Department of Agriculture
PhilRice ®
PHILIPPINE RICE RESEARCH INSTITUTE

PalayStat System
Socioeconomics Division

One website for your rice data needs!

Summary Tables
Results from our nationwide survey of rice farm households conducted every 5 years since 1996

Rice Statistics
Philippine Statistics Authority's yearly statistics on rice farming and rice industry

Publications
Archives of rice-related presentations and references

Quick Facts
Provincial overview on its rice farming and rice industry situation

Latest Updates and News

2021
DA-PHILRICE R&D HIGHLIGHTS

SOCIOECONOMICS DIVISION

Content

Socioeconomics Division

Alice B. Mataia

EXECUTIVE SUMMARY

The Socioeconomics Division (SED) is one of the research divisions under the Office of the Deputy Executive Director for Research (ODEDR). SED's thrust is to generate rice and rice-related statistics, conduct socioeconomic and policy research, and provide, package, and communicate science-based socioeconomic information in support to the PhilRice strategic outcome in creating a science-based and supportive policy environment for the rice industry. The division's outcome was achieved through the interactions of its three core projects. Project Statistical Series of the Rice Economy provides accessible statistical series on the rice economy to major rice stakeholders by integration of results from rice-based farm households survey (RBFHS) and updated rice statistics from the Philippine Statistics Authority (PSA) under one system for easier access and retrieval of users. Project Socioeconomic Researches on Philippine Rice Industry provides socioeconomic information on farmers' technology needs, impacts of rice R&D production technologies/products/practices, marketing, and trade policies as guide for planning and research prioritization, and policymaking. Whereas, Project Policy Research and Advocacy organizes and communicates the science-based information to guide and influence our national and local decision makers in creating a strong science-based, supportive, and enabling policy environment toward a secure and competitive rice sector. In addition to its core projects, SED implements four projects in support to RCEF Seed and Extension Program and RiceBIS Community Program, and one extra core funded project. Moreover, the division facilitates and coordinates the implementation of two collaborative projects with the Food and Agriculture Organization (FAO).

In 2021, notable and relevant outputs were produced by the division from its core and other projects. These outputs played a vital role in establishing data-driven policies and recommendations across fields in rice research, development, and extension as clearly emphasized in one of the main key strategies under the *"One-DA"* Reform Agenda. Moreover, the outputs were disseminated and advocated to guide our decision makers in making enabling rice policies for the improvement of the rice industry.

PROJECT 1

Statistical Series of the Rice Economy

Marco Antonio M. Baltazar, Jesusa C. Beltran, Aileen C. Litonjua, Imelda A. Arida, Ranxel M. Almario, Byronne C. Mendoza, Thich Eloise Paris, Janine P. Curibot, Aerone Philippe G. Bautista, and Roy F. Tabalno

Statistics is vital in planning, implementing projects, and developing rice research and development policies. Policymakers enjoin researchers and development workers to present project impacts quantitatively. Through this project, the need to gather, process, search, and access up-to-date rice statistics by primary rice stakeholders was addressed.

There are two studies in this project: (1) *Updating and restructuring statistical series on the rice economy and* (2) *Integration of other rice statistics databases in the PalayStat system.* The first study managed a publicly accessible rice data repository that contains the publications, farm-level data from the quinquennial monitoring of the Rice-based Farm Households Survey (RBFHS), and selected Philippine Statistics Authority rice statistics. Data maintained in the repository are kept up-to-date and ensured to be from official sources. The second study provided access to data users through a platform with an interactive web-based information system and the PalayStat System, formerly named Rice-Based Socioeconomic Information System (RBSEIS). The project ensures that credible data is provided as inputs to other projects such as the *Policy Research and Advocacy*, which helps them to craft science-based policies for farmers. The project also provided PhilRice's top management with updated rice industry situation. In addition, all socioeconomic reports regularly submitted to the Office of the Secretary of the Department of Agriculture source data from this project.

UPDATING AND RESTRUCTURING STATISTICAL SERIES ON THE RICE ECONOMY

MAM Baltazar, JC Beltran, AC Litonjua, IA Arida, RG Manalili, AB Mataia, RM Almario, BC Mendoza, TE Paris, JP Curibot, APG Bautista, RF Tabalno

This study restructured the datasets to create manageable and easy-to-reconstruct matrices for faster data analyses. It coordinated with the PalayStat study to ensure that the data sets are in accordance with the system for easy storage. Final restructured data were compiled and forwarded to the system for testing, storing, and uploading.

