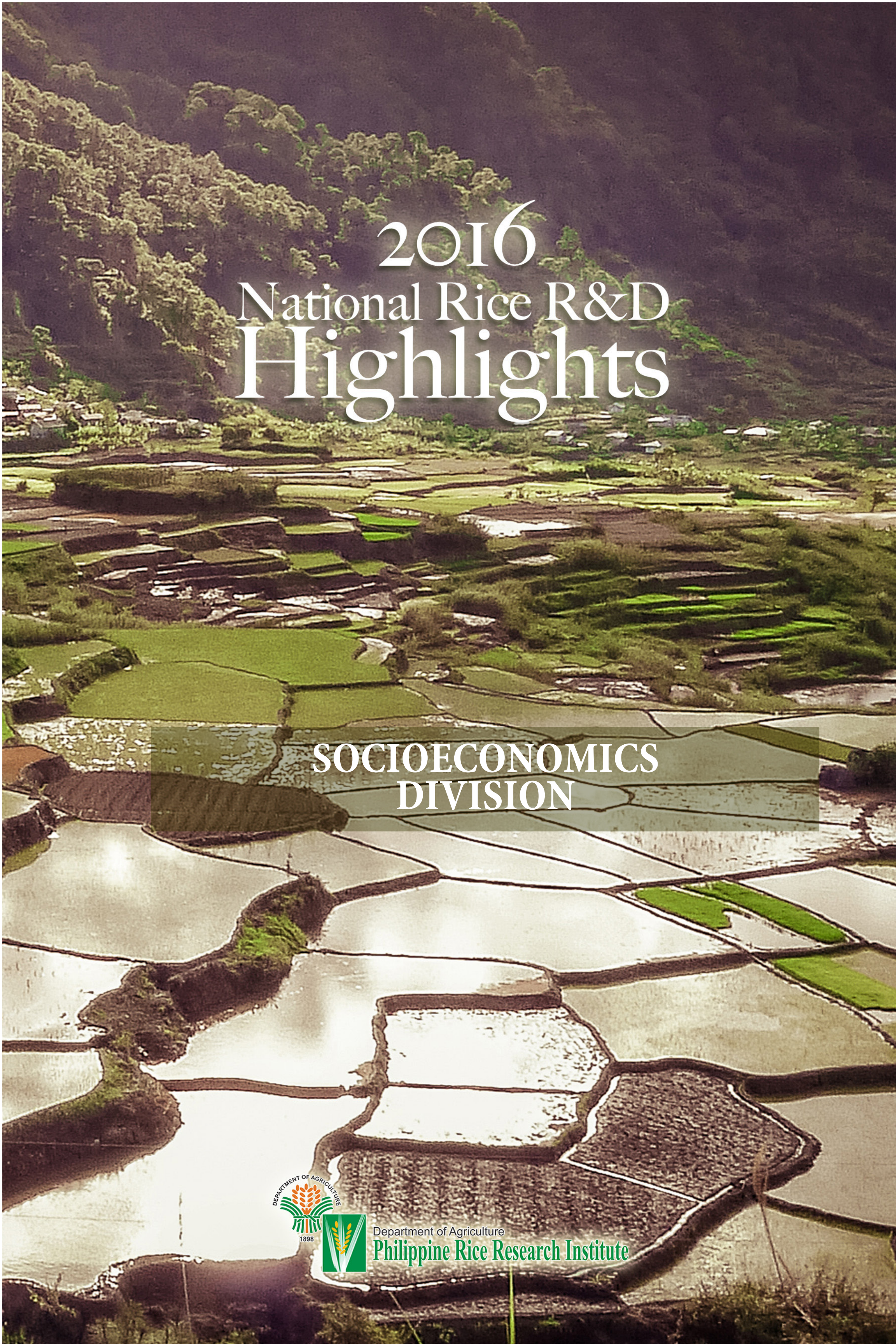

2016 National Rice R&D Highlights

SOCIOECONOMICS DIVISION

Department of Agriculture
Philippine Rice Research Institute

TABLE OF CONTENTS

SocioEconomics Division

Division Head: Rhemilyn Z. Relado

Executive Summary

The Socioeconomics Division 1) conducts discipline-based studies, 2) supports PhilRice's function of providing timely information to rice stakeholders, 3) develops and tests socioeconomic methodologies and theories, 4) conducts impact assessments of rice technologies, and 5) implements policy research and advocacy activities of the Institute. The division has 4 core projects for 2016. In addition, SED does various projects and studies that are both internally- and externally-funded.

The first project deals with updating, gathering, and consolidating rice statistics. In one study, SED partners with the Philippine Statistical Authority (PSA) to access rice and rice-related statistics. Another study is on rice-based farm household survey (RBFHS), which is presently at its fifth round. The survey is quenquinnially conducted to monitor and evaluate the status of rice-based farm households in major rice-producing provinces of the Philippines. In the past, a total of 2,500 respondents from 33 provinces were surveyed. However for the 2016-2017 survey round, an additional of 9 provinces is proposed with 3,164 respondents. The last study serves as conduit to consolidate both secondary and primary statistics into one system that is accessible and available to data users.

Another project of the division focuses on evaluating the adoption and impact of PhilRice technologies and support services. There are three studies under this project. The first evaluates the socioeconomics of using combine harvesters in farmer fields. The second study documents the socioeconomic characteristics and current production practices of farmers in Mindoro at the onset of the establishment of the PhilRice satellite station in the island. The last study monitors the PhilRice-JICA project in the five provinces of ARMM.

As a way of advocating for socioeconomic policies that are favorable to the rice industry, SED implements the project on policy research and advocacy. In September 2016, SED plans to conduct a forum outlining possible interventions that could aid direction-setting for rice programs of the new administration. Aside from the forum, an annual issue of the Rice Science for Decision-makers will also be released.

Taking off from the results of the 2011-2012 RBFHS, the next project evaluates adopted technologies and profiles sociodemographic characteristics of rice-based farm households in the Philippines. From farmer profiles to varieties to mechanization to market access, the derivative papers looked at different aspects of rice production. The papers will be completed by the end of 2016.

In addition to the core-funded projects discussed earlier, SED also implements externally-funded projects. Projects on rice value chain, extension through IPaD, and yield gap are under this project.

I. Statistical Series on the Rice Economy

Project Leader: RZ Relado

Statistics play a vital role in planning and implementing projects as well as making policies in rice research and development. With enormous thrust on government accountability, policymakers enjoined researchers and developmentalists to present project impacts quantitatively. This project addresses the need to gather, process, and update rice statistics and make the information available to rice stakeholders. Three studies are under the project. These are 1) updating and restructuring rice and rice-related statistics, 2) monitoring rice-based farm households in major rice producing provinces in the Philippines, and 3) integrating other rice statistics databases into the PalayStat system. The first study is on continued updating of rice statistics from available secondary data in handbook and web format. The second study is concerned with primary data gathering that would form the sequence of the quinquennial survey of SED. The last study is on producing socioeconomic profiles that would be comprehensible to target stakeholders and are available as web-based applications.

Updating and Restructuring Rice and Rice-Related Statistics

MGC Lapurga, RF Tabalno, and RB Malasa

With the emergent active role of the local government in the formulation of responsive and location-specific policies and in implementing local rice production programs; and the PhilRice RD&E thrust of developing more location-specific technologies, the need for location-specific rice database in indispensable. Hence, this collaborative study between PhilRice and Philippine Statistics Authority (PSA, formerly Bureau of Agricultural Statistics) attempts to provide updated provincial rice statistics that are highly relevant for development planners, RD&E workers, and policymakers in sound decision-making on rice-related matters. Also, this aspires to come up with restructured rice-related datasets that are ready to be uploaded in the PalayStat System, formerly known as the Rice-Based Socioeconomics Information System (RBSEIS). This utilizes secondary data from PSA Provincial Rice Statistics which include but not be limited to rice supply and demand, input-use, production costs and returns, production losses, and rice marketing.

Activities:

- All available secondary data from PSA were gathered and consolidated. Data were then tabulated and disaggregated at the provincial level. Compilation, retrieval and organization of these data were done by PSA while validation, editing and retrieval of output tables were performed by SED staff.

- Data of provincial rice statistics were restructured following the database format needed for the PalayStat System. Restructuring were done to generate database that is a 'consolidated version' of specific summary table [*e.g.* Philippine rice production (mt), area (ha) and yield (mt ha-1)] consisting of sub-tables for national, regional and provincial statistics.

- Requested rice statistics from PhilRice staff were prepared, processed and provided to them.

- Coordination with PSA was done to monitor the status of the on-going finalization of draft memorandum of agreement for the year 2017 to 2019.

- All updated and restructured matrices were forwarded to the PalayStat System.

Results:

- There were six (6) summary tables of rice and rice-related data updated for the years 2013, 2014, and 2015.

- There were 16 summary tables of rice and rice-related data restructured and forwarded to the PalayStat System for storing and uploading (Figure 1).

- Selected PSA rice statistics (yield and area harvested) were presented in the PhilRice Strategic Planning Workshop (January 2016). Based on the overview of Philippine rice production for the past years (2010 to 2014), the country has an average of 4.61 million hectares rice area harvested. Irrigated areas correspond to 68.2% of this total rice area. The average yield is 3.81 mt ha-1 and it evidently varies across ecosystems and provinces (Figure 2). Only the province of Nueva Ecija achieved an average of 5.4 mt ha-1 in irrigated ecosystems.

- Rice statistics data were provided to at least 15 PhilRice staff (8 from other divisions). Examples of data requested were the following:
  - Volume of production every 10 years from 1975-2015, area

harvested (2015) and volume of imports (2004 and 2014) [for the Infographics 'Rice Production in the Philippines'].

- Average area harvested (2010 to 2014) and percent of traditional variety planted in 82 provinces in the Philippines.
- Volume of rice production, area harvested and yield in the Philippines (1975, 1985, 1995, 2005, and 2015) [for Infographics].
- Area harvested (in hectare) by ecosystems (including upland areas), Philippines, 2000 to 2014.
- Annual per capita consumption of rice, Philippines, 1999 to 2000, 2008 to 2009, and 2012.
- Rice: supply utilization accounts by year and item, Philippines, 2005 to 2015.
- Palay production, area harvested, and yield by year, Philippines, 2005 to 2015.
- Production, area and yield, by year and type of variety (modern and traditional), 2005 to 2014.
- Rice: farmgate, wholesale and retail prices by year, Philippines, 2005 to 2015.
- Relative distribution (%) of farms reporting - by type of crop establishment, 1998 to 2012.
- Rice production and use estimates, by province, 1970 to 2012.

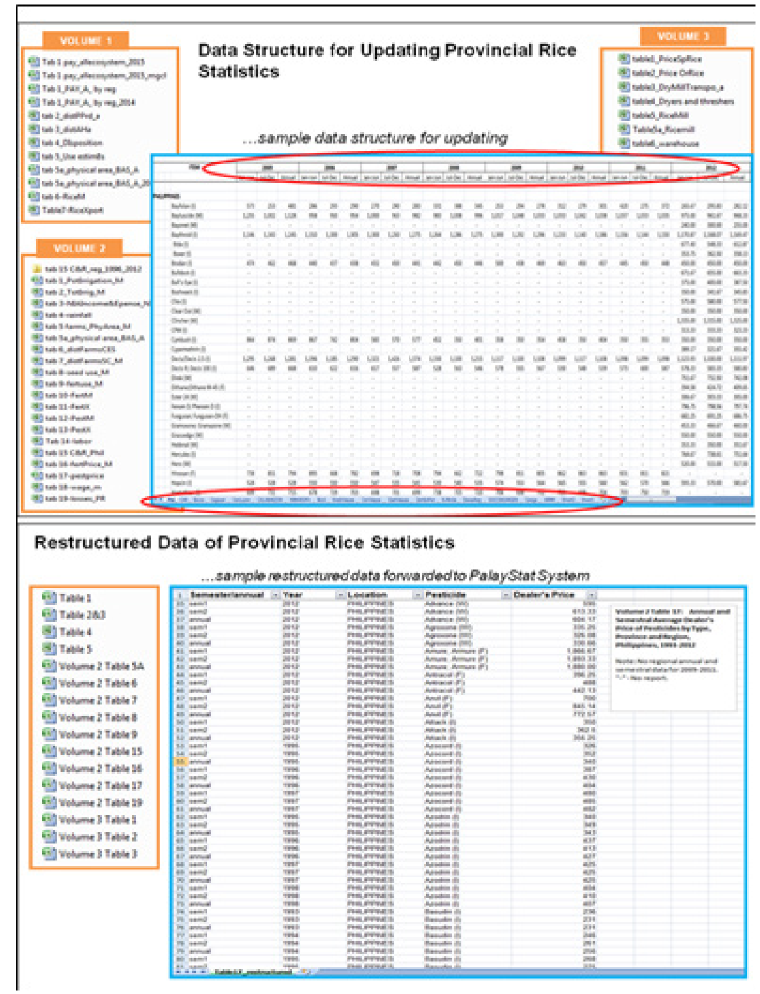

Figure 1. Database structures for updating and restructuring rice and rice-related statistics.

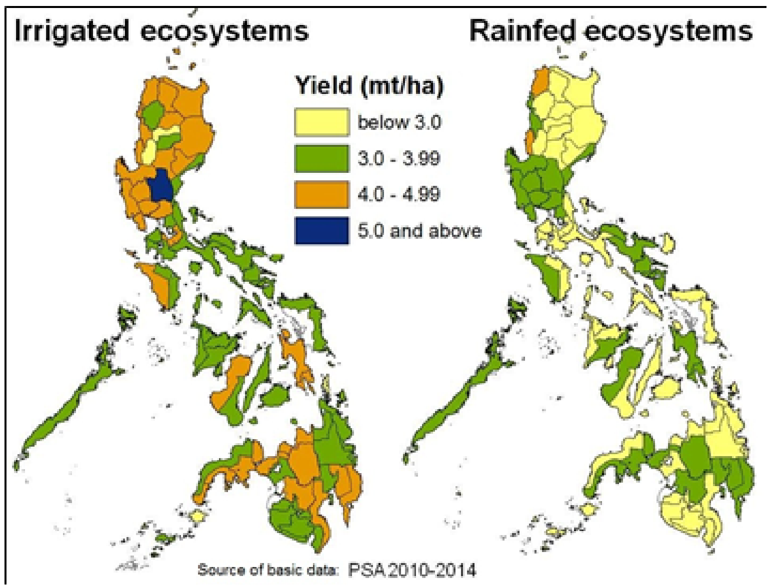

Figure 2. Maps of the Philippines with provincial average rice yield, by ecosystem, 2010 to 2014.

The 5TH Round of the Regular Monitoring of Rice-Based Farm Households in the Philippines

RZ Relado, RB Malasa, CN Parayno, and Socioeconomics Division

Statistical information is crucial to the success of a project or the implementation of a rice program. In a micro viewpoint, stakeholders who want to engage in rice production are keen on statistics that would provide them productivity and profitability assessment. In the macro perspective, government programs used statistics to appropriately developed interventions that would be beneficial and with greater impact to the rice industry. In Philippine rice R&D, availability of rice data and information would ensure that researchers, developmentalists, and policy makers are guided on their decisions regarding rice programs to achieve rice self-sufficiency. Moreover, rice data and information are necessary in identifying problems and key research areas that could increase rice farm productivity and enhance profitability.

In this regard, one of the major thrusts of SED is to regularly monitor rice-based farm households (RBFH) nationwide. The monitoring of RBFH is a quinquennial activity that addresses the need to provide rice socioeconomic trends to PhilRice major stakeholders. The country's current and potential major rice-producing areas are stratified into two main production ecosystems: lowland irrigated and rainfed areas. In the current round, additional 8 provinces (Table 1) will be surveyed together with the 33 provinces from the past surveys. The outputs are developed into socioeconomic profiles of the sample provinces. Moreover, derivative papers are written to highlight thematic areas and exhaustively cover rice production practices of farm households.

