilocos</b>	<b>115</b>	<b>121</b>	<b>5.35</b>	<b>122</b>	<b>128</b>	<b>5.07</b>
Ilocos Norte	113	123	8.37	121	140	15.62
Ilocos Sur	127	125	(1.32)	131	129	(1.66)
La Union	114	119	4.93	107	120	11.42
Pangasinan	113	120	6.15	124	128	3.01

Source of basic data: BAS, 2012

Processed by: PhilRice

Disaggregation showed that residents from rural barangays in Ilocos consumed more rice than their urban counterparts by 7 kg per capita annually. Between the two survey periods, per capita consumption in both barangay types increased by just over 5% with a slightly higher increase in urban barangays.

Per capita consumption increased in all provinces for both rural and urban barangays, except in Ilocos Sur. Ilocos Norte reflected the highest increase in both barangay types. During the 2008-2009 survey, urban and rural residents in all provinces ate above the national target of 119 kg annual per capita consumption, except urban residents from La Union who consumed as much as the target.

## RATIO OF PER CAPITA RICE AVAILABILITY TO PER CAPITA CONSUMPTION, 2008-2009

Region/ Province	Average Per Capita Palay Availability (kg/year)	Average Per Capita Rice Availability (kg/year)	Average Per Capita Rice Consumption (kg/year)	Per Capita Rice Availability to Consumption Ratio
<b>Ilocos</b>	<b>303</b>	<b>197</b>	<b>125</b>	<b>1.58</b>
Ilocos Norte	469	305	136	2.23
Ilocos Sur	272	177	128	1.38
La Union	179	116	120	0.97
Pangasinan	310	202	124	1.63

Source of basic data: BAS, 2012

Processed by: PhilRice

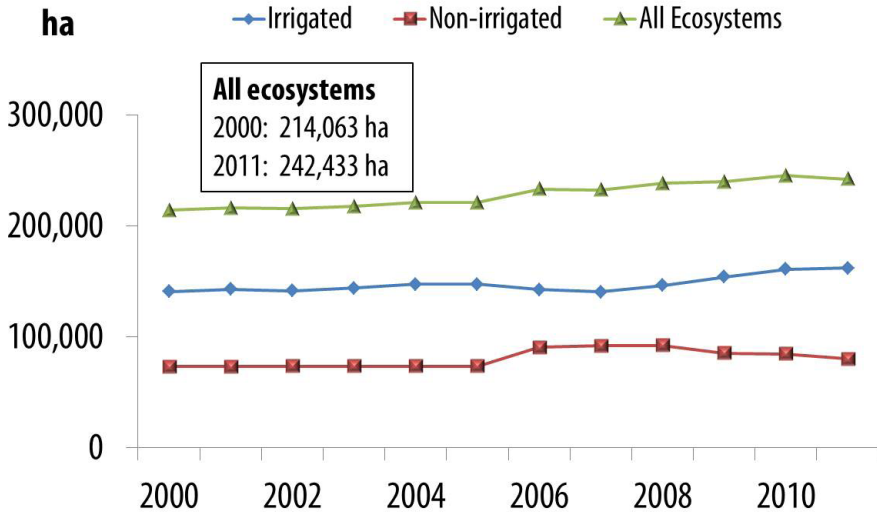
### Notes:

- Average per capita paddy rice available was computed as the sum of 2008 and 2009 production divided by the sum of 2008 and 2009 projected population.
- Average per capita rice availability was computed as the average per capita paddy rice availability multiplied by 0.65 (assumed milling recovery rate).
- Rice availability to consumption ratio is NOT EQUIVALENT to self-sufficiency ratio of each province. It is an OVERESTIMATE of the self-sufficiency ratio since it only considers the food use and ignores other uses such as seeds, processing, and wastes. A ratio of 1 or below indicates deficit status though a ratio of greater than 1 does not necessarily entail a surplus status.

During the 2008-2009 food consumption survey, the per capita availability-to-consumption ratio for rice in the entire region was 1.58, classifying Ilocos as a marginally surplus region. Ilocos Norte attained the highest per capita availability-to-consumption ratio of 2.23, implying that it was likely to have had surplus in rice during that period. La Union was a deficit-province while Pangasinan and Ilocos Sur were marginally surplus provinces.