PROJECT1

Some 74 statistical tables from the Philippine Statistics Authority (PSA) are being maintained and updated (i.e., either weekly, monthly, quarterly, and annually) with the latest data available in rice production, area, and yield as well as imports and exports, prices, supply, and demand. In addition, results from the latest Rice-Based Farm Households Survey (2016-2017) in 33 central rice-producing provinces were also made available through the PalayStat information system. Additionally, the study catered to 95 data requests received on farm-level statistics and the status of the rice industry. Data requests ranged from comprehensive data on rice production, area, and yield in the Philippine rice industry to specific data on regional and provincial performance. Provided datasets were mainly used in planning and policy creation (31%), empirical research (48%), and as references for reports and publications (21%). The number of quarterly users based on data requests for 2021 is presented in Figure 1.
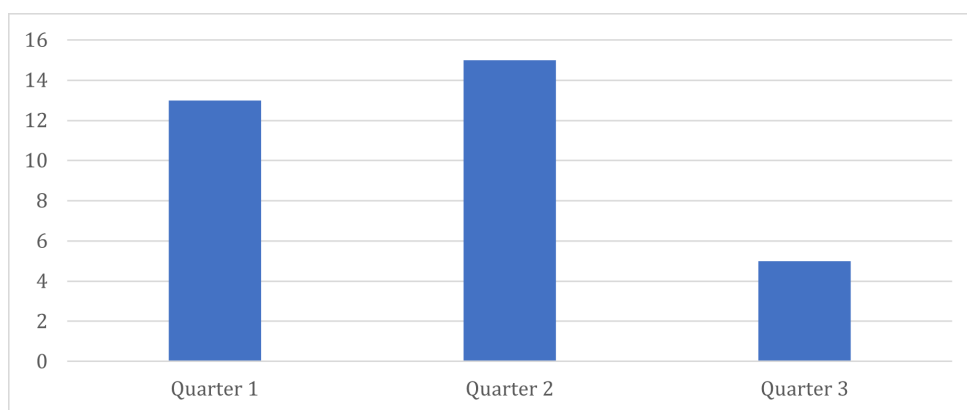

FIGURE 1. Number of users per quarter, data request

INTEGRATION OF OTHER RICE STATISTICS DATABASES IN THE PALAYSTAT SYSTEM
RM Almario, MA MBaltazar, RF Tabalno

This study provides access to data users through a platform with an interactive web-based information system developed by the study, the PalayStat System formerly named Rice-Based Socioeconomic Information System (RBSEIS). PalayStat is continuously improved to help data users in accessing rice and rice-related information that suit their needs. Additional functionalities were developed to further improve user experience such as dynamic search options and broader search keywords, bigger database on publications, maps and other references, and better website design and user-friendly experience. The system has been viewed 17,671 times and accessed by 5,333 unique users in January-December 2021.

Six unique datasets were provided to RiceLytics as a data source for charts and tables of the dashboard system: (1) Estimated

production, area harvested and yield per hectare, Philippines, regions, and provinces, 2000-2020; (2) supply utilization account of selected agricultural commodities, Philippines, 2000-2020; (3) costs and returns of rice production, Philippines and regions, 2000-2020; (4) rice imports and rice exports by volume and value, Philippines, 2000-2020; (5) average farmgate, wholesale, and retail prices for ordinary, special, well-milled rice, and regular-milled rice, 2000-2020, respectively; (6) and estimated per hectare inorganic fertilizer usage, Philippines and provinces, 2019.

Internally, SED staff members were regularly informed of the data updates through corporate email or various social media platforms. The project also provided datasets on rice industry status to the PhilRice Management Committee.

PROJECT 2

Socioeconomic Researches on Philippine Rice Industry

Rowena G. Manalili, Jaime A. Manalo IV, Aileen C. Litonjua, Jesusa C. Beltran, Alice B. Mataia, Marco Antonio M. Baltazar, Daphne Kitongan, Chona P. Austria, Teresa Joi P. de Leon, Roy F. Tabalno, and Louie Gerard F. Orcullo

This project deals with socioeconomic research studies that cater to PhilRice's target outcomes and in support of the DA's defined directions through its eight paradigms. Specifically, this project aimed to provide research-based data and information on pressing issues and concerns surrounding the Philippine rice industry. Additionally, it aimed to contribute to the effective and efficient monitoring, evaluation, and quantification of the performance of rice R4D products and development programs through ex-ante monitoring and evaluation activities and ex-post impact evaluation studies. Finally, it hoped to provide evidence of the usefulness of R4D and production-related services while providing feedback to researchers and development workers to ensure more efficient R4D work, research prioritization, and better management of projects and programs.

There are six studies under this project, namely: (1) Economics of hybrid and inbred rice seed production, (2) Where are the PhilRice-developed technologies?, (3) Crop diversification: An alternative production system for rice farmers, (4) The role of young people in reinventing agriculture, (5) How pro-poor are PhilRice technologies, and (6) Potential of rice-corn grit mixtures in the market.

