Socioeconomic profile of Mindoro farmers: 2015 DS baseline survey results

JIC Santiago, CG Yusongco, JC Beltran, RZ Relado


PhilRice
Batac
PhilRice
Isabela
PhilRice CES
Nueva Ecija
PhilRice
Los Banos
PhilRice
Liaison Office
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Bicol
PhilRice
Mindoro
Satellite station
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Samar
Satellite station
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Field Office
Bukidnon
PhilRice
Midsayap

Goal:

"Increase rice productivity and farm income"

Baseline Characterization of PhilRice-Mindoro Satellite Station

Rationale

A need for **baseline** data:

- ✓Serve as a guide in designing, implementing and terminating project interventions
- ✓Gauge socioeconomic impact and production impacts of development projects

Methodology

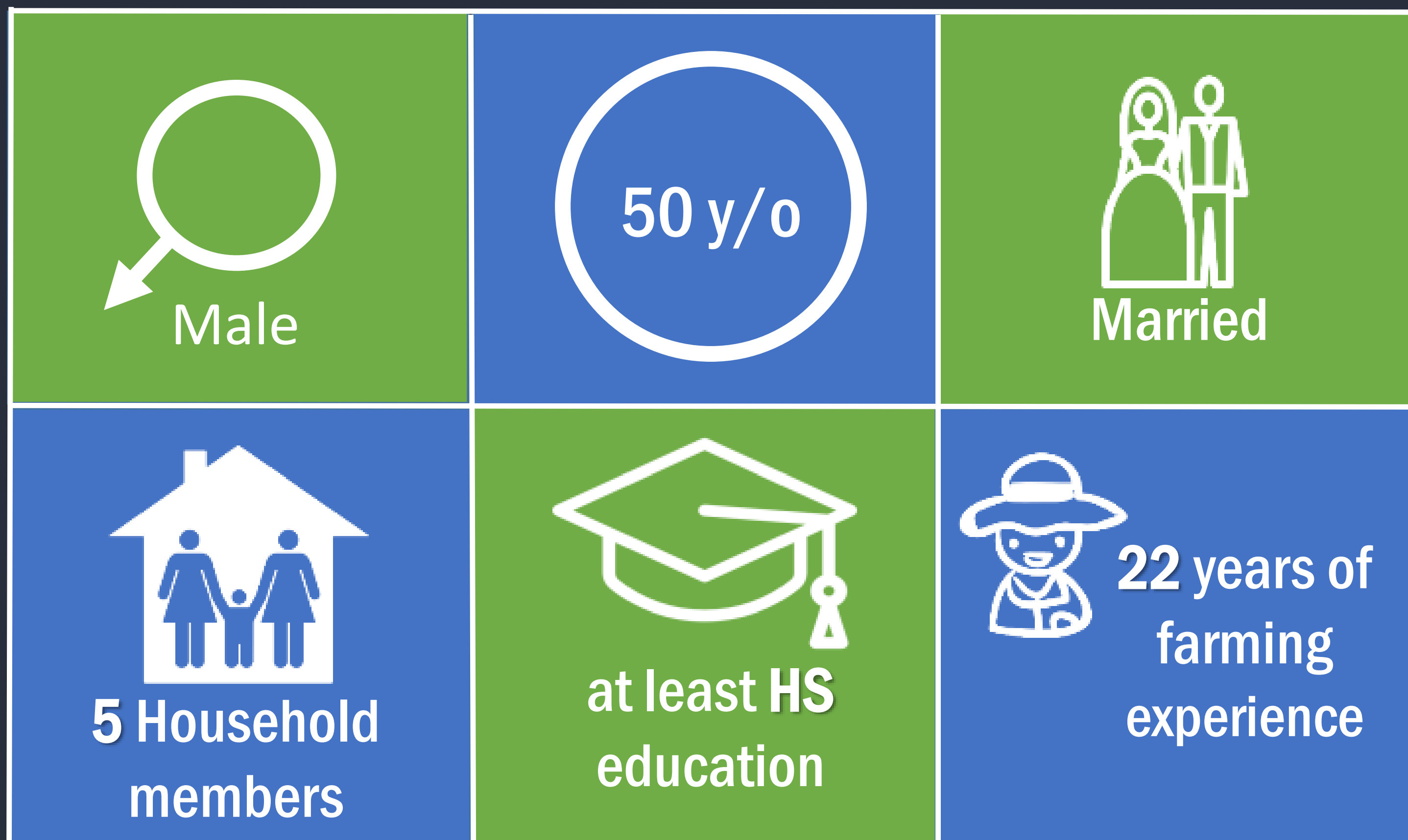
- ✓ **Baseline Survey in Mindoro Occidental and Oriental**
- ✓ **100 sample farmers from each province**
- ✓ **2015 Dry Season (January to June Harvest)**

Objectives

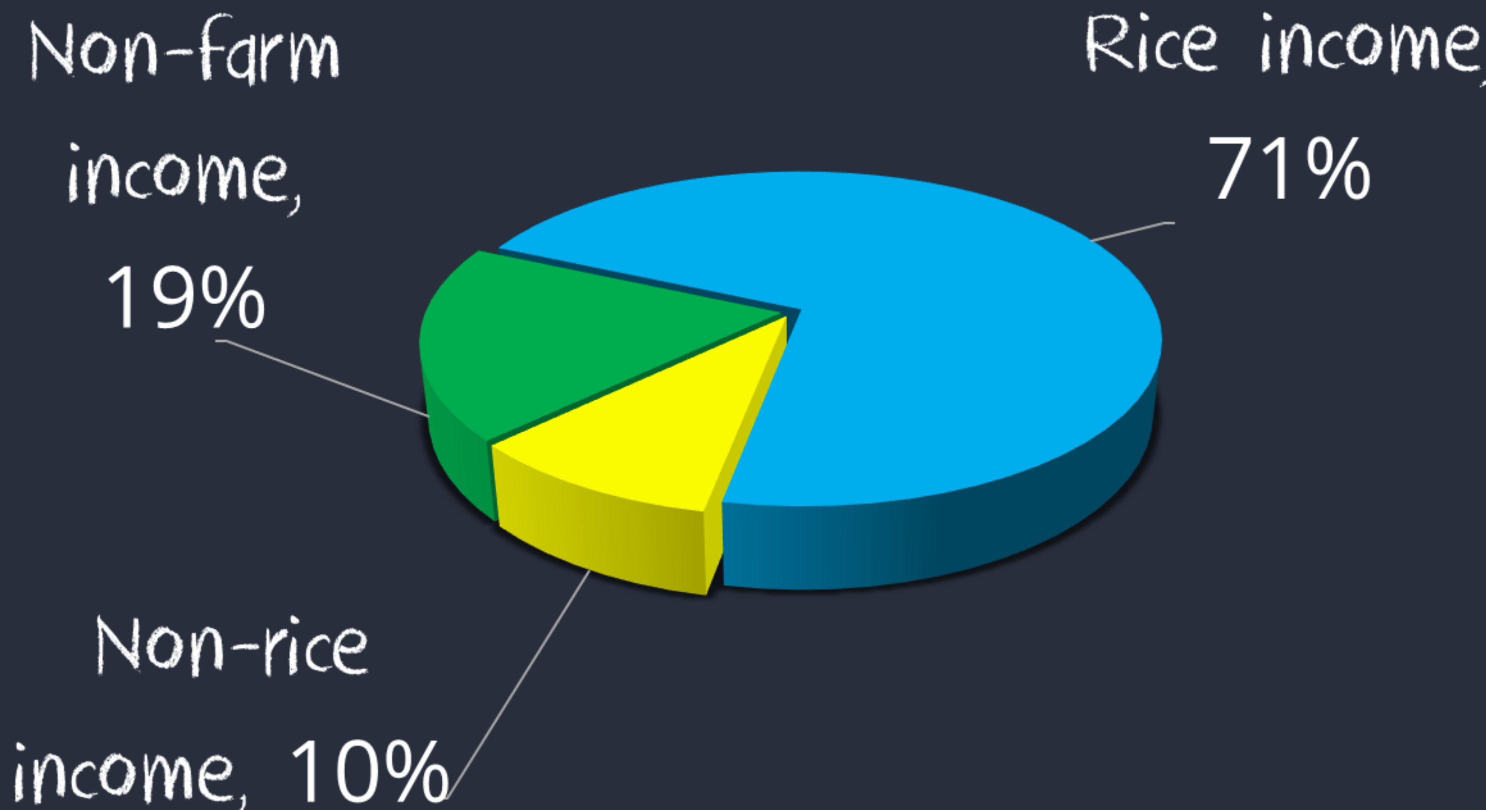
- ✓Determine the basic socio-economic characteristics of Mindoro rice farmers
- ✓ Describe current production practices in the area
- ✓Examine cost and profitability of rice production

Socio-economic Characteristics

Basic characteristics of a rice farmer



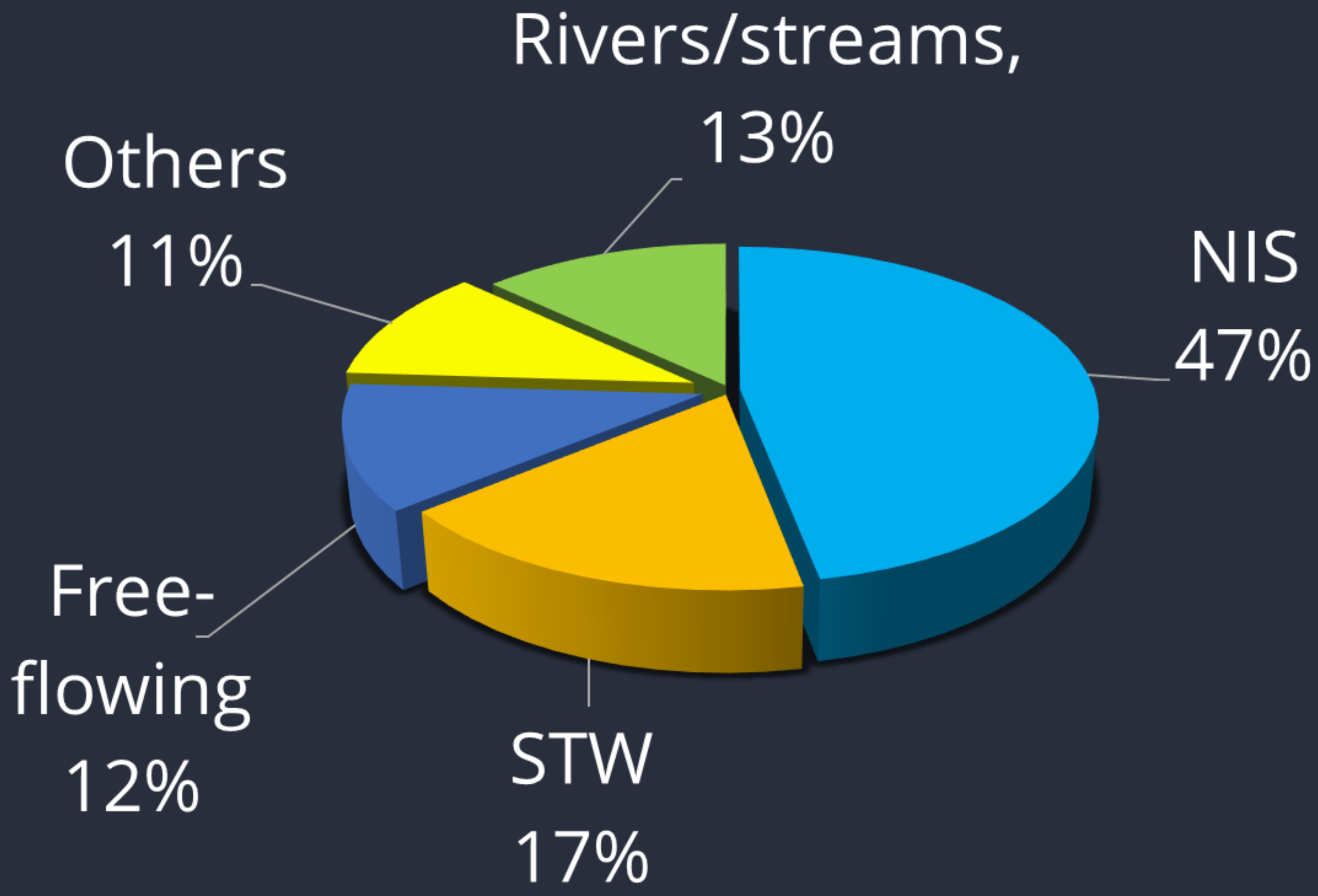
RICE FARMING is the major source of income.



Basic farm characteristics

Item	Oriental Mindoro	Occidental Mindoro
No. of rice-based farm parcels	2	1
Size of largest parcel (ha)	1.40	1.55

Source of irrigation



Objectives

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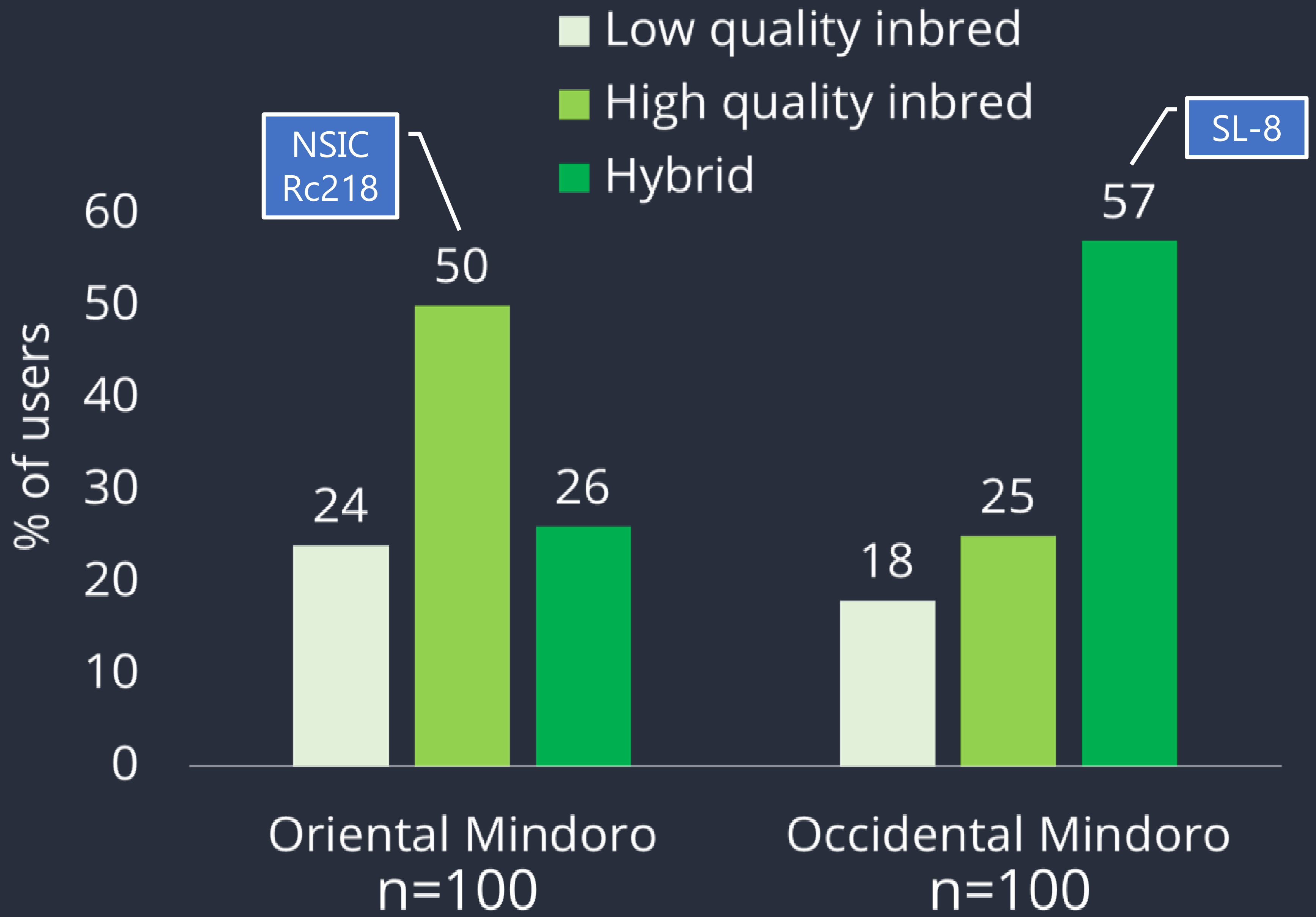
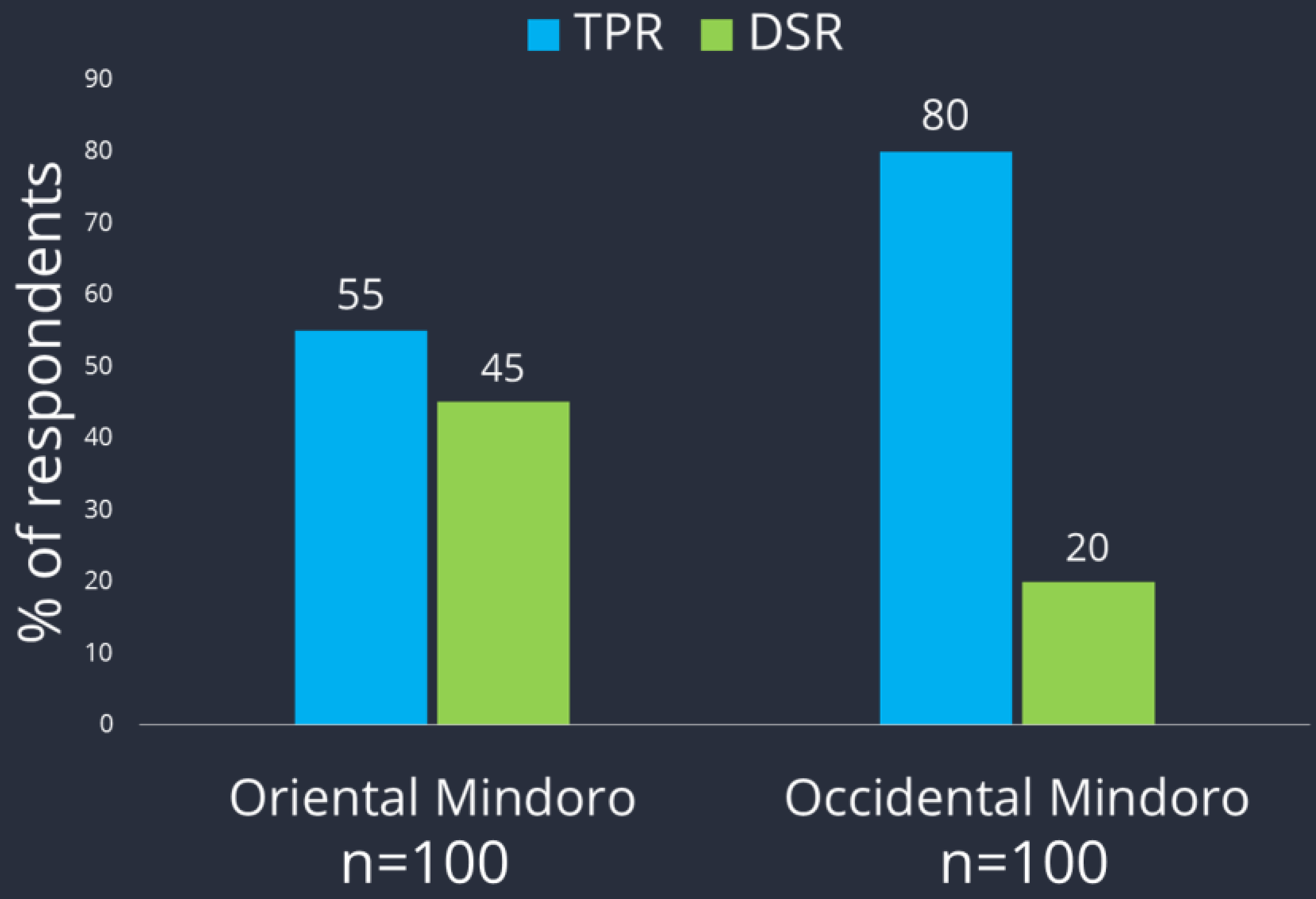
Farm Inputs and Crop Management