# **PROVINCIAL PROFILE: PANGASINAN**

## TRENDS IN RICE HARVEST AREA, 2000-2011



Source of basic data: BAS, 2012  
 Processed by: PhilRice

Pangasinan had the largest rice harvest area among the four Ilocos provinces. Harvest area from all ecosystems rose by 13%, up from 214,063 ha in 2000 to 242,433 ha in 2011.

This increase in harvest area was mainly due to the expansion in both irrigated and non-irrigated areas. Between 2000 and 2011, harvest area from the irrigated ecosystem increased by 15%, and by 10% from non-irrigated ecosystems. As of 2011, roughly 67% of the harvest area in the province was irrigated. However, it appears that in the last 12 years, new rice areas were opened in non-irrigated areas, while existing rainfed areas were being provided with irrigation facilities.

## GROWTH IN RICE HARVEST AREA, 2000-2011

<b>Ecosystem</b>	<b>Jan-Jun</b>	<b>Jul-Dec</b>	<b>Jan-Dec</b>
All Ecosystems (ha)	1,969	1,163	3,133
Irrigated (ha)	1,966	(317)	1,649
Non-irrigated (ha)	3	1,481	1,484

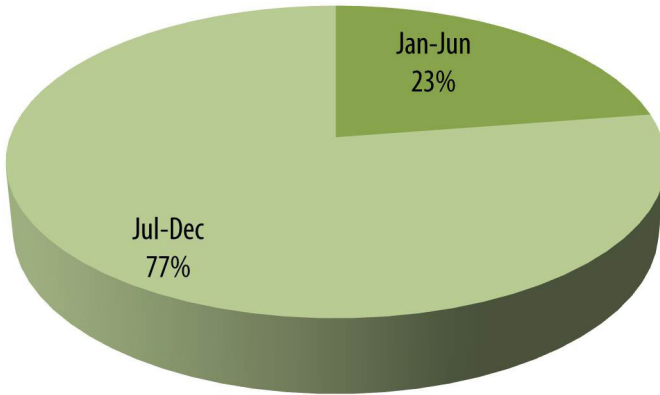
Source of basic data: BAS, 2012

Processed by: PhilRice

From 2000 to 2011, rice harvest area from all ecosystems in Pangasinan grew by 3,133 ha annually. Both irrigated and non-irrigated ecosystems contributed to this growth with the first semester contributing more than the second semester.

However, only the first semester posted a positive annual growth in area harvested from the irrigated ecosystem. Harvest area during the second semester shrank by 317 ha annually because of the damage to standing crops caused by numerous typhoons. Conversely, harvest area from non-irrigated ecosystems rose by 1,481 ha annually during the second semester while the annual increase during the first semester was marginal.

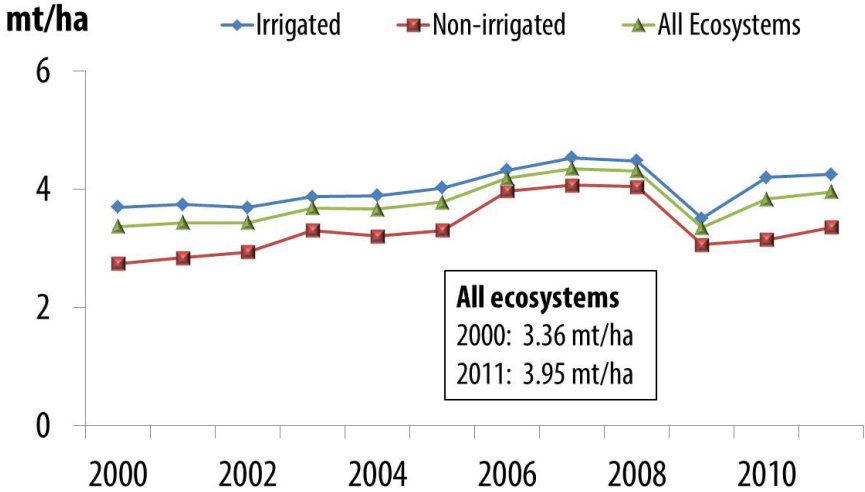
## RICE HARVEST AREA BY SEMESTER, 2000-2011



Source of basic data: BAS, 2012  
Processed by: PhilRice

From 2000 to 2011, significantly more rice areas were harvested during the second semester in Pangasinan. This was a typical pattern in the entire region where many of the rice areas during the wet season were planted with other crops during the dry season.