PROJECT 2

The first study examined the productivity, profitability, and crop management practices of hybrid and inbred rice seed production for informed decision-making by policy makers. The second study is concerned with tracing the outcomes of PhilRice-developed technologies. The third study is focused on looking at the potential impact of crop diversification as an alternative production system for farmers who are significantly affected by the Rice Tariffication Law (RTL). The fourth study is concerned with the different ways in which young people can participate in reinventing agriculture while the fifth evaluates how PhilRice-developed technologies respond to the needs of resource-poor farmers. Finally, the last study assesses the potential and acceptability of rice corn-grit mixtures in the market. The first three studies started in 2021.

The first study examined the input use, productivity and profitability, and other crop management practices of hybrid and inbred rice seed production in selected provinces. PhilRice, in cooperation with the Department of Agriculture through the Rice Competitiveness Enhancement Fund (RCEF) Seed Program, is extensively promoting the use of high-quality inbred rice seeds and their associated technologies to help farmers increase their yield and become more competitive. Therefore, the availability of high-quality inbred seeds is extremely important as one of the significant components of RCEF.

Meanwhile, hybrid rice production is being pursued in selected provinces by the DA-National Rice Program (NRP) where hybrid rice is more suitable and highly adopted by farmers than other rice varieties. Success stories indicate that hybrid rice does not only increase productivity but can also reduce the per unit cost of production. These developments have inspired the government to revive its interest in hybrid rice technology. Currently, the government aims to promote hybrid rice on a broader scale and at a more affordable price to farmers. The government also wants to complement public hybrids with private hybrids. Through PhilRice, the government has embarked on a program that deals with commercializing public hybrids. Extensive promotion of public hybrid use is ongoing. PhilRice also provides technical assistance to seed growers in producing parentals.

It is timely to pursue this study to inform project implementers about the current status of seed production in the country. To gather information on inbred seed production, a survey was conducted in Nueva Ecija, Pangasinan, and Kalinga covering the 2019 DS, and 2020 WS for Nueva Ecija. In addition, a survey was conducted in Kalinga covering 2018 DS and 2019 DS for hybrid seed production. These surveys gave policymakers and planners insights into crafting sustainable development programs for the rice seed industry.

PROJECT 2

The second study traced the reach of the PhilRice-developed technologies. The focus of the inquiry was to document how farmers or entities who work with farmers adopted and adapted these technologies. It did not only look at the adoption but it also assessed the technology adaptation by farmers and other entities. This study sought to reinforce that PhilRice develops technologies that farmers adapt to their conditions. At the institutional level, this may be useful in assessing the impacts of R4D products on the ground. The adoption and adaptation of the microtiller, a machine developed by PhilRice in the 1990s, was prioritized in this study. The study aimed to: (1) determine the enablers and hindrances to effective adoption; (2) determine the social and farming "uptake niches" of the technology; (3) identify the innovations and adaptations made to introduced technology; and (4) explain the positive and negative impacts of microtiller on the livelihood of farmers. Key informant interviews and expert consultations were conducted with staff members from PhilRice, partner institutions like the Central Cordillera Agricultural Program (CECAP), and DA-Cordillera Administrative Region. Farmer-recipients and manufacturers in the Cordillera were also interviewed.

The third study gathered information on the status of the adoption of crop diversification. Initially, key informants in Nueva Ecija were interviewed. The interviews documented the current support systems and the diversified patterns adopted by farmers. The research team is set to conduct a farm-level survey, focus group discussions, and windshield survey in 2022 in Nueva Ecija, Tarlac, and Ilocos Norte to document the adoption and assess the socioeconomic status of farmers in crop diversification. It will complement the 2016-2017 data of the Rice-based Farm Households Survey (RBFHS).

ECONOMICS OF HYBRID AND INBRED RICE SEED PRODUCTION
RG Manalili, JC Beltran, IA Arida, MAM Baltazar, DL Kitongan, CP Austria, TJP de Leon, and RF Tabalno

Quality seed is among the most critical inputs in rice production. The timely supply of a sufficient quantity of high-quality seeds of high-yielding varieties increases yield. The yield may be improved further by timely application and efficient management of other inputs such as fertilizer and irrigation. Moreover, high-quality seeds not only increase productivity but also reduce production costs due to lower seed rate requirement and potentially disease-free seeds. This study aimed to: (1) examine the yield and input use in hybrid and inbred rice seed production, (2) estimate the costs and returns, and (3) identify problems encountered by seed producers. A survey on hybrid seed production was conducted in Kalinga covering the dry seasons of 2018 and 2019. Survey on inbred seed production was conducted in

PROJECT 2

Nueva Ecija, Pangasinan, and Kalinga covering the 2019 DS and 2020 WS for Nueva Ecija.