Activities:

- Conduct series of consultation meetings and planning workshops.
- Edite and restructure paper-based questionnaire.
- Develope e-questionnaire/program.
- Prepare survey materials.
- Conduct site verification in 8 new sample provinces.
- Conduct 1st and 2nd level trainings on the use of e-questionnaire (SED and branch station staffers).
- Initially start the 2016 Wet Season data collection in 3 provinces.

Outputs:

- 1 Paper-based questionnaire
- 1 E-questionnaire/program
- 1 Manual of Operations
- 1 Field Editing Manual
- 1 List of Codes
- 1 Set of showcards
- Site visited/verified and selected 27 irrigated and 24 rainfed barangays in 8 new sample provinces.
- Updated master list of panel survey respondents and barangays for 42 provinces.
- Field tested the e-questionnaire/program.
- Trained SED and branch staff on how to use the e-questionnaire/program.
- Accomplished/filled up e-questionnaire of Nueva Ecija, Aurora, and Bulacan.

Table 1. List of new sample provinces for the 2016 to 2017 RBFH Survey in addition to the existing 33 provinces.

	New Province	# of Irrigated Barangay	# of Rainfed Barangay
1	Apayao	3	3
2	Kalinga	3	3
3	Negros Occidental	6	3
4	Capiz	3	3
5	Antique	3	3
6	Palawan	3	3
7	Nueva Vizcaya	3	3
8	Western Samar	3	3
	Total	**27**	**24**

Integration of other rice statistics databases in the PalayStat System

RM Almario, MGC Lapurga, RB Malasa, RF Ibarra, MA Gacutan, and AC Arocena Jr.

Detailed rice-based socioeconomic information in the Philippines is wanting. Thus, SED developed the Rice Based Socioeconomic Information System (RBSEIS). It is a compilation and computing system of the quinquennial survey, Rice-Based Farm Household Survey (RBFHS), which covers 33 major rice-producing provinces. RBSEIS also serves as a portal for researchers and policy makers to easily access the RBFHS outputs and other division accomplishments. Seeing the potential of RBSEIS as an efficient medium to provide rice statistical information and respond to the need for available rice-related data collected over the years, it is essential to maximize the system's potential. Thus, the databases of the study, "Updating rice-related statistics," which covered data from 1970 and updated annually both in national and provincial levels in collaboration with PSA, are included in the RBSEIS. The system is renamed as PalayStat.

Activities:

- Created database structures and populated them with the restructured datasets of selected rice statistics.
- Developed modules necessary for managing algorithms for data processing and retrieval of the available rice statistics.
- Developed algorithms and operated them for the processing of all compiled RBFHS datasets from 1996-2012 to include improved primary keys.
- Conducted usability tests and hands-on demonstrations of PalayStat on selected PhilRice branch stations.

Accomplishments:

- Maintained and updated 4 MySQL databases storage with restructured datasets populated inside- include rice production, area harvested, and yield, relative distribution of palay production and area harvested, rice production and use-estimate, estimated physical area, effective area and cropping area.
- Developed a new system module in PalayStat (a separate module from the summary tables) that houses the algorithms for data processing and retrieval of the available rice statistics based on analysis of user activities in similar statistical websites.
- Submitted data flow and use case diagrams which show processes and outputs involving potential user activities on

rice-related statistical tables.

- Structured, uploaded, and verified 20 datasets on compiled RBFHS datasets from 1996 to 2012- include master list of new primary keys, rectype1 tables, processing tables, and season tables.

- Conducted manual data verification of first-batch processed datasets (1996 to 2007 datasets and cross-checked previous IDs and corrected master list errors.

- Developed an internal web system (in development phase) for SED staff to be capable of processing datasets that include improved primary keys. Functions include user management modules, main processing page, and importing and client-side processing of MS Excel files.

- Conducted 4 hands-on demonstrations and usability tests of PalayStat in PhilRice branch stations (PhilRice Bicol, August 9; PhilRice Negros, September 13; PhilRice Midsayap, October 27; PhilRice Agusan, November 23) (Figure 3).

- The PalayStat system is now available and accessible outside of PhilRice campus via dbmp.philrice.gov.ph/palaystat (Figures 4 and 5).

Figure 3. 3rd hands-on demonstration and usability test of PalayStat conducted in PhilRice Midsayap last October 27, 2016.

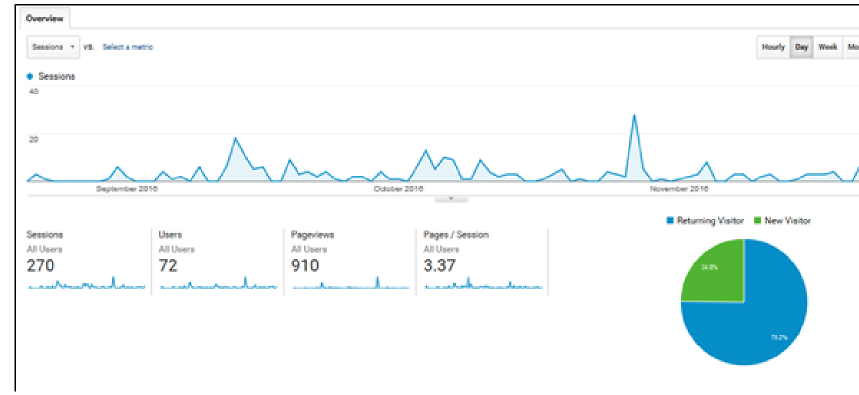

Figure 4. For the period August 21, 2016 to November 21, 2016, the user tracking module of PalayStat detected a total of 910 unique page views and 270 unique sessions.

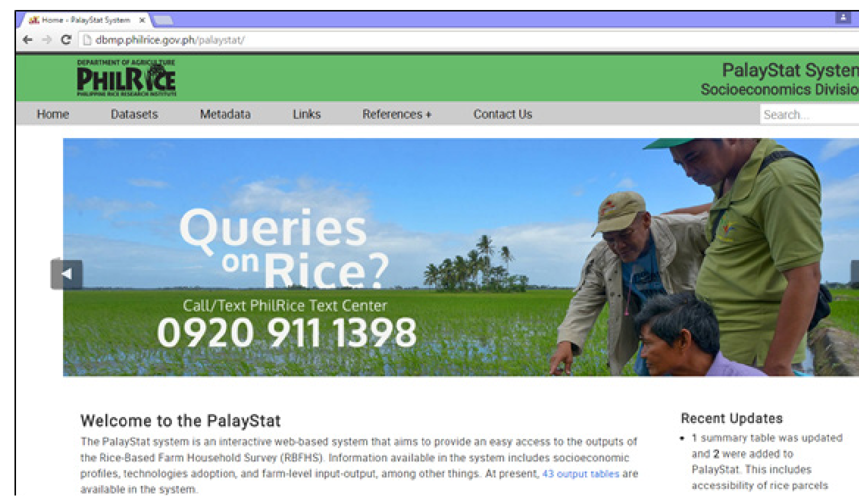

Figure 5. The PalayStat system is now available and accessible outside of PhilRice campus via dbmp.philrice.gov.ph/palaystat.

II. Adoption and Impact Evaluation of Rice R&D Products and Related Support Services

Project Leader: JC Beltran

PhilRice continually generates research products to contribute to the attainment of the goals of sustained food security and reduced poverty and malnutrition. The effectiveness or success of PhilRice generated rice R&D products and related rice production support services depend on their impacts or on how they contribute to meeting these goals. This project aims to contribute in the effective and efficient monitoring, evaluation, and quantification of the performance of rice R&D products and development programs through ex-ante, monitoring and evaluation activities, and ex-post impact evaluation studies. It hopes to provide evidence of the usefulness of rice R&D and production related services, while providing feedbacks to researchers and development workers and ensure more efficient R&D work, research prioritization, and better program/project management.

Socioeconomic impact of adopting rice combine harvester in the Philippines

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

Domestic rice farming is generally labor and capital intensive compared to other neighboring countries like Thailand and Vietnam. Majority of labor requirements in domestic rice production can be attributed to harvesting and threshing. Thus, use of combine harvester is highly recommended to help increase the land and labor efficiency of farmers. Unfortunately, based from 2011 wet season data, adoption of combine harvester was generally low with less than 1%, albeit its advantages on labor requirement. Initial findings also showed that costs of adopting this technology were not statistically significant with other methods of harvesting and threshing, which lead to the conduct of this study. This study aims to: (1) assess the farmers' perception and level of awareness, (2) determine adoption level, (3) identify determinants of combine harvester adoption, (4) determine its effect on farmers' income, (5) assess the effect of adoption on labor productivity and profitability across selected provinces, (6) determine social and economic effects of combine harvester adoption, and (7) draw policy implications from results.

Activities:

- 450 sample farmers were interviewed during the second round of survey with reference period 2015 wet season (WS).
- 900 dry season (DS) and WS survey returns were successfully edited, encoded, and scanned. 2nd level editing and data cleaning of 12 DS and WS databases were performed. Two data matrices were developed in preparation for the costs and returns, partial budget, and adoption model analyses.
- Prepared 24 output tables and 6 charts on socioeconomic profile, farm practices, level of awareness, farmers' perception, adoption level, effect of combine on income, and social welfare and economic effects by stakeholders.
- Prepared DS 2015 preliminary costs and returns, and partial budget analysis.
- Partial results presented on the 29th National Rice R&D Conference.
- Conducted a project writing workshop.

Results:

- Result showed that mean age of sample farmers is 55 years old, and 88% were male. Farmers reached at least secondary level of education with an average of 10 years in schooling, and with 24 years of farming experience. About 70% have access to irrigation facilities, either national or communal irrigation systems.
- More than half (59%) of the total respondents own the land they till. On the other hand, 25% were tenant, and the rest were either lessee, amortizing owner or borrowed only. About 68% of farmers were members of any rice-based farm organizations such as cooperative, irrigators' association, and farm association.
- About 70% of sample respondents have actively participated in seminars or trainings related to rice production. Additionally, in terms of financing their production, 48% of farmers used owned capital, 33% borrowed money, while remaining 19% used both personal and borrowed capital.
- In 2006 study, use of combine harvester has been suggested by Moya and Dawe in order to bring down the cost of rice production in the country. However, WS 2011 data showed that the adoption of combine harvester was only less than 1%. On the other hand, results from this study showed that 89% of sample farmers were aware of the technology for about 3 years or less, 8% aware for about 3 to 5 years, while only 3% were aware for more the 5 years. Thus, farmers' level of awareness on combine harvester could also be the limiting factor for low

adoption rate in 2011.

- Combine harvester was locally called as "halimaw/bukatot/kurimaw" (33%), reaper (54%), and combine harvester (17%). Farmers called combine harvester as reaper due to the similar mechanism of the existing rice reaper machine. On the other hand, the local term "halimaw/bukatot/kurimaw" became popular mainly due to its performance in the rice field, works faster and performs like a beast. Others farmers used these terms because it adversely affected the landless farmers' sources of income.

- Results also showed that sources of information mostly came from co-farmers (61%), service providers (19%), and others like promotion, government program through farm-demo, agents of combine harvesters, and hired laborers.

- During the DS 2015 survey, sample respondents were grouped into two categories, users and non-users. Users were farmers who have used/rented combine harvester at least once and also during the reference period considered. Additionally, non-users were farmers who have never availed the services of combine harvester. Same set of respondents were interviewed during the second survey round (WS 2015). The categories and its corresponding sample size varied depending on the number of farmers who shifted from users to non-users and vice-versa.

- The main reason of farmers who used this technology was due to its fast performance and convenience that it provides to farmers with 37% response. About 25 % preferred combine harvester due to reduction in labor cost, while other reasons include non-availability of manual harvesters (15%), prevention from crop losses due to heavy rain (12%), lower postharvest losses (3%), out of curiosity (3.2%), and experienced lodged paddy area (2.6%).

- Non-users hesitate or do not want to use combine harvester was due to their compassion with the affected manual harvesters (35%). Other reasons were as follows; machine were not applicable in the area (19%); smaller farm area (10%); farmers used their own thresher (8%); conditional arrangement with hired transplanters (8%); and unavailability combine harvester in the area (4%). Other adverse reasons of non-adoption were as follows: damages the field, low quality of palay harvested by the machine, more postharvest losses, and unaffordable machine rental services.

- In terms of its social impact, sample respondents were asked to rate the effect of combine harvester on the manual hired harvesters, result showed that about 47% of sample farmers responded that landless hired laborers were extremely affected, 35% were very affected, 13% were somewhat affected, 4% were slightly affected, and only 1% were not affected at all (Figure 6).

- Partial budget analysis was used to estimate the changes in cost reduction and income, for both manual as well as the combine harvester operation. In terms of the positive effects of using combine harvester, reduction in costs include labor cost on harvesting and threshing, hauling costs, fuel and oil, machine custom rent for threshing and hauling, sacks and twine, and food costs during harvesting and threshing amounting to a total of PhP12,750 (Table 2). In contrast, negative effects only include machine custom rent on combine harvester that is about PhP7,617. Overall, the change in net income between usage and non-usage of combine harvester amounted to PhP5,133.

- Harvesting and threshing requires high labor use in the Philippines especially when harvested manually. Initial findings from this study showed that among the provinces considered, the percent difference of labor requirements between users and non-users ranges from 81% to 85% (DS 2015), in favor of farmers using combine harvesters (Table 3). This implies that an average of 16.29 man-days/ha were saved when farmers use combine harvester, thus saved time can be allotted to other important activities, either personal or related to farming.

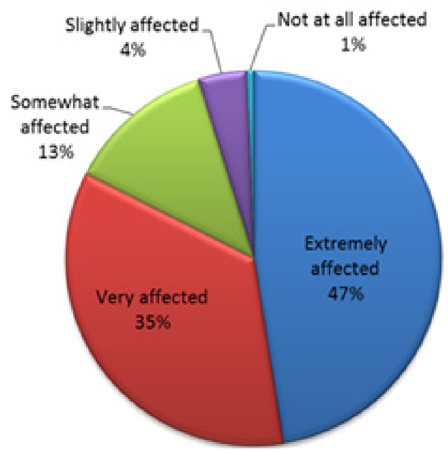

Figure 6. Perceived effect on manual harvesters.

Table 2. Partial budget analysis on use of combine harvester, DS 2015*

Positive Effects	Value	Negative effects	Value
Additional Income	0.00	**Reduced Income**	0.00
Total additional income	0.00	**Total reduced income**	0.00
Reduced costs		**Additional costs**	
Labor cost on harvesting and threshing	7,360.81	Machine rent (combine harvester)	7,617.09
Labor cost on hauling (farm to road)	225.57		
Machine rent (thresher)	3,423.41		
Machine rent (hauling)	35.20		
Fuel and oil (hauling)	1.51		
Sacks and twine	1,019.29		
Food costs on harvesting and threshing	653.22		
Total reduced costs	12,749.90	**Total additional costs**	7,617.09
A. Total additional income and reduced costs	12,749.90	**B. Total reduced income and additional costs**	7,617.09
C. Change in net income (A-B) = 5,132.80			

* Data based from actual use of farmers.

Table 3. Comparison of labor requirements on harvesting and threshing, DS 2015.

Province	Type of Farmer		Difference	|% Diff|
	User	Non-User		
Cagayan	1.85	20.75	-18.90	83.59
Isabela	1.74	18.46	-16.72	82.74
Nueva Ecija	1.73	16.27	-14.54	80.76
Pangasinan	1.49	18.16	-16.67	84.81
Tarlac	1.61	16.03	-14.42	81.71
TOTAL	**1.69**	**17.98**	**-16.29**	**82.85**

Baseline Characterization of PhilRice-Mindoro Satellite Station
CG Yusongco, JC Beltran, JIC Santiago, and RZ Relado

PhilRice aims to expand its R&D activities in Region IV-B through the establishment of a new satellite station in Sta. Cruz, Occidental Mindoro. An important aspect of this project is to determine the socioeconomic characteristics and current production practices of farmers in the region. Such information is valuable in the design of project interventions aimed at increasing rice production and farm income in the region. To get this information, baseline surveys were conducted in Occidental and Oriental Mindoro. Sta. Cruz, Mamburao, and Sablayan were the coverage areas in Occidental Mindoro, while Calapan, Pola, Pinamalayana, and Roxas were selected for Oriental Mindoro. The baseline survey covers two cropping seasons: dry season (DS) and wet season (WS) in 2015. For each survey round, 100 sample farmers from the top rice producing villages in each province were interviewed.