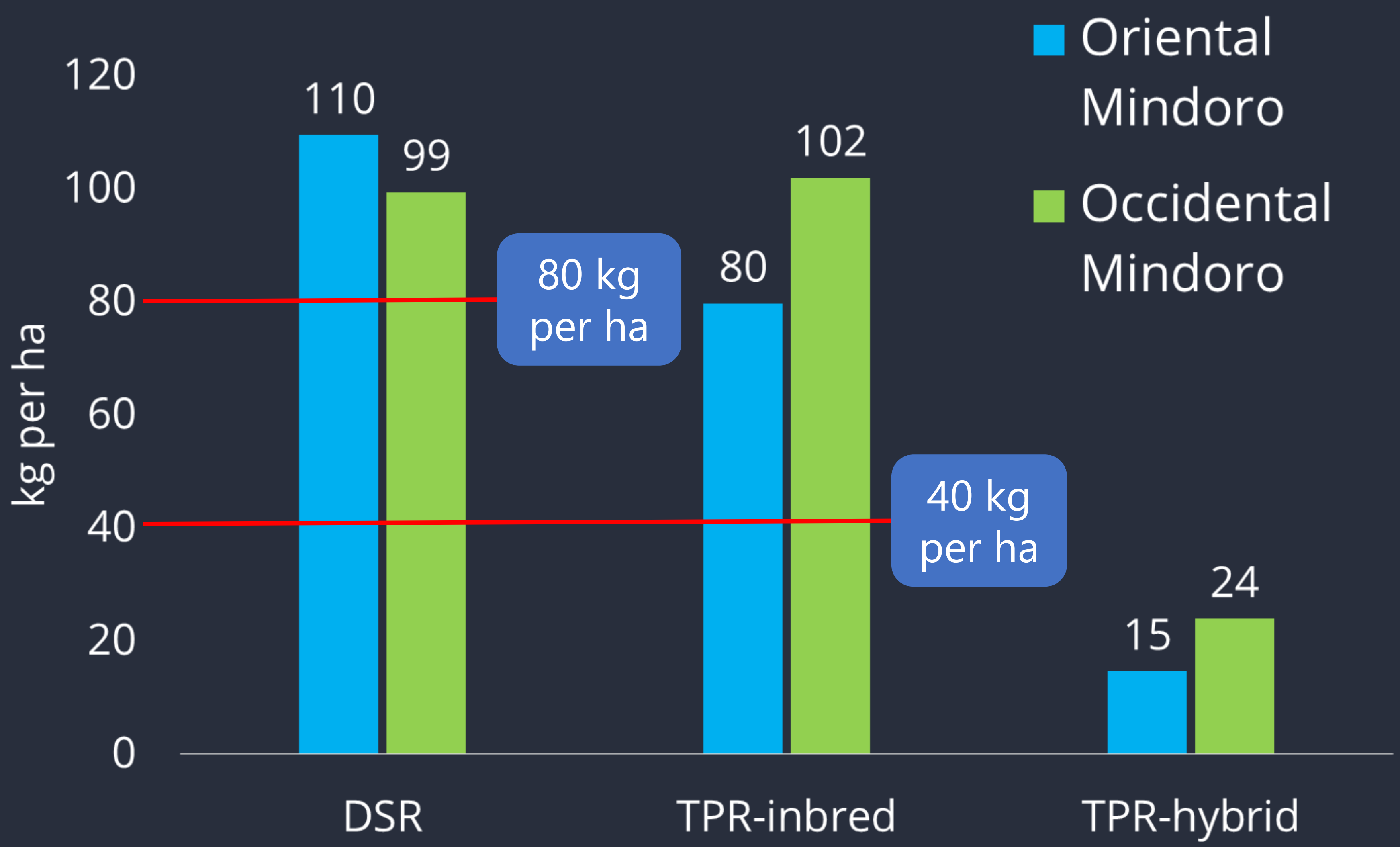
Seed class


Low quality inbred
High quality inbred
Hybrid
NSIC Rc218
SL-8
% of users
60
50
40
30
20
10
0
24
50
26
18
25
57
Oriental Mindoro
n=100
Occidental Mindoro
n=100

Crop establishment



Seeding rate



Fertilizer use

Province	N	P	K
	Kg per ha		
Occidental Mindoro	171	8	19
Oriental Mindoro	101	10	20

Urea, complete, ammonium phosphate, ammonium sulfate, MOP

Pesticide (% of users)

Item	Occidental Mindoro n=100	Oriental Mindoro n=100
Herbicide	76	98
Insecticide	94	77
Fungicide	20	16
Other pesticides	44	83

⬆ DSR

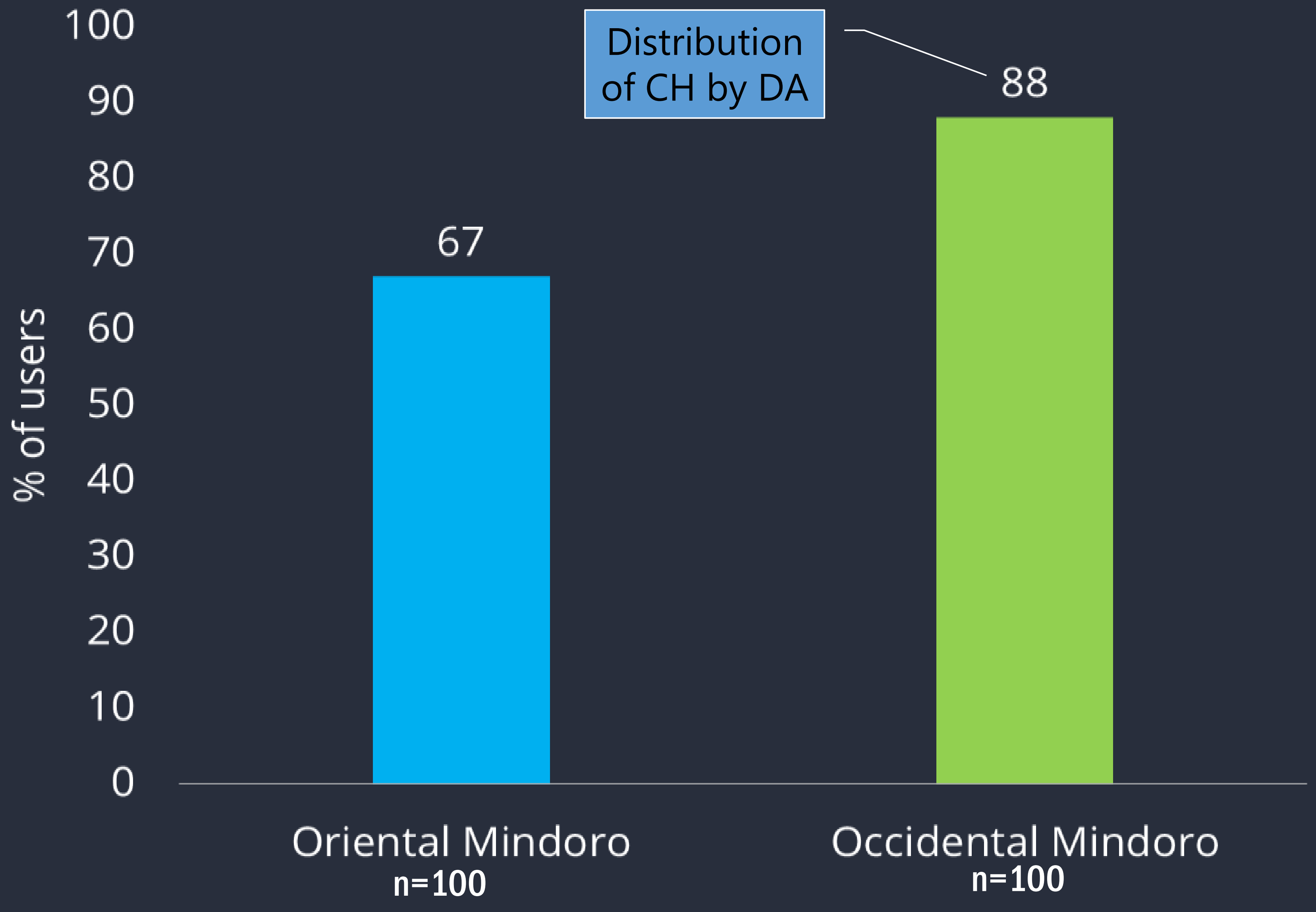
Labor (man-days/ha)

Farm activity	Oriental Mindoro	Occidental Mindoro
Land preparation	9.70	11.04
Crop establishment	12.43	26.91
Crop care & maintenance	12.15	17.34
Harvesting and Threshing	7.56	6.70

Total labor (man-days/ha)

Oriental Mindoro: 47.15 | Occidental Mindoro: 66.48

Mechanization (Combine-harvester)



Objectives

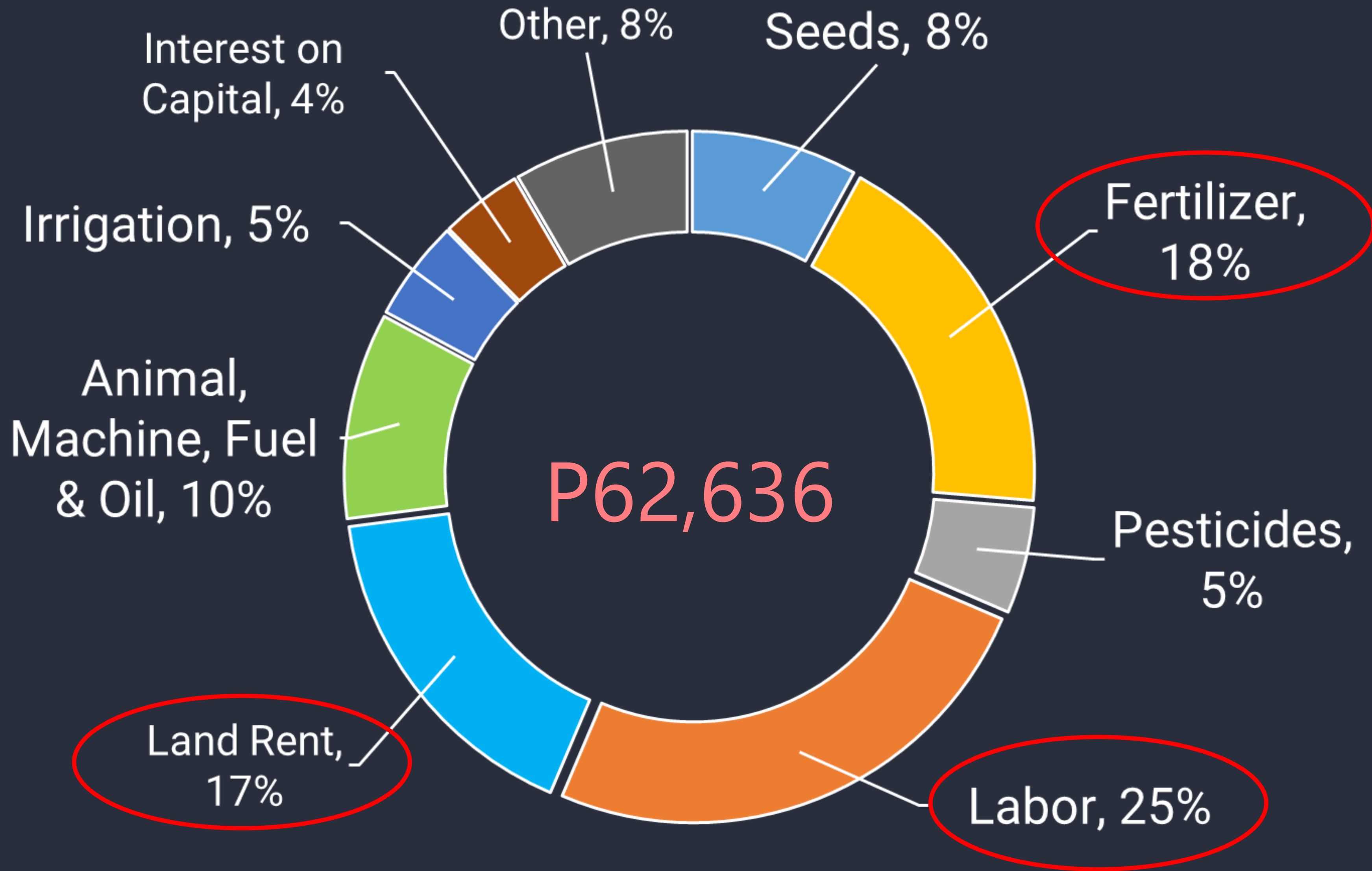
- ✓Determine the basic socio-economic characteristics of Mindoro farmers
- ✓ Describe current production practices in the area
- ✓Examine cost and profitability of rice production

Cost and retu

Gross income from rice farming

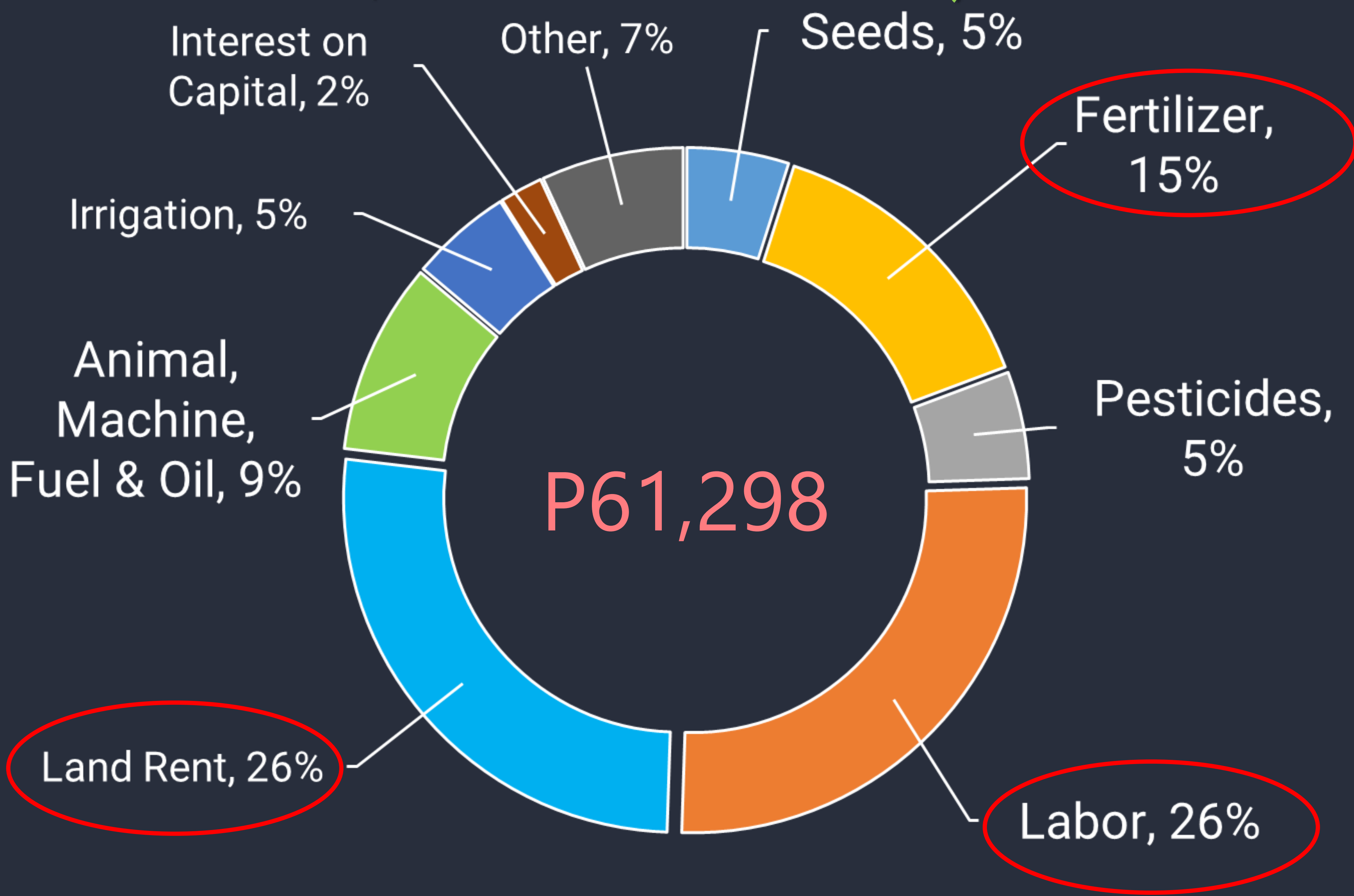
Item	Occidental Mindoro	Oriental Mindoro
Yield (mt/ha)	6.21	5.5
Farmgate price (P/kg)	16.05	15.61
Gross income (P/ha)	**P99,711**	**P86,023**

Cost distribution
(Occidental Mindoro)



Cost distribution

(Oriental Mindoro)



Profitability (Occidental Mindoro)

Item	Mean
RETURNS	
Yield (kg/ha)	6,213
Price (Php per kg)	16.05
Gross Returns	**99,711**
Total Cost (Php/ha)	**62,636**
Net Income from Rice Farming	**37,075**
Farmers' Income	**54,068**
Cost per unit	10.08

"Farmer's income = net income + net returns on own land, capital and labor

"Farmer's income" is considered as the take-home pay of the

Profitability (Oriental Mindoro)

Item	Mean
RETURNS	
Yield (kg/ha)	5510.6
Price (Php per kg)	15.6
Gross Returns	**86,023**
Total Cost (Php/ha)	**61,298**
Net Income from Rice Farming	**24,725**
Farmers' Income	**45,860**
Cost per unit	11.12

"Farmer's income" = net income + net returns on own land, capital and labor

"Farmer's income" is considered as the take-home pay of the

Do they need a PhilRice satellite station?

YES…

Rice farmers are dependent on rice farming

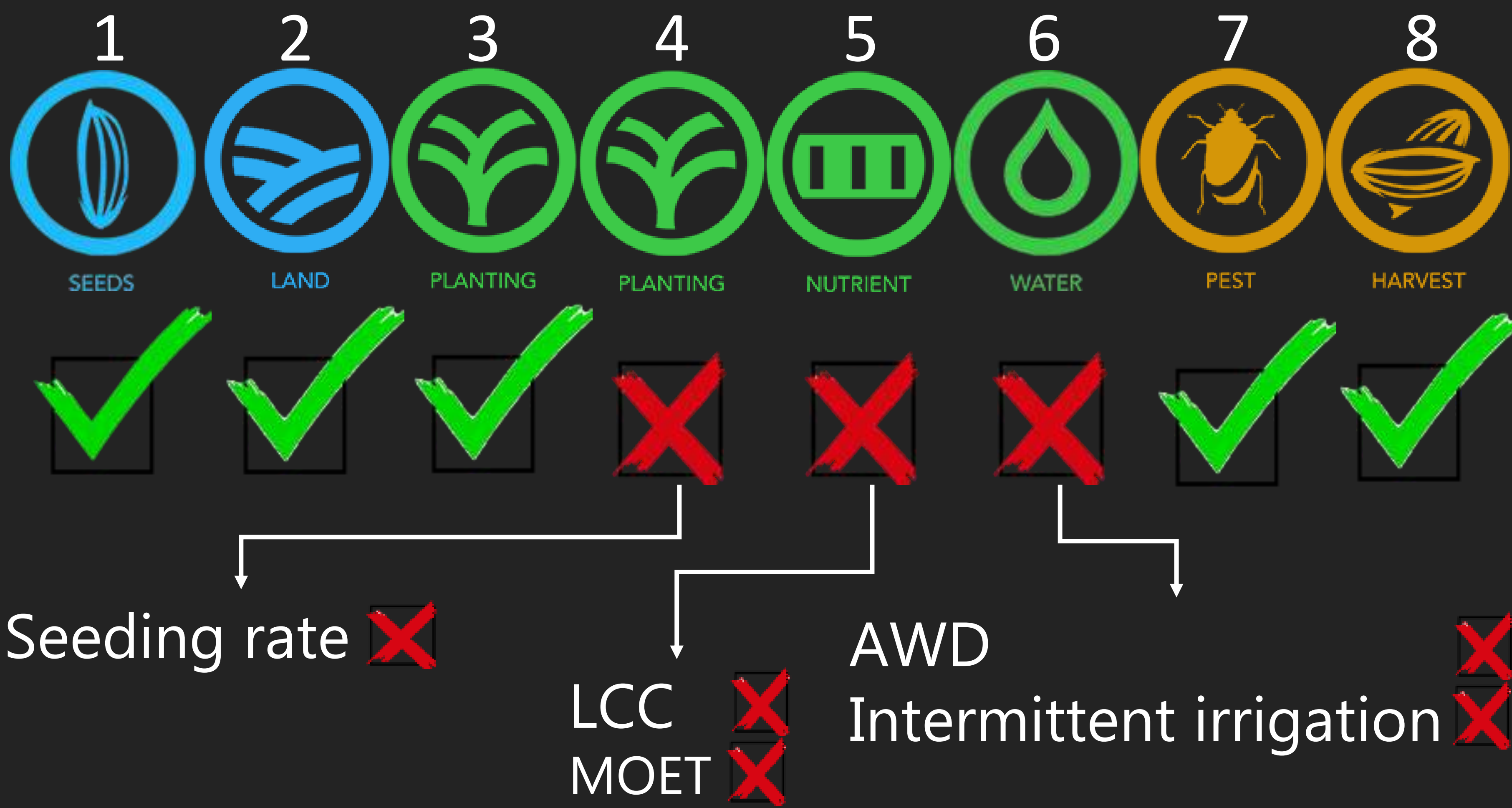
Mindoro is an island.

PhilRice satellite station can offer:

1. Technical knowledge
2. Technology
3. Access to other agencies

There is still room for
improvements.