Hybrid seed yield was 693kg/ha during 2018 DS and significantly increased to 1,234kg/ha during 2019 DS. The average yield for R Line was 1,357kg/ha during 2018 DS and 1,628kg/ha during 2019 DS. In inbred seed production, the average yield was 4,990kg/ha with Nueva Ecija obtaining the highest yield at 6,040kg/ha. Consequently, Nueva Ecija reported the highest gross and net returns and the lowest production cost per unit cost at PhP15.46/kg. The net profit-cost ratio was 0.96. As yield improved, the cost per unit of rice seed production decreased while net income increased. Hybrid seed growers identified insect pest damage and lack of markets as significant problems. In contrast, the inbred seed growers mentioned late irrigation water releases and the unavailability of preferred varieties.

TABLE 1. Clean seed yields, output prices, and returns in hybrid rice seed production in Kalinga, 2018 DS and 2019 DS.

Item	2018 DS (n=22)	2019 WS (n=18)
Yield (kg/ha)		
F_1 (clean)	693	1,234
Restorer	1,357	1,628
Price (PhP/kg)		
F1 (clean)	212.14	211.07
Restorer	17.40	14.24
Returns (PhP/ha)		
F1 (clean)	147,081	260,530
Restorer	23,616	23,193
Gross Returns	170,697	283,723
Cost (PhP/ha)		
Material costs	32,152	33,143
Labor and power costs	62,283	60,909
Other costs	28,479	27,760
Total Cost of Production (PhP/ha)	122,914	121,812
Net Returns (PhP/ha)	47,783	161,911
Cost per kg of F1 seed (PhP/kg)	177.28	98.69
Net Profit Cost Ratio	0.39	1.33

PROJECT 2

TABLE 2. Cost share (%) of inputs from the total cost of hybrid rice seed in Kalinga, 2018 DS, and 2019 DS.

Item	2018	2019
Seeds	9.46	10.60
Fertilizer	8.16	8.26
GA$_3$	4.18	3.91
Insecticides	1.73	1.75
Herbicides	0.68	0.52
Fungicides	0.79	0.94
Other Pesticides	1.15	1.23
Hired Labor	29.14	32.99
OFE Labor	8.06	4.90
Permanent Hired Labor	12.02	10.76
Power Cost	1.45	1.35
Land Rent	16.27	17.06
Other Costs	6.90	5.73

TABLE 3. Clean seed yields, output prices and returns in inbred rice seed production in 3 selected provinces, 2019 DS and 2020 WS.

Item	2019 DS				2020 WS
	All Provinces (n=120)	Nueva Ecija (n=44)	Pangasinan (n=47)	Kalinga (n=29)	Nueva Ecija (n=48)
Yield (kg/ha)	4,990	6,040	4,374	4,393	4250.62
Price (PhP/kg)	32.17	30.23	33.33	33.23	28.97
Gross Returns	160,523	182,582	145,811	146,007	123,139
Costs (PhP/ha)					
Material costs	15,423	14,976	16,279	14,741	13,075
Labor and power costs	37,361	36,116	35,297	42,595	31,669
Other costs	34,954	42,298	32,500	27,787	32,785
Total Cost of production (PhP/ha)	87,737	93,390	84,076	85,122	77,529
Net returns per hectare (PhP/ha)	72,786	89,192	61,734	60,885	45,609
Cost per kg (PhP/kg)	17.58	15.46	19.22	19.37	18
Net Profit Cost Ratio	0.83	0.96	0.73	0.72	0.59

PROJECT 2

TABLE 4. Cost share (%) of inputs from the total cost of inbred rice seed production in 3 selected provinces, 2019 DS and 2020 WS.

Item	2019 DS				2020 WS
	All Provinces (n=120)	Nueva Ecija (n=44)	Pangasinan (n=47)	Kalinga (n=29)	Nueva Ecija (n=48)
Seeds	3.0	3.1	3.2	2.8	3.6
Fertilizer	11.7	11.6	12.3	10.9	11.1
Insecticides	1.2	0.3	1.9	1.7	0.4
Herbicides	0.8	0.7	0.9	0.8	1.1
Fungicides	0.3	0.1	0.5	0.5	0.2
Other pesticides	0.5	0.3	0.6	0.8	0.5
Hired Labor	28.3	22.2	32.3	31.9	26.7
Permanent hired labor	10.3	14.0	5.5	12.0	11.6
OFE Labor	1.9	0.3	2.4	4.1	0.2
Power cost	2.0	2.2	1.8	2.1	2.3
Land rent	27.5	32.1	27.9	19.0	30.1
Repair and Maintenance	4.6	6.9	2.4	4.4	4.6
Other costs	7.8	6.3	8.4	9.2	7.6

WHAT HAPPENED TO THE PHILRICE-DEVELOPED MICROTILLER?
JA Manalo IV, LGF Orcullo, TJP de Leon, and MAM Baltazar