Activities:

- Prepared draft report of DS 2015 baseline survey of Occidental and Oriental Mindoro.
- Conducted WS 2015 survey on 200 respondents from Occidental and Oriental Mindoro.
- All survey returns from the 2 provinces were fully edited and encoded. About 60% of the encoded data undergone 2nd level editing and verification.
- Presented the DS 2015 partial results in the 29th National Rice R & D Conference.

Results:

- On the average, rice area planted in Occidental Mindoro was 1.26 ha in DS and 1.55 ha in WS. While in Oriental Mindoro, sample farmers cultivated an average of 1.40 ha and 1.36 ha in DS and WS, respectively.
- The yield attained by farmers was above the national DS average (3.99 mt/ha), averaging to 6.21 mt/ha in Occidental Mindoro and 5.6 mt/ha in Oriental Mindoro. In WS, the average yield decreased to 4.4 mt/ha in Occidental Mindoro and 5.06 mt/ha in Oriental Mindoro.
- The use of high quality seeds was popular across provinces and seasons. Oriental Mindoro farmers used certified seeds (47% in DS and 49% in WS) more than hybrids seeds (26% in DS and WS). On the contrary, more than half (57%) of the sample farmers in Occidental Mindoro used hybrid seeds and 23% used certified seeds in DS. But in WS, 50% of farmers planted certified seeds and 31% used hybrid.

- More than 60% of the farmers-respondents in DS planted medium-maturing varieties such as NSIC Rc 132H or SL 8H in Occidental Mindoro, while NSIC Rc 218 or “Mabango 3” in Oriental Mindoro. On the other hand, majority of the farmers planted PsB Rc 18 in Occidental (24%) and Oriental (18%) Mindoro in WS.
- Transplanting was widely practiced in Mindoro Island as more than 80% of sample farmers in Occidental Mindoro and 55% in Oriental Mindoro used this method of planting rice in 2015 DS and WS.
- Table 4 shows the inputs used in rice production in 2015 DS in Occidental and Oriental Mindoro. The average seeding rates regardless of seed class, variety, and method of crop establishment in Occidental and Oriental Mindoro were 60.56 kg/ha and 74.17 kg/ha, respectively (Table 4). In addition, an average of 69.94 kg/ha in Occidental Mindoro and 60.16 kg/ha of seeds used in 2015 WS.
- Majority of the sample farmers in both provinces reported that they experienced insect and weed problems in 2015. They commonly used chemicals to manage these pests.
- Farmers in Oriental Mindoro applied more herbicides (0.45 kg a.i./ha) and other pesticides (0.21 kg a.i./ha) relative to their counterparts in Occidental Mindoro. However, farmers in Occidental Mindoro used more insecticides (0.32 kg a.i./ha) and fungicides (0.07 kg a.i./ha).
- The average nitrogen (N) application in Oriental Mindoro was 101 kg/ha, which is significantly lower than the application rate of farmers in Occidental Mindoro at 171.44 kg/ha. Farmers in Occidental Mindoro applied less Phosphorus (P) and Potassium (K) fertilizers at 8 kg/ha and 19 kg/ha, respectively. In Oriental Mindoro, average application rate of P was 10 kg/ha, while 20 kg/ha for K.
- In terms of labor requirement, farmers in Oriental Mindoro used 14 man-days/ha of OFE and 33 man-days/ha of hired labor in one cropping season. Rice production in Occidental

Mindoro was more labor-intensive with an average labor use of 22 man-days/ha of OFE and 49 man-days of hired labor (Table 1).

- Table 5 shows costs and returns of Oriental and Occidental Mindoro paddy production. The average total cost of producing rice per hectare was about PhP 62,636 in Occidental Mindoro, while PhP 61,298 in Oriental Mindoro. The estimated cost per kg of paddy were PhP 10.08 in the former and PhP 11.12 in the latter. Net returns in rice farming in Oriental Mindoro was PhP 24,724.78/ha, which was significantly lower than in Occidental Mindoro at PhP 37,074.77/ha.

Table 4. Rice production inputs used per hectare in Oriental and Occidental Mindoro, 2015 DS.

Inputs	Oriental Mindoro	Occidental Mindoro
Seed (kg/ha)	74.17	60.56
Fertilizer (kg/ha)		
N	101.25	171.44
P	10.06	7.56
K	20.44	19.15
Chemicals (kg a.i./ha)		
Herbicide	0.45	0.22
Insecticide	0.19	0.32
Fungicide	0.03	0.07
Other chemicals	0.21	0.11
Labor (man-day/ha)		
OFE labor	13.97	21.69
Hired labor	33.04	49.38

Table 5. Average costs and returns of paddy production in Oriental and Occidental Mindoro, DS 2015.

Item	Oriental Mindoro	Occidental Mindoro
RETURNS		
Yield (kg/ha)	5,510.58	6,212.52
Price (Php per kg)	15.61	16.05
Gross Returns (PhP/ha)	**86,022.89**	**99,710.98**
COSTS (Php/ha)		
Seeds	3,019.48	5,003.08
Fertilizer	8,803.82	11,491.57
Chemicals	3,178.58	3,203.24
Hired Labor	12,257.16	11,446.01
Operator, Family, & Exchange Labor	3,702.00	4,185.47
Animal, Machine, Fuel & Oil	5,680.46	6,202.95
Irrigation	3,002.97	3,028.84
Food	884.76	1,564.01
Transportation	309.10	545.39
Tax	368.53	1,607.91
Land Rent	16,158.17	10,353.87
Interest on Capital	1,275.42	2,453.65
Other Production Cost	2,657.68	1,550.23
Total Production Cost	**61,298.11**	**62,636.22**
Cost per unit	**11.12**	**10.08**
Net Income from Rice Farming	**24,724.78**	**37,074.77**
Farmers' Income	**45,860.37**	**54,067.76**

Baseline assessment and seasonal monitoring of PhilRice-JICA Technical Cooperation Project (TCP5)
MAM Baltazar, JC Beltran, and FH Bordey

The PhilRice-JICA Technical Cooperation (TCP 5) project has reached out to remote areas in several municipalities of the five provinces of the Autonomous Region in Muslim Mindanao (ARMM). Around 1,000 vegetable and rice farmers were trained and provided with farming knowledge, technologies, and tools to improve their practices and eventually win over poverty and become food secure. The TCP5 project is in its 5th year of implementation. It aims to: (1) train and update the knowledge base of ATs to enhance their capacity to provide training for farmers; (2) train Muslim farmers in rice-based farming technologies utilizing Farmers' Field School approaches; and (3) provide information and education materials to ATs and farmers. In particular, the project targets that at least 70% of the trained farmers adopt 1 out of 10 rice technologies to be introduced (except in Tawi-tawi) and 70% of those who are trained in vegetable farming adopt at least 2 out of 10 introduced technologies. In monitoring and evaluating the progress of the TCP5, regular baseline and monitoring surveys were done in the sites covered by the project. For this paper, Batch 4 baseline information and results from the third monitoring round for Batch 1, second monitoring for Batch 2, and first monitoring for Batch 3 were reported.

Activities:

- Conducted baseline survey of Batch 4 group of farmer beneficiaries and non-participants.
- Generated output tables for the baseline survey of Batch 4 and presented preliminary results during the implementers' meeting.
- Prepared draft report of Batch 4 baseline survey.
- For the monitoring and evaluation, a total of 2,472 farmer beneficiaries (FB) and 556 non-participants (NP) were interviewed. Table 6 shows the distribution of the samples covered by the project. The Batch 1 of farmers has a 4-year data including their baseline, Batch 2 has three, and Batch 3 has two.

Table 6. Sample respondents of TCP5 project in ARMM.

Batch/Type of survey	Farmer beneficiary (FB)	Non-participant (NP)
Batch 1		
Baseline 2011	254	64
Monitoring 2012	241	61
Monitoring 2013	229	51
Monitoring 2014	207	46
Batch 2		
Baseline 2012	272	64
Monitoring 2013	258	61
Monitoring 2014	228	47
Batch 3		
Baseline 2013	267	64
Monitoring 2014	234	48

- Conducted Year-4 monitoring and evaluation survey.
- Generated output tables for Batches 1, 2, and 3.
- Prepared draft reports of Year-3 monitoring and evaluation survey for Batches 1, 2, and 3.

Results:

- For the baseline survey of Batch 4, a total of 268 farmer-beneficiaries (FB) and 64 non-participants (NP) were interviewed. Farmers can be described as mostly middle-aged male (21 to 40 years old) who live with an average household size of 7, who have spent 11 to 25 years in farming, but have not attended formal schooling and any farm-related trainings.
- The estimated average farm size planted with rice was 1.82ha for FB and 1.67ha for NP. Vegetable crops were planted in small spaces, usually for their own consumption. Majority of the farms planted with rice were upland areas, though in larger areas like Maguindanao, majority has access to irrigation canals of NIA.
- Only 1 technology (recommended rice variety in the area) was used by at least 70% of the farmers. For rice technologies/recommendations with almost 50% adoption were recommended varieties, synchronous planting, harvest timing, and rice straw management.
- Vegetables technologies which were easily adopted were the recommended vegetable variety (86%), the use of trellises (88%), and fruit wrapping (88%). Least followed vegetable

technologies were permanent raised plot bed (25%) and mulching (30%).

- Transplanted rice was the popular crop establishment method used. Popular varieties planted were PSB Rc 18, Alimona, SS, NSIC Rc128, and NSIC Rc226. Alimona and SS are traditional farmer-named varieties. Farmer-named varieties may have gotten their names from the plant's physical characteristic, yield potential, source, among other things. They gave names to their rice because they simply want to remember it.

- Majority in Tawi-tawi and some in Sulu planted vegetables and cassava. Cassava is considered a staple food in Tawi-tawi, though there are also some in Basilan and Sulu that include cassava as their staple.

- For the monitoring and evaluation survey of Batch 1, FB farmers steadily increased their yield, while NP farmers showed unpredictable yield pattern since the baseline. Until the El Nino event in 2014, FB yield decreased about half a ton from their previous harvest in 2013 monitoring.

- FB had a significantly (95% confidence level) higher yield than NP by 576kg/ha. Though both FB and NP yield decreased, the difference-in-difference analysis (DID) showed significant yield differences from their baseline. This means that the NP farmers yield had suffered more than their FB counterparts in this monitoring round.

- For Batch 2, FB yield decreased at about 0.5 t/ha based on the latest monitoring survey round (from 2.9t/ha in 2013 to around 2.4t/ha). Although both FB and NP yields of Batch 2 decreased, the DID showed no significant yield differences from their baseline values. The decrease in yield was probably due to the event of El Niño that started mid-year of 2014.

- The total variable cost among FB of Batch 2 was slightly higher than from its baseline (from PhP12,584 to PhP13,337). Increased in fertilizer expenses could be attributed to the knowledge gained of farmers from the project in nutrient management.

- For Batch 3, FB baseline and 2014 yields showed that there was a significant increase in their yields. Similarly, yield differences between NP and FB were insignificant.

- The rice sufficiency index for Batch 1 FB farmers for this survey round declined as compared to their baseline. Among NP farmers, rice sufficiency index also decreased substantially as compared to their baseline values. The difference between the differences of the rice sufficiency index of FB and NP was insignificant. This implies that although their yield may have totally decreased, but the rice that they produce is still enough for their annual consumption.

- For Batch 2, rice sufficiency index increased from just 3.27 during their baseline to 5.49 during this survey round.

- For Batch 3, the rice sufficiency index increased significantly for both FB and NP farmers in this survey round. This implies that the rice that they produced before the project implementation was not enough for their annual consumption.

- In terms of technology adoption and farm practices, Batch 1 steadily increased their technology adoption since 2011, but failed in this year's monitoring round. In 2011 (baseline), no technologies were used by at least 70% of the farmers, but increased in 2012 (11 out of 20) and 13 out of 20 in 2012. Adoption went down further to only 6 out of 20 technologies in the most recent monitoring. One of the possible reasons is the El Nino event that hit the areas of the project. There were 6 technologies among listed above that are water-related. Farmers may have had a hard time following the recommendations due to the availability of water and heightening perceived risks in decision making.

- Technologies like Leaf Color Chart (LCC), Minus One Element Technique (MOET), and Community Trap Barrier System (CTBS) remained least adopted. Farmers did not adopt these technologies primarily because of its perceived complexity, risk and uncertainty, compatibility, trialability, and costs involved.

- For Batch 2, farmers adopted 13 out of 20 recommended technologies in this monitoring period. Similar to Batch 1, technologies that were least adopted by Batch 2 farmers were Leaf Color Chart (LCC), Minus One Element Technique (MOET), and Community Trap Barrier System (CTBS).

- For Batch 3, even in 2013 during their baseline, farmers were practicing 11 out of 20 recommended technologies, and this adoption further increased in 2014 (13 out of 20). Batch 3 farmers had the same least adopted technologies to Batches 1 and 2.

- Results show that the project has brought positive impacts to batch 1 rice farmers, their yield and income remained almost the same and their rice sufficiency index was not affected despite of the drought.

- However, due to the limiting conditions brought by the calamity, the target of 10 out of 20 technologies to be adopted by at least 70% of the farmers was not achieved.

- When FB were compared to NP farmers, NP have suffered more than the FB because NP yield significantly decreased by almost a ton and have significantly affected their rice sufficiency index and so their income.

- Batch 2 farmers insignificantly decreased yield in this monitoring round. Since their yield decreased, their income came down along with it. However, though their rice sufficiency index has increased but is statistically insignificant.

- Batch 3 on its second year of implementation, the improvements are recognizable. The FB yield increased significantly by almost half a ton. The income of NP almost doubled in this year's monitoring round but still FB farmers have decreased in their cost of production and sold their produce at a higher price.

- Aside from improved yield, income, and rice sufficiency index, farmers have also received other benefits by being part of the project. Key informants were appreciative of the project because since it started, they became recipients of other aids from the Department of Agriculture (both municipal and provincial level).

- The TCP 5 farmers also noted that there are more benefits in becoming organized group of farmers, they learn and work together in achieving their goals, thus, making things easier.

- Despite of the ratio of men and women in the project, women are seen as active as the male farmers. They became part of the group.

- Further, farmers from heavily-conflicted areas now see that the war as a cause of hunger and poverty.

III. Policy Research and Advocacy

Project Leader: AC Litonjua

PhilRice produces rich information from its policy researches but some are not fully utilized to affect policy planning and formulation. There are only rare occasions when information from these researches are reported in news articles, used in training lectures, and referred to by policymakers and other stakeholders in their meetings. To increase the use of policy research results and create greater impact, information derived from it has to be actively delivered and promoted to its intended users. This project serves as a vehicle of PhilRice, specifically the SED, in creating greater influence on rice-related policy planning and formulation of the government.

Linking rice research to policy and action

AC Litonjua, JY Siddayao, RF Tabalno, GA Rimocal, and Socioeconomics Division

Issues concerning the rice sector affect the operations and decisions of its major players, i.e., consumers, producers, traders, and input dealers. As a support to the major players of the industry, the government has to ensure that sound policies are created for the rice sector. Crucial to this task is the relevant information that serves as their decision guide in addressing issues confronting the sector. This information has to be actively and promptly delivered to policymakers to ensure use and, thus, strengthen the link between policy research and information users. This study mainly aims to speed up provision of relevant information to stakeholders. This is being accomplished through policy forums, seminar, and workshops that serve as avenues for discussions of issues besetting the rice industry. To help stakeholders generate appropriate actions and interventions for the rice industry, the study updates them of its current status.

Accomplishments:

- As part of the Development Policy Research Month celebration every September, a policy seminar-workshop was held in Manila on September 30, 2016. The event "Toward a rice-secure Philippines: identifying key priority government interventions for 2017 to 2022" aimed to identify key interventions that DA could prioritize to enhance growth in the rice industry. It was attended by researchers, academicians, DA officials and heads of its attached agencies and bureaus, policymakers, private sector, international institutions, NGOs, and other government officials working on rice.