Palaycheck System



Thank you!! ☺

End of presentation

Progress in rice farming…

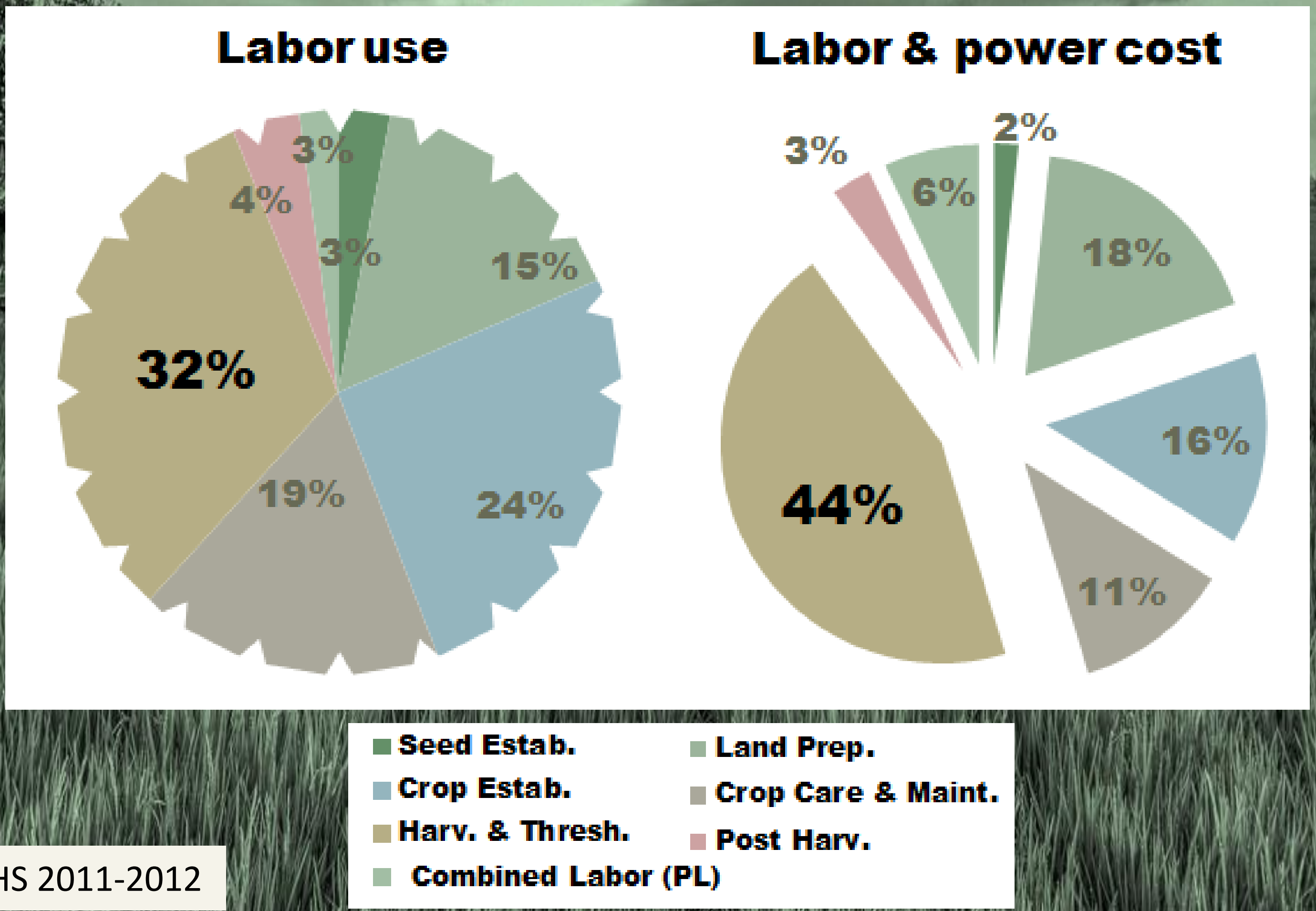
Combine harvester: Its impact in rice farming

Socioeconomic Impact of Adopting Rice Combine Harvester in the Philippines

IAArida, JCBeltran, FHBordey, IRTanzo, RZRelado, RBMalasa, and MJTAntivo

Rice farming in the Philippines:

- Labor and capital intensive
- Labor shortage



Source: RBFHS 2011-2012

Towards agricultural mechanization:

- Significantly reduces production cost, higher profits and lower prices
- Eliminates problems on unavailability of laborers during peak seasons
- Problem: Low adoption rate

In 2011-2012:

- **0.33%** (WS) and **0.68%** (DS) adoption
- Labor requirement is significantly lower
- Labor and power cost not significantly different

Source: RBFHS 2011-2012

Objectives:

1. To assess the perception and level of awareness on combine harvester;
2. To determine the social welfare effects of combine harvester adoption; and
3. To assess the impact of combine harvester adoption on the productivity and profitability.

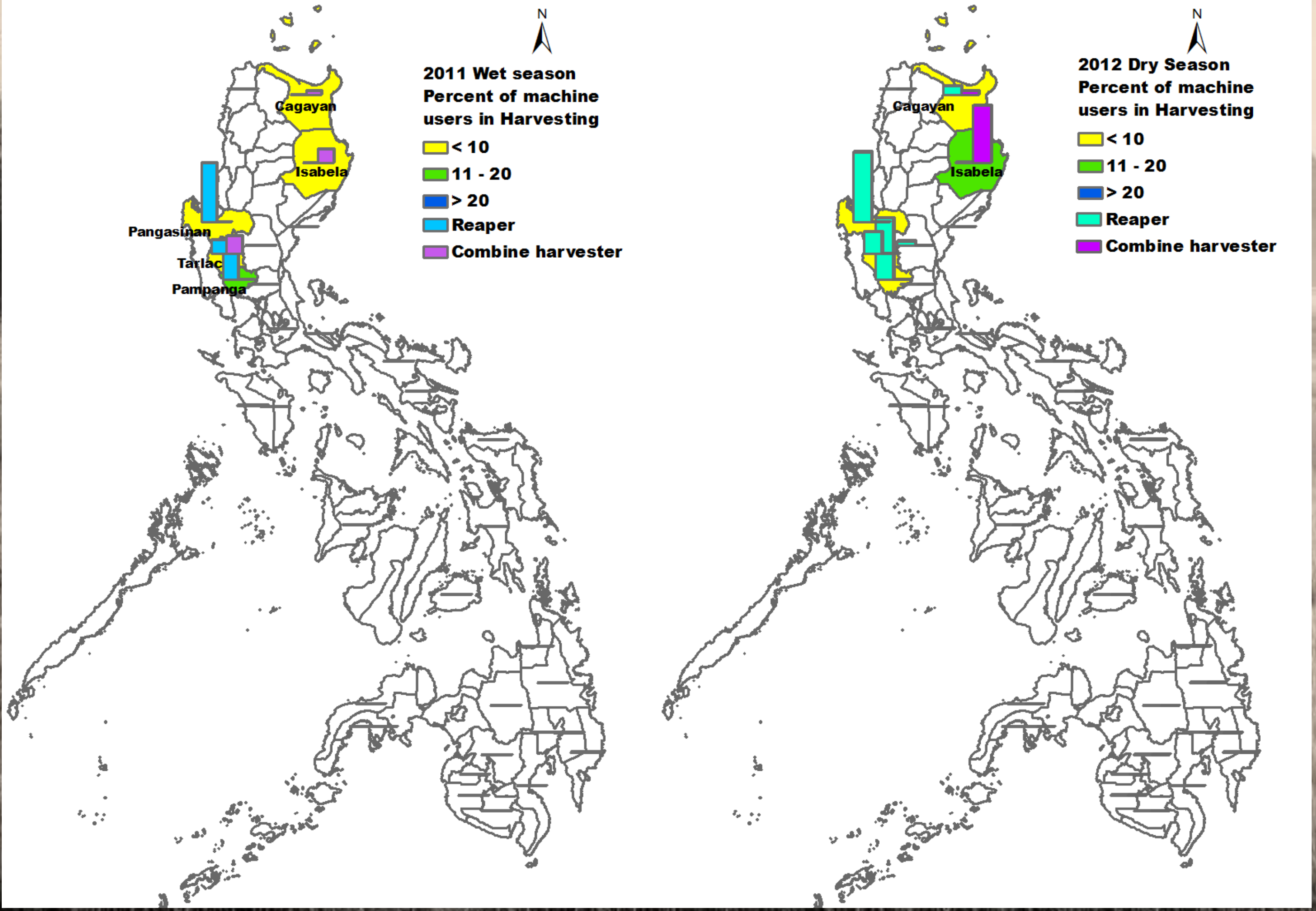
Data and Sources

Category:
1. User
2. Non-User

- **Duration:** March 2015 to December 2016
- **Project sites: Nueva Ecija, Isabela, Tarlac, Pangasinan, & Cagayan**
- **450** sample respondents/ cropping season
- Reference period: 2015 (DS and WS)

Data and Sources

% of machine users in harvesting



Source: RBFHS 2011-2012

Analytical Procedure

A. KIs/FGDs/Surveys

B. Descriptive Statistics

C. Partial Budget Analysis

Preliminary results on DS 2015

RESULTS

Socio-demographic profile

55

years old

(Mean)

25 years

(Mean years in farming experience)

RESULTS

Socio-demographic profile

9 years

(Mean years of schooling)

57%

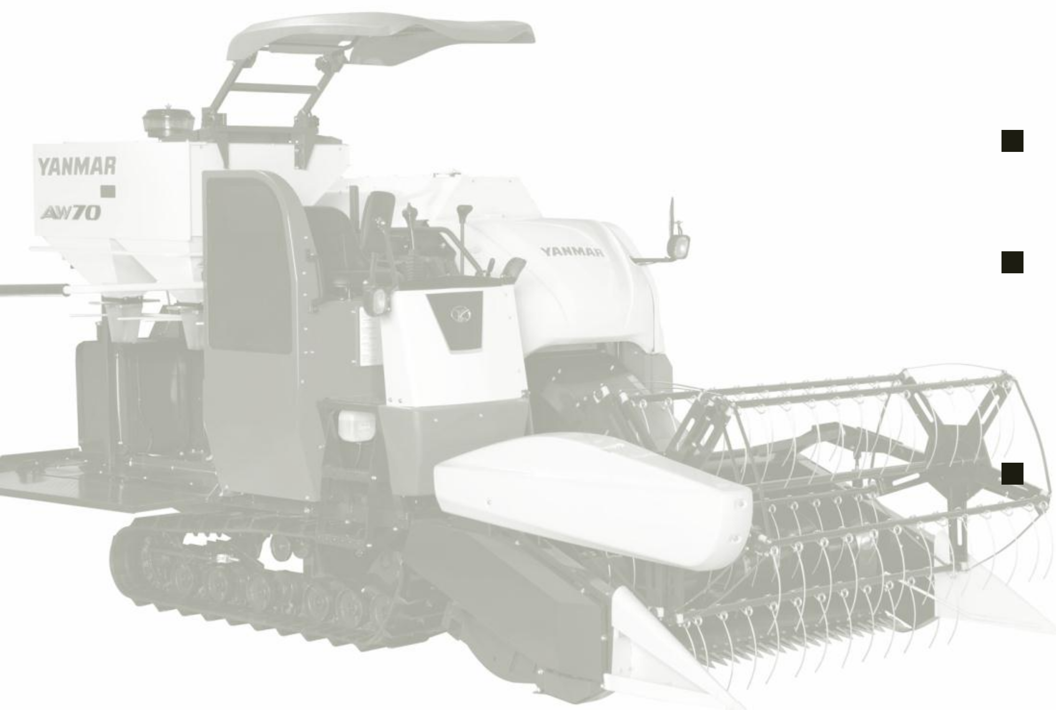
(Participation in rice-related trainings)

Perception and awareness

Reaper
52%

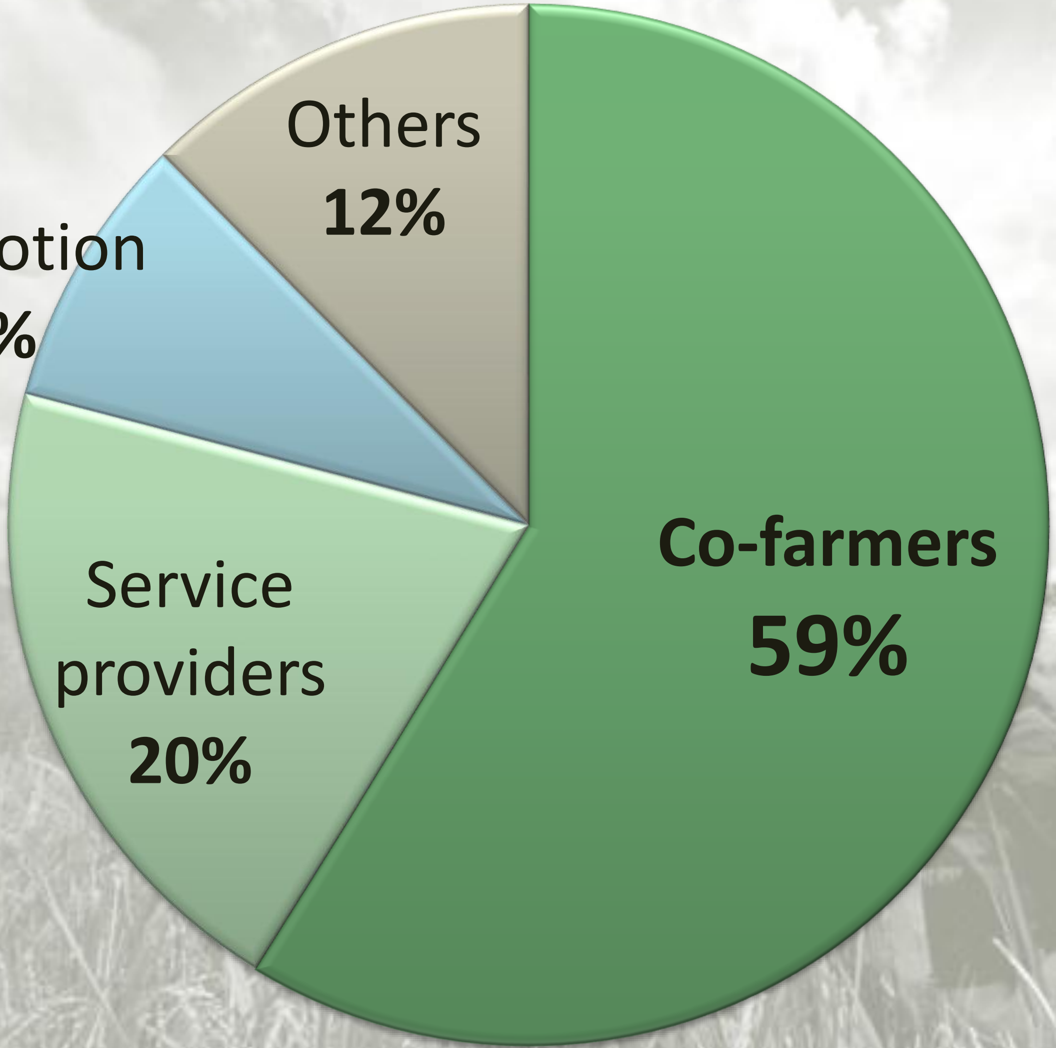
"Halimaw"
38%

Combine
17%

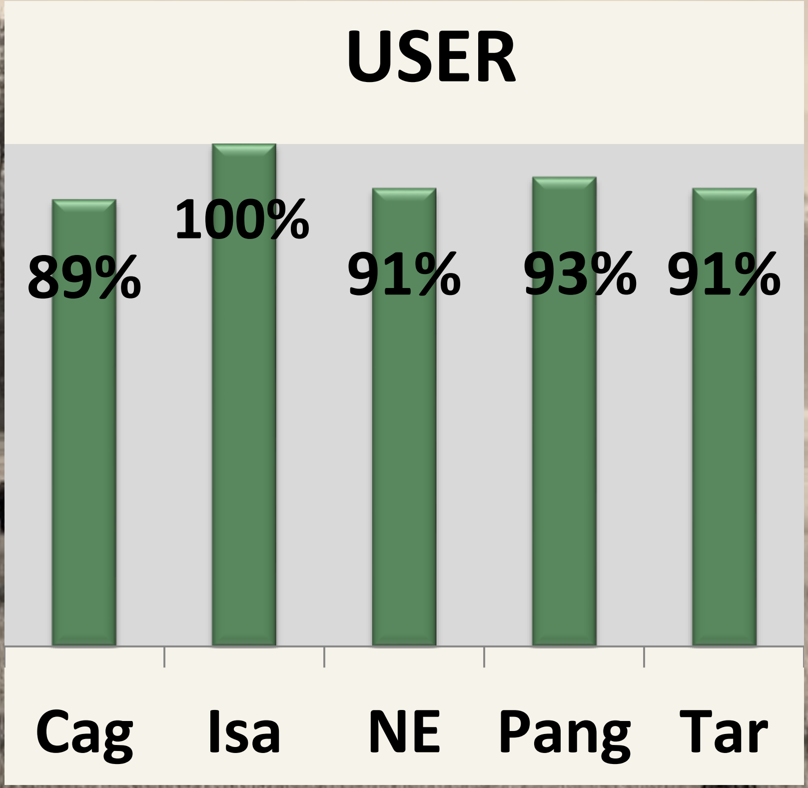


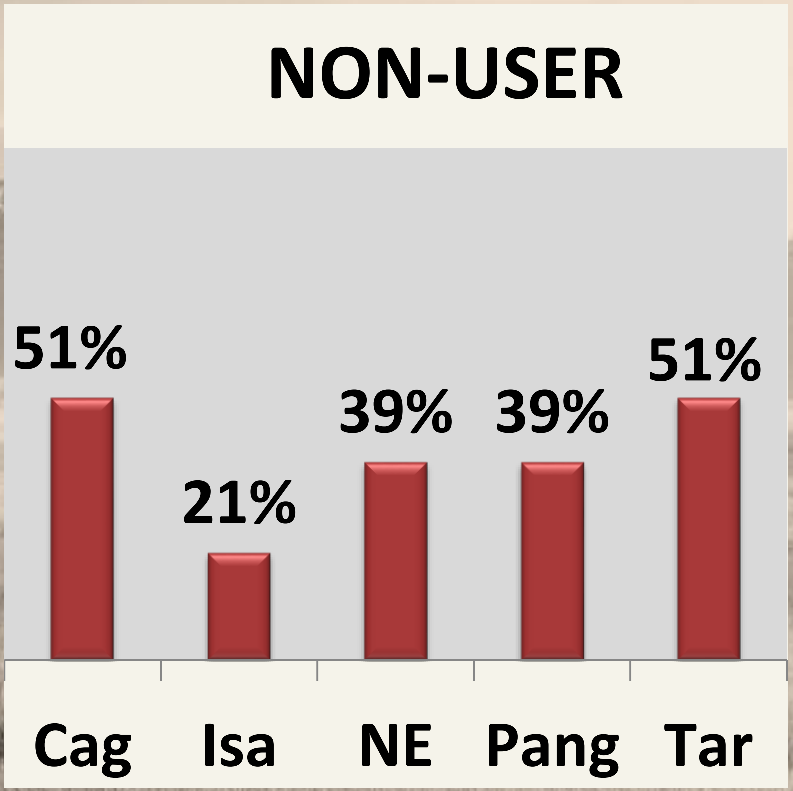
- Fast performance
- Appearance and mechanism
- Affects manual laborers

Sources of information



Willingness to adopt or continue to adopt





- ❑ More than 80% are willing to adopt again among users
- ❑ Surprisingly, only 21% non-users are willing to adopt in Isabela

Advantages of using combine

- **44%** - Fast performance and convenience
- **30%** - Decreases labor costs
- **17%** - Unavailability of manual harvesters
- **14%** - Prevents crop losses
- **5%** - Reduces postharvest losses

Disadvantages of using combine

- **42%** - Affects manual harvesters
- **16%** - Not applicable in the area
- **5%** - Smaller farm area