This study aimed to understand the processes of adoption and adaptation of the PhilRice-developed microtiller. PhilRice developed this machine in the 1990s. The Central Cordillera Agricultural Program and the DA-CAR were the partners of the Institute. The study interviewed key informants from PhilRice (2), DA-CAR (1), and CECAP (1). Interviews were also conducted with farmer-recipients and DA officials in Kibungan, Benguet (1 municipal agriculturist, five farmers; Lubuagan, Kalinga (2 farmers); Hungduan, Ifugao (1 municipal agriculturist, 3 farmers); and Mayoyao, Hungduan (1 municipal agriculturist). Overall, the microtiller was found to have eased the tedious farming operations among farmers in the Cordilleras. However, the adoption of this machine was constrained by many factors such as a lack of a clear and sustainable business case, a lack of support for local manufacturers, and the rise of new machines that are cheaper and more versatile.
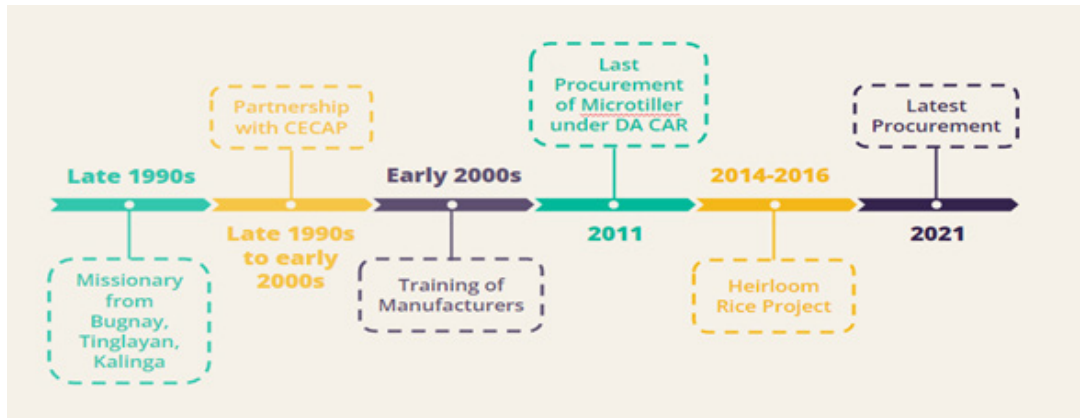
PROJECT 2

Figure 1. Significant events in the promotion and adoption of the microtiller in the Cordilleras.
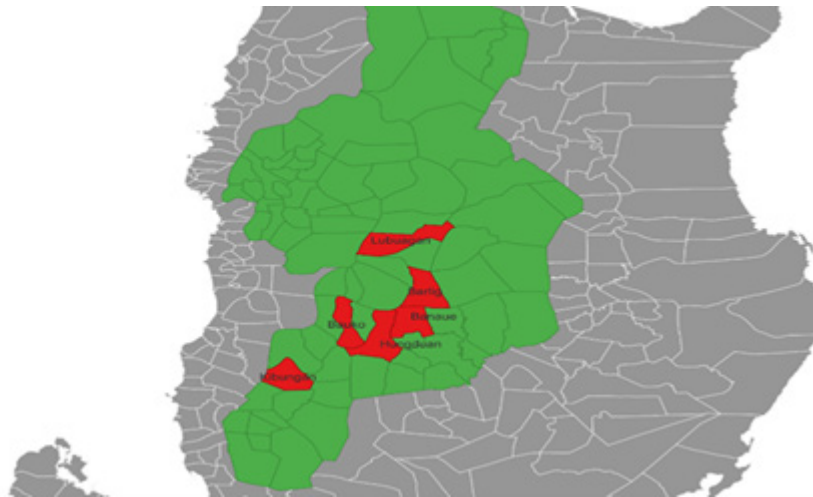

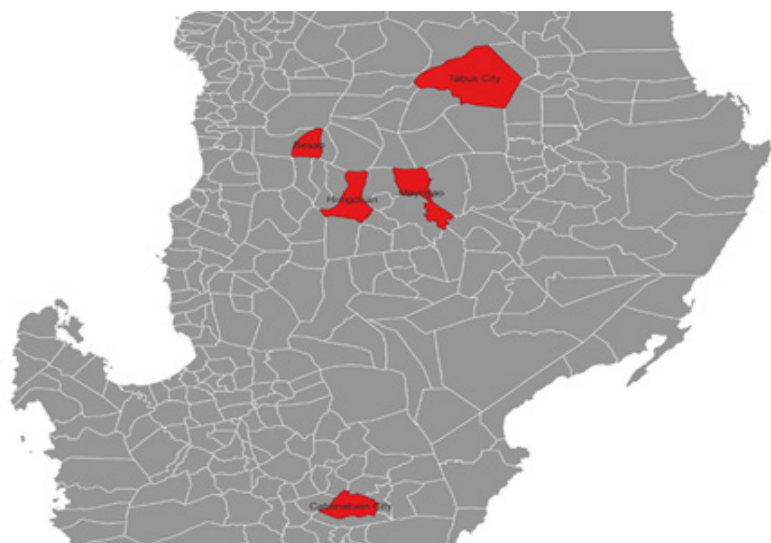**Figure 2.** Location of the recipients of the microtiller under the Heirloom Rice project.