- The seminar-workshop comprised of paper presentations, open forum, and workshops on the themes (1) rice research for development, (2) marketing and trade, (3) rice extension, and (4) support services for farmers. These themes were included in the DA Secretary's (Emmanuel S. Piñol) priority agenda. Table 7 shows the speakers and discussants who were invited to deliver a presentation on these themes:

Table 7. List of speakers and discussants in the 2016 policy seminar-workshop.

Theme	Speakers	Discussants
Rice research for development	Mr. Raymond Patrick L. Cabrera (Technical Staff, Bureau of Agricultural Research)	Dr. Flordeliza H. Bordey (Deputy Executive Director for Development, PhilRice)
Marketing and trade	Dr. Roehlano M. Briones (Senior Research Fellow, Philippine Institute for Development Studies)	Dr. Isabelita M. Pabuayon (Dean, University of the Philippines at Los Baños)
Rice extension system	Dr. Eliseo R. Ponce (Former Professor of Research and Extension Management, Visayas State University)	Engr. Renato B. dela Cruz (OIC-Director, Agricultural Training Institute)
Support services for farmers	Mr. Nomer C. Esmero (Senior National Coordinator, Better Rice Initiative Asia)	Engr. Ariel T. Cayanan (Undersecretary for Operations, Department of Agriculture)

- After the presentation of speakers and discussants, the participants were grouped by theme to discuss among themselves the strategies and interventions that they think the administration has to prioritize to promote growth in the industry. To help them with the identification, the groups outlined first the most pressing issues of the industry in relation to the specified theme and then recommended possible interventions or support services that could help address the identified issues. Table 8 summarizes the workshop output per theme which will be presented to the DA Secretary for his consideration.

Table 8. Workshop outputs per theme.

Theme	Issues/Contraints	Recommended Interventions	Persons/agencies/programs that will be involved
A. Rice research for development (R4D)	1. Centralized research for development.	1.1. Conduct more site-specific researches 1.2. Strengthen manpower of PhilRice branch stations 1.3. Strengthen regional research centers 1.4. Participatory identification of problems	Department of Agriculture, Regional Research Centers, SUCs, PhilRice branch stations.
	2. Fragmented R&D efforts in the regions	2.1 Increase complementation of R4D activities of PhilRice branch stations and regional research centers; encourage collaboration between PhilRice brach stations and research centers.	Department of Agriculture, Regional Research Centers, SUCs, PhilRice branch stations.
	3. Low budgetary allocation	3.1. Lobby for increased budget.	Department of Agriculture, DBM, policymakers
	4. Rice budgetary structure	4.1. The government could consider PhilRice as the lead rice R4D agency in the country. This implies that PhilRice will be in-charge of approving rice R4D projects even of other research institutions, and also manage the distribution of funds for rice R4D.	Department of Agriculture, PhilRice, other research institutions, DA-Bureau of Agricultural Research
	5. Research centers and SUCs are included in rationalization	5.1. Exclude them from rationalization. They should not be treated as a corporation. Do not force them to make money because they are engaged in knowledge generation. Their research outputs, therefore, should be given for free.	Policymakers, Department of Agriculture, SUCs, research centers.
B. Marketing and trade	1. QR Extension vs Tariffication	1.1. Prepare for tariffication	NEDA, DA
	2. Low price during peak season	2.1. "Quedan" system; use cooperatives to hold the stock; provide cooperatives with storage facilities	Cooperatives/FOs, banks (for Quedan system), DA, private sector, NFA
	3. Inefficient use of mechanical drying facility	3.1. Monitoring and sustain support; expand adoption of mechanical drying and other postharvest facilities	PhilMech, LGUs, Cooperatives/FOs, DA, NFA
	4. Overlapping functions of CDA and other government agencies (DA, DOST, DTI, etc.) in relation to cooperative assistance	4.1. Reformation of CDA; Transfer registration function to SEC	Congress, NEDA, PIDS, academe, DOF
	5. Limited advocacy for grading and standardization	5.1. Impact evaluation to come up with a technical regulation (PNS).	NFA, Bureau of Agriculture and Fishery Standards, Cooperatives/FOs, grain industry stakeholders
	6. Limited access to market information	6.1. Promote electronic trading system among grain industry players	DA, NFA, Cooperatives/FOs, grain industry players
	7. Role of NFA in marketing	7.1. Policy review on NFA functions	NEDA, PIDS, academe, DOF
	8. Lack of business acumen/entrepreneurial skills among smallholders	8.1. Capacity-building for entrepreneurial skills	DA, LGUs, DTI, private sectors, academe, CSOs, NGOs

Table 8. Workshop outputs per theme. (con't)

C. Rice extension system	1. Fragmented extensions system in Ph	1.1. develop an integrated national rice extension system; resubmit extension bill	ATI (lead), PhilRice, National Rice Program, DILG and LGU representatives, other R&D agencies
	2. Low capacity of AEWs	2.1. AEWs should undergo capacity enhancement	ATI (lead), PhilRice, National Rice Program, DILG and LGU representatives, other R&D
	3. Low ratio of rice AEWs and farmers	3.1. Engage intermediaries (e.g. Farmer lead extension (FLE), LFTs, SCUs, private sectors); ensure critical mass of rice extension specialists; enhance technology adaptation; establishment of demo sites	
	4. Weak linkage of RDE	4.1. Strengthen linkage of RDE continuum	
	5. Low budget	5.1. Systematic budget allocation to extension	
D. Support services for farmers			
On production	1. High-cost of fertilizers and Seeds	1.1. Liberalization of fertilizer importation; subsidy	
	2. Limited access to	2.1. revisit production system of hybrid;	PhilRice; DA-OSEC; RFO; BPI
	3. Limited supply to public hybrid seeds	3.1. revisit production system; localizing hybrid seed production	
	4. Popularizing climate-resistant varieties	4.1. revisit production; localizing hybrid seed production	PhilRice; DA-OSEC; RFO; BPI
	5. Limited supply of		PhilRice; DA-OSEC; RFO; BPI
	6. limited SSIS in non-	6.1. higher budget	DA-RFO; BSWM
	7. Limited soil analysis	7.1. mobile soil lab; infra support and capability building for soils laboratory and research center	BSWM; DA-RSL
On mechanization	8. Lack of access to machines	8.1. Organized ownerships; establishing farm service centers;	DA-RFO; PhilMech, PhilRice, BAFE
	9. Crop establishment		
	10. combine-harvester		
	11. post-harvest		
	12. milling facilities		
	13. labor displacement	13.1. selective intervention; capacity-building	
	14. lack of quality	14.1. develop guidelines	PhilMech, PhilRice, BAFE
	15. lack of inter-agency	15.1. develop guidelines	PCAF
On services	16. limited information	16.1. information dissemination	PCIC
	17. poor access to credit	17.1. additional fund for bigger coverage; capacitate to be credit-worthy; encourage banks to lend more;organize farmers	ACPC, LBP, GFI, ATI,CDA
	18. high interest rate of credit	18.1. information dissemination; encourage banks and other conduits to lower their interest rates	ACPC, LBP, GFI
	19. no health		PhilHealth; DSWD
On marketing	20. limited link to markets	20.1. guidelines to utilize Rice Processing Complex	PhilMech
	21. Inadequate storage facilities	21.1. organized ownerships; establishing farm service centers	DA-RFO;

- The study also updated the data and information in the briefing material about the Philippine rice industry and prepared new material for other topics requested by rice stakeholders. Table 9 summarizes the requests and presentations delivered in several events in 2016.

Table 9. Summary of presentations made in several events as requested by other agencies and rice stakeholders.

Topic	Requesting agency/division/person	Resource Person	Event	Venue	Date	Participants
Overview of Philippine rice industry	PhilRice - TMSD	RBMalasa	S&T Updates	Bustos, Bulacan	April 4, 2016	Farmers
	PhilRice - TMSD	RBMalasa	S&T Updates	Norzagaray, Bulacan	April 12, 2016	Farmers
	PhilRice - TMSD	RZRelado	S&T Updates	PhilRice CES	March 2016	Upland farmers
	PhilRice - DevComm	RBMalasa and ACLitonjua	Training on climate-smart agriculture and rice production	PhilRice CES	April 1, May 16, and June 20, 2016	three batches of teachers
	PhilRice - ED	ACLitonjua	Welcoming of guests from Argentinia	PhilRice CES	November 15, 2016	Argentinian investors/businessmen
	PhilRice - TMSD	ACLitonjua	Rice Boot Camp	PhilRice CES	November 21, 2016	New graduates and students of agriculture from Pangasinan
Rice industry situation in Central Luzon	ATI-Zambales	RBMalasa	Rice Production Training: A Package of Technology for Agricultural Technicians and Farmer Leaders of Zambales	Dinalupihan, Bataan	October 24, 2016	Farmer leaders and Agricultural technicians of Zambales
Trade Liberalization/ International trade/Benchmarking rice industry in Asia	ATI-Zambales	ACLitonjua	Rice Production Training: A Package of Technology for Agricultural Technicians and Farmer Leaders of Zambales	Dinalupihan, Bataan	October 24, 2016	Farmer leaders and Agricultural technicians of Zambales
	Regional Agricultural and Fishery Council - 5	ACLitonjua	2016 regional Agricultural Fishery council sectoral consultation	Naga City	December 5, 2016	Farmer leaders and government officials of Region V.
	DA - Central	JCBeltran	2016 Cluster-wide consultation on Quantitative Restriction on Rice	Quezon City	September 28, 2016	DA officials
	Municipal Office of M'lang	RBMalasa/ JCBeltran	First Municipal Rice Industry Congress	M'lang, North Cotabato	December 6, 2016	Constituents of M'lang

- The archive of news articles, rice-related laws and issuances, policy briefs, and discussion papers were updated this year. A total of 383 rice-related news articles were gathered and actively provided to SED and other staff for their convenience. These news articles were consolidated to form 27 Oryza news bulletins. Additionally, 18 working papers, 22 policy briefs, and 107 rice-related laws (Republic Act, Executive Order, House and Senate Bills) were gathered and archived for reference of staff. These materials will be uploaded to PalayStat when the flatform is readied for archiving.

Rice Science for Decisionmakers

AC Litonjua and JY Siddayao

In order to create a sound policy environment, policymakers need reliable and timely data and information to serve as their decision guide. These data and information may be threshed out from relevant policy research papers or findings. However, not all policymakers have the time to read long research papers nor have the technical background to understand findings of a technical research. In this case, a policy brief can be a useful tool in providing important technical research results to policymakers that could help them create a sound policy environment for the industry. It is a short reading material that discusses important policy issues and recommends solutions in a concise and easy to understand for. This material is then hoped to effectively advocate policies or solutions based on strong research findings.

Results:

- The 2016 issue of the Rice Science for Decisionmakers (RS4DM) will tackle land reconfiguration and mechanization. This is in response to the emerging need of farmers to be more competitive in anticipation of freer trade in 2017. The special treatment on rice is set to expire again in 2017, hence, removal of quantitative restriction on imported rice.

- Improving price competitiveness is necessary to help farmers survive under an open economy. One of the ways to achieve this is by reducing the unit cost of producing rice. Based on previous studies, hired labor occupies a significant share in production cost, most specially those spent on transplanting and harvesting. Farmers are then advised to manage high hired labor cost through mechanization.

- The available machines for harvesting are mechanical reapers and combine harvesters. As combine harvesters are becoming more popular, the authors chose to analyze its net effect on cost and income of farmers. Partial budget analysis shows that replacing the traditional way of harvesting and threshing (manual + axial flow thresher) with combine harvesters would result in a net additional income of PhP1,796.67/kg and net cost reduction of PhP4,213.53, ceteris paribus. Using the total production cost and yield data of Bordey et al. (2016), the cost reduction implies that the unit cost of dry paddy could reduce to PhP11.52/kg, which is 7% lower than the PhP12.41/kg using traditional operations. These changes would ultimately result in a net profit increase of PhP6,010.20/ha or 26% of profit using the usual operations, ceteris paribus. (Table 10).

Table 10. Partial budget analysis of shifting from manual harvesting to combine harvester.*

Added Income	**3,530.24**	**Reduced Income**	**1,733.57**
Savings due to reduced crop loss (231.33 kg/ha)	3,530.24	Reduced income due to crop loss from combine (114.57 kg/ha)	1,733.57
Reduced Cost	**13,047.17**	**Added Cost**	**8,833.64**
Manual labor cost on harvesting	5,486.00	Rental of combines (includes fuel and operator)	8,660.28
Threshing cost (includes operator, machine, and fuel)	5,486.00	Permanent hired laborer [a]	173.36
Sacks and twine	1,722.16		
Permanent hired laborer [a]	353.02		
Subtotal A	16,577.41	**Subtotal B**	10,567.22
Net Profit Change		**6,010.20**	

*based on key informant interview (Nueva Ecija) and secondary data.

Assumptions:

1. Grain loss (source: PHilMech, and Regalado and Ramos, 2016):
   Manual harvesting (2.03%)
   Mechanical threshing (2.18%)
   Piling (0.08%)
   Combine harvesters (2.11%)
2. Other basic data used in the computation (source: Benchmarking project)
   Yield (equivalent wet paddy): 5,438.3 kg/ha
   Price per kg of wet paddy PhP15.13/kg
4. Sharing arrangement:
   Manual harvesting (1:15)
   Mechanical threshing (1:15)
   Combine harvesters (10% of gross harvest)
   Permanent hired laborer (10% of gross harvest)

- Based on the RBFHS 2011-12 data, the significant factors that influence the decision of farmers to mechanize harvesting operation are land size, gender, borrowed capital, and cost per unit of labor (Table 11). Farmers who cultivate bigger lands are more likely to mechanize harvesting than those with smaller lands. This is because manual harvesting becomes more laborious and costly as area increases. Male farmers are more than twice likely to mechanize harvesting than their female counterparts. This could imply that males are more responsive to technological change than women. Likewise, as labor becomes more expensive (i.e., labor cost per md increases) there is a greater chance that a farmer would resort to mechanized harvesting. A farmer with borrowed financial capital is more likely to mechanize harvesting than those who used own capital only. Possibly, this is because of the added accountability attached to a borrowed financial capital. Farmers would spend a borrowed capital more wisely because they are expected to repay debts after harvest. Therefore, they prefer custom-hired machines rather than manual labor to save time and cost, and reduce postharvest losses.

Table 11. Factors affecting farmers' decision to mechanize harvesting, Philippines, 2011 to 12.

VARIABLES	Odds ratio		Std. Error
Land size	1.2041	**	0.1108
Age	1.0120		0.0138
Gender	2.7295	*	1.4776
Farming experience	1.0110		0.0119
Membership in farm organizations	0.9449		0.2130
Land ownership	0.9604		0.2200
Borrowed capital	1.9459	***	0.4570
Labor cost per man-day	1.0017	***	0.0003
Constant	0.0008	***	0.0007

*, **, *** - significant at 10%, 5%, and 1% alpha, respectivelLR chi2: 49.49 with p-value of 0.0.
Source of raw data: Rice-based farm household survey (RBFHS),
2011-12 of the Socioeconomics Division, PhilRice.

- Additionally, based on some studies (MJCRegalado, EGBautista, and RBMalasa, 2015), lack of field access is a constraint in machine adoption because of difficulty in reaching inner parcels of adjoining rice fields. Right-of-way belongs to outer parcels located along access roads. Irrigation water has also been distributed unequally to land parcels because of uneven field landscape. Small and irregularly shaped fields can reduce efficiency of machines because of too much maneuvering in operations.

- Based on these results, mechanizing harvesting operations is one of the ways to reduce production cost and improve the farmers' income. Projects and programs that would enhance adoption of mechanical harvesters, especially the combine harvester, may be prioritized on areas with large farms and high labor price (which could be a result of labor scarcity). Farmers in these areas may be more receptive to these innovations. Moreover, a sound credit program may also be introduced to farmers so that they may be encouraged to custom-hire machines. Finally, land reformation is highly recommended as this will modify field layout for easier field access and efficiency of machine operations.