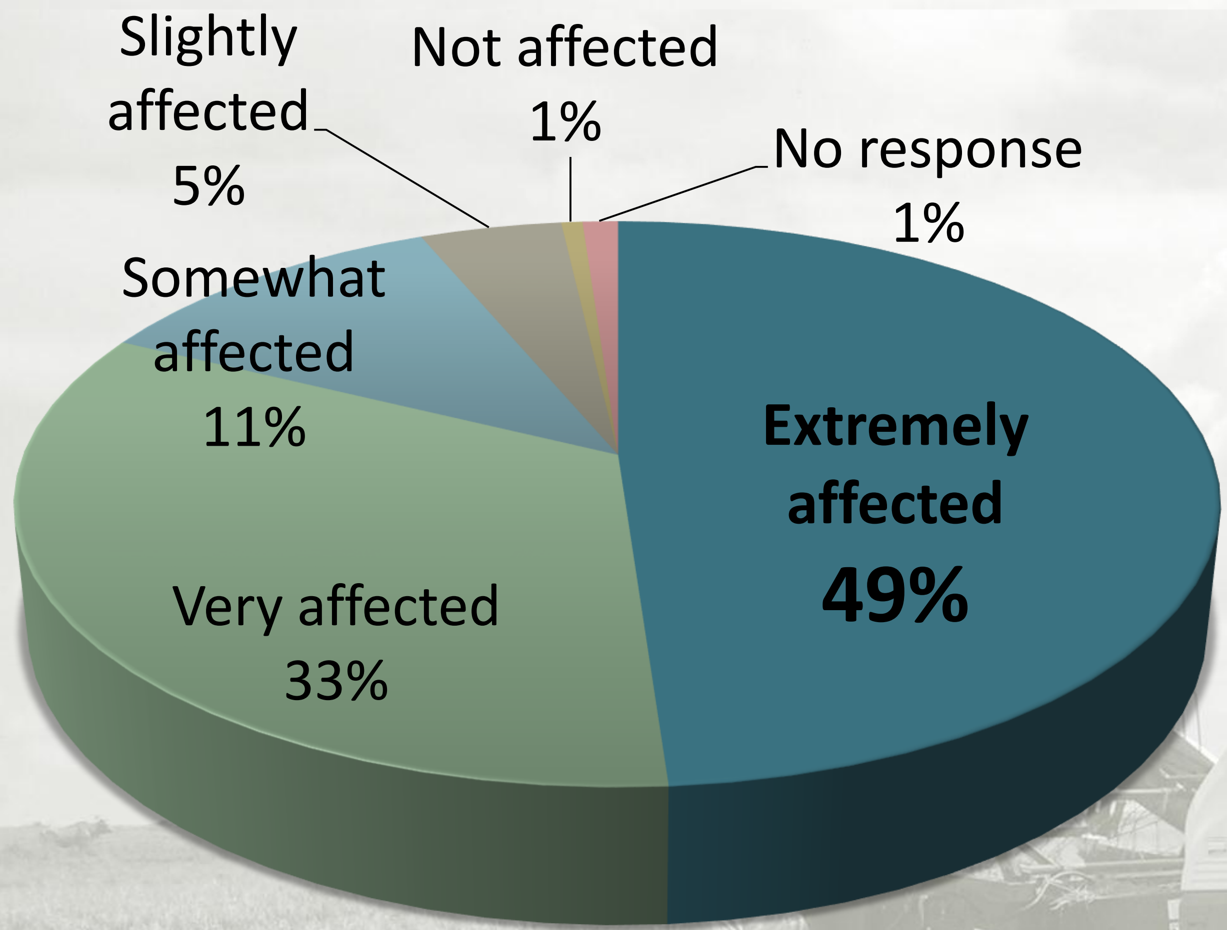
Other adverse reasons for non-adoption:

- Damages the field
- Low quality of palay harvested by combine
- Postharvest losses
- Affordability of machine custom fee

Other issues of using combine

- **12%** - Increases costs on land preparation
- **64%** - Increases costs on transplanting

Social impact



Comparison of labor use (MD/ha)

Province	User	Non-User	Diff
Cagayan	1.85	21.15	-19.30
Isabela	1.74	18.46	-16.72
Nueva Ecija	1.73	16.49	-14.76
Pangasinan	1.49	16.90	-15.41
Tarlac	1.61	14.42	-12.81
TOTAL	**1.69**	**17.48**	**-15.80**

Comparison of yield & costs

Item	User	Non-User	Diff
Yield (kg/ha)	6,073.29	5,595.88	-477.40
Total costs on HT	9,857.18	14,310.46	-4,453.28

Other issues of using combine

- **12%** - Increases costs on land preparation
- **64%** - Increases costs on transplanting

Item	User	Non-User	Diff
Labor cost on land preparation	1,739.12	2,103.07	-363.95
Labor cost on transplanting	7,033.20	7,035.81	-2.61

Partial budget analysis

Reduced Costs	Value
Labor cost (HT)	7,360.81
Labor cost (hauling)	225.57
Fuel and oil (HT)	30.88
Machine custom fee (hauling)	35.20
Fuel & oil (hauling)	1.51
Sacks & Twine	339.76
Food cost (HT)	653.22
Total reduced costs	**8,646.95**

Added costs	Value
Machine custom fee (HT)	4,193.68
Total additional costs	**4,193.68**

Change in net income : PhP 4,453.28

Summary

1. Adoption due to its performance, reduction in labor costs, labor shortage during harvesting, prevents crop losses, and reduction in PH losses
2. Non-adoption due to displaced laborers, non-applicability in the area, smaller farm size.
3. Land preparation and transplanting costs were perceived to increase due to adoption of combine but preliminary results showed otherwise.

Summary

3. Harvesting and threshing labor requirements significantly decreased by 83 percent.

4. Harvesting and threshing labor costs significantly decreased by 18 percent.

6. Users of combine harvester receives a higher net income of PhP 4,453.28, compared to non-users.

*"Biggest factors in rice farming is the high quantity of labor use and low amount of mechanization. The future of Philippines' rice production is really on cutting out labor use out of the system. There maybe problem with practicing direct seeding or problem with people asking for more wages in transplanting, **BUT** these are problems that needs to be solved. If you don't make labor cost down, you will never be out of it."*

- Dr. David C. Dawe, FAO

End of presentation.....

IRRI

On-farm Survey on Dry Direct Seeded Rice in the Drought-prone Environment of Pangasinan province

Hoshie Ohno[1], Nino Banayo[1], Crisanta Bueno[1], Eden Gagelonia[2], Elmer Bautista[2], Yoichiro Kato[1]

1: International Rice Research Institute (IRRI)
2: Philippine Rice Research Institute (PhilRice)

Rice Science for a Better World

Introduction

Rainfed lowland system

- **30 %** of harvested area is under Rainfed in the Philippines
- **Low yield** relative to irrigated area because of drought
  Rainfed: 3.07 t/ha, Irrigated: 4.43 t/ha (Source: PSA, 2014)

Dry Direct Seeded Rice (DSR)

- DSR can **reduce water & labor requirements** compared to transplanting rice (TPR)

Germplasm x Environment x Management

Rainfed

Mechanized DSR

Multi-Purpose Seeder (MP seeder)

Courtesy of ED Gagelonia and EU Bautista

MP seeder trial at PhilRice CES

MP seeder (58 kg/ha)

Broadcasting (60kg/ha)

* Establishment rate (%) = actual emergence (/m^2) / seeds (/m^2)

	seeding rate (kg/ha)	population (/m^2)	Establishment rate (%)	sowing depth (mm)
MP seeder	58	168.9	78.6	31.4
Furrow	60	141.9	63.9	17.0
Broadcasting	60	130.4	58.7	16.3
Broadcasting	150	316.3	56.9	30.0

Technology for DSR in rainfed

DSR
Less water & Labor ⟷ Not widely acceptance

1 **What's farmer needs to develop acceptable technology**

2 **Germplasm x Environment x Management**

Germplasm → Drought tolerant variety

Environment: **Rainfed** **Drought-prone**

Management → Dry Direct seeding

On-farm trial in Umingan, Pangasinan

Purpose

1 **Current situation of DSR for smallholder farmer**

- Driving-force & Constrain to shift from TPR to DSR
- How does farmers manage in DSR

2 **Agronomic performance** of
NSIC Rc348 (Sahod Ulan12) and PSB Rc10 in DSR

Sahod Ulan12	Rc10
103 DAS	106 DAS

Methodology

Site: Umingan, Pangasinan
3 barangays (Casilan, Sta.Rosa, Prado)
22 farmers participated
*Same 22 farmers was interviewed to identify current situation

Variety: NSIC Rc348 (Sahod Ulan 12), PSB Rc10

Management: DSR by **Farmer's practice**

Measurements: Seedling rate, NDVI, SPAD, Weed scoring

Soil hydrology score: 0 (Standing water),1 (Saturated)
2 (Moist), 3 (Dry) weekly recorded

IRRI

Results

Current situation of DSR in Umingan

7 farmers (per 22 farmers) changed from TPR to DSR within 5 years

Driving-force	Labor cost Water shortage (delay of rainy season)
Constrain	Weed Scarcity of knowledge/information

- Some farmers use wet direct seeded rice (WSR) instead of DSR to save labor cost

How does farmers manage in DSR?

- Land preparation:
  Rotovator – **hand tractor** – broadcasting – hand tractor
  (Rotovator – broadcasting – hand tractor)

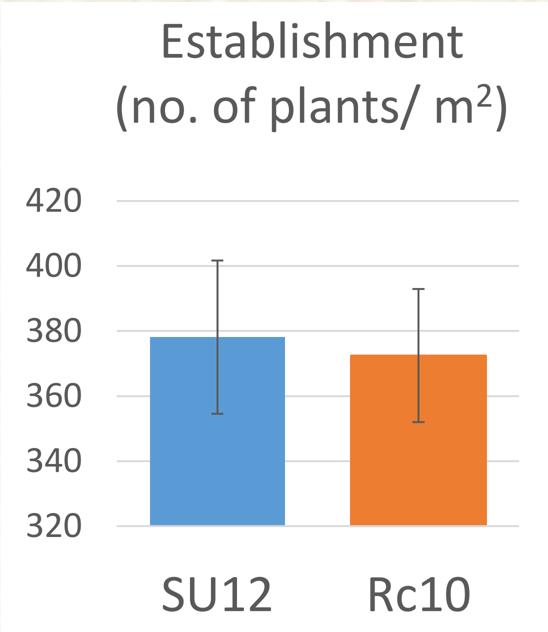
- Weed management

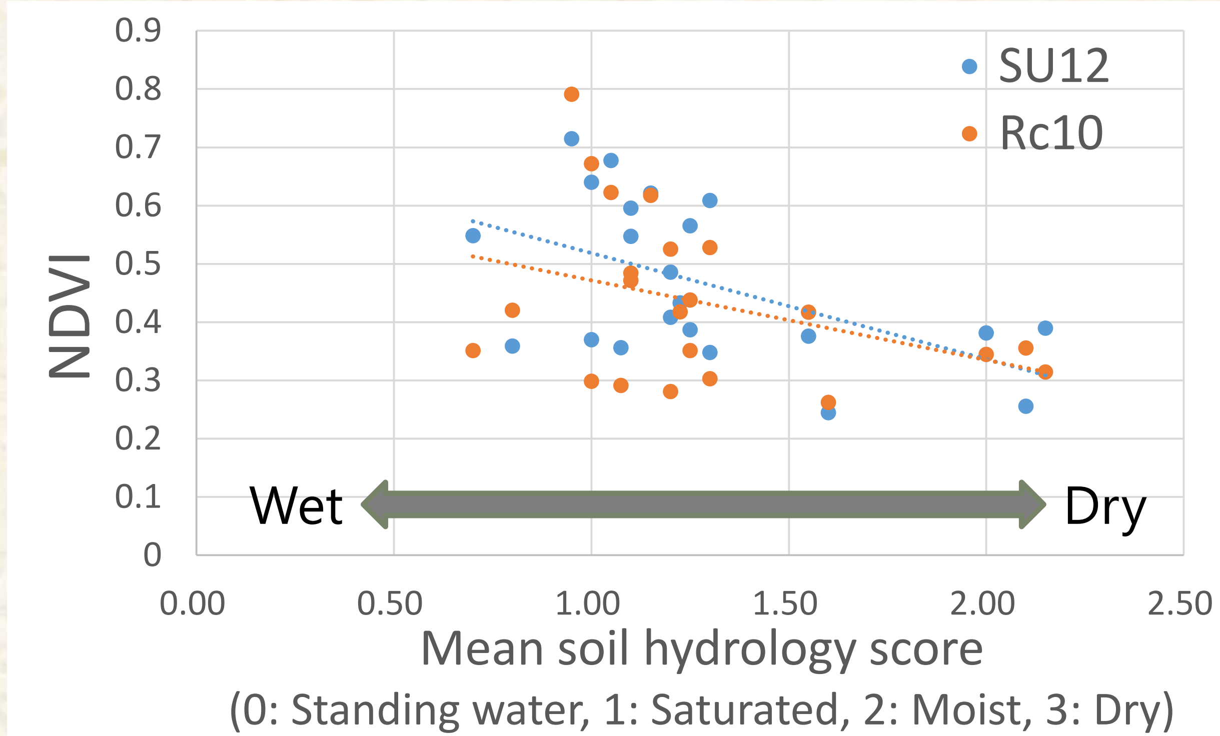
Pre-emergence herbicide	**3** farmers (per 22 farmers) use
Post-emergence herbicide	All farmers use once/ twice

- Nutrient management
  Basal application: **18-37 DAS** (days after sowing)
  14-14-14 (4-9 bags/ha), urea (3-5 bags/ha) etc.
  Topdressing : around 3 weeks after basal

Farmer's management is still on-going…

Early growth stage (30 DAS)





* NDVI (normalized difference vegetation index): show crop canopy reflectance

Flowering stage

SU12 is much taller than Rc10

→ concern: **Lodging**

Farmers apply much higher fertilizer than recommendation of RCM (Rice Crop Manager)

e.g.) Total= 14-14-14: 10 bags/ha

↕

RCM= 14-14-14: 2.5 bags & urea: 2.5 bags/ha

IRRI

Conclusion

DSR has been accepted by smallholder farmers in rainfed to <u>save labor cost and address water shortage</u>

1. There are differences in knowledge and management of DSR among farmers (They rely on own/neighboring experience)

   → How to introduce appropriate management to smallholder farmers

2. Mostly farmers like SU12 but concern of Sahod Ulan 12 is lodging

   → Appropriate nutrient management is required for Sahod Ulan 12

Acknowledgment

- The activity is supported in part by DA-BAR (Associated Technology Project- MP seeder project in Rainfed Lowland).
- MAO and technicians of Umingan, and all the farmers who participate.

"STATE OF FARM MECHANIZATION OF IRRIGATED LOWLAND RICE IN REGION XI"

J.C. Escario[1], D. Espiritu[2], M. Pinohan[3] & D. Langahin[3]

[1]SRSI Chief PDS Section-RAED, [2] Chief- Agricultural Engineering Research Section, Engineer I
Agricultural Engineering Research Section – Research Division
Department of Agriculture Regional Field Office XI, 8000 Davao City
(082) 226 36 25

INTRODUCTION

Regional Profile

In 2014, Davao Region ranked 14th in terms of rice production contributing about 2.38% or 452,267.00 MT to the national output of 18,967,826 MT, according to Philippine Statistics Authority (PSA).

However, in terms of yield performance (4.36 MT/ha.), the region ranked 3rd and was more than the national average yield of 4.00 MT/hectares.

Various data on rice production and land in Region XI are readily available but for the level of mechanization for this areas has yet to be established.

This study focused on the assessment of the major farm operations that needed mechanization; **1) land preparation, 2) planting, 3) crop care and maintenance, 4) harvesting, and 5) postharvest.**

OBJECTIVES

General Objective:

To provide **Regional Profile of the Level of Mechanization** of Region XI for the proper planning, identification, and allocation of future interventions for irrigated lowland rice.

Specific Objectives:

- Establish an updated inventory on farm mechanization
- Provide updated map of the production area versus mechanization
- Provide data of level of utilization

METHODOLOGY

Pre-implementation Stage

- Consolidation of the available five (5) years data of farm mechanization interventions of the DA RFO XI, other government agencies, non-government agencies and the private sector to fall part of the initial working data (data includes volume of distribution and the corresponding field capacity of the equipments).

Implementation Stage

1. Conduct series consultation and planning workshop with various stakeholders for the verification of the consolidated initial data.
2. Forging of the final master list of the various farm mechanization interventions. All data gathering and analysis will emanate from this master list.
3. Site validation of the items listed in the final master list for the various farm mechanization interventions.
4. Come up with validated data on the level of mechanization per province versus the existing land area.
5. Presentation of the validated data to the various stakeholders.
6. Establish a Regional Profile of the Level of Mechanization in Region XI.

RESULTS AND DISCUSSIONS

Total Horsepower per Farm Operations

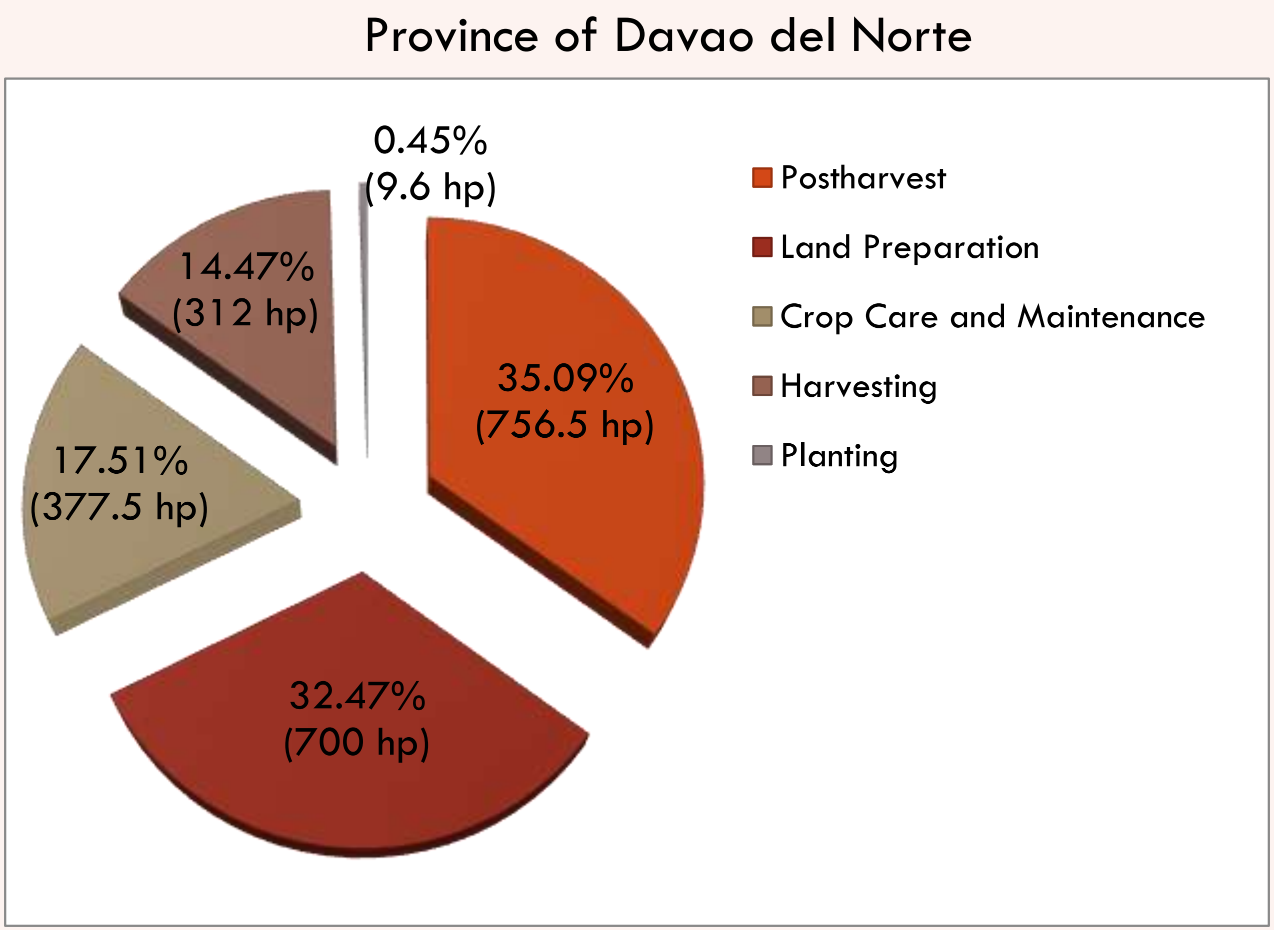


Figure 1. Highly mechanized farm operation is **Postharvest** with 35.09%.