Figure 3. Location of accredited microtiller manufacturers.

CROP DIVERSIFICATION: AN ALTERNATIVE PRODUCTION SYSTEM FOR RICE FARMERS

AC Litonjua, JA Manalo IV, JC Beltran, RG Manalili, AB Mataia and MAM Baltazar

The Department of Agriculture (DA) identified crop diversification as among the strategies that may help farmers beef up their income amidst problems with low paddy prices and high input prices.

Based on a key informant interview conducted in 2021 in Nueva Ecija, there has been no comprehensive program on crop diversification since 1990. Nevertheless, a support system exists in training, market matching, and cold storage facilities. There are already diversified patterns in the province such as rice-watermelon, rice squash, rice-onion-squash, and rice-onion-corn. However, some are still reluctant to plant other crops because they want evidence that it will be profitable, i.e., a to-see-is-to-believe mindset. Additionally, farmers tend to specialize in certain commodities, like rice, because they take pride in being the best "rice farmers." Inadequate financing available for other commodities was also identified as an issue.

PROJECT 3

Policy Research and Advocacy

Jaime A Manalo IV, Alice B. Mataia, Aerone Philippe G. Bautista, Jemina Laya D. Bugayong, Jesusa C. Beltran, Aileen C. Litonjua, Rowena G. Manalili, and Flordeliza H. Bordey

The Policy Research and Advocacy Project (PRAP) aimed to create a solid science-based, supportive, and enabling policy environment to guide and influence national and local decisions on rice-related issues. Socioeconomic research outputs and results from completed R&D projects/studies were also used to back-up advocacy. PRAP operates with two interrelated studies - Policy Research and Policy Advocacy. Policy Research focused on researching existing and emerging policy issues and programs across the rice value chain. These research studies generated and provided science-based information and policy recommendations for policy-making and program directions. On the other hand, the Policy Advocacy study complemented the policy research, which carries out advocacy activities to put science-based information into action.

Science-based information materials such as policy briefs or *Rice Science for Decision-Makers*, position papers, policy memos, policy notes, and information on emerging rice-related issues were

generated from this project. These outputs played a vital role in establishing data-driven policies and recommendations across rice research, development, and extension fields, as clearly emphasized in one of the primary key strategies under the *"One-DA" Reform Agenda*. Moreover, the outputs were disseminated and advocated among policymakers.

The policy research spearheaded the dissemination of five policy recommendations on rice-related issues across the value chain. The team members provided technical assistance to the DA in the form of position papers, policy memo, policy notes, and reports on current and emerging rice-related issues and trade policies. Under the policy advocacy study, four issues of the *Rice Science Decision Makers* were packaged and published, which were emailed to all members of the houses of Congress and policy champions such as the DA-Philippine Council for Agriculture and Fisheries and the Department of Finance. A key accomplishment of the study is the passage of the *truthful labeling of rice classification* as a provincial ordinance in Nueva Ecija in October 2021. The ordinance is expected to benefit farmers and give consumers the power to choose. The benefits from both parties, the farmers and consumers alike, may be drawn from the full implementation of fair trade practices in the rice industry. One of the motivations in researching truthful labeling was the clamor of some Filipino consumers who would like to patronize rice produced by local farmers.

As for GAD concerns, the accomplishments of this project are expected to bring positive impacts on women and men farmers in the immediate future. Farmers from hereon will be used to refer to men and women farmers. Primarily, the accomplishments aimed to improve major rice stakeholders' policy environment. The RS4DM issues, for example, are expected to improve rice farmers' yields if translated to local or national ordinances. For example, the RS4DM issue on community action is expected to optimize the gains from incentivizing farmers who participate in practices such as synchronous planting, a known pest management strategy.

POLICY RESEARCH
AB Mataia, APG Bautista, JC Beltran, JA Manalo, AC Litonjua, RG Manalili, FH Bordey

The study aimed to shed light on various rice industry issues by conducting socioeconomic and policy inquiries. Results generated from these studies were presented in various fora or forwarded directly to the Department of Agriculture to provide information or recommendation on policy issues relevant to the rice economy.