## TRENDS IN RICE YIELD, 2000-2011



Source of basic data: BAS, 2012

Processed by: PhilRice

Paddy rice yield in all ecosystems in Pangasinan increased by 17%, up from 3.36 mt/ha in 2000 to 3.95 mt/ha in 2011. Yield levels remained stable from 2000 to 2005. A marked increase occurred in 2006 when provincial yield level exceeded 4 mt/ha and remained so until 2008. In 2009, yield level dropped significantly owing to the damage caused by strong typhoons to the about-to-be harvested rice. From then on, yield levels reverted to below 4 mt/ha until 2011.

Yield from both irrigated and non-irrigated ecosystems followed a similar trend. Irrigated yield stayed above 4 mt/ha since 2005 while non-irrigated areas crossed the 4 mt/ha mark only in 2007 and 2008.

## GROWTH IN RICE YIELD, 2000-2011

<b>Ecosystem</b>	<b>Jan-Jun</b>	<b>Jul-Dec</b>	<b>Jan-Dec</b>
All Ecosystems (mt/ha)	0.06	0.05	0.05
Irrigated (mt/ha)	0.06	0.04	0.05
Non-irrigated (mt/ha)	0.08	0.06	0.06

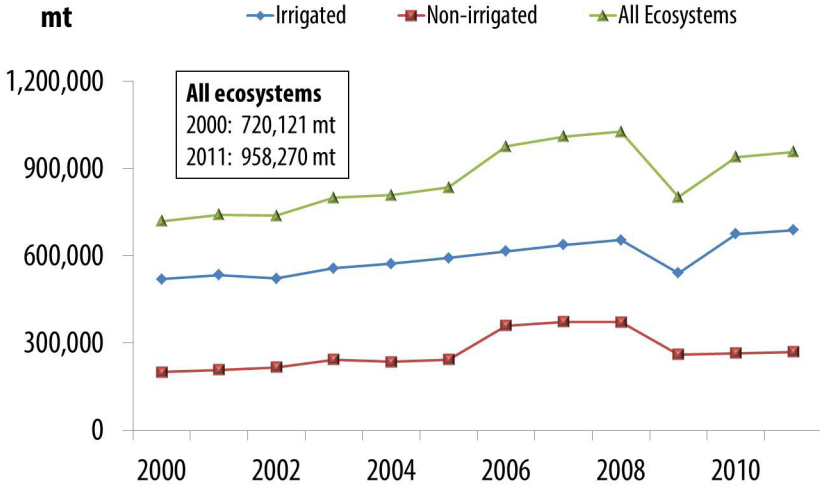
Source of basic data: BAS, 2012

Processed by: PhilRice

From 2000 to 2011, rice yield from all ecosystems in Pangasinan increased by 0.05 mt/ha annually contributed by both the irrigated and non-irrigated ecosystems. The growth likewise occurred in both semesters.

The irrigated and non-irrigated areas posted positive growth in yield in both semesters. Annual growth in yield from irrigated and non-irrigated areas during the first semester was consistently higher than the second semester.

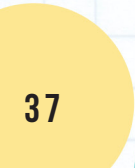
# TRENDS IN RICE PRODUCTION, 2000-2011



Source of basic data: BAS, 2012  
 Processed by: PhilRice

Paddy rice production in Pangasinan increased by 33%, up from 720,121 mt in 2000 to 958,270 mt in 2011. Production increased slowly from 2000 to 2005. It rose sharply in 2006, then crossed the 1 million mt mark in the next two years. Production sharply dropped in 2009 then recovered in the succeeding two years, but has never reached the 1 million mt mark again.

Production from irrigated areas gradually increased from 2000 to 2011, except for the sizeable drop in 2009. A different trend occurred in non-irrigated areas where production remained stable from 2000 to 2005, then rose sharply in 2006, and stayed on a steady level until 2008. After the sharp plunge in 2009, production remained at the same level until 2011.