POSTHARVEST

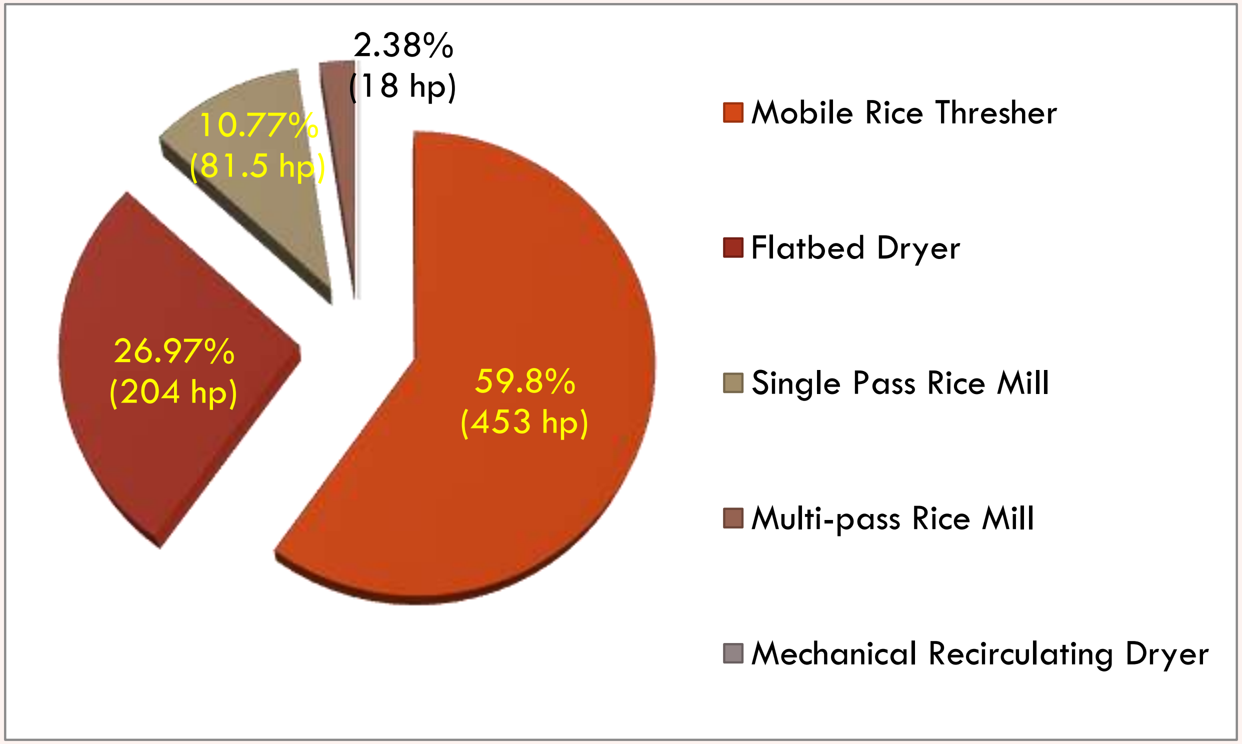
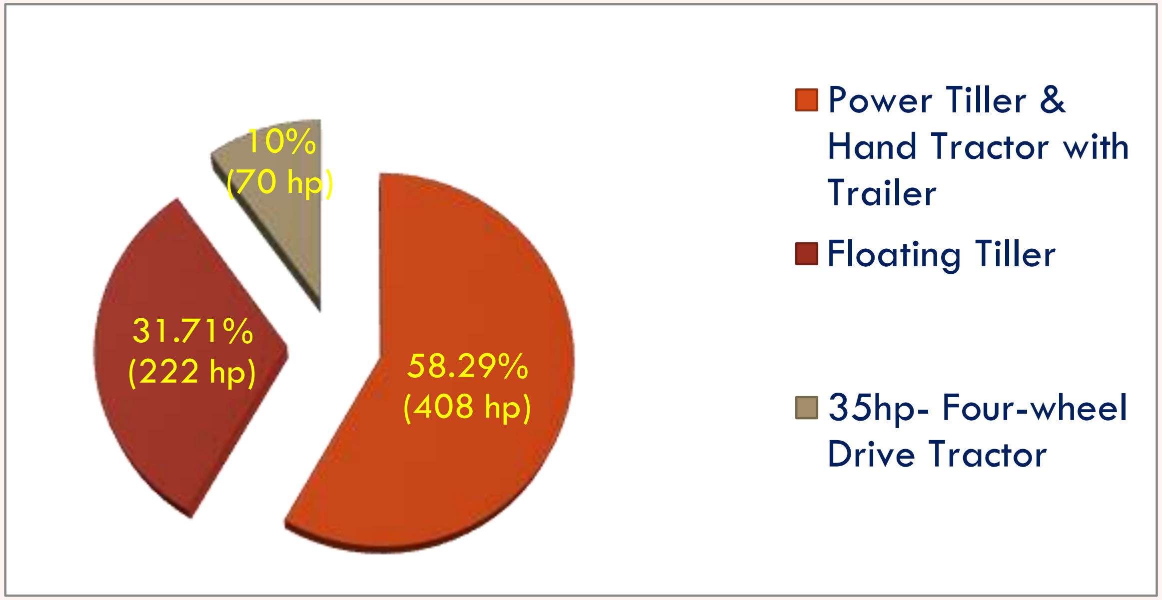


Figure 2. **Mobile Rice Thresher** showed the greater demand on power utilization with 453 horsepower.

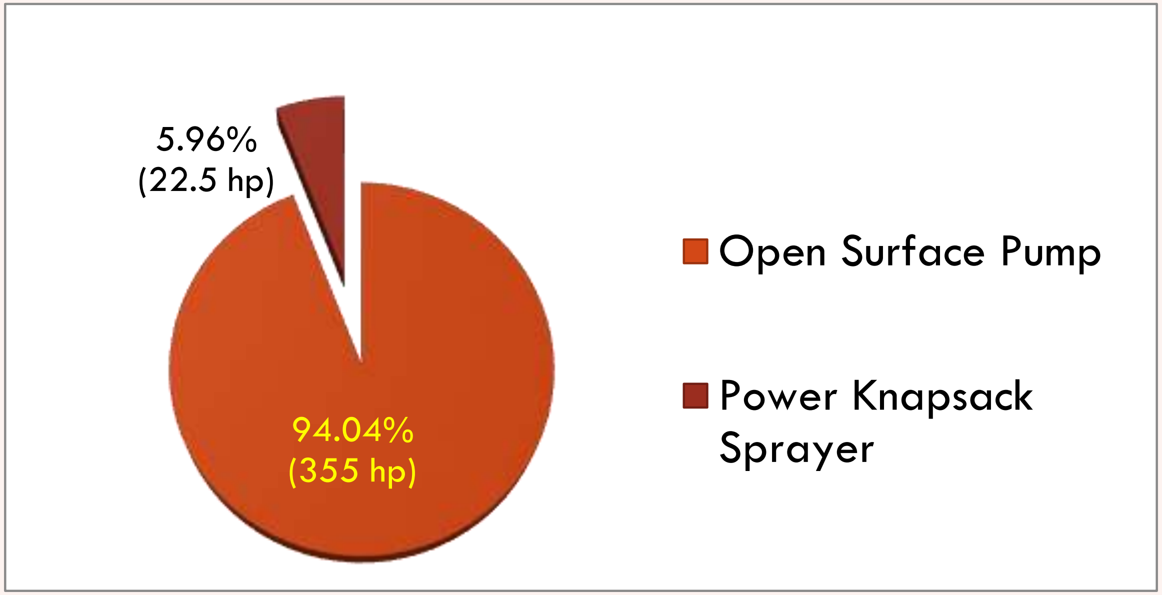
LAND PREPARATION



LAND PREPARATION.

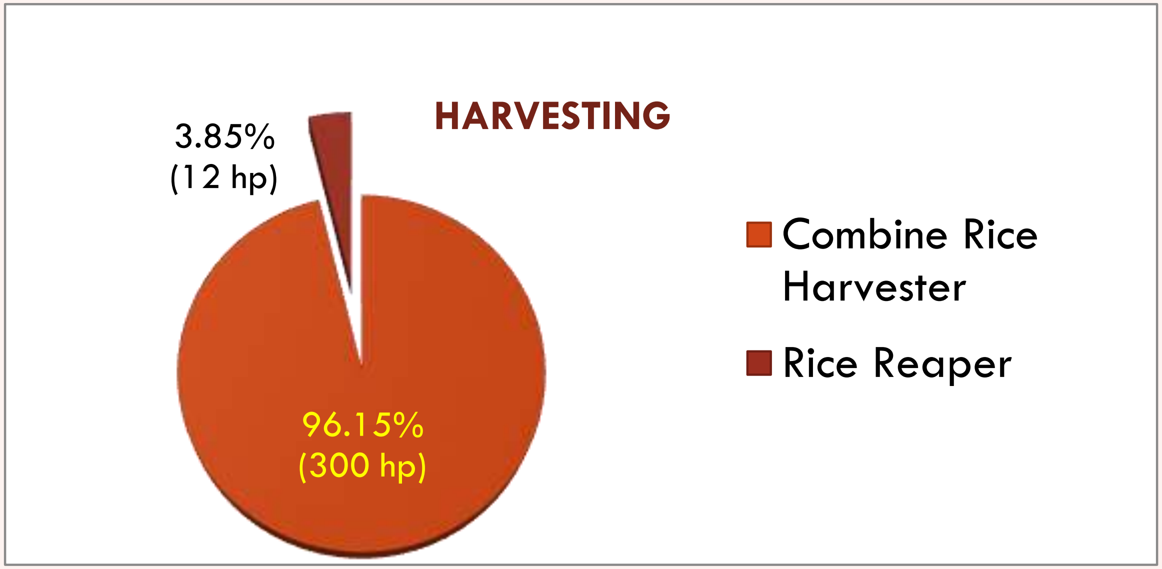
In Davao del Norte, the highest power utilized of land preparation equipment was the **Power tiller and Hand Tractor with Trailer** with 58.29% horsepower being utilized.

CROP CARE AND MAINTENANCE



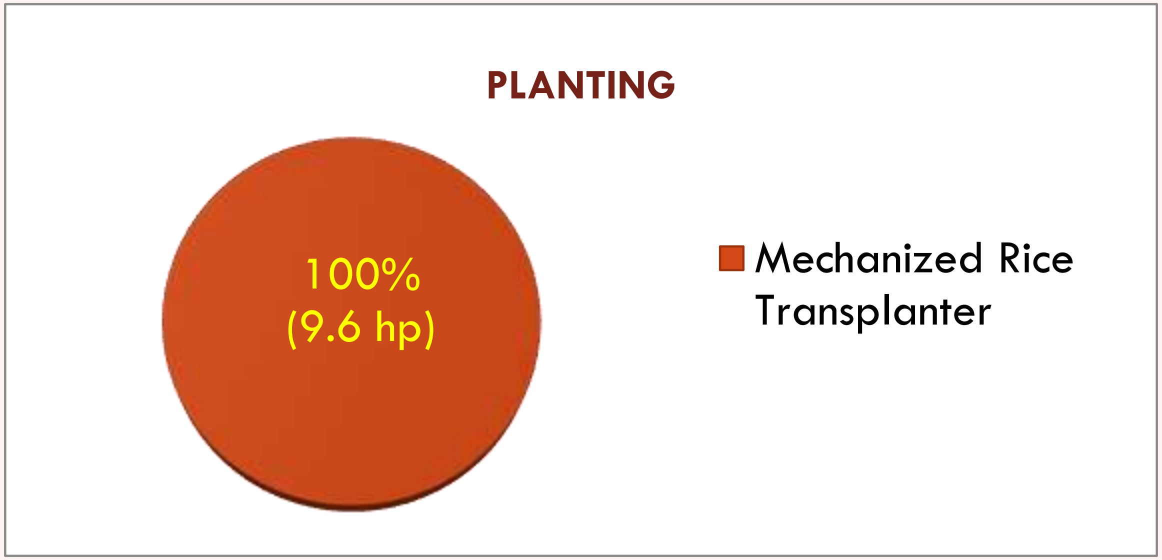
CROP CARE AND MAINTENANCE.

The province of Davao del Norte shows greater percentage of utilization on the **Open Surface Pump** with the 355 horsepower used.



HARVESTING.

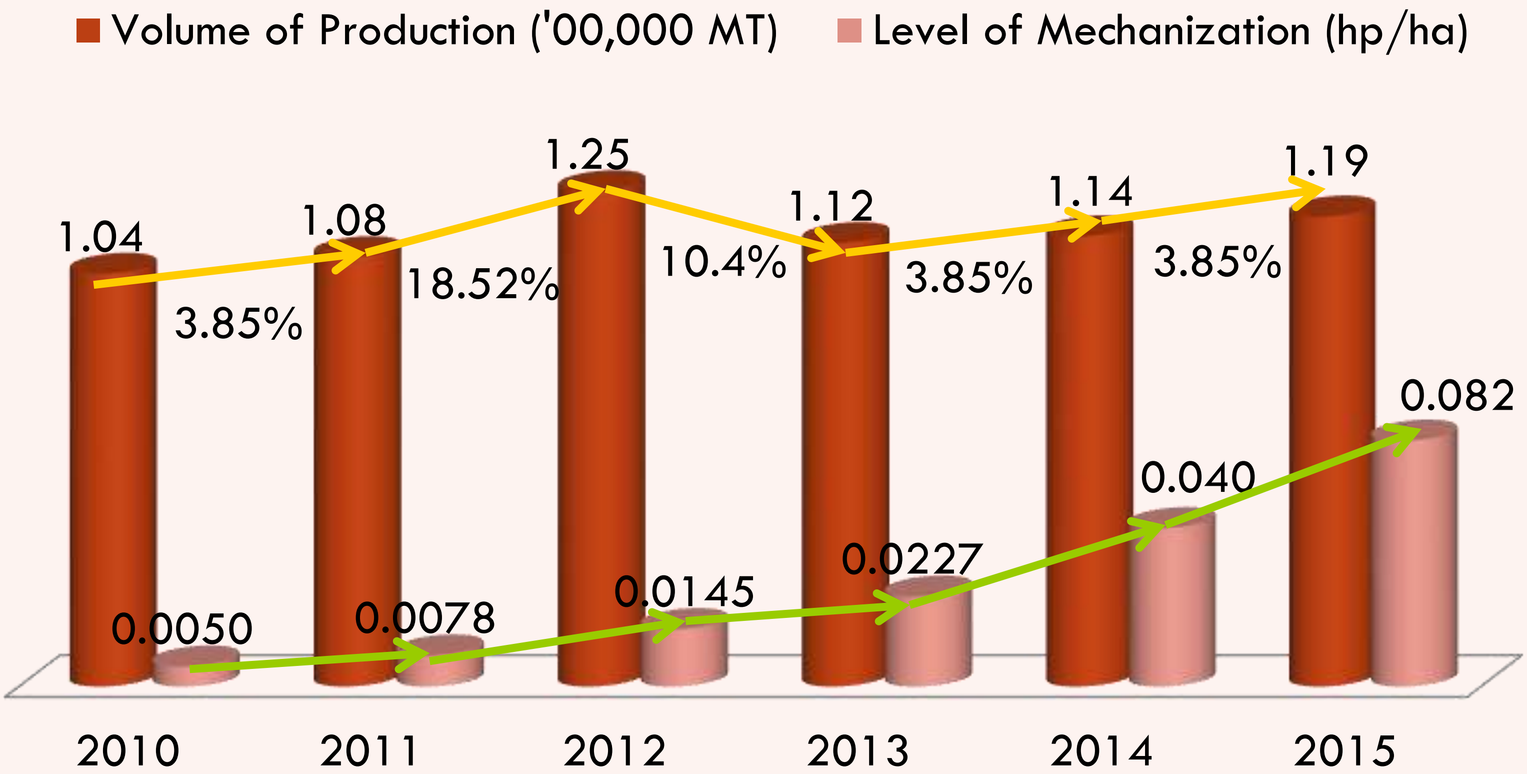
The greatest number of utilized machineries in terms of Harvesting was the **Combine Rice Harvester,** with 300 hp delivered or 96.15%.



Planting.

Only Walk Behind **Mechanical Transplanter** is present in the area.

COMPARISON BETWEEN VOLUME OF PRODUCTION AND LEVEL OF MECHANIZATION



The volume of production from year 2010-2015 of the province of Davao del Norte on the irrigated palay versus the level of mechanization every year.

Percent Area Mechanized

Provinces	Actual Area Mechanized (has.)	Area Harvested (2015, has.)	Percent Area Mechanized
Davao del Norte	2,700.6	26,250	10.29%
Davao Oriental	-	12,043	-
Davao del Sur	-	25,812	-
Compostela Valley	-	21,046	-
Davao City	-	2,466	-

The percent area mechanized was derived by dividing the actual area mechanized thru survey validation in the different provinces of Davao Region to the total area harvested from Philippine Statistics Authority CY 2015

Percent Utilization of Farm Mechanization

Farm Operation	Total Horsepower Delivered (hp)	Total Horsepower Utilized (hp)	Percent Utilization
Postharvest	789	756.5	96%
Land Preparation	784	700	89%
Crop Care and Maintenance	401.5	377.5	94%
Harvesting	312	312	100%
Planting	9.6	9.6	100%

The most utilized farm operation was **Haresting** and **Planting** yet the **Land Preparation** showed the lowest farm utilization among other major operations.

Level of Mechanization

Provinces	Total Horsepower	Total Area Harvested (2015, has)	Level of Mechanization (hp/ha)
Davao del Norte	**2,155.6**	**26,250**	**.0822**
• Postharvest	756.5	26, 250	.0288
• Land Preparation	700	26, 250	.0267
• Crop Care and Maintenance	377.5	26, 250	.0144
• Harvesting	312	26, 250	.0119
• Planting	9.6	26, 250	.0004

The highest mechanized farm operation was **Postharvest** with a level of mechanization of 0.288 hp/ha in the province of Davao del Norte; hence, **Planting** was the lowest level of mechanization with 0.0004 hp/ha

SURVEY,VALIDATION AND CONSULTATION

THANK YOU

DEPARTMENT OF AGRICULTURE RFO XI

RESEARCH DIVISION

Regional Agricultural Engineering Research Section

RICE VALUE CHAIN ANALYSIS IN WESTERN VISAYAS

A Joint Research Project of
West Visayas State University – College of Agriculture and Forestry
and the Department of Agriculture, RFU 6

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Mrs. Ma. Anne S. Oren

Introduction

- Western Visayas is 3rd in the National Production for Palay (PSA, 2016)
- Palay is one of the major agricultural crops in the region (DA, 2016)
- Many rice farmers are economically below poverty level despite of government support.
- Thus, there was a need to study about rice value chain analysis.

Introduction

Significance of the Study

- ✓ Provided vital information to government agencies (DA, NIA, LGU'S, Academe, others)
- ✓ Basis for further study of other researchers

Objectives

1. Describe the socio-economic profile of rice farmers & traders

1. Evaluate the production practices

2. Determine the profitability of rice production and trading

3. Assess the value added in the various stakeholders

4. Characterize the marketing channel in rice

Methodology

- Respondents
- Data Collection Procedure
- Cost and Return Analysis
- Value Chain Analysis

TOP RICE PRODUCING MUNICIPALITIES PER PROVINCE IN WV (DA, 2014)

Results and Discussion

SOCIO-ECONOMIC PROFILE		
PARAMETER	FARMER	TRADER
AVE. AGE (YRS. OLD)	54.4	51.3
CIVIL STATUS	89.2% were married	More than 90% were married
AVE. NUMBER OF CHILDREN	6	4
EDUC. ATTAINMENT	47.8% have reached high school level	79.6% have reached college level
PRIMARY OCCUPATION	93.1% full time farmer	70.4% full time rice traders

Results and Discussion

Farm Profile and Farming Practices

- The average farm size in WV was 1.35 has.
- 59.6% of the farms in the region were irrigated.
- 54.5% used hand tractor while 45.5% used carabao in land preparation.
- 39.5% practiced direct seeding while 60.5% practiced transplanting
- All farmers used commercial fertilizer and chemicals
- All farmers practiced manual harvesting method

Results and Discussion
Farming Practices

- 88.8% used mechanical thresher
- Majority of farmers practiced two cropping per year
- Average yield/ha. 3.036 MT (1st crop.) & 2.767 MT (2nd crop.)
- 52.4% of palay produced was sold after harvest while the remaining palay was kept for household consumption
- Generally palay sold was picked up at farmers place

Marketing Information		
Ave. Price of Palay (Pesos)	Wet	Dry
1st Cropping	12.96	15.34
2nd Cropping	13.08	15.86
Ave. Transport Cost (Farm Gate to Market)	₱11.62/cav.	