PROJECT 3

Additionally, the study provided DA and policymakers technical support or policy guidance. In 2021, the team produced policy memo (1), policy notes (2), position papers (3), and reports on pressing rice and trade-related issues in response to queries made by the DA or other policy champions such as the National Economic and Development Authority (6).

Two policy papers on crop diversification as a strategy to increase farmer's income and adoption and performance of direct seeded rice technology were presented in various scientific fora. Additionally, reports on adoption and adaptation of the microtiller, the performance of hybrid rice production, and farmers' limitations in implementing integrated nutrient management practices in rice production were presented.

Posting of '*The Explainer*' on the PhilRice website and the Facebook page was initiated. Explainers are materials that aim to educate the public on rice-related concepts and issues. For this, a series of explainers on the difference between the price of fresh and dry *palay* were posted on the PhilRice website. Additionally, an explainer was drafted to explain the Philippine government's move to replace quantitative restrictions (QR) on rice imports with tariffs. It was explained that the move was to honor the commitment of the Philippines to the World Trade Organization (WTO). The expected long-term economic benefits of this policy were also explained in light of the recurring questions of farmers and other entities concerning the amendment in the country's trade policy in 2019.

Proceedings of the policy forum on mobilizing local government units (LGUs) to support local rice farmers and of the webinar titled "*Kanin ng Pinas, mas mainam ba at ligtas?*" were prepared and posted on the PalayStat website. These two events were conducted as part of the 2020 National Rice Awareness Month (NRAM) celebration, which sought for the active participation of local government executives and consumers to support local rice farmers. The proceedings of the policy forum include presentations on the Palay Price Support Program (PPSP) of the Provincial Local Government Unit of Nueva Ecija and the DA's *Kadiwa ni Ani at Kita*. These presentations could well be replicated in other LGUs to support rice farmers in their area. The proceedings of the webinar introduced consumers to the different types and varieties of rice available in the Philippines, and how their quality and safety are measured and ensured.

The requested technical and policy supports from DA and NEDA are the following:
- Three position papers: (a) imposition of Suggested Retail Price on rice; (b) appropriate rice categories for use in 2021 FIES of

PSA; and (c) understanding of public investment in the rice sector

- One policy memo: appropriate rice classification, which NEDA adopted
- Two policy notes: (a) Are increasing rice prices the solution to farmers' woes? and (b) Inside EO 135: Why lower the tariff on rice imports from non-ASEAN countries?
- Six reports on current and emerging pressing rice-related issues: (a) sources of rice production growth in 2021; (b) sources of 2021 semester 1 production growth; (c) validation report on quality rice; (d) rice supply, demand, and price outlook; (e) 2021 projected palay production with estimated losses from typhoon Odette; and (f) rice classification methods used relative to other countries.
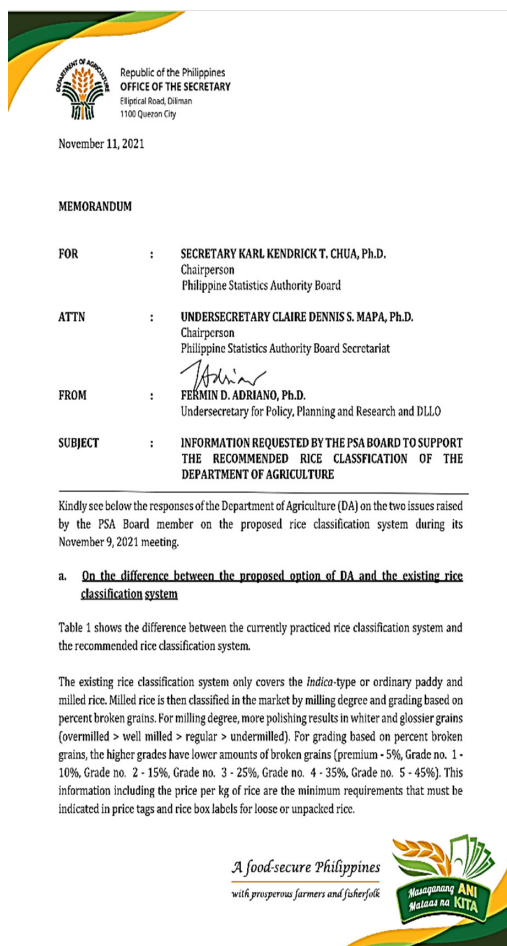
Requested by the PSA Board to support the recommended rice classification

Sample infographic on EO 135

PROJECT 3

ADOPTION AND PERFORMANCE OF DIRECT SEEDED RICE TECHNOLOGY IN THE PHILIPPINES
APG Bautista, AB Mataia, CP Austria

Manual transplanting has been the traditional method of rice crop establishment in the Philippines; hence crop establishment accounts for over 30% of the total labor use, a significant driver of the higher production cost in the Philippines relative to other top rice-producing countries in Asia. The study assessed the socioeconomic effects of farmers' adoption and use of direct-seeding using 1996/97 to 2016/17 RBFS data. It determined the trends and patterns of adoption of direct-seeding; examined the economic performance of direct-seeded rice (DSR) relative to transplanted rice (TPR); identified the factors that influence DSR adoption, and provided policy options to promote the adoption of direct-seeding. Results showed that the proportion of rice farmers that used direct-seeding increased from 27% in 1996/97 to 36% in 2016/17. In addition, more DSR farmers were in rainfed areas and many practice DSR during the dry season.