IV. Socioeconomic Studies of Rice-based Farm households in the Philippines

Project Leader: AB Mataia

Remarkable array of rice-based technologies are now available for rice-based farm households' adoption to increase farm productivity, profitability, and competitiveness. Yield variabilities however still exist, which can be attributed not only to biological and physical constraints but also to socioeconomic factors. This project is being conducted because of the increased need for information about technology adoption and diffusion and its impacts and the characteristics of rice production and producers for effective design of research and development interventions.

Farmers' pest problems and management practices: implications to rice productivity

AC Litonjua and JY Siddayao

Pests and diseases has always been one of the top problems in rice production. Based on the rice-based farm household survey data covering the wet season 2011, it is second common problem of rice farmers. More than 50% of farmer-respondents reported problem on pests and diseases. Moreover, based on a study conducted by PhilRice , the number of farmers who experienced pest problems increased from 1996-97 to 2006-07. The growing trend of pest problems merits the attention of researchers, policymakers, and other stakeholders. Updating them with information on pest problems, its control, and productivity implications will enable them to align their activities, programs, and policies with current situation in the field. This study focuses on identifying common pest problems, its management, and implications to productivity.

Activities:

- Reviewed literatures- include literatures on pests and diseases, resource use efficiency, pesticides, and rice productivity.

- Data matrix review and regeneration of output tables on pest problems and management practices- Data matrices of the two seasons were reviewed again for consistency and correctness of formulas used in deriving the variables of interest. Some of the results were regenerated to consider the changes made in the matrices. Preliminary discussions were then prepared.

- Preparation of draft paper.

Results:

- Majority of farmer-respondents had problems on Echinocloa colona (weed), Rice Bug (insect), Stem Rot (WS 2011) and Leaf Blast (DS 2012) (diseases), and Golden Apple Snail (GAS) (Table 12). Among these pests and diseases, GAS and Rice Bug were the most common to majority of farmers in both seasons.

- In WS 2011 and DS 2012, majority of farmers used chemical application to manage pests and diseases because it is the easiest and less laborious management control. Most of the chemicals applied are non-toxic, meaning they are non-threatening to farmers' health. However, some farmers still used highly-toxic ones like Endosulfan, Terbufos, MN-ZN Ethylene Bisdithiocarbamate. Moreover, there are farmers who applied chemicals even without any problem on pests and diseases (Figure 7).

- The active ingredient commonly used are 2,4-d (herbicide), Cypermethrin (insecticide), Copper Hydroxide (WS 2011) and Difenoconazole + Propiconazole (DS 2012) (fungicides), and Niclosamide Ethanolamine Salt (GAS) (Table 13).

- Table 14 shows the quantity of active ingredients per type of chemical. Insecticides, fungicides, and molluscicides are applied in greater quantities in the wet season than in the dry season. This could imply that incidence of insect pests, diseases, and GAS is higher in the wet season than in the dry season. Weeds multiply faster in less watery areas; thus, its active ingredient was higher in the dry season.

Table 12. Prevalent pests and diseases by type of problem, WS 2011 and DS 2012.

Type of Pests and Diseases	2011 WS	2012 DS
Weeds	*Echinochloa colona* (40%)	*Echinochloa colona* (38%)
Insect Pests	Rice Bug (52%)	Rice Bug (56%)
Diseases	Stem Rot (12%)	Leaf Blast (6%)
Other Pests	Golden Apple Snail (55%)	Golden Apple Snail (60%)

Note: other pests includes rats, birds, and Golden Apple Snail.
Percentages are distribution of farmers based on the following sample sizes:
With weed problem - 2,247 (WS) 1,868 (DS) With disease problem - 1013 (WS) 559 (DS)
With insect problem - 2,042 (WS) 1,776 (DS) Other Pests - 1,615 (WS) 1,395 (DS)

Arida, I.A. and S.R. Francisco [2013] Common problems encountered by Filipino rice farmers, unpublished manuscript submitted to the Socioeconomics Division, PhilRice.

Table 13. Common active ingredients applied by farmers, by type of chemicals, WS 2011 and DS 2012.

Type of Pests and Diseases	2011 WS	2012 DS
Herbicide	2,4-D IBE (30%)	2,4-D IBE (29%)
Insecticide	Cypermethrin (58%)	Cypermethrin (56%)
Fungicide	Copper Hydroxide (26%)	Difenoconazole + Propiconazole (15%)
Chemicals for GAS	Niclosamide Ethanolamine Salt (36%)	Niclosamide Ethanolamine Salt (39%)

Table 14. Quantity of active ingredient (L or kg per ha) by type of chemical used, WS 2011 and DS 2012.

Type of Chemical	Qty of Active Ingredient (li or kg per ha)	
	2011WS	2012DS
Insecticides	0.25	0.23
Herbicides	0.32	0.4
Fungicides	0.11	0.06
Rodenticides	0.03	0.05
Molluscicides	0.16	0.02

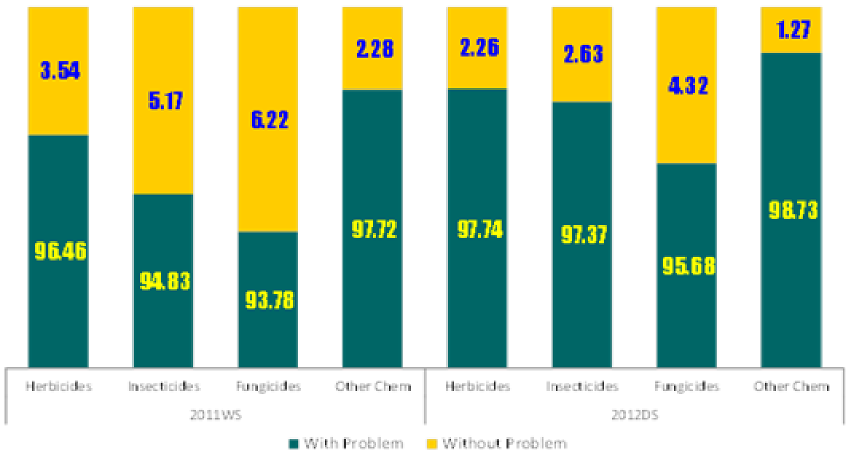

Figure 7. Distribution of farmers (%) who are chemical users, with and without pest problem, WS 2011 and DS 2012.

Assessment of Access to Market for Small Rice-based Farm Households in the Philippines

AB Mataia and AC Flores

Poverty incidence registered at 25.8% in 2014 in which majority lives in rural areas and work in the agriculture sector mostly are farmers and fishers. In the rice sector, the prevalent of poverty incidence can be partly attributed to small landholdings operated by rice-based farm households and low access to markets. Results from the 2012 rice-based farm households survey (RBFHs) showed that 55% of our farmers are only cultivating an average of one (1.0) ha and below. Most often, these small farmers have little bargaining power with traders because of their insignificant marketable surplus available for sale. Their inability to access markets in particular agricultural markets for input supplier and agricultural produce impede their improvement. Assisting farmers to improve market access and promoting rice market are considered crucial areas of intervention in enabling them to overcome their poverty. Generally, this study aimed to assess market access for small scale rice-based farm households, and identify key intervention for improvement.

The study used the rice-based farm households (RBFH) survey data in 2011 WS and 2012 DS production harvest collected in 33 major rice-producing provinces in the Philippines. Descriptive statistics and graphs were used in the analysis of data using MS Excel and SPSS. Assessment of market access was determined by farmers' constraints on 1) physical access markets; 2) market structure; and 3) membership in farm organization and access to market information.

Activities:

- Gathered and reviewed related literatures on methods of measuring access to markets.
- Extracted needed data from the RBFH survey database.
- Organized data set and generated data matrix on constraints to access to markets.
- Produced preliminary summary or statistical tables.
- Prepared draft report.

Results:

- One constraint to access to market is poor rural road infrastructure as this affect the transportation cost. As reported by 37% farmers, road structures from farmers' farm to nearest market center are either made of earth or rough road, sand and gravel, and river. Tricycle and PUJ are the common means of transportation. However, for less accessible road, habal-habal, hand tractor, horse, carabao, and boat were used. Transportation cost varies depending on the distance and road structure. It ranges from PhP20 to PhP700.
- The distance to the nearest market center (where farmers buy major input and sell produce) ranges from 5 to 46 km, which made difficult for farmers to access input, output and other factor markets.
- Overall, 45% of our rice farmers borrowed capital to finance their rice production, which majority (80%) loaned out to informal moneylenders with interest rate ranging from 4 to 6% per month. Informal lenders are more accessible to small farmers despite the high interest charge mainly because of the low transaction cost.
- The average total rice area cultivated by a Filipino farmer is 1.41 hectares. However, around 60% are operating one (1.0) hectare and below and almost equally the same in irrigated and rainfed ecosystems. This means that many of our rice farmers are small-scale operators. There are 24% cultivating between 1.01 to 2.0 hectares; and 8% each cultivating 2.0 to 3.0 and above 3.0 hectares, respectively.
- Palay production is directly proportional to the size of the rice area. The smaller the size, the smaller the volume of gross harvest. On average, 84% of our farmers have marketable surplus. This means that 16% are subsistence with no available surplus for sale. Many subsistence farmers are seen in areas cultivating 0.5 hectare and below hence, poverty incidence is high (51% in irrigated and 61% in rainfed).
- Those with marketable surplus, 72% sold their produce to palay traders because of accessibility. They picked up the palay from the field and pay in cash. Others sold to assembler, miller, creditor and cooperative. Very few (2) sold to NFA, which explained the small volume available for sale of majority of our farmers. NFA has volume and quality requirements for palay procurement.
- Around 82% of our rice farmers sold palay in fresh form, which price is lower than dried form by PhP 2.00 to PhP5.00 per kg depending on the moisture content. Majority of the

farmers have no drying and storage facilities hence they are constrained to sell even at a low farmgate price. Thus, they miss the option to dry, store and to wait for high price.

- More than half (53%) of our farmers are members of farm organization like cooperative, irrigators association and farmers association. However, the extent of coordination or relationship of the organization between farmers is still weak.

- Palay trader, co-farmers and input traders are the major source of market and other information of farmers due to their accessibility.

Labor productivity in rice farming in the Philippines and selected rice-producing countries in Asia
JC Beltran, RZ Relado, IA Arida, and FH Bordey

Increasing labor productivity in agriculture is vital in country's economic growth. Failure to achieve rapid growth in labor productivity can raise the cost of transferring labor, and other resources, from the agricultural to the nonagricultural sector as development proceeds. Over the years, there are technological advances in rice production coupled with varying levels of economic development that is happening in the Philippines and to the other countries that drives changes in the levels of labor productivity. By being updated on the level of labor productivity and having more information on factors affecting it across provinces and countries, a more relevant policies and a better system of targeting in the national rice program can be made with higher probability of success. This study aims to determine the labor productivity and its growth across intensively-cultivated irrigated rice areas in selected countries in Asia and across rice-producing provinces in the country. Specifically, it aims to identify factors affecting labor productivity and provide policy recommendations in improving its level in the country.

Activities:

- Reviewed literature related to labor productivity of rice farming in the Philippines and other major-rice producing countries and prepared its annotated bibliography.

- Reviewed literature related to new methods of estimating comparative labor productivity and prepared its annotated bibliography.

- Prepared labor and power costs distribution of the 2011-12 database of the RBFHS and Benchmarking data.

- Edited labor use and mechanization of Benchmarking and RBFHS databases.

- Constructed a data matrix of labor productivity growth determinants across selected Asian countries and across rice-producing provinces in the Philippines.

- Generated preliminary output tables.

- Prepared draft report.

Results:

- Based on 2011 to 2012 RBFHS data, the average total labor use in rice production in the Philippines was less than 65 man-days/ha in both wet and dry seasons.

- Crop establishment and harvesting and threshing were the most labor-intensive crop operations in rice farming in both seasons with an average of 20% and 30% shares to the total labor requirements, respectively.

- Hired labor accounts for the biggest share in the total labor use in both wet and dry cropping seasons. Crop care and maintenance activities were mostly done by own, family, and exchange labor.

- On average, labor productivities in the Philippines were 83kg/manday in dry season and 55kg/manday in wet season.

- Using the Benchmarking data, Philippines, India, and Indonesia are the highest labor-using or labor-intensive countries, while China, Vietnam, and Thailand are the least labor-using or highly mechanized countries.

- The total labor use in rice farming exceeds 65 mandays/ha in the labor intensive countries, but it is substantially less in highly mechanized countries at roughly 10 to 20 mandays/ha.

- Hired labor accounts for the biggest share in the total labor use in labor-intensive countries, while own, family, and exchange labor accounts for the bulk in highly mechanized countries.

- Highly mechanized countries achieved significantly higher labor productivity than labor-intensive countries with less than 100 kg/manday.

- The Philippines particularly need to mechanize its labor-intensive operations to reduce labor input use, reduce costs, and thereby improve competitiveness and labor productivity.

Factors affecting adoption of nutrient management practices in rice production in the Philippines
RG Manalili and CP Austria

Fertilizer is one of the major inputs in rice production. This major input along with the use of high yielding varieties and good irrigation water management, is one of the major factors that made the Green Revolution a success. Nearly all rice farmers use fertilizers, but not all use the best nutrient management practices that would increase rice production. The effects of fertilizers are not maximized due to limited knowledge of farmers on proper timing and amount of application. The high price of this input also constrained many farmers on its optimum use. Levels of fertilizer use and nutrient management practices of farmers in the 33 major rice producing provinces for 2011 wet season (WS) and 2012 dry season (DS) were described. Data used were from the Regular Monitoring of Rice-Based Farm Households Survey (RBFHS) covering 2,339 farmer-respondents during WS and 2,043 farmers during DS.

Activities:

- Data matrix on socioeconomic characteristics and fertilizer use from 2011-2012 RBFHS data prepared.
- Set of statistical tables, graphs and maps prepared.
- Presented a poster in the 19th PSSST annual meeting and scientific conference- Extended abstract was published in the proceedings of PSSST annual meeting and scientific conference.

Results:

- More than 90% and 80% of farmers in irrigated and rainfed areas used fertilizers in rice production. Majority of them utilized inorganic sources and only a few combined these with organic sources. Urea (46-0-0) remained to be the most commonly used fertilizer grade, followed by complete fertilizer (14-14-14), ammonium sulfate (21-0-0) and ammonium phosphate (16-20-0). Potassium nitrate (17-017) and muriate of potash (0-0-60) are also gaining popularity among rice farmers in both ecosystems.
- Basal fertilizer application was not a common practice of farmers in both ecosystems. On the average, fertilizers were commonly applied using 2 to 3 splits per season. Very few of them applied in 4 or more splits (Table 15).
- The national average application of NPK in irrigated farms was 81-7-11 kg ha-1 during 2011 WS and 82-8-12 kg ha-1 during 2012 DS. Lower NPK rates were applied in the rainfed farms at 53-5-6 kg ha-1 during WS and 42-4-5 kg ha-1 during DS. These NPK rates are well below the recommended rates (Figure 8).
- Farmers who applied more fertilizers obtained higher yields. Provinces with higher fertilizer applications are the top rice-producing provinces of the country, which indicates that this input indeed could help in increasing the national rice production. However, inefficient fertilizer use was observed in some provinces where farmers applied less fertilizer in the DS when the plant's potential for nutrient absorption is higher. This could be addressed by greater information dissemination on proper nutrient management in these areas.
- Farmers in irrigated areas also applied more fertilizers than in rainfed areas. Farmers served by CIS and NIS applied more N-P-K than farmers who sourced water from small-scale irrigation systems. As expected, the sufficiency of irrigation water increased the level of fertilizer application. Hence, ensuring the reliability of water availability could promote fertilizer use. Farmers who used high-quality inbred and hybrid seeds also applied more fertilizers than those who used low-quality inbred seeds. Thus, promoting the adoption of high-quality seeds could be also a way to encourage greater fertilizer use.
- Results also showed that there is low adoption of soil and plant nutrient diagnostic tools such as MOET and LCC, basal fertilizer application, and use of rice straw and hull to improve soil quality. These could help farmers improve their fertilizer-use efficiency.