Results and Discussion

Profitability

Farmer

First Cropping	Pesos
A. Income Value of Palay	46,464
B. Expenses 1. Labor 2. Farm Inputs Total	14,034 10,807 24,841
C. Net Income	21,623
D. ROI	87.0%

Second Cropping	Pesos
A. Income Value of Palay	42,795
B. Expenses 1. Labor 2. Farm Inputs Total	12,313 11,412 23,725
C. Net Income	19,070
D. ROI	80.4%

Trader

First Cropping	Pesos
A. Income Value of Clean Rice	950.93
B. Expenses 1. Value of 1 cav. 2. Drying, Milling, Transport Total	674.96 104.32 779.2
C. Net Income	171.65
D. ROI	22.0%

Second Cropping	Pesos
A. Income Value of Clean Rice	982.87
B. Expenses 1. Value of 1 cav. 2. Drying, Milling, Transport Total	685.30 104.32 789.62
C. Net Income	193.25
D. ROI	24.5%

Results and Discussion

Income Share of Farmer and Trader in a Cavan of Palay (1st Cropping)

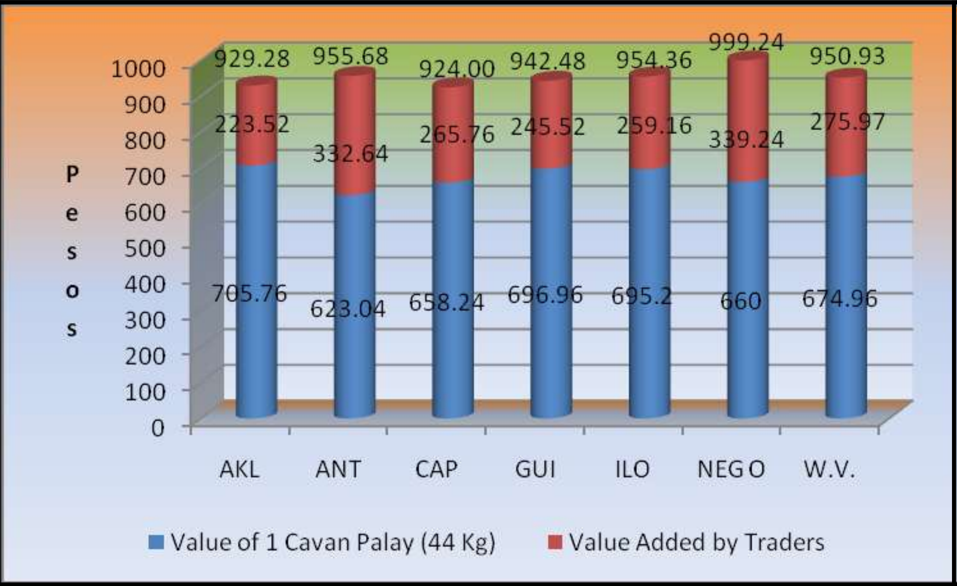
Stakeholder	*Income Share as % of Combined Net Income*	*Percent Share of Total Expenses*	*Expense/ Kg Palay*	*Net Income/Peso Expense*
Farmer	63.2	77.9	8.38	0.78
Trader	36.8	22.1	2.37	1.61

Income Share of Farmer and Trader in a Cavan of Palay (2nd Cropping)

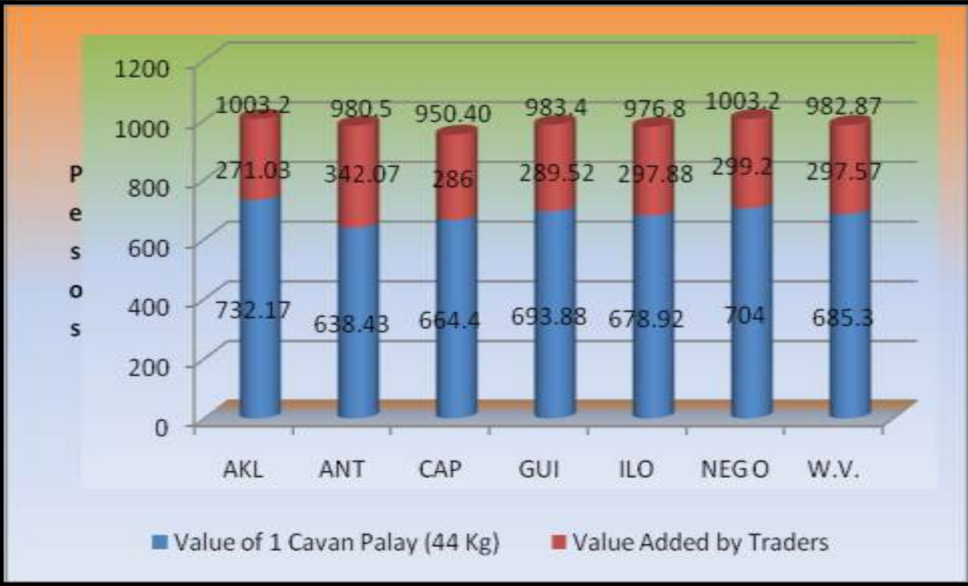
Stakeholder	*Income Share as % of Combined Net Income*	*Percent Share of Total Expenses*	*Expenses/ Kg Palay*	*Net Income/Peso Expense*
Farmer	61.10	77.90	8.36	0.82
Trader	38.90	22.10	2.37	1.85

Results and Discussion

VALUE ADDED BY TRADERS.MILLERS AFTER SALE OF PALAY BY FARMERS



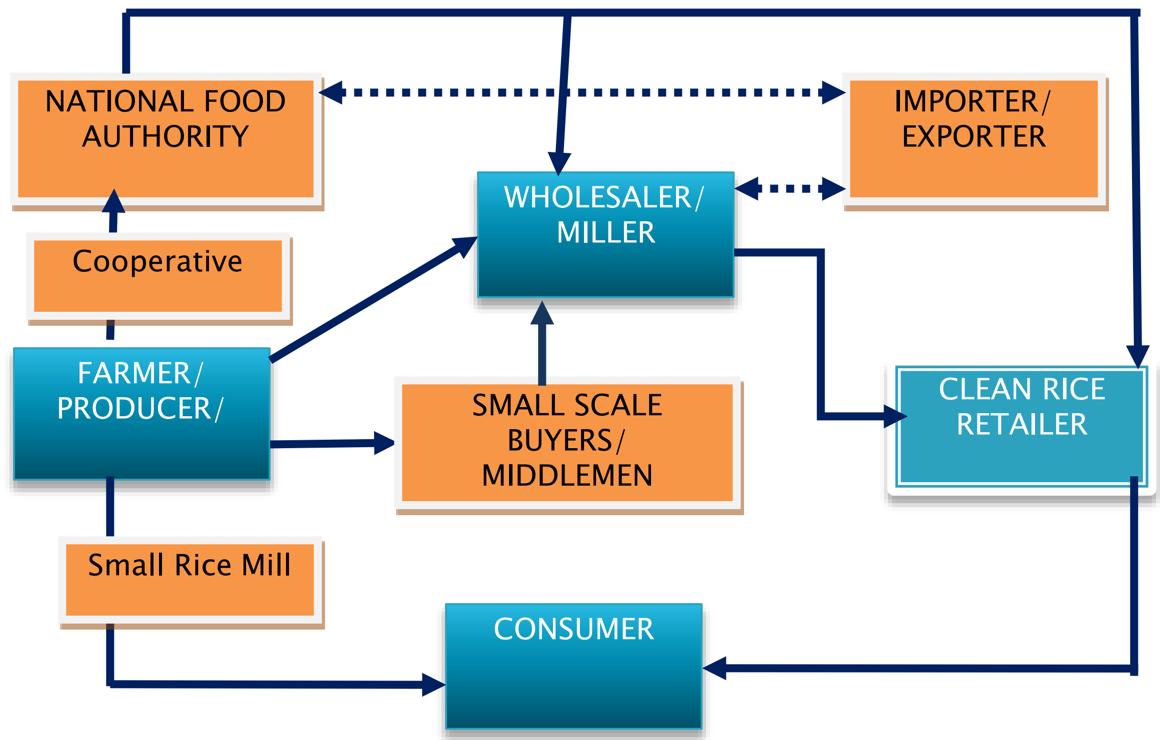
First Cropping



Second Cropping

RESULTS AND DISCUSSION

RICE MARKETING CHANNEL IN WESTERN VISAYAS

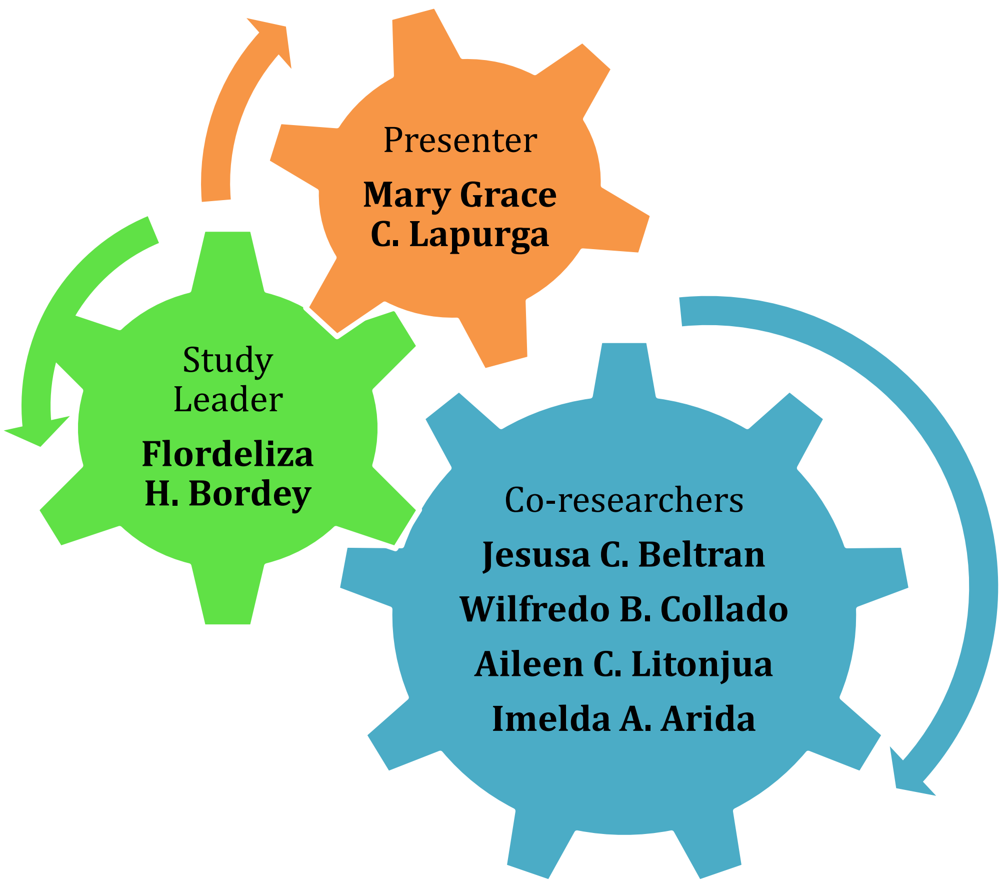


CONCLUSION

- Rice farmers and traders in WV were relatively old
- Many of them were educated at least in the secondary level.
- The average farm size was generally smaller with 1.35 has.
- All farmers were using commercial fertilizer and chemicals.
- More than 50% of palay produced was sold after harvest.
- Transport cost from farm gate to market was quite high.
- Rice farming in WV was considerably profitable.
- Traders enjoyed a better income than farmers.
- Rice trading in WV involved various key players.

Economic Efficiency of Rice Farmers in Asia and the Philippines

29th National Rice R&D Conference
September 8, 2016



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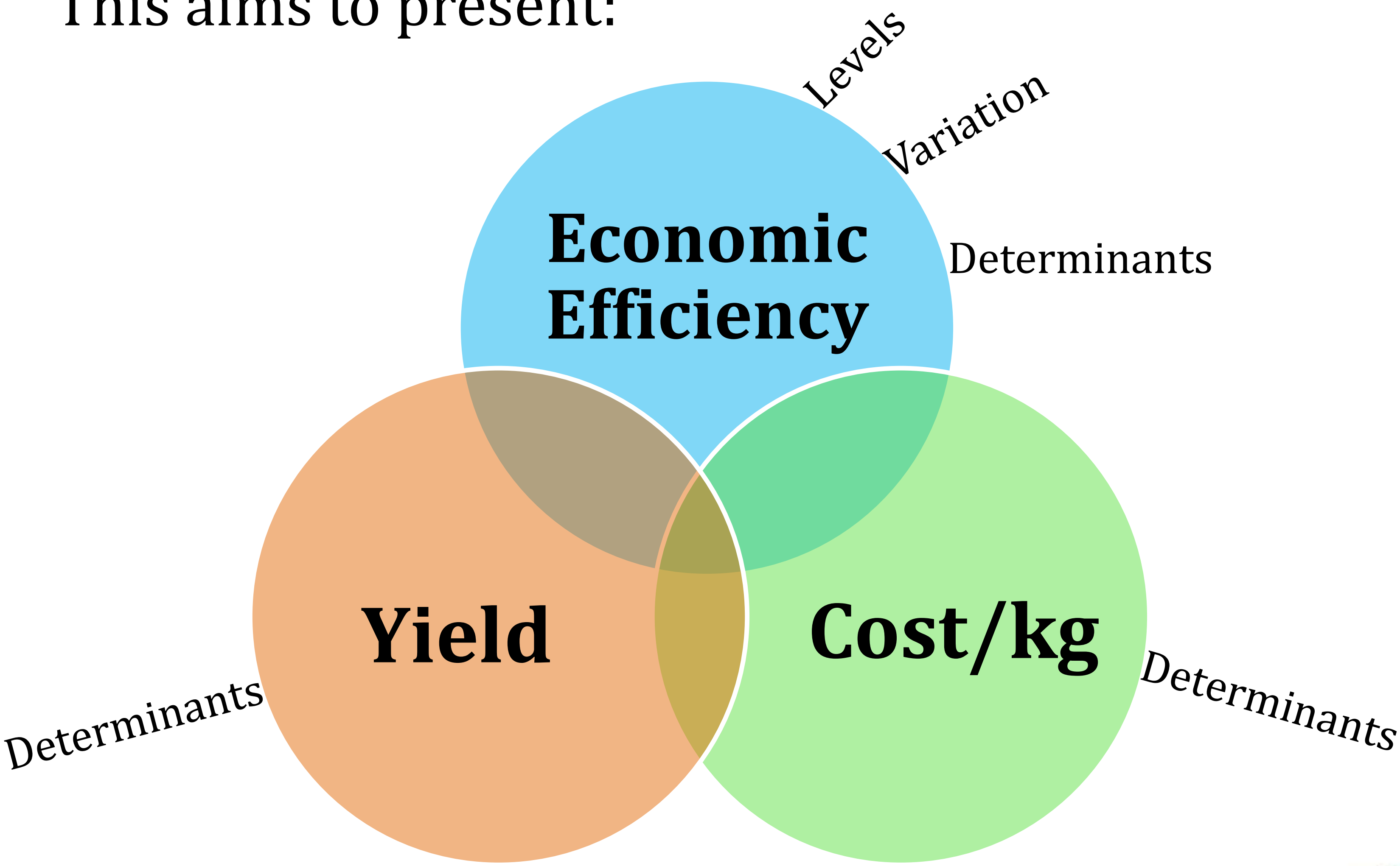
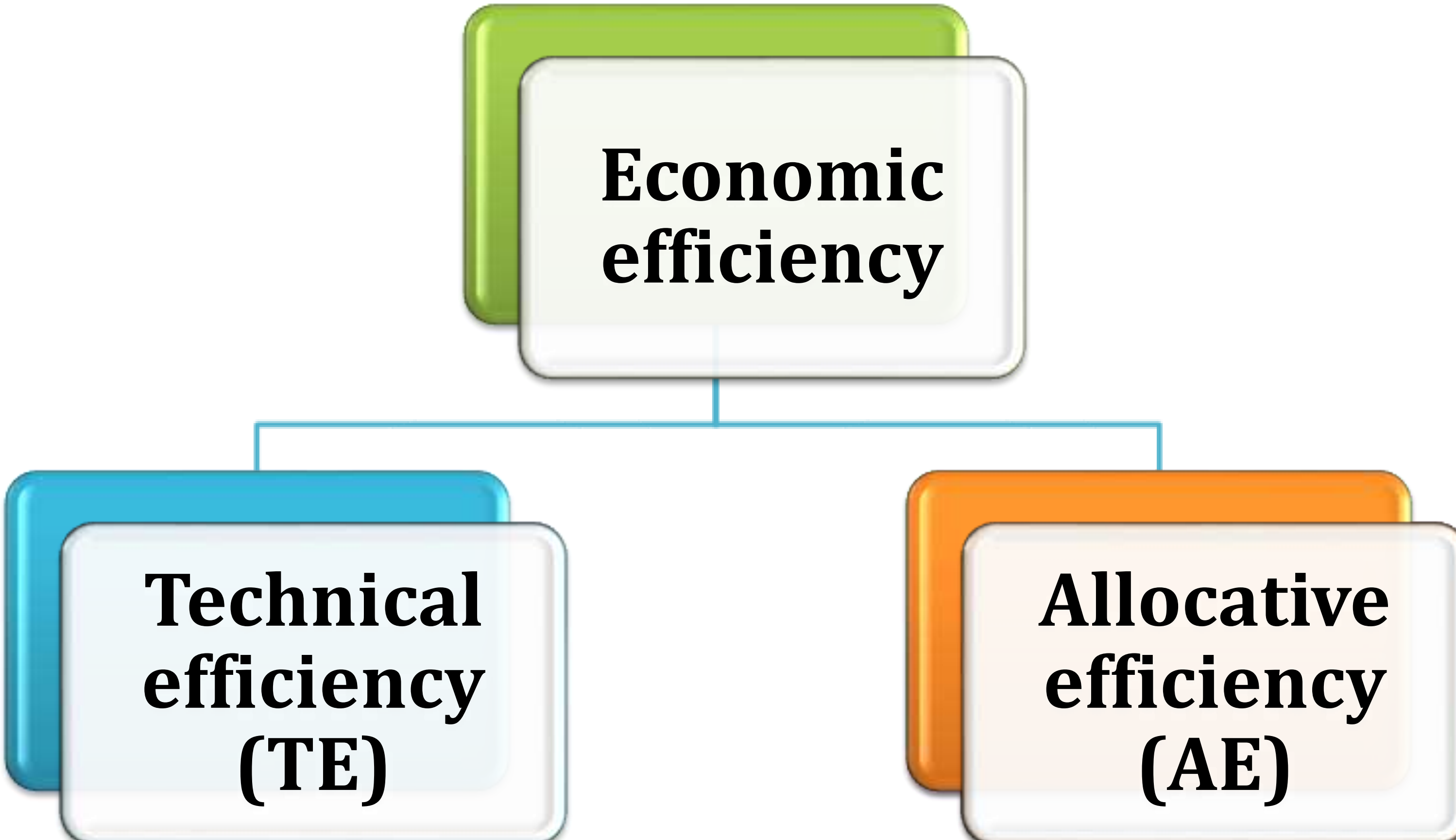
OBJECTIVES

This aims to present:



BACKGROUND

Farell (1957)



1. Benchmarking the Philippine Rice Economy Relative to Major Rice-producing Countries in Asia, 2013

China (Zhejiang)
Thailand (Suphan Buri)
Vietnam (Can Tho)
India (Tamil Nadu)
Indonesia (West Java)
Philippines (Nueva Ecija)

Intensively cultivated and irrigated areas

2. Rice-Based Farm Households Survey (RBFHS), 2011-2012

33 major rice-producing provinces
2,500 rice farmers; 2 cropping seasons
July-Dec 2011 Harvest (wet season)
Jan-Jun 2012 Harvest (dry season)

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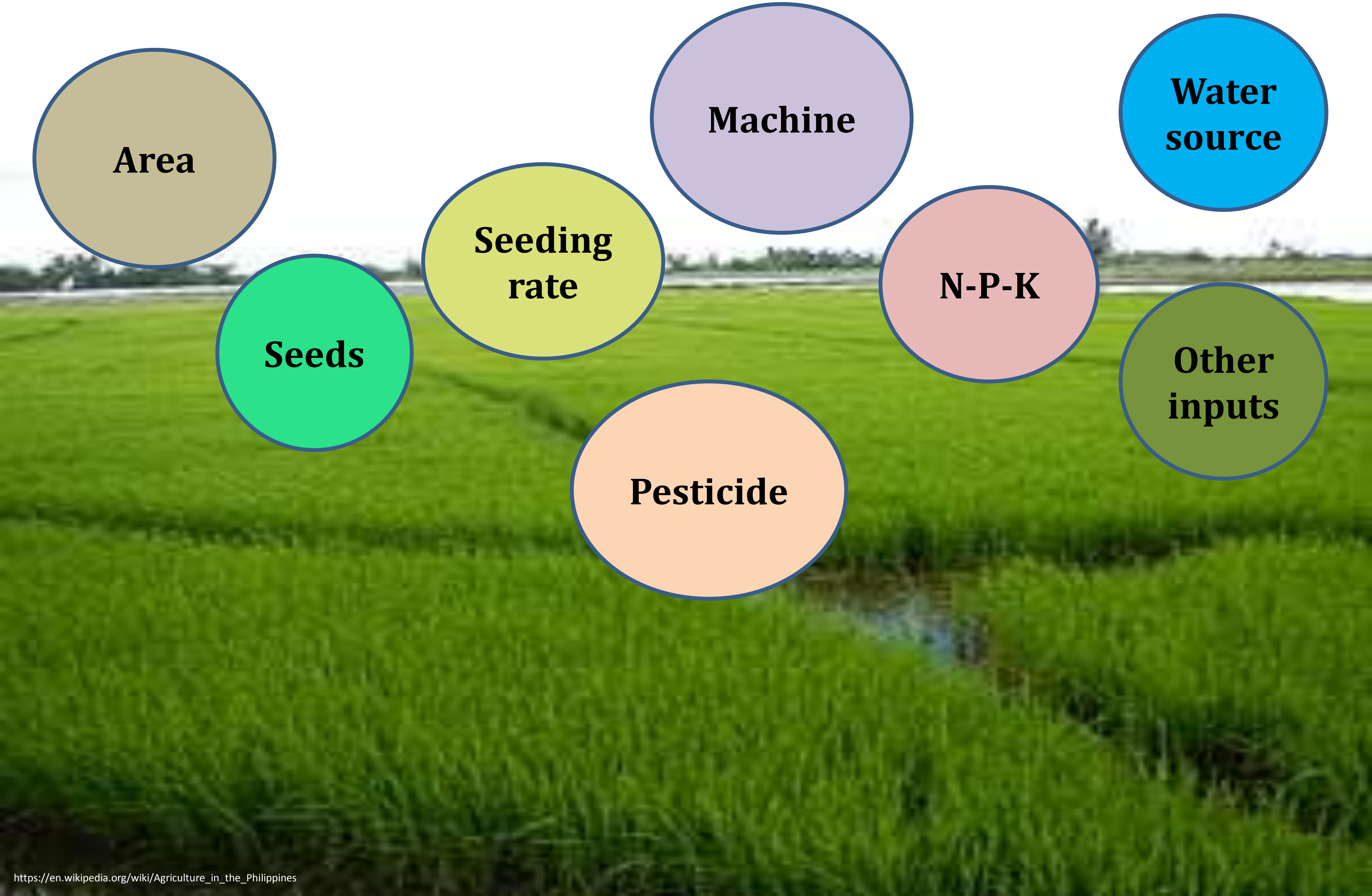
ANALYTICAL PROCEDURES