## GROWTH IN RICE PRODUCTION, 2000-2011

<b>Ecosystem</b>	<b>Jan-Jun</b>	<b>Jul-Dec</b>	<b>Jan-Dec</b>
All Ecosystems (mt)	10,978	12,552	23,531
Irrigated (mt)	10,951	2,922	13,873
Non-irrigated (mt)	27	9,630	9,657

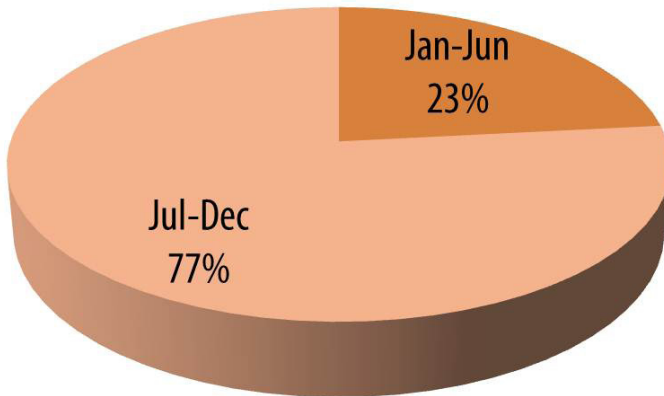
Source of basic data: BAS, 2012

Processed by: PhilRice

From 2000 to 2011, rice production in all ecosystems in Pangasinan grew by 23,531 mt annually, with both the irrigated and the non-irrigated ecosystems contributing to the overall positive growth. The irrigated areas, however, contributed more to this growth owing to improved yield since 2006. The overall growth was almost equally shared by the first and second semesters.

Growth in production from the irrigated ecosystem was significantly higher during the first semester, more than thrice that of the second semester. In contrast, growth in production from non-irrigated ecosystems was much higher during the second semester because of expanded harvest area.

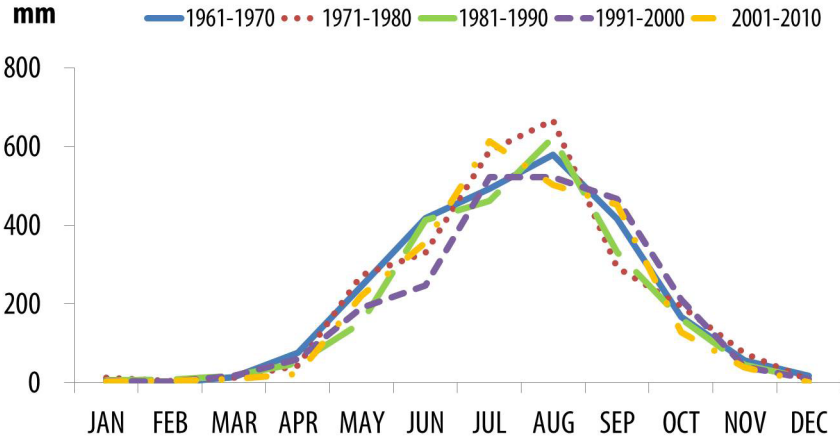
## RICE PRODUCTION BY SEMESTER, 2000-2011



Source of basic data: BAS, 2012  
Processed by: PhilRice

From 2000 to 2011, Pangasinan produced more paddy rice during the second than the first semester. Production and area maintained an equal share between semesters indicating the same land productivity levels.

# DECADAL MONTHLY RAINFALL (MM), DAGUPAN, PANGASINAN PAGASA STATION, 1961-2009

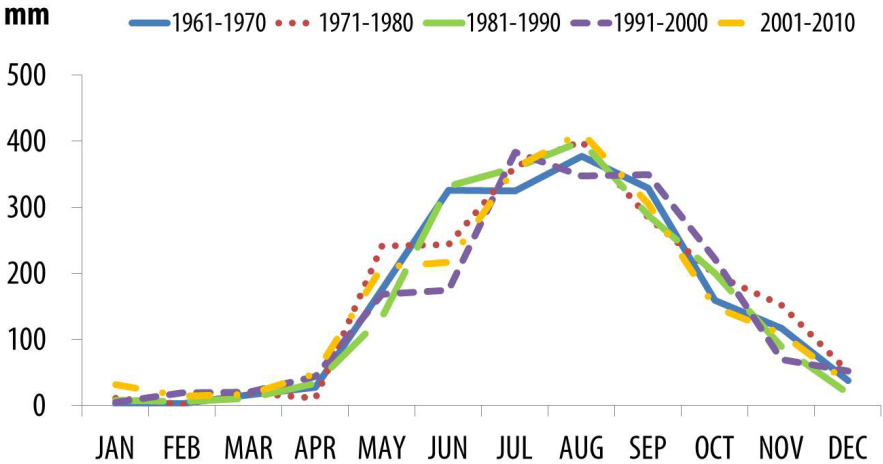


Source of basic data: PAGASA, 2011  
Processed by: PhilRice

The rainfall data from PAGASA Dagupan station is relevant to areas at the western portion of Pangasinan where minimal changes in the rainfall pattern in the area from 1961 to 2009 in terms of volume and distribution were observed.