Table 15. Percent distribution of farmers, by number of fertilizer application, by crop stage, by ecosystem and by season, crop year 2011 to 2012.

Ecosystem/Crop Stage	No. of Applications/Season									
	2011 WS					2012 DS				
	0	1	2	3	4 or more	0	1	2	3	4 or more
Irrigated										
Seedbed	31	54	14	1	0	34	55	11	0	0
Pre-standing crop	92	7	0	0	0	92	8	0	0	0
Standing crop	3	15	64	15	4	2	15	61	17	4
Rainfed										
Seedbed	47	51	3	0	0	60	37	3	0	0
Pre-standing crop	96	4	0	0	0	93	7	0	0	0
Standing crop	10	26	56	7	1	17	31	43	7	2

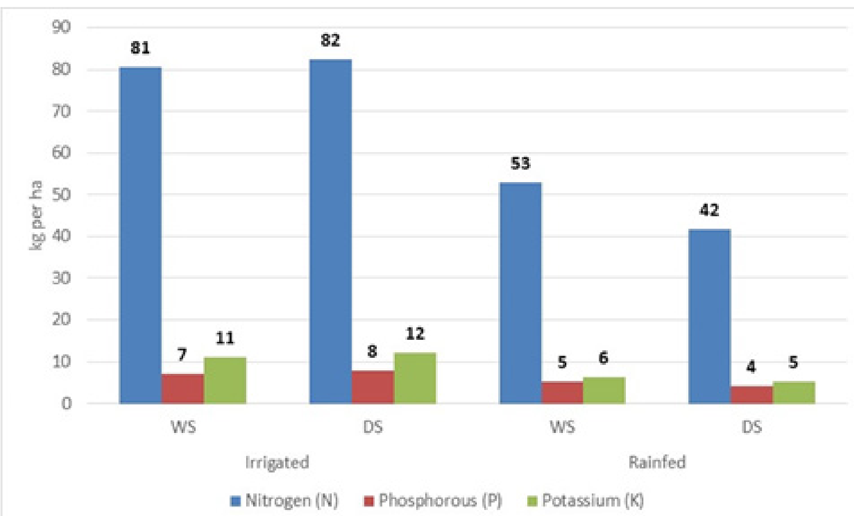

Figure 8. Average amount of NPK (kg/ha) used by farmers, by ecosystem and by season, 2011 to 2012.

Rice-Based Farm Households' Access to and Sources of Information
RZ Relado and MGC Lapurga

One important facet of rice agriculture in attaining self-sufficiency is the decisive and effectual delivery of rice information, a major prerequisite to agricultural change. Information delivery is important since it highly influences adoption of the latest and scientifically sound rice techniques and technologies. Social science studies have shown that stimulating a target audience's awareness through information dissemination is related to changes in knowledge, attitudes, perceptions, and practices that are favorable or threatening to the rice self-sufficiency program. Hence, to document rice farmers' information sources is a significant primary step to facilitate changes in farming practices from inefficient and ineffective techniques to profitable and scientifically proven rice management practices.

This study aims to 1) document information sources of rice-based farm households in the 33 major rice-producing provinces in the Philippines, 2) determine the most effective source of information on rice, 3) assess factors that affect information access, and 4) provide implications to national rice extension based on information access.

Activities:

- Reviewed literature related to access and sources of information.
- Extracted data from RBFHS 2011 to 2012.
- Processed and analyzed results.
- Drafted paper ready for publication.

Results:

- In the 2011 to 2012 RBFHS, the top three information providers reported by rice-based farm households (n=2,547) are co-farmers (69%), local government units (48%), and DA-RFU (24%). For extension activities, 38% of the respondents reported technician visits as means of accessing rice information. Thus, it is not surprising that when respondents were asked regarding their perceived most effective information source, co-farmers (23%), LGU (14%), and technician visits (13%) are identified.
- When information sources are categorized, personal contacts or face-to-face interaction (institutions and extension activities) is favored by farmers (from 39% and up) in the monitored 33 major rice-producing provinces. However, for non-personal means of accessing information, radio programs are popular in many provinces.
- Across age groups, reported sources of information depend on face-to-face interactions. Mass communication as source of information is not heavily relied upon. Perhaps, mass communication sources only create awareness but personal/ face-to-face interaction provides proof/testimonies to the truthfulness of the information being communicated. Development planners should always consider this implication when promoting rice technologies.

- Looking at the use of information and communication technologies to access rice information, 79% of the rice-based farm households own cellular phones. Of these, 74% are willing to receive rice information through text messages. Ownership of personal computers is low. Only 12% of 2,546 respondents own them. However, almost half (42%) of the respondents reported that that they have a household member who is knowledgeable in using the Internet. Around 37% of those with Internet-literate members are willing to access the Internet for rice information.

Quo vadis, rice-based farm households: A social mobility study
RB Malasa, IR Tanzo, and RF Ibarra

The Philippines had been lagging behind other Asian countries in alleviating poverty and most of the poor are found in the rural areas. Moreover, most of those involved in agriculture are into rice production. Understanding poverty particularly in the context of social mobility would enrich the discussion on alleviating poverty among policy makers and development workers, especially in relation to rice farmers. Generally, the study aims to assess social mobility of rice-based farm households. Specifically, the study aims to 1) assess the intergenerational and intragenerational status of education, income, and occupation of the rice farm operators; 2) identify the strata (or emerging sub-strata) of farmers and its relationship in relation to education, income, and occupation; 3) Determine the extent of rice-based farm households that are chronic poor or borderline poor; and 4) identify factors influencing the social mobility of rice farm operators. Data from 1996-1997 to 2011-2012 of the Rice-based Farm Household Survey will be used for this study.

Results:

- Of the 2,500 RBFHS original respondents from the 1996-1997 survey period, 46% (1,143) remained as respondents in the 2011-2012 survey round. Moreover, 11% (284 out of the 2,500 respondents) had data in all the survey periods (1996 to 1997, 2001 to 2002, 2006 to 2007, and 2011 to 2012 survey rounds). However, since 1996 to 1997 until 2011 to 2012, there were 5,616 unique respondents of RBFHS.

- Among the respondents with data in the 1996 to 1997 and 2011 to 2012 survey periods, they perceive rice farming as their main source of income. This increased by 10% during the 15 year-period. However, farmers that relied on other agriculture and non-agriculture sources of income declined by 4% and 6%, respectively (Figure 9).

- There was also a decline in the average household size from 6 to 5 from 1996 to 1997 to 2011 to 2012. The number of those with less than 5 household members increased by 13%. However, the number of respondents with only 1 to 2 household members increased from 6% to 12% during the 15-year period.

- There was a slight increase in the number of farmers joining farmer organizations from 50% in 1996 to 1997 to 53% in 2011 to 2012. However, the number of farmers that were able to avail training or seminars declined from 48% to 41% during the last fifteen years.

- In 2011 to 2012 survey round, showed that the characteristics of the original sample farmers and the replacements farmers slightly differed. The composition of the samples were 68% were respondents from the 2006 to 2007 survey period, 10% were samples replacing the farmer respondent within their own household, and 22% were from a totally new household.

- Women seems to be the recipient of the rice farm as management seems to be turned over to them as seen among the sample households that were replaced by their own member (Table 16). How this would affect extension and technology development must be addressed in the future.

- In terms of farming experience, the original sample farmers from the 2006 to 2007 had the most farming experience at 31 years while those that were sampled from new households had 24 years of experience. The ones replacing the sample farmer within their own household had the least farming experience with 19 years (Table 16).

- From the original samples of 2006 to 2007 survey round, 91% perceive rice farming as their main source of income, 53% were members of farm organizations and 43% had attended a training or seminar in rice production (Table 16).

- On the other hand, 88% of the samples that replaced the original farmer respondent from their own household, perceived rice farming as their main source of income, but only 43% were members of farm organizations and 36% had attended training or seminar in rice production (Table 16).

- Many of the new samples (83%) also identified rice farming as their main source of income, and their membership in farm organizations and attendance to training or seminar were 50% and 37%, respectively (Table 16).

- Initial intragenerational results showed that over time more rice farmers have perceived that rice production is their main source of income. This supports the importance of improving rice production technologies for greater productivity (Table 16).

- However, support mechanisms should also be in place among rice-based farm households. New farmers going into rice production, particularly those within their own households should also be involved in rice production training early on (Table 16).

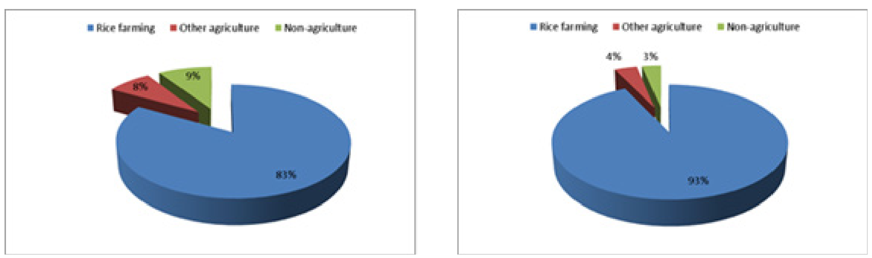

Figure 9. Perception of main source of income among same sample farmers from 1996 to 1997 and 2011 to 2012.

Table 16. Selected characteristics by farmer category, 2011 to 2012.

Item	2006-2007 sample farmer	replacement (same household)	replacement (new household)
Age (years)	56	46	51
Sex	91	69	91
Farming experience (years)	31	19	24
Organizational membership (%)	53	43	50
Training attendance (%)	43	36	37
Rice farming as main source of income (%)	91	88	83

n=2,500

Profile of the Filipino Farmer
IR Tanzo and MGLapurga

Recognizing who the rice farmers are gives researchers and policy-makers a clearer understanding about their capacity, challenges, and needs. This is important if we want our agricultural policies, research technologies, and development programs to be suitable for the rice farmers. In the past, most public agricultural extension systems often fail due to inadequate knowledge of what farmers need (Babu et al. 2012, FAO 2003). More so, most agricultural expenditure is usually poorly focused on the real needs of small-holder farmers (ActionAid 2013). It is about time we learn our lesson. A study describing the socioeconomic characteristics and the needs of the rice-based farm households and elaborating the changes that they had undergone is then important. This will lead us to realize what further interventions should be in place to fit the Filipino farmer or what policies need to be designed, so as to improve rice production in the country and thereby meet the elusive rice self-sufficiency target. This study hopes to give the needed answers.

The study used the data from the Rice-based Farm Household Survey of the PhilRice SED. Using MS Excel and Statistical Product and Solution Services, frequencies, tables, percentages, averages, cross tabulations, sex-disaggregated data are used in analyzing the data.

Activities:

- Reviewed variables from the RBFHS data and focused on four components to characterize the Filipino farmers. First, sociodemographic variables included: age, sex, civil status, educational attainment, years of farming experience, household composition, major source of income, sources of income, and gross income. Second, extension-related variables involved: membership in farm organization, seminars/training attended, and sources of information on rice farming. Third, farm-related variables looked at: farm size, farm income, farm assets, number of rice-based parcels, tenurial status, seed class used, what chemical inputs he/she used, what activities women and men do, and farm problems encountered. Lastly, the quality of life variables touched on the: house and roof construction materials, house assets, toilet, and water facilities.

- Draft of the paper had been written.

Results:

- Sociodemographic characteristics. The Filipino farmers, on the average, are in their golden years. Female farmers are even older as they approaching their sixties. Majority of the farmers are married and have, on the average, a household size of five members. One to three of these members are contributing to the household income. In addition, less than 10 percent of these households depend on an Overseas Filipino Worker who is considered a household member. On the average, Filipino farmers had only reached, but not completed, secondary education. This is regardless of sex. Filipino famers had been farming more than half of their lives, this shows that they are usually born to farming households. On the average, male Filipino farmers had a higher semi-annual gross income (PhP109,088) than female farmers (PhP101,001).

- Extension-related characteristics. About majority (51%) of the male farmers are members of farm organizations. Female farmers are less active members (47%). There are more male farmers (42%) who attend in seminars or trainings related to rice farming as compared to female farmers (36%). The top three major sources of information on rice farming are: co-farmers (69%), LGU (48%), and technician visits (38%). PhilRice is mentioned by 13% of the farmer-respondents.

- Farm-related characteristics. On the average, the Filipino farmer tills 1.42ha of rice land. Male farmers have bigger lands (1.42ha) as compared to female farmers (1.37ha). The smallest land reported is 0.04ha while the biggest is 25ha. Slightly more than half of the farmers owned (53%) the land they are tilling. The gross income per cropping from a hectare of rice land is, on the average, PhP53,264. Some farmers earn as little as P1,540 while others earn as much as PhP148,500. Farm assets of farmers usually include a carabao (32%), handtractor (26%) and moldboard plow (17%). Despite the IPM campaign, a knapsack sprayer is still owned by some farmers (13%). In addition, farmers still most commonly use their own seed (41%) for planting. When asked what activities women are involve in rice farming, the top three mentioned are: harvesting (54%), pulling of seedlings (45%), and transplanting (38%). The most common problems faced by the farmer in rice production are: high price of inputs, pests/diseases, and low price of palay.

- Quality of life characteristics. When asked about their house and its facilities, many of the Filipino farmers describe it as made of strong materials, including the roof. Majority has water-sealed toilets (83%) and owns a refrigerator (53%) and a television (79%). Note that other households have two or more television sets (8%).

V. SED Externally-Funded Projects

Aside from core projects, SED also implements externally-funded undertakings that are aligned with its mandate. At the start of 2016, these projects focus on value chain analysis, yield gap, hybrid rice seed, and IPaD monitoring and evaluation. However in the middle of the year, two more projects were added that deal with production and marketing of specialty rice and assessment of farming systems to develop a Palayamanan Plus model.

Analysis of the Rice Value Chain in the Philippines

AB Mataia, RG Manalili, JC Beltran, BM Catudan, NM Francisco and AC Flores

Compelled by the free trade that will come along with the ASEAN integration and the probable removal of quantitative restriction (QR) in rice in 2017, there is a need for the rice industry to prepare for this significant development or "eventful scenario." This however requires an understanding of dynamic factors within the whole rice value chain. Concurrently, there was little hard data at the national level on how domestic basic staple commodity value chain is structured and performing hence the study was conducted. The rice value chain covers the full range of activities required to bring a raw material through a chain to the sale of the final product. It covers the different phases of production, processing, and delivery via market-focused collaboration among different stakeholders who produce and market value-added products (IDRC 2000). An analysis of rice value chain involves identifying each segment of the value chain and seeing where improvements can be made either from a production or marketing cost perspective to enhance competitiveness. Overall, this study aimed to analyze the rice value chain in the Philippines, and identify priority interventions and recommended specific policy directions and strategies for improvement of the rice industry in general, and upgrading of the specific segments in the rice value chain in particular. It covered the top twenty (20) rice producing provinces and major rice trading centers in the country. Both secondary and primary data were used. For secondary data, databases and other complementary information were obtained from the existing websites relevant for the study while primary data were collected through field survey; key informant interviews, field observations and photo documentation, stakeholders workshop and SWOT analysis. Data were analyzed using trend analysis, descriptive analysis, structural analysis, and economic analysis. (Note: The study will be completed on March, 2017.)

Activities:

- Validated survey data gathered from palay traders, rice millers and rice traders.

- Standardized processing and marketing related costs (aggregation, handling, transportation, drying, storage, packaging, distribution, etc.).

- Constructed data matrix for economic analysis or costs and returns of the chain actors in the rice value chain (farmer, palay trader, miller, wholesaler, retailer).

- Generated preliminary costs and returns tables on rice production, palay trading, rice milling, rice wholesaling and retailing.

- Conducted key informant interviews of key person of different financial and non-financial support agencies.

- Gathered additional data needed for the rice value chain report write-up.