1. Cobb-Douglas stochastic frontier production and cost function
2. Estimation of technical and allocative efficiency
3. Yield response function
4. Unit cost response function
5. Regression for efficiency determinants

Part I: TECHNICAL EFFICIENCY (TE)

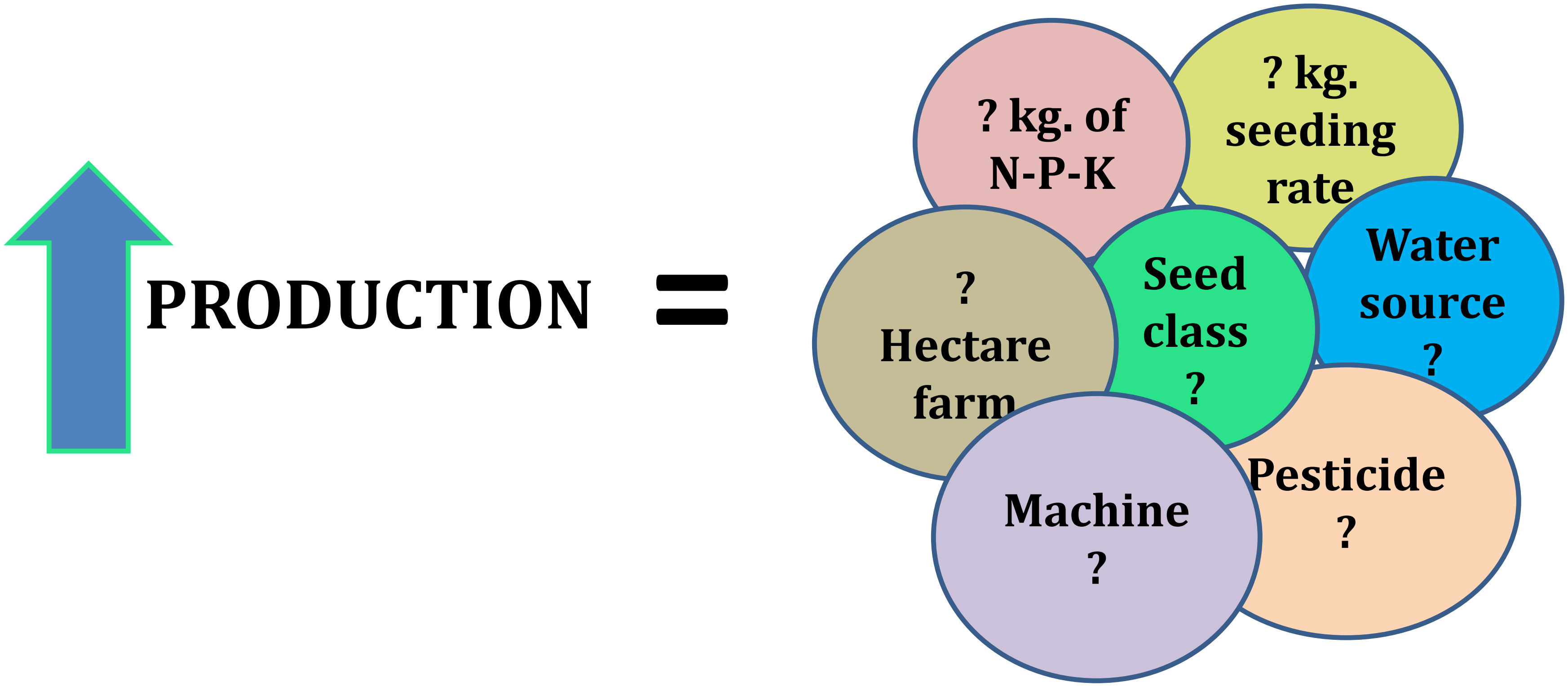
...what is technical

?



https://en.wikipedia.org/wiki/Agriculture_in_the_Philippines

Technical efficiency – the ability of farmer to obtain maximum production using their chosen combination of inputs.



Technical efficiency – the ability of farmer to obtain maximum production using their chosen combination of inputs.

$$\textbf{TE} = \frac{\textbf{Observed output}}{\textbf{Maximum possible output}}$$

Frontier Production Function

Production = f (Farm Inputs) exp(v – u)

Seeds (kg)
N-P-K (kg)
Herbicide AI (kg)
Insecticide AI (kg)
Labor (md)
Machine (day)
Area (ha)
+

Seed class, Water source, Season

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Frontier Production Function

Production = f (Farm Inputs) exp(v – u)

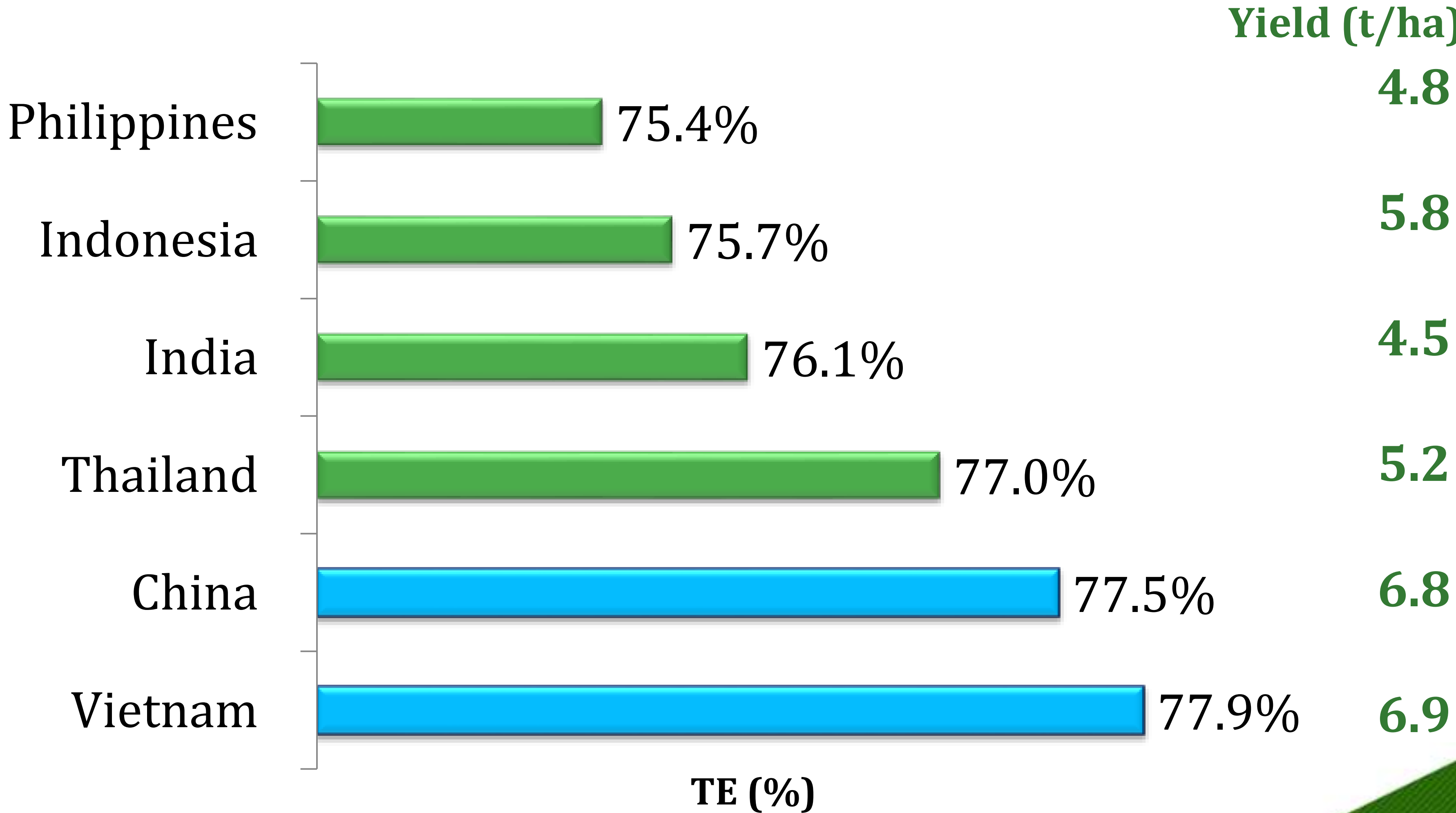
v = represents the symmetric random error component

u = inefficiency >> **TE = exp(-u)**

Data limitation: Factors like climate, rainfall, and other environment factors were not included.

KEY RESULTS

Technical efficiency estimates across selected Asian countries

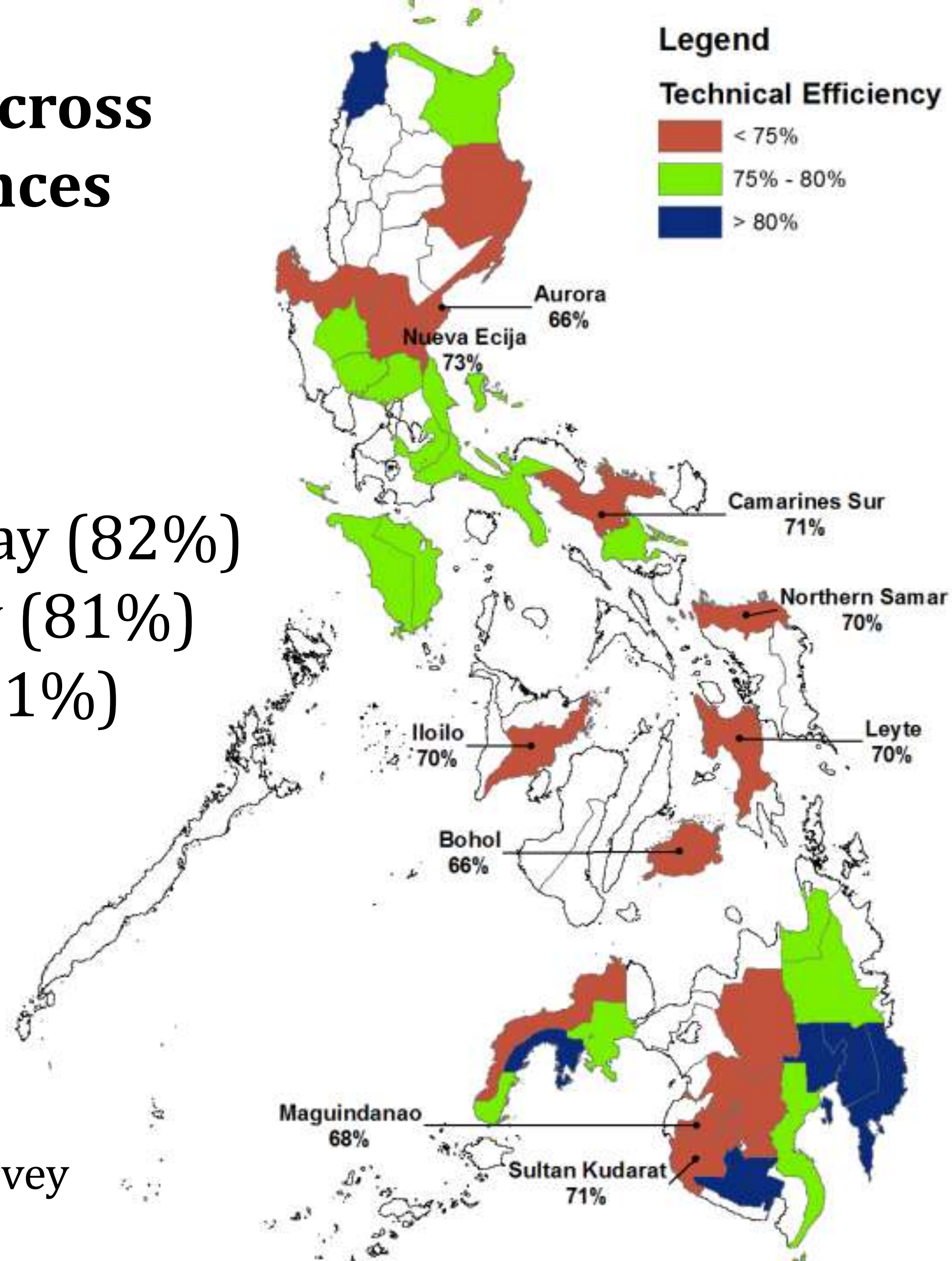


Benchmarking the Philippine Rice Economy
Relative to Major Rice-producing Countries in Asia 2013

Technical efficiency across rice-producing provinces

Highest TE:

1. Zamboanga Sibugay (82%)
2. Compostela Valley (81%)
3. Davao del Norte (81%)



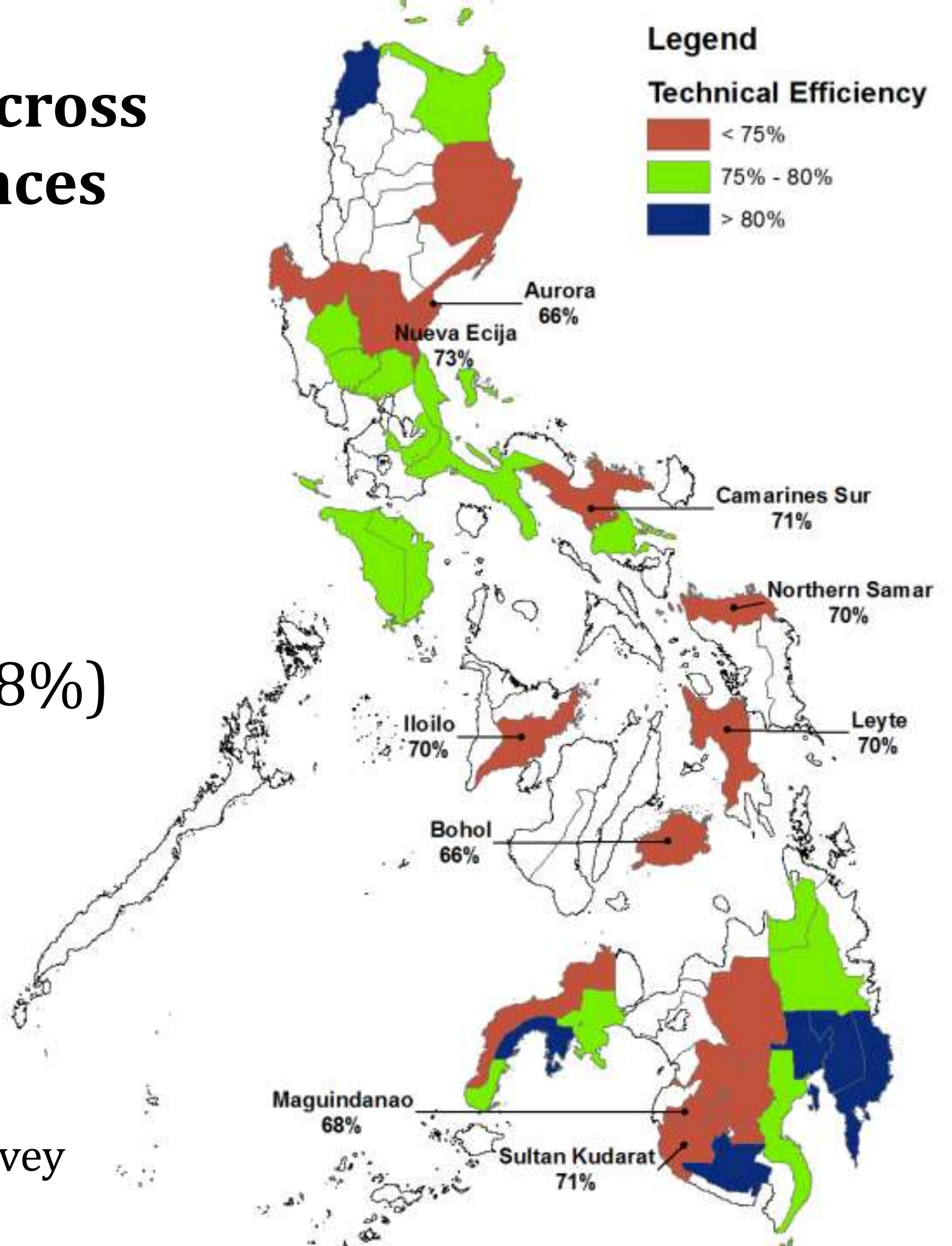
Rice-Based Farm Households Survey (2011-2012)

Technical efficiency across rice-producing provinces

Lowest TE:

1. Aurora (66%)
2. Bohol (66%)
3. Maguindanao (68%)

Rice-Based Farm Households Survey (2011-2012)



…how TE and farm inputs affect the yield?

Effect of TE and farm inputs to yield

More than **70%** of the variation in the composite error term is attributed to the technical inefficiency component.

Rice yield could be improved by increasing the technical efficiency of farmers.

Effect of TE and farm inputs to yield

Yield (kg/ha) =

Higher if farmer is using **high quality seeds** (e.g. hybrid, RS/CS)

Higher if farmer has source of **irrigation** (e.g. NIS/CIS, SSIS, natural source)

Higher during **dry season** than wet season

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…what are the factors affecting TE?