August was the wettest month during the first three decades, but it shifted to July in the last two decades. The volume of precipitation from November to April was nearly the same across decades, but variations occurred from May to October.

# DECADAL MONTHLY RAINFALL (MM), CABANATUAN, NUEVA ECIJA PAGASA STATION, 1961-2009



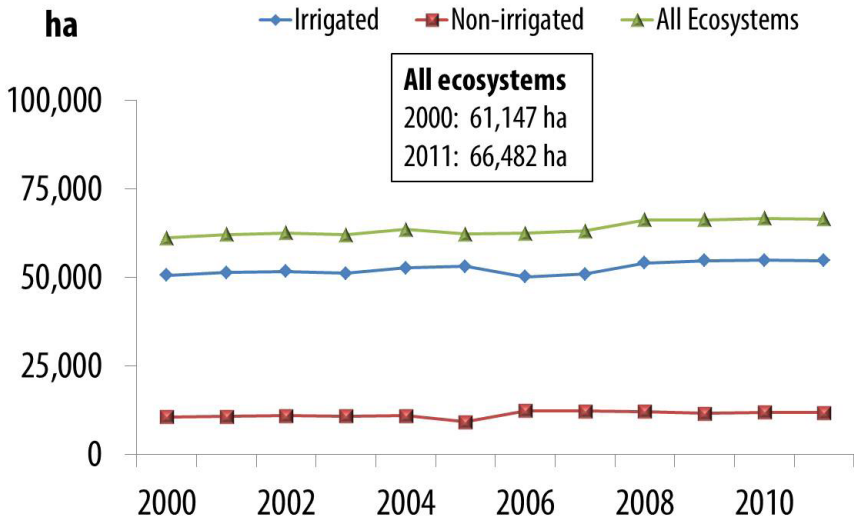
Source of basic data: PAGASA, 2011  
 Processed by: PhilRice

The rainfall data from PAGASA Cabanatuan station may be relevant to areas in eastern Pangasinan where minimal variations in the rainfall pattern from 1961 to 2009 in terms of volume and distribution were observed.

August was the wettest month in all the decades, except in 1991-2000 where it shifted to July. The volume of rainfall during the peak month in all the decades did not vary very much. However, June was relatively drier in the last two decades than in the other decades. Rainfall was more evenly distributed during the 1961-1970 and 1981-1990 wet months.

# **PROVINCIAL PROFILE: ILOCOS NORTE**

## TRENDS IN RICE HARVEST AREA, 2000-2011



Source of basic data: BAS, 2012

Processed by: PhilRice

Ilocos Norte had the second largest rice harvest area among the four Ilocos provinces. Harvest area from all ecosystems maintained a stable level with only 9% increase between 2000 and 2011. As of 2011, the irrigated ecosystem contributed 82% of total harvest area.

Although harvest area showed increasing trends from 2000 to 2011, slumps occurred in 2006 and 2007 from irrigated areas and in 2005 from non-irrigated areas.

## GROWTH IN RICE HARVEST AREA, 2000-2011

<b>Ecosystem</b>	<b>Jan-Jun</b>	<b>Jul-Dec</b>	<b>Jan-Dec</b>
All Ecosystems (ha)	52	460	512
Irrigated (ha)	48	313	362
Non-irrigated (ha)	3	147	150

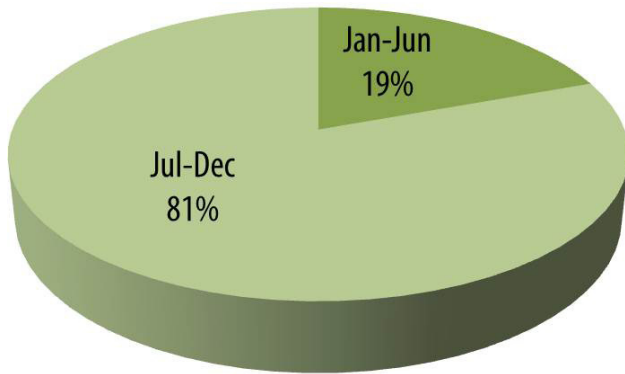
Source of basic data: BAS, 2012

Processed by: PhilRice

From 2000 to 2011, rice harvest area in all Ilocos Norte ecosystems increased by 512 ha annually. Although both the irrigated and non-irrigated ecosystems posted positive growth, the overall growth in harvest area was mainly contributed by the former. Likewise, area growth was more prominent during the second semester.