- Prepared and finalized the rice VCA report outline.

- Conducted writeshop, and drafted the report (40% completed).

Results:
The report outline comprises nine chapters; the following are some of the partial results:

1) Overview of the rice industry
   - In 2014 WS and 2015 DS, 164 unique rice varieties were reported by sample farmers, suggesting an extensive diversity of rice varieties planted within the 20 sample provinces surveyed. Newly released NSIC Rc varieties from 2011 were most preferred although some farmers still favored third generation varieties due to their good performance and premium eating quality.

   - The top ten rice varieties adopted are NSIC Rc222, NSIC Rc216, SL-8H, NSIC Rc160, PSB Rc100, PSB Rc18, NSIC Rc224, PSB Rc82, NSIC Rc226, and NSIC Rc238. These varieties are either known for their high yield characteristic, long grain, and intermediate amylose content.

   - Annually, millions of milled rice and by-products are produced in the country. The by-products include rice straw, hull and bran, which are becoming important sources of raw material by industry users and have generated new income opportunities for some players in the rice industry.

   - Based from survey of millers, rice hull and bran are used by industry (63%) and households (34%). Ninety five percent of the rice bran is utilized as ingredient for animal feeds while rice hull in its loose form is mostly (70%) used for production of alternative energy and its high silica content is used as additive in cement industry. Rice hull is also used as soil additives and as block or tiles.

   - Global paddy production was 703 M tons in 2010, increased to 742.7 M tons in 2014. Annually, it grew by 1.13%. Ninety percent of the global production is produced by Asian countries. China tops the top ten rice producing countries with a production share of 32%, followed by India (25%), Indonesia is third (9%). Thailand and Vietnam ranks fifth and sixth, respectively. Philippines manages to keep at 8th place. While palay production grew remarkably from 17.78 M tons in 2010 to 18.97 M tons in 2014, the Philippines is still not self-sufficient in rice.

   - On domestic palay production status, Central Luzon, Cagayan Valley and Western Visayas top the three major rice producing regions. Collectively, these account around 44% share to total palay production. Across provinces, Nueva Ecija, Cagayan and Pangasinan are consistently top three large producers of rice due to their large volume of palay production and harvested rice areas.

2) Nature and structure of the rice industry
   - Geographic flow (source and destination) of paddy and milled rice was determined at the national level and by major island. It was observed that paddy and milled rice flows within the province however inflow and outflow of paddy and milled rice across provinces is also very common, which explained the rice market supply and demand of each province.

   - A number of rice marketing channels were observed in the sample provinces. The typical channel is from farmer to palay trader/assembler to rice miller to rice wholesaler to rice wholesaler-retailer then to a retailer. There is also marketing channel that involves farm organization and cooperative where they performed all the functions from palay procurement, aggregation, milling and marketing/distribution. Few modern channels that sell directly to supermarkets and institutional buyer were also noticed.

- The rice value chain in the Philippines encompasses the different segments related to the input provision, aggregation, processing, marketing and consumption, which carried out by the entire network of chain actors consisting of input providers, farmers, assemblers, millers, traders and final consumers (Figure 10).

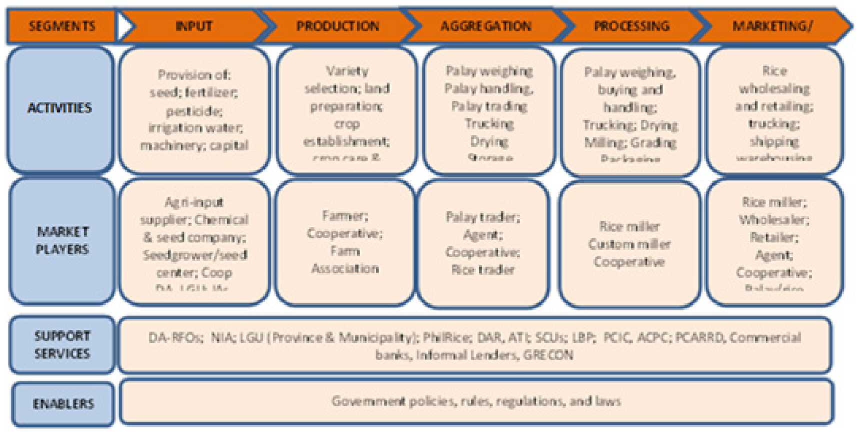

Figure 10. Rice value chain map in the Philippines.

Rice Yield Gap and Economic Efficiency in the Philippines

FH Bordey, JC Beltran, WB Collado, AC Litonjua, IA Arida, and MGC Lapurga

Due to importance of rice in the Filipino diet, it is not surprising that paddy is being produced in 79 provinces and 2 highly urbanized cities in the Philippines. Because of this, rice production environment in the Philippines varied greatly. As a result, variation in yield across provinces is also high. There is also uncertainty on what to expect on yield from year-to-year basis. Aside from yield variation across provinces and years, evidences of yield gap also persist. On top of this, rice yield in the Philippines is lagging behind the yields obtained in intensively cultivated and irrigated areas in other neighbouring Asian countries particularly during the wet season. Hence, this study seeks to understand the causes of yield variation in selected Asian countries, and in selected provinces in the Philippines. This also aims to determine the technical and allocative efficiency level of rice farmers using production and cost frontier functions.

Activities:

- Yield determinants were identified using the data from the project Benchmarking the Philippine Rice Economy Relative to Major Rice-producing Countries in Asia and farm-level data from the Rice-Based Farm Households Survey (RBFHS) 2011 to 2012.

- Production function and cost function models were generated. Initial technical efficiency estimates and allocative efficiency estimates of farmers in 33 major rice-producing provinces in the Philippines and were generated. These estimates were used as one of the independent variables affecting the yield and unit cost at the province-level. Similarly, initial technical efficiency estimates and allocative efficiency estimates of farmers across 6 selected countries were generated and used as explanatory variables for the yield and unit cost response functions.

- Comparison of different regression models for yield determinants was done using the province-level data of 33 selected provinces in the Philippines and country-level data of 6 selected Asian countries.

Results:

- Economic efficiency of rice farmers, across 6 selected countries and among 33 major rice producing provinces in the Philippines, significantly contributes to the attainment of an improved yield and reduced cost of production.

- Figure 11 shows the predicted mean technical efficiencies of rice farmers across 6 selected countries. Results showed that Philippines had the lowest mean technical efficiency of 80.19%, while the highest technical efficiencies were from China (87.15%) and Vietnam (85.94%).

- Technical efficiencies across 33 major rice producing provinces are shown in Figure 12. Result showed that provinces with highest technical efficiencies were Zamboanga Sibugay (82%), Compostela Valley (81%), and Davao del Norte (81%). On the other hand, lowest technical efficiencies were observed in Aurora (66%), Bohol (66%), and Maguindanao (68%).

- In terms of allocative efficiency, Figure 13 shows that Vietnam had the highest efficiency (86.27%) followed by Indonesia (86.10%) and Thailand (86%). Philippines had a mean allocative efficiency of 85.71%. This means that Filipino farmers can still produce the same level of production using only 85.71% of the cost per kilogram.

- Allocative efficiencies (AE) among 33 major rice producing provinces are shown in Figure 14 with highest efficiency in Zamboanga del Sur (89%), followed by Ilocos Norte (87%), Albay (85%), and Compostela Valley (85%). In contrast, lowest AE were observed in Nueva Ecija, Aurora, and Bukidnon.

- Farmers' education, training, farm organization and tenurial status have significant and positive contributions to higher technical efficiencies of farmers across 6 selected countries.

- Using the 'Benchmarking' data, yield-enhancing strategies are adoption of high quality seeds and improved technical efficiency.

- Cost-reducing strategies are increased yield and improved allocative efficiency.

- Using RBFHS data, 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 of farmers among 33 major rice producing provinces in the Philippines.

- At the provincial level, yield-enhancing strategies are adoption of high quality seeds, access to irrigation, and improved technical efficiency, while cost-reducing strategies are adoption of high quality seeds, machine-use, increased yield, and improved allocative efficiency.

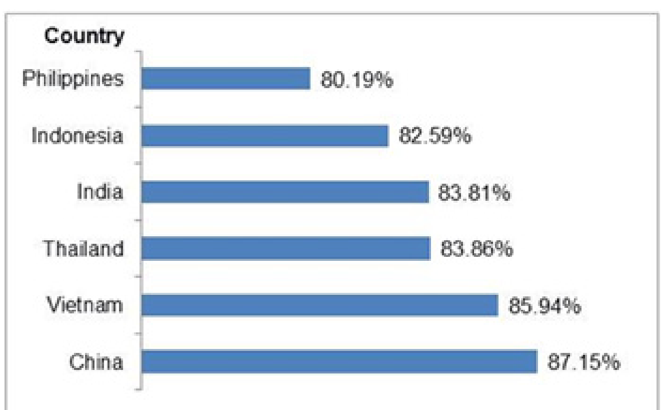

Figure 11. Technical efficiency estimates across selected Asian countries.

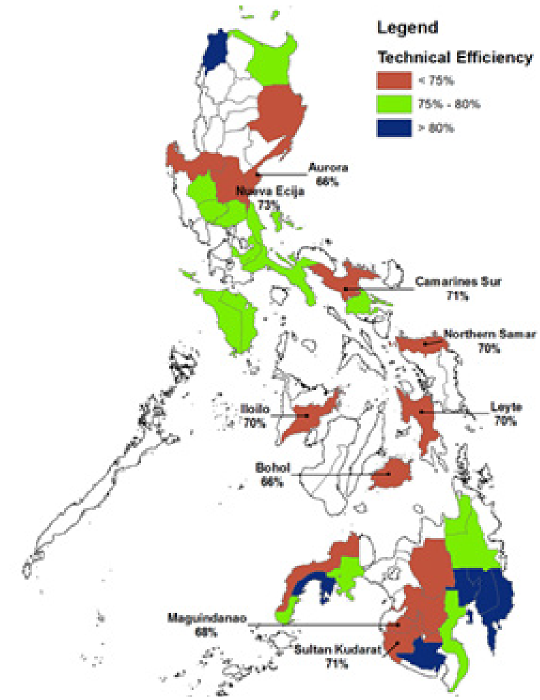

Figure 12. Technical efficiency across rice-producing provinces.

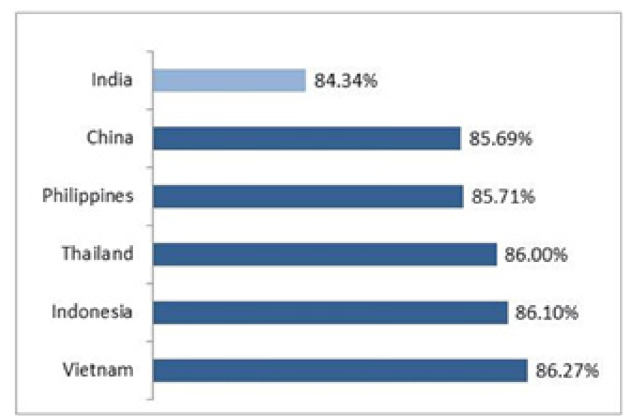

Figure 13. Allocative efficiency estimates across selected Asian countries.

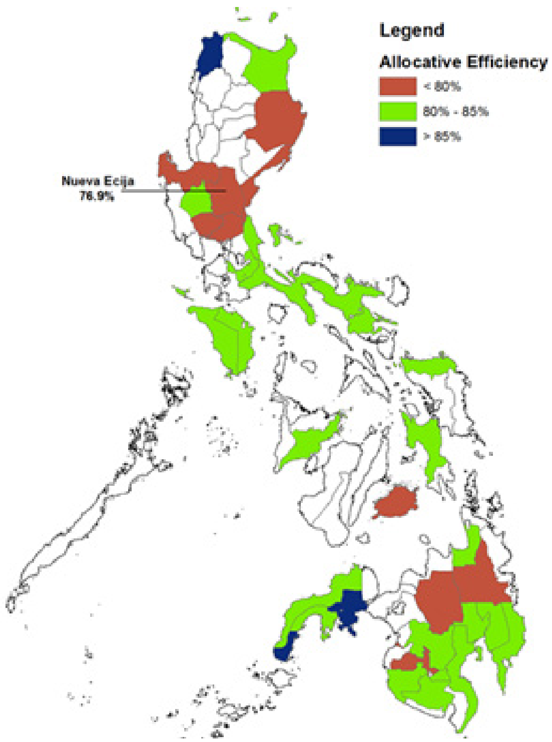

Figure 14. Allocative efficiency across rice-producing provinces.

Project IPaD: Monitoring and Evaluation Component
IR Tanzo, MAA Saludez, HJL Altamarino, and RF Ibarra

To ensure that objectives are met for its two major activities, a monitoring and evaluation (M&E) component is put in place for Project IPaD. The component assesses (a) if the training for the rice extension professionals (called AgRiDOCs) have indeed enhanced their capabilities and (b) if the knowledge, sharing and learning (KSL) activities have helped equipped the rice extension intermediaries (or REIs) with skills and information to make them help our farmers more. The results will be used in coming up with policies that will help in the scaling up/out of activities in the future.

An M&E methodology is developed for the project (see Figure 15). All levels (0-5) are used in assessing the two batches of the AgRiDOC training. For the REIs, due to the limited engagement, only levels 1 and 3 are applied. For Levels 0-3, a questionnaire is generally used for the respondents. For Level 4, besides a guided questionnaire for the AgRiDOCs, a focus group discussion (FGD) for their clients and a one page questionnaire for their officemates are used/done to capture the rippling effect of the training. Level 5 is being done by the IRRI partners of the project. Descriptive statistics and correlation are used in analyzing the data.

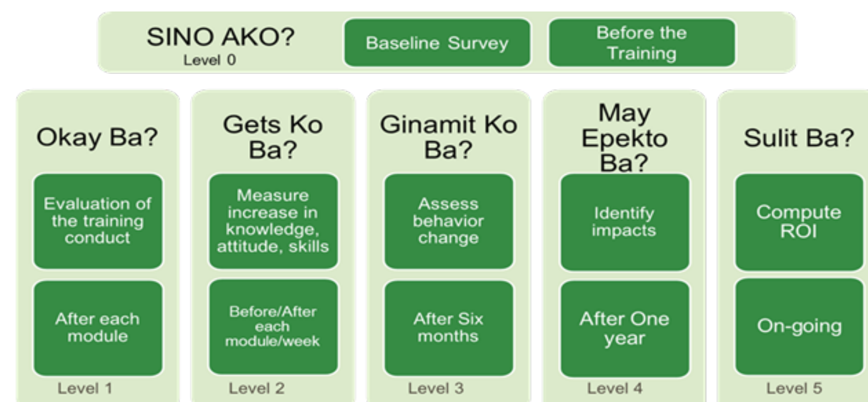

Figure 15. Monitoring and Evaluation Methodology used for the two major activities of Project IPaD.

Activities:

A. M&E of Knowledge, Sharing, and Learning Activities (Rice Extension Intermediaries)

- Baseline survey of 624 Rice Extension Intermediaries (REIs) has been completed. This included four kinds of REIs: community, academe, media and private based. Data had been encoded and processed. Several presentations had been made to the team.

- Follow-up survey of 133 REIs has been done.

- Poster (for the PhilRice R&D Conference) and institutional seminar were presented entitled “Tulong Pa More: How are intermediaries helping rice farming communities”.

- As a quick win strategy to hasten result-sharing, three infographics has been made namely, (a) So Far Who Did We Capacitate; (b) AgRiDOC Roll-out Demographic Profile; (c) Project Hero Making.

- The return on investment of the KSL activities was also determined. Based on data, investment for each REI is Php337.62.

B. M&E of the AgRiDOC Training

- Levels 0 to 3 surveys from the two batches of training have been completed. Data has been encoded and processed. Results were presented during Project IPaD workshops to improve training activities.

- Level 4 M&E activities for Batches 1 and 2 have been completed. Data is being processed.