Factors affecting TE

Technical Efficiency

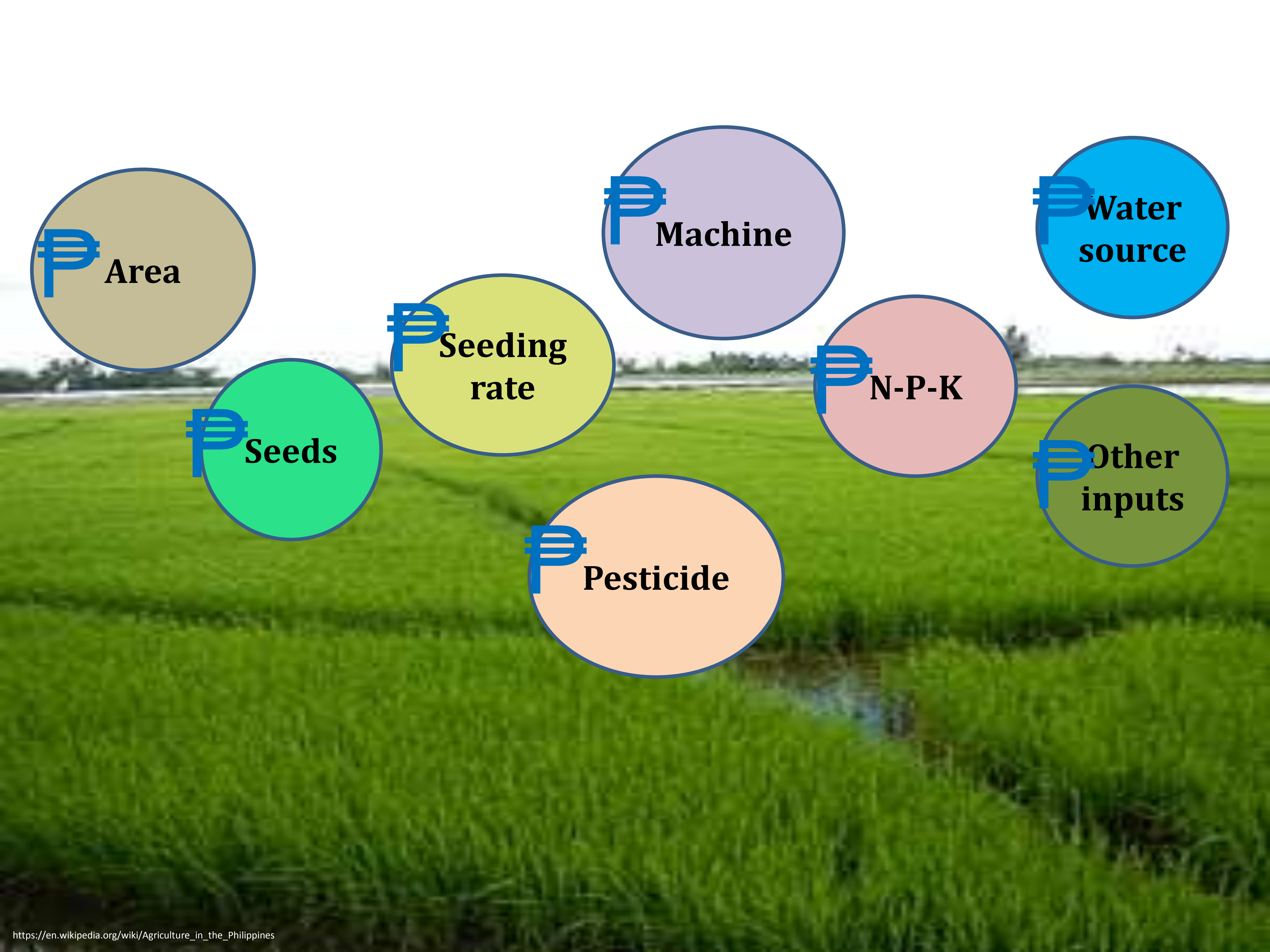
(+) Membership in any rice-based farm organization

(+) Education

Part II: ALLOCATIVE EFFICIENCY (AE)

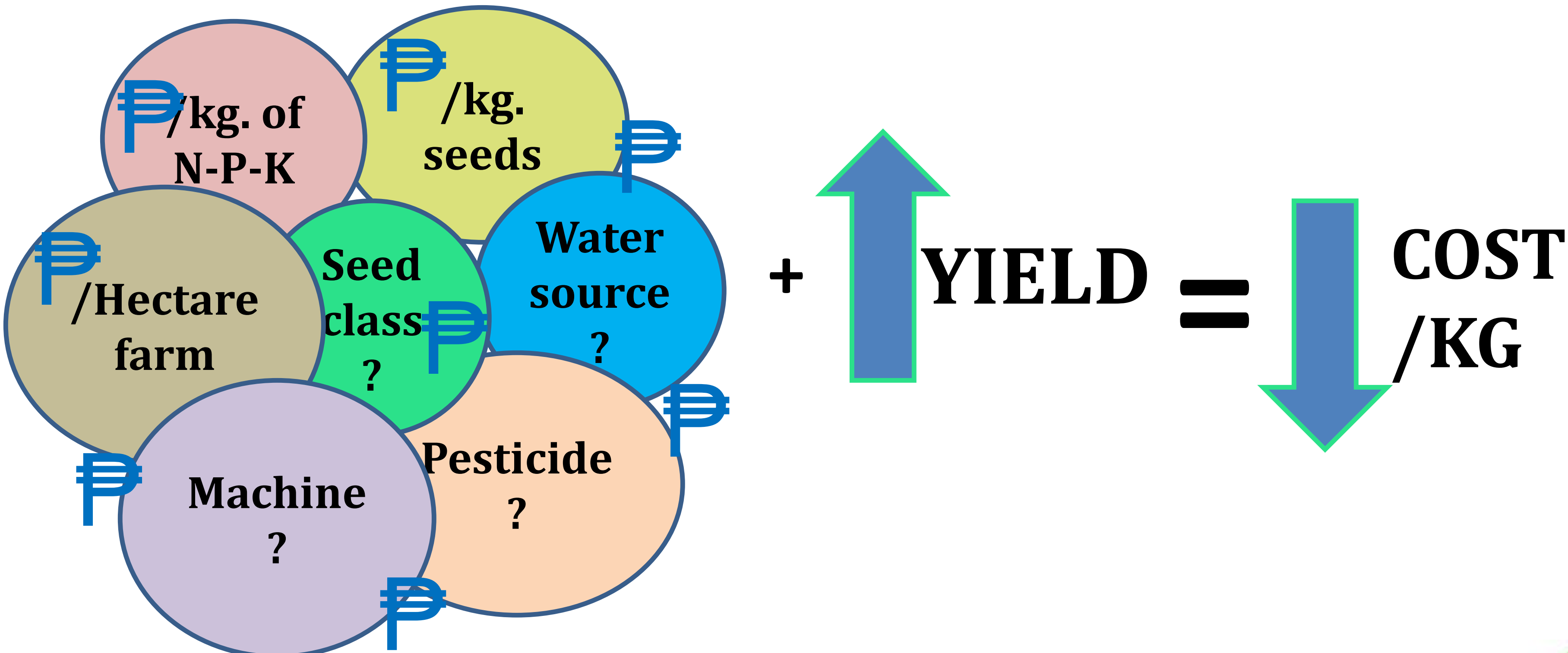
…what is allocative

?



https://en.wikipedia.org/wiki/Agriculture_in_the_Philippines

Allocative efficiency – the ability of the farmer to choose the least-cost **but** technically efficient combination of inputs given the input prices.



Allocative efficiency – the ability of the farmer to choose the least-cost **but** technically efficient combination of inputs given the input prices.

$$\mathbf{AE} = \frac{\textbf{Predicted minimum cost}}{\textbf{Observed cost}}$$

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Frontier Cost Function

Cost = f (Input Prices, Production) exp(v – u)

Seeds (P/kg)
N-P-K (P/kg)
Herbicide AI (P/kg)
Insecticide AI (P/kg)
Labor (P/md)
Machine (P/day)
Land rent (P/ha)
Production (kg)
+
Seed class, Water source, Season

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Frontier Cost Function

Cost = f (Input Prices, Production) exp(v – u)

v = represents the symmetric random error component

u = inefficiency >> AE = 1/exp(u)

Data limitation: Factors like climate, rainfall, and other environment factors were not included.

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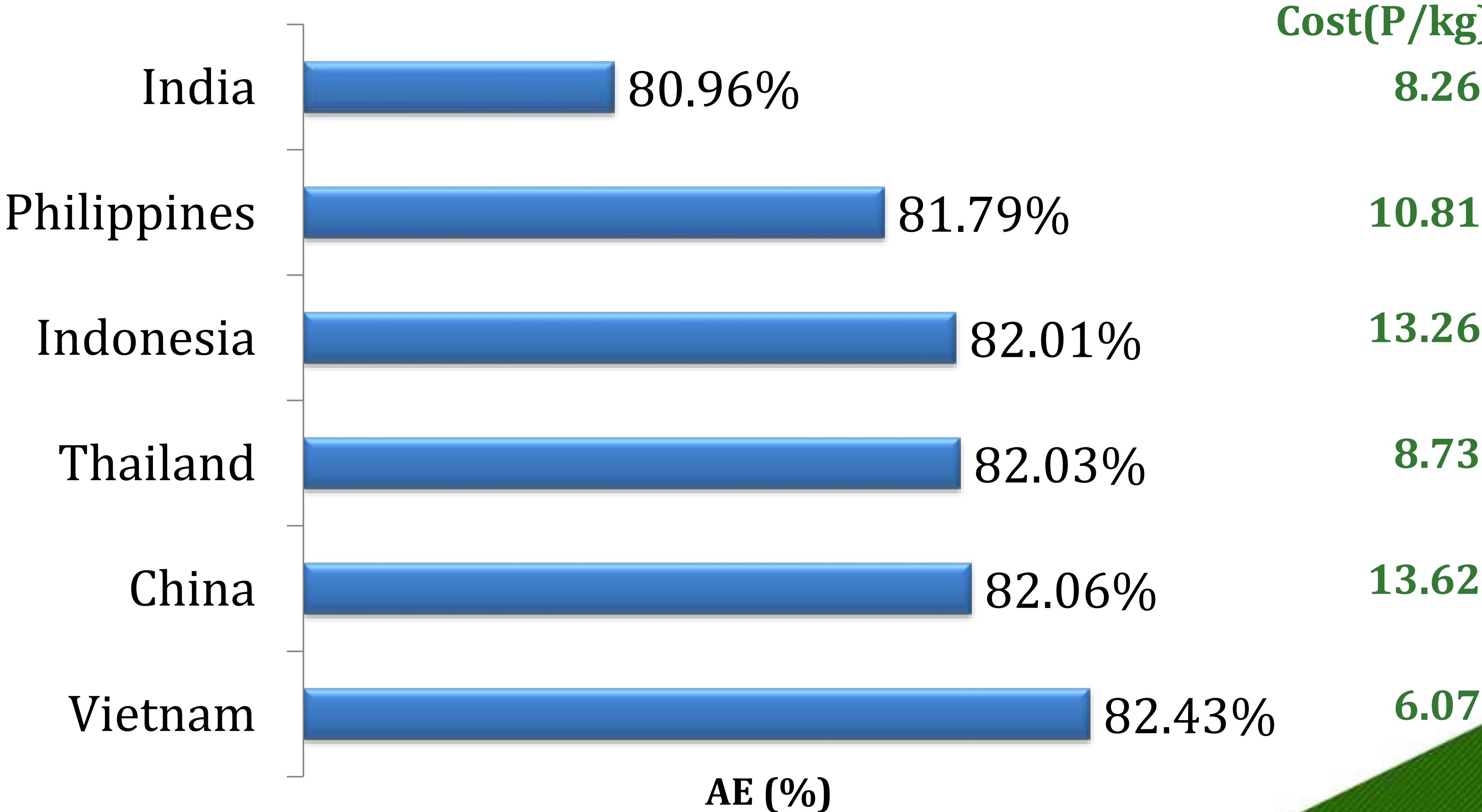
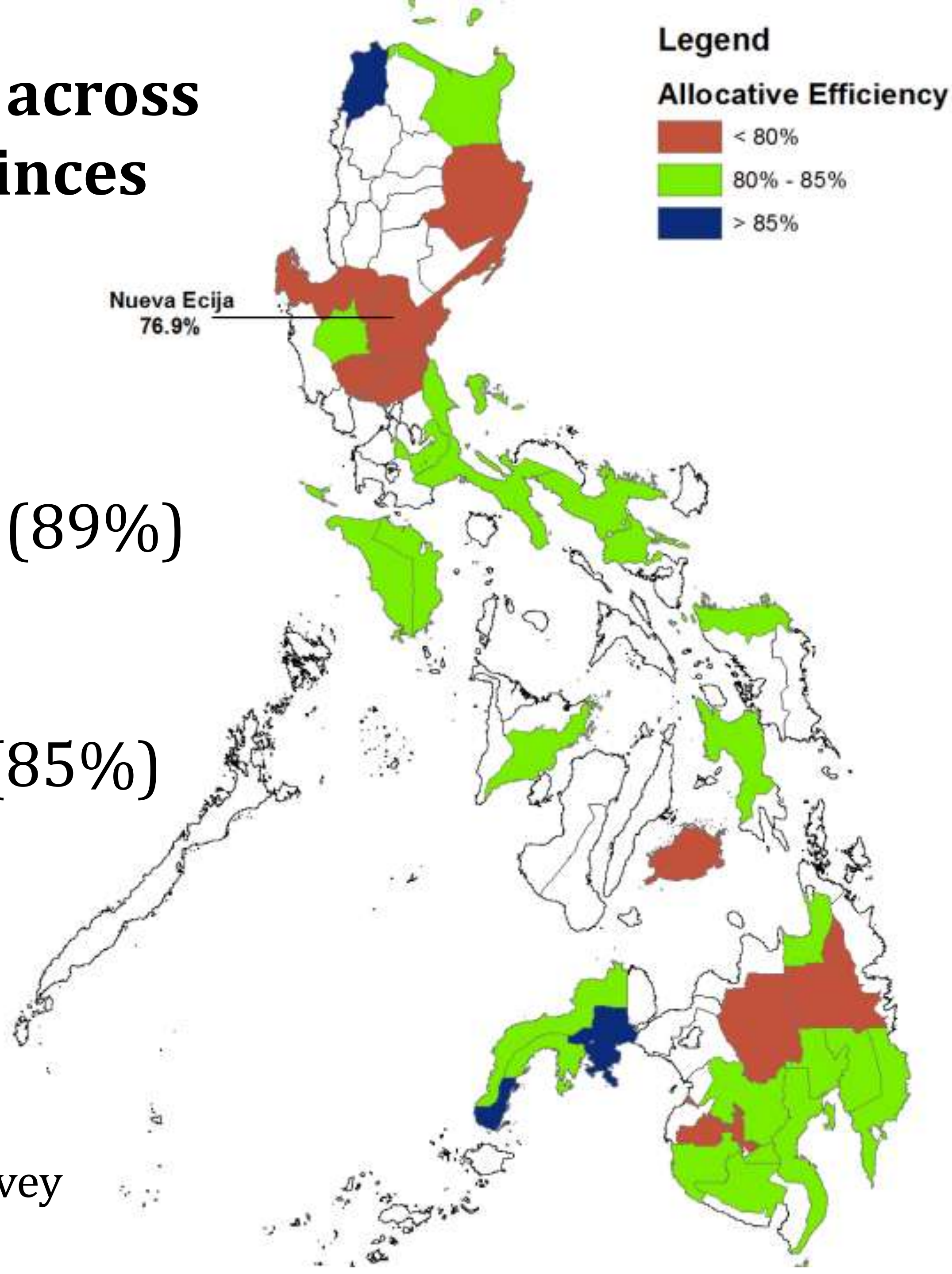
KEY RESULTS

Allocative efficiency estimates across selected Asian countries



Benchmarking the Philippine Rice Economy
Relative to Major Rice-producing Countries in Asia 2013

Allocative efficiency across rice-producing provinces

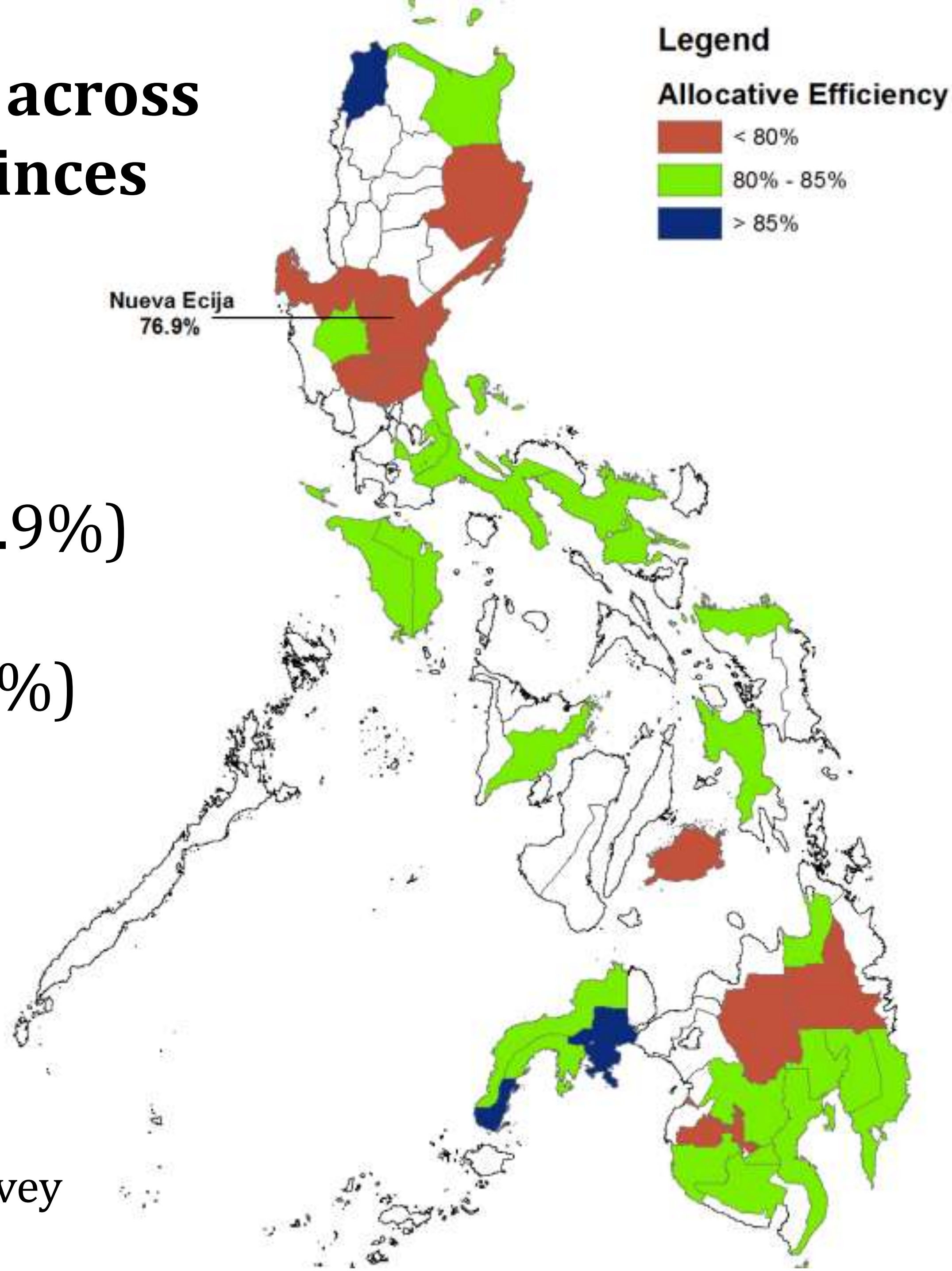


Highest AE:

1. Zamboanga del Sur (89%)
2. Ilocos Norte (87%)
3. Albay (85%)
   Compostela Valley (85%)

Rice-Based Farm Households Survey
(2011-2012)

Allocative efficiency across rice-producing provinces



Lowest AE:

1. Nueva Ecija (76.9%)
2. Aurora (77.3%)
3. Bukidnon (78.3%)

Rice-Based Farm Households Survey (2011-2012)

...how AE, input prices and production affect the cost/kg?

Effect of AE, input prices and production to the cost/kg

More than **50%** of the variation in the composite error term is attributed to the cost inefficiency component.

Cost/kg could be reduced by increasing the allocative efficiency of farmers.

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Effect of AE, input prices and production to the cost/kg

Cost (Php/kg) =

Decreases as yield increases

Lower if high quality seeds are used (hybrid, RS, CS)

Decreases with the adoption of machine

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...what are the factors affecting AE?

Factors affecting AE

Allocative Efficiency

(+) Membership in any rice-based farm organization

(-) Tenurial status

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CONCLUSION

- ✓ Economic efficiency of rice farmers significantly contributes to the attainment of an improved yield and reduced cost of production.

CONCLUSION

- ✓ Farm organization can be an avenue to extend support for farmers, and make them more technically and allocatively efficient.

- ✓ Farmers' education has significant positive contribution to a higher allocative efficiency.

CONCLUSION

- ✓ Yield-enhancing strategies are adoption of high quality seeds, access to irrigation, and **improved technical efficiency.**

- ✓ Cost-reducing strategies are adoption of high quality seeds, machine-use, increased yield, and **improved allocative efficiency.**

Thank you.

Frontier Production Function Estimates

Production	Coefficient	Robust SE	z	P>z
Constant	6.809	0.110	62.13	0.000
Seed	0.072	0.012	5.89	0.000
N	0.085	0.010	8.46	0.000
P	0.018	0.008	2.34	0.020
K	-0.002	0.007	-0.3	0.764
Herbicide AI	0.020	0.004	4.54	0.000
Insecticide AI	0.033	0.004	7.99	0.000
Area	0.576	0.022	25.64	0.000
Labor	0.186	0.018	10.49	0.000
Machine	0.013	0.007	1.89	0.058
d_NISCIS	0.214	0.016	13.12	0.000
d_SSISnat	0.114	0.017	6.67	0.000
d_Hybrid	0.382	0.031	12.48	0.000
d_RSCS	0.124	0.012	10.59	0.000
d_Season	0.077	0.010	7.54	0.000
/lnsig2v	-2.994	0.057	-52.8	0.000
/lnsig2u	-2.135	0.059	-36.14	0.000
sigma_v	0.224	0.006		
sigma_u	0.344	0.010		
sigma2	0.168	0.006		
lambda	1.536	0.014		

Frontier Cost Function Estimates

Cost	Coefficient	Robust SE	z	P>z
Constant	2.222	0.125	17.78	0.000
Seed	0.117	0.015	7.84	0.000
N	0.031	0.009	3.42	0.001
P	-0.011	0.007	-1.63	0.102
K	0.012	0.008	1.44	0.150
Herbicide AI	0.014	0.003	4.44	0.000
Insecticide AI	-0.005	0.004	-1.22	0.221
Land rent	0.087	0.008	10.95	0.000
Labor	0.024	0.012	2.06	0.040
Machine	**-0.018**	**0.004**	**-4.47**	**0.000**
Production	0.835	0.006	130.42	0.000
d_NISCIS	-0.012	0.011	-1.13	0.258
d_SSISnat	-0.014	0.012	-1.18	0.239
d_Hybrid	**-0.327**	**0.043**	**-7.70**	**0.000**
d_RSCS	**-0.023**	**0.010**	**-2.23**	**0.026**
d_Season	**-0.031**	**0.008**	**-3.86**	**0.000**
/lnsig2v	-3.246	0.057	-57.42	0.000
/lnsig2u	-3.087	0.077	-40.16	0.000
sigma_v	0.197	0.006		
sigma_u	0.214	0.008		
sigma2	0.085	0.003		
lambda	1.083	0.012		