Harvest area posted positive growth in both seasons for irrigated and non-irrigated ecosystems, although much more pronounced during the second semester.

## RICE HARVEST AREA BY SEMESTER, 2000-2011

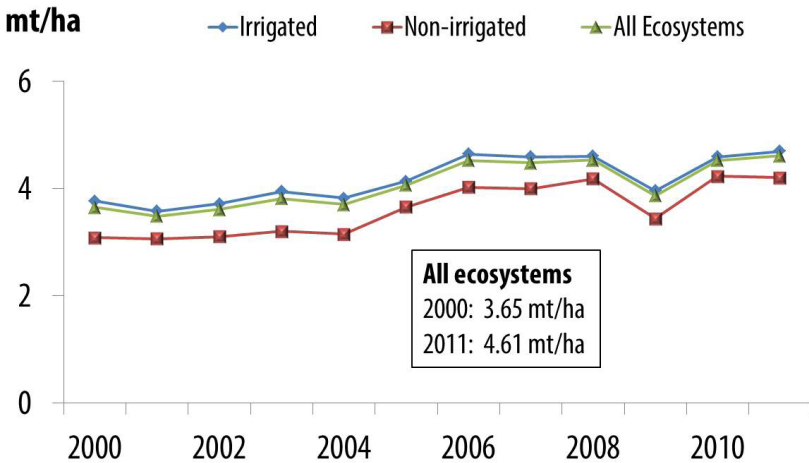


Source of basic data: BAS, 2012

Processed by: PhilRice

From 2000 to 2011, significantly more rice areas were harvested in Ilocos Norte during the second semester. This was a typical pattern in the entire region where many of the rice areas during the wet season were planted with other crops during the dry season.

## TRENDS IN RICE YIELD, 2000-2011



Source of basic data: BAS, 2012  
 Processed by: PhilRice

Paddy rice yield in Ilocos Norte in all ecosystems increased by 26%, up from 3.65 mt/ha in 2000 to 4.61 mt/ha in 2011, with yield levels remaining stable from 2000 to 2005. A marked increase occurred in 2006 and leveled until 2011, except for a significant drop in 2009. Yield in the province crossed the 4 mt/ha mark in 2005, making it one of the provinces countrywide with the highest yield in recent years.

Yield from both irrigated and non-irrigated ecosystems followed a similar trend, although the yield levels of the latter stayed below the former. Except the anomaly in 2009, yield levels from irrigated areas exceeded 4 mt/ha starting 2005, and in non-irrigated areas starting 2006.

## GROWTH IN RICE YIELD, 2000-2011

<b>Ecosystem</b>	<b>Jan-Jun</b>	<b>Jul-Dec</b>	<b>Jan-Dec</b>
All Ecosystems (mt/ha)	0.09	0.10	0.10
Irrigated (mt/ha)	0.09	0.09	0.09
Non-irrigated (mt/ha)	0.09	0.12	0.12

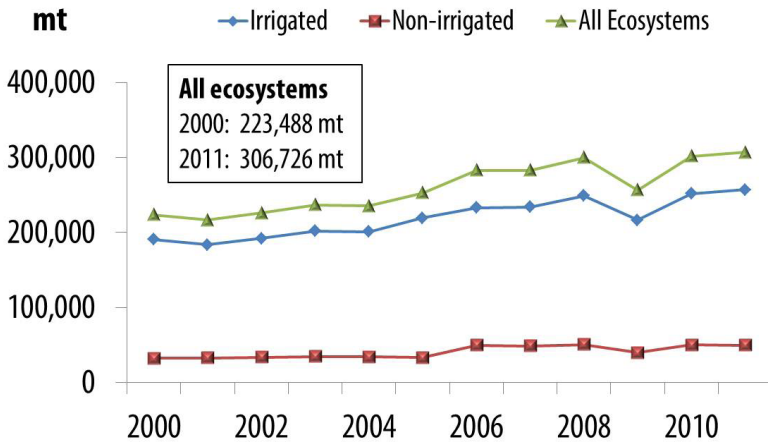
Source of basic data: BAS, 2012

Processed by: PhilRice

From 2000 to 2011, rice yield from all ecosystems in Ilocos Norte increased by 0.10 mt/ha annually as contributed by both the irrigated and non-irrigated ecosystems. This growth was likewise almost equally shared by the first and second semesters.