- Presented two papers namely, (a) e-Competency: Crossing the Bridge Toward Digital Extension in the Philippines at the Asia-Pacific Symposium in Social Science and Management, Singapore, 18 to 20 Feb 2016 and (b) Are AgRiDOCs Techie? PhilRice R&D National Conference, September 2016, Philippines.

- The return on investment of the AgRiDOC training was determined. Based on data, investment per AgRiDOC (Batch 1) is Php432,871.22. This includes both direct and indirect costs and cost for M&E. Other costs excluded, direct cost for training one AgRiDOC is only Php156,284.71. It is expected that the values will be reduced when the multiplier effects are accounted for.

Assessing the Production and Marketing of Philippine Specialty Rice
FH Bordey, PF Moya, JC Beltran, RZ Relado, and MV Romero

Rice is mostly cultivated in irrigated lowland areas. However, there are few arable lands in the upland and rainfed lowland areas that are planted with local specialty rice varieties. These varieties are defined here as those possessing special qualities - aroma, pigment, and stickiness (glutinous). They are recognized for their premium rice grains with excellent eating quality, unique and special traits, and organically grown most of the time. For example, pigmented rice is gaining popularity because it contains higher amounts of phytochemicals and antioxidants, while aromatic rice enhances the overall palatability of cooked grains because of its fragrance. Hence, most of the specialty rice varieties command higher prices compared to regular milled rice. As the Philippines faces a more liberal rice trade and with influx of cheaper rice imports, prices of ordinary white rice is expected to go down in the domestic market. As such, some farmers may not find rice cultivation profitable and may stop from farming. Production of specialty rices could serve as a viable enterprise for them given that Philippine rice exports are composed mostly of specialty rice.

This project generally aims to produce a recommended action plan to the Department of Agriculture on harnessing the commercial value and preserving the cultural significance of Philippine specialty rice. Specifically, the project aims to 1) document the relationship of the local culture to cultivation and consumption of specialty rice; 2) determine the production and marketing flow of specialty rice in selected market segments in the Philippines; 3) assess the quality attributes of the specialty rice demanded in the domestic and major international markets and match it with the varieties planted locally; 4) examine the cost of producing specialty rice in the Philippines and compare with exporting country; and 5) recommend policies to invigorate the niche market of Philippine specialty rice both at the domestic and international levels.

Activities:

- Conducted focus group discussions and key informant interviews in Apayao and Negros Occidental.

- Gathered secondary data.

- Visited Cambodia, Vietnam, and Thailand as part of site scanning activities.
- Conducted inception meeting with project team.

Results:

- The provinces of Apayao and Negros Occidental are chosen as target project sites. There is only one cropping season in

Kabugao, Apayao while there are two in San Carlos and Bago, Negros Occidental. Production of specialty rice is confirmed in these target provinces.

- One major difference between the target sites is in harvest disposition. The farmers in Kabugao, Apayao are into subsistence farming given that their harvest is mainly used for home consumption. On the other hand, farmers in the two sites of Negros Occidental sell their produce (highly commercialized) and at the same time retain some for home consumption.

- Compared to the rudimentary ways of producing rice in Kabugao, Apayao, the production and marketing of specialty rice in Negros Occidental are advanced and established. Farmers from the two provinces plant aromatic, pigmented, and glutinous rice varieties.

- Rice production in accordance with organic certification is practiced in Negros Occidental capitalizing on the "organic capital" tag of the island region. Further, reasons for going organic in producing rice include quality, advocacy, environment, economics, and sustainability.

- As for cultural practices, there are rituals practiced before planting and harvesting in Apayao and Negros Occidental. These practices are associated with the indigenous people of the target sites. However, farmers in Bago, Negros Occidental use modern approaches, instead of rituals, in rice farming compared to their counterparts in Kabugao, Apayao and San Carlos, Negros Occidental.

Helping the Philippines Become Competitive Thru Improved Hybrid Rice Seed Production

FH Bordey, JC Beltran, PF Moya, RG Manalili, MRL San Valentin, DB Rebong II

Hybrid rice is one of the technologies identified to increase production and meet the growing demand for the staple food in the Philippines and Asia. The widespread commercialization of hybrid rice in the Philippines is stymied by the limited availability of F1 seeds at affordable price. The country produces hybrid seeds but not enough to meet the demand. Private companies have responded by importing cheaper hybrid seeds in addition to their local produce. Can the Philippines then produce hybrid seeds at a cost competitive with other hybrid seeds-producing countries? Comparative data on hybrid seed productivity and costs are limited, hence the need for this study. This paper assesses the farm-level competitiveness of producing F1 seeds in the Philippines relative to China and India, the world's major hybrid seed producers. Specifically, yield and input-use in hybrid rice seed production were examined; costs of and returns to producing F1 seeds were estimated and compared; and policies on increasing hybrid seed availability and affordability in the Philippines were recommended.

Results:

- Respondents in China were the oldest at an average age of 55, the Philippines at 50, and India at 40. Older farmers tend to rely more on hired workers than their own labor. In general, labor-intensive hybrid seed production remains to be a male-controlled occupation. All sample seed producers in China and India are male, but women (19%) in the Philippines are actively engaged. Household compositions in China and India were male-dominated; Philippines had more female household members. Household size was largest in China with seven family members while the Philippines had six and India had only five members. The size of the household generally affects the availability of family labor for seed production. Filipino hybrid seed producers had an average of 10 years of formal schooling, Chinese and Indian farmers had only 9 and 8 years, respectively.

- Area devoted to hybrid rice seed production was biggest in the Philippines at 1.86ha, India at 1.76ha, and China at only 0.23ha that necessitates optimizing their hybrid rice technologies. Chinese farmers had the most accessible input and output markets, which were only 1.83km of concrete farm-to-market road away. All hybrid seed producers in the Philippines obtained water from state irrigation canals. Some 70% of the Chinese relied on irrigation canals built by the government, on communal irrigation canals (13%), and on rivers, streams, and free-flowing sources (13%). Up to 80% of the Indians depended on bore, open, dug, and tube wells; on state irrigation canals (13%). Indians owned the farms where they produced hybrid seeds; 90% of the Chinese were owner-cultivators, and 10% rented land. More than half of the Filipinos were renters, 39% were owners, and others were leaseholders and mortgaged owners.

- Seeding rate of A line was lowest in India with only 13kg ha-1; Philippines with 26kg ha-1; China had the highest at 28kg ha-1, but also had the lowest seeding rate of R line with only 5kg ha-1. India (9kg ha-1) and the Philippines (10kg ha-1) had much higher rates. Estimated seeding rates of A x R per hectare were 28 x 5 in China, 26 x 9 in the Philippines, and 13 x

10 in India.

- Different rates of fertilizer application in the study sites were observed, with China having the highest Nitrogen (N) at about 300kg ha-1; Indian seed producers at 170kg ha-1; and Filipinos at only about 142kg ha-1. Phosphorous (P) fertilizer was moderately used in all study sites, with the Chinese using the highest at 56kg ha-1; Filipinos the least at 16kg ha-1; the Indians at 41kg ha-1. Potassium (K) fertilizer had the same trend: 110kg ha-1 for China; India at 55kg ha-1; and 40kg ha-1 for the Philippines.

- All subject seed growers relied heavily on pesticides for their pest and disease problems, with the Chinese spending most at US$329ha-1 ; Indians the least at US$130ha-1; Filipinos at US$166ha-1, indicating that they are not major users of chemical inputs.

- Labor input was highest in China that employed 241 labor man-days per hectare (md ha-1); 221md ha-1 in India; and 137md ha-1 in the Philippines. In China, family labor contributed more than two-thirds of the total md per cropping season because of its small farm size.

- China ranked first in terms of land productivity with an average F1 seed yield of 3.12t ha-1 per cropping season, a superior yield advantage of 36% over the Philippines (1.98t ha-1) and 27% over India (2.29t ha-1). The high yield in China is attributed to their advances in biotechnology that overcome the biotic or abiotic pressures. The Philippines had the lowest F1 seed yield, as China and India are more familiar and experienced with the technology.

- On average, China incurred the largest total hybrid seed production cost at US$4,959ha-1, hence the biggest unit cost at US$1.59kg-1, despite being the highest yielder. The Philippines was in the middle in terms of total production cost with US$2,303 ha-1. Despite its lowest yield of hybrid seeds, its unit cost of US$1.16 kg-1 was cheaper than in China and almost comparable to India. The cheapest cost of hybrid seed production was in India at US$2,294 ha-1, with cost per unit estimated at US$1 kg-1.

Assessment of farming systems in the rice-based communities and development of Palayamanan Plus model

RB Malasa, RG Corales, AM Corales, AB Mataia, and MA Diamsay

Since the early 2000s the Philippine Rice Research Institute (PhilRice) had initiated Palayamanan which served as a platform for research and promoting diversified and integrated rice-based farming system to address income and food security of the rice-based farm households. However, there is a need to elevate the Palayamanan approach to address national food security concerns and not limited within the confines of the farm household-level. To do this a framework and indicators of establishing successful Palayamanan Plus model is important. Generally the study aims to assess and develop an approach to scale-up Palayamanan Plus in four ecosystems (fully irrigated, supplementally irrigated, favorable rainfed, and unfavorable rainfed). The specific objectives are to prepare a farming community-based and capabilities-based approach Palayamanan Plus framework and training module for the different ecosystems to address issues of integration, intensification, diversification, and climate-change resiliency; generate indicators to measure the level of integration, intensification, diversification, climate-change resiliency and sustainability of Palayamanan Plus in a community; and characterize the farming communities, and the functionalities and opportunities of their existing farming systems based on their ecosystem, for integration, intensification, diversification and climate-change resiliency.

Activities:

- Improved methodology for future participatory appraisal activities.

- Prepared semi-structured questionnaire for participatory appraisal activities.

- Developed site selection criteria.

- Conducted pre-inception meeting with potential collaborators (Figure 16).
- Met with LGU in Nueva Ecija, Tarlac, and Pampanga.

- Scanned sites in Nueva Ecija, Tarlac, and Pampanga (Figure 17).

Figure 16. Inception meeting with DA-RFO III, DA- ATI III and LGUs.

Figure 17. Site scanning in Mexico, Pampanga.

Abbreviations and acronymns

ABA – Abscicic acid
Ac – anther culture
AC – amylose content
AESA – Agro-ecosystems Analysis
AEW – agricultural extension workers
AG – anaerobic germination
AIS – Agricultural Information System
ANOVA – analysis of variance
AON – advance observation nursery
AT – agricultural technologist
AYT – advanced yield trial
BCA – biological control agent
BLB – bacterial leaf blight
BLS – bacterial leaf streak
BPH – brown planthopper
Bo - boron
BR – brown rice
BSWM – Bureau of Soils and Water Management
Ca - Calcium
CARP – Comprehensive Agrarian Reform Program
cav – cavan, usually 50 kg
CBFM – community-based forestry management
CLSU – Central Luzon State University
cm – centimeter
CMS – cystoplasmic male sterile
CP – protein content
CRH – carbonized rice hull
CTRHC – continuous-type rice hull carbonizer
CT – conventional tillage
Cu – copper
DA – Department of Agriculture
DA-RFU – Department of Agriculture-Regional Field Units
DAE – days after emergence
DAS – days after seeding
DAT – days after transplanting
DBMS – database management system
DDTK – disease diagnostic tool kit
DENR – Department of Environment and Natural Resources
DH L– double haploid lines
DRR – drought recovery rate
DS – dry season
DSA - diversity and stress adaptation
DSR – direct seeded rice
DUST – distinctness, uniformity and stability trial
DWSR – direct wet-seeded rice
EGS – early generation screening
EH – early heading
EMBI – effective microorganism-based inoculant
EPI – early panicle initiation
ET – early tillering
FAO – Food and Agriculture Organization
Fe – Iron
FFA – free fatty acid
FFP – farmer's fertilizer practice
FFS – farmers' field school
FGD – focus group discussion
FI – farmer innovator
FSSP – Food Staples Self-sufficiency Plan
g – gram
GAS – golden apple snail
GC – gel consistency
GIS – geographic information system
GHG – greenhouse gas
GLH – green leafhopper
GPS – global positioning system
GQ – grain quality
GUI – graphical user interface
GWS – genomwide selection
GYT – general yield trial
h – hour
ha – hectare
HIP - high inorganic phosphate
HPL – hybrid parental line
I - intermediate
ICIS – International Crop Information System
ICT – information and communication technology
IMO – indigenous microorganism
IF – inorganic fertilizer
INGER - International Network for Genetic Evaluation of Rice
IP – insect pest
IPDTK – insect pest diagnostic tool kit
IPM – Integrated Pest Management
IRRI – International Rice Research Institute
IVC – in vitro culture
IVM – in vitro mutagenesis
IWM – integrated weed management
JICA – Japan International Cooperation Agency
K – potassium
kg – kilogram
KP – knowledge product
KSL – knowledge sharing and learning
LCC – leaf color chart
LDIS – low-cost drip irrigation system
LeD – leaf drying
LeR – leaf rolling
lpa – low phytic acid
LGU – local government unit

LSTD – location specific technology development
m – meter
MAS – marker-assisted selection
MAT – Multi-Adaption Trial
MC – moisture content
MDDST – modified dry direct seeding technique
MET – multi-environment trial
MFE – male fertile environment
MLM – mixed-effects linear model
Mg – magnesium
Mn – Manganese
MDDST – Modified Dry Direct Seeding Technique
MOET – minus one element technique
MR – moderately resistant
MRT – Mobile Rice TeknoKlinik
MSE – male-sterile environment
MT – minimum tillage
mtha^{-1} - metric ton per hectare
MYT – multi-location yield trials
N – nitrogen
NAFC – National Agricultural and Fishery Council
NBS – narrow brown spot
NCT – National Cooperative Testing
NFA – National Food Authority
NGO – non-government organization
NE – natural enemies
NIL – near isogenic line
NM – Nutrient Manager
NOPT – Nutrient Omission Plot Technique
NR – new reagent
NSIC – National Seed Industry Council
NSQCS – National Seed Quality Control Services
OF – organic fertilizer
OFT – on-farm trial
OM – organic matter
ON – observational nursery
OPAg – Office of Provincial Agriculturist
OpAPA – Open Academy for Philippine Agriculture
P – phosphorus
PA – phytic acid
PCR – Polymerase chain reaction
PDW – plant dry weight
PF – participating farmer
PFS – PalayCheck field school
PhilRice – Philippine Rice Research Institute
PhilSCAT – Philippine-Sino Center for Agricultural Technology
PHilMech – Philippine Center for Postharvest Development and Mechanization
PCA – principal component analysis
PI – panicle initiation
PN – pedigree nursery
PRKB – Pinoy Rice Knowledge Bank
PTD – participatory technology development
PYT – preliminary yield trial
QTL – quantitative trait loci
R - resistant
RBB – rice black bug
RCBD – randomized complete block design
RDI – regulated deficit irrigation
RF – rainfed
RP – resource person
RPM – revolution per minute
RQCS – Rice Quality Classification Software
RS4D – Rice Science for Development
RSO – rice sufficiency officer
RFL – Rainfed lowland
RTV – rice tungro virus
RTWG – Rice Technical Working Group
S – sulfur
SACLOB – Sealed Storage Enclosure for Rice Seeds
SALT – Sloping Agricultural Land Technology
SB – sheath blight
SFR – small farm reservoir
SME – small-medium enterprise
SMS – short message service
SN – source nursery
SSNM – site-specific nutrient management
SSR – simple sequence repeat
STK – soil test kit
STR – sequence tandem repeat
SV – seedling vigor
t – ton
TCN – testcross nursery
TCP – technical cooperation project
TGMS – thermo-sensitive genetic male sterile
TN – testcross nursery
TOT – training of trainers
TPR – transplanted rice
TRV – traditional variety
TSS – total soluble solid
UEM – ultra-early maturing
UPLB – University of the Philippines Los Baños
VSU – Visayas State University
WBPH – white-backed planthopper
WEPP – water erosion prediction project
WHC – water holding capacity
WHO – World Health Organization
WS – wet season
WT – weed tolerance
YA – yield advantage
Zn – zinc
ZT – zero tillage

List of Tables

List of Figures

List of Figures

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