The irrigated and non-irrigated areas posted positive yield growth in both semesters. Annual growth in yield from irrigated areas was the same in both semesters. Yield growth though from non-irrigated areas was slightly higher during the second semester.

## TRENDS IN RICE PRODUCTION, 2000-2011



Source of basic data: BAS, 2012

Processed by: PhilRice

Paddy rice production in Ilocos Norte increased by 37%, up from 223,488 mt in 2000 to 306,726 mt in 2011. Production increased slowly from 2000 to 2005, but rose sharply in 2006, and continued to increase until 2011, except for a sharp decline in 2009.

Production from irrigated areas followed the same trend since the harvest area in the province was largely irrigated. The volume of production from non-irrigated areas was relatively constant over the years.

## GROWTH IN RICE PRODUCTION, 2000-2011

<b>Ecosystem</b>	<b>Jan-Jun</b>	<b>Jul-Dec</b>	<b>Jan-Dec</b>
All Ecosystems (mt)	1,400	6,936	8,335
Irrigated (mt)	1,375	5,121	6,496
Non-irrigated (mt)	25	1,815	1,840

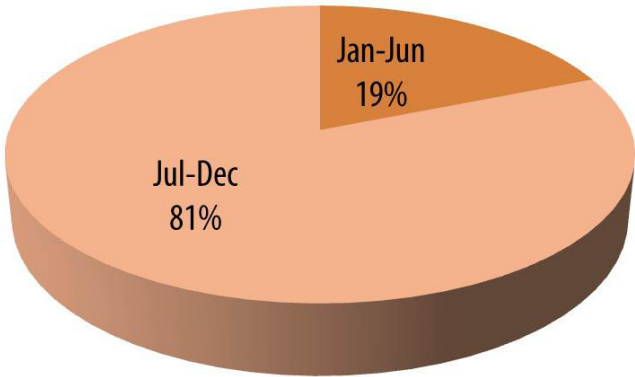
Source of basic data: BAS, 2012

Processed by: PhilRice

From 2000 to 2011, rice production in all ecosystems in Ilocos Norte grew by 8,335 mt annually. Both irrigated and non-irrigated ecosystems contributed to the overall positive growth. The irrigated areas, however, contributed thrice that of the non-irrigated areas. Likewise, the second semester contributed more than four times that of the first semester.

The irrigated and non-irrigated areas posted positive growth in both semesters. Growth in production from both the irrigated and non-irrigated areas, however, was consistently higher during the second semester.

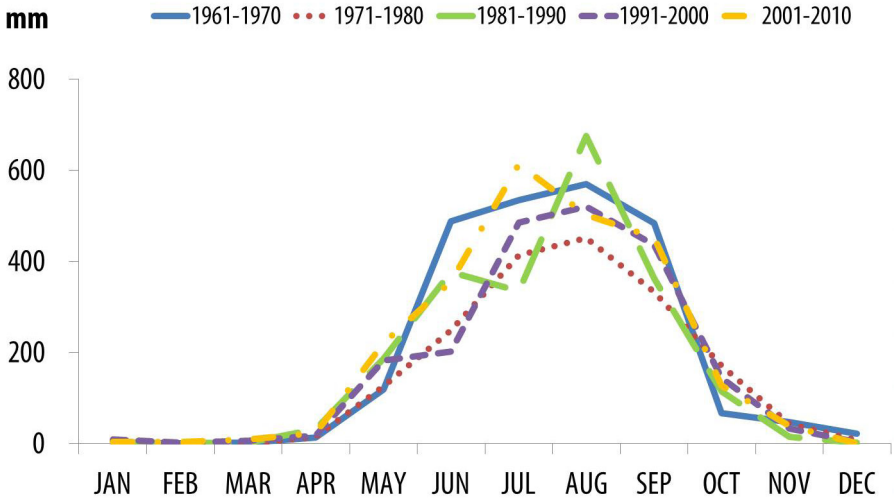
# RICE PRODUCTION BY SEMESTER, 2000-2011



Source of basic data: BAS, 2012  
Processed by: PhilRice

From 2000 to 2011, Ilocos Norte produced significantly more paddy rice during the second than the first semester. Production and area maintained an equal share between semesters indicating the same land productivity levels.

# DECADAL MONTHLY RAINFALL (MM), LAOAG, ILOCOS NORTE PAGASA STATION, 1961-2009

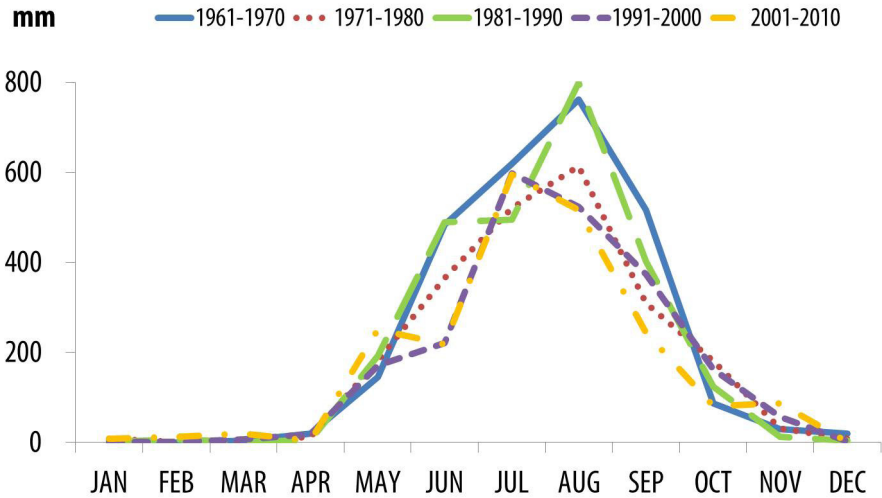


Source of basic data: PAGASA, 2011  
Processed by: PhilRice

The rainfall data from PAGASA Laoag station is relevant to areas in the central western portion of Ilocos Norte. There had been a significant change in the rainfall pattern in the area from 1961 to 2009 in terms of volume and distribution.

August was the wettest month from 1961 to 2000. During the last decade, however, it shifted to July where the volume of rainfall during the peak month rose every other decade. Rainfall in June and September was much less in the past four decades.

# DECADAL MONTHLY RAINFALL (MM), VIGAN/SINAIT, ILOCOS SUR PAGASA STATION, 1961-2009



Source of basic data: PAGASA, 2011  
Processed by: PhilRice

The rainfall data from PAGASA Vigan/Sinait station in Ilocos Sur is relevant to areas in southern Ilocos Norte where a significant change in the rainfall pattern from 1961 to 2009 in terms of volume and distribution was noted.

August was the wettest month from 1961 to 1990. In the last two decades, however, it shifted to July. The volume of rainfall during the peak month was much less in 1971-1980 compared with those in 1961-1970 and 1981-1990. Rainfall in June was much less in the past two decades. February, March, and May though were wetter in the last decade.

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## Notes

# Credits

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We are a chartered government corporate entity under the Department of Agriculture. We were created through Executive Order 1061 on 5 November 1985 (as amended) to help develop high-yielding, cost-reducing, and environment-friendly technologies so farmers can produce enough rice for all Filipinos.

We accomplish this mission through research and development work in our central and seven branch stations, coordinating with a network that comprises 57 agencies and 70 seed centers strategically located nationwide.

To help farmers achieve holistic development, we will pursue the following goals in 2010-2020: attaining and sustaining rice self-sufficiency; reducing poverty and malnutrition; and achieving competitiveness through agricultural science and technology.

We have the following certifications: ISO 9001:2008 (Quality Management), ISO 14001:2004 (Environmental Management), and OHSAS 18001:2007 (Occupational Health and Safety Assessment Series).



The DA-Regional Field Office Ilocos (DA-RFO I) is the primary arm of the Department of Agriculture responsible for promoting the region's agriculture; growth and development through the delivery of appropriate goods and services. Our efforts are focused on raising the quality of human existence, particularly those of small farmers and fisherfolks; and on sustainability of resource productivity over the long term.

Our mission is to increase the income of farmers and fisherfolks, thereby contributing to the achievement of the national goals of alleviating poverty, generating productive opportunities, fostering social justice and equity, and promoting sustainable economic growth. In pursuit of this, we provide a policy framework that directs public investments and, in partnership with the local government units (LGUs), provides the support services necessary to make agriculture and fisheries, and agri-based enterprises profitable to help spread the benefits of development to the poor, particularly those in the rural areas.

We implement at the regional level the national programs on rice, corn and high value crops. The components of the rice program include production support services, irrigation, credit and financing, marketing assistance, provision of postharvest facilities and farm equipment, and R&D.