The main advantage of DSR is its lower labor use and cost, particularly in crop establishment. However, seed and herbicide costs were higher in DSR due to the unmanaged number of seeds sown and higher weed incidence. DSR yield was also generally lower than TPR's. Despite this, the partial budgeting analysis showed that shifting to DSR poses incremental income, especially for farmers in rainfed areas during the dry season. It means that DSR is not a one-size-fits-all method and that ecosystem and season are important considerations for farmers when selecting a crop establishment method. The additional income can be attributed to the labor savings that compensated for the higher material cost and lower yield. Factors affecting farmer adoption of DSR were season, ecosystem, area planted, household size, organization membership, price of seeds, herbicide, insecticides, and labor. Additionally, narrowing the yield gap between DSR and TPR and addressing the disadvantages of DSR may encourage rice farmers to shift to direct-seeding. To do this, the study suggests promoting DSR as a viable alternative to TPR through extension services and technology demonstrations; training and encouraging rice farmers to refer to the PalayCheck platform on direct seeding as their guide for efficient weed control techniques, proper water management, and land preparation, which also helps in controlling weeds that significantly affect DSR yield; encouraging the use of technologies like drum seeder, precision seeder, and drones for more efficient use of seeds and labor, and developing rice varieties and technologies ideal for direct-seeding.

PROJECT 3

TABLE 1. Percentage distribution of rice farmers by the method of crop establishment, and ecosystem, Philippines, 1996/97–2016/17

Method of Crop Establishment	1996/97	2001/02	2006/07	2011/12	2016/17
			(%)		
Irrigated Ecosystem					
Transplanting	68.65	70.51	70.99	70.40	66.59
Direct seeding	26.62	29.49	28.89	29.41	33.22
Both*	4.73		0.12	0.19	0.19
N	*3,148*	*2,689*	*2,561*	*2,581*	*4,163*
Rainfed Ecosystem					
Transplanting	71.06	71.63	71.92	69.88	57.42
Direct seeding	26.75	28.37	28.08	29.91	42.31
Both*	2.19			0.21	0.26
N	*1,458*	*1,868*	*894*	*1,869*	*1,522*
All Ecosystem					
Transplanting	69.41	70.97	71.23	70.18	64.13
Direct seeding	26.66	29.03	28.68	29.62	35.66
Both*	3.93		0.09	0.20	0.21
N	*4,606*	*4,557*	*3,455*	*4,450*	*5,685*

n–sample size
Source of basic data: PhilRice RBFHS
*both transplanting and direct seeding

TABLE 2.1. Partial budget analysis on rice farmers› shift from TPR to DSR by ecosystem, wet season

Ecosystem	Item	Value (PhP/ha)
	Added income due to change:	None
	Reduced costs due to change:	
	crop establishment cost	5,967.63
	crop care and maintenance cost	913.44
	harvesting and threshing cost	908.66
	Subtotal	7,789.73
	Added costs due to change:	
	Seed cost	1,106.00
Irrigated ecosystem	Herbicide cost	294.00
	Insecticide cost	644.00
	Reduced income due to change:	
	Yield reduction (kg)	366.00
	Farmgate price (PhP/kg)	15.16
	Value (PhP/ha)	5,548.56
	Subtotal	7,592.17
	Net change	197.56
	Added income due to change:	None
	Reduced costs due to change:	
	crop establishment cost	6,226.00
	crop care and maintenance cost	1,143.06
	harvesting and threshing cost	850.86
	Subtotal	8,219.92
	Added costs due to change:	
	Seed cost	860.00
Rainfed ecosystem	Herbicide cost	707.00
	Insecticide cost	79.00
	Reduced income due to change:	
	Yield reduction (kg)	397.00
	Farmgate price (PhP/kg)	15.16
	Value (PhP/ha)	6,018.52
	Subtotal	7,664.10
	Net change	7,664.10

Source of basic data: PhilRice RBFHS

TABLE 2.2. Partial budget analysis on rice farmers› shift from TPR to DSR by ecosystem, dry season

Ecosystem	Item	Value (PhP/ha)
	Added income due to change:	None
	Reduced costs due to change:	
	crop establishment cost	6,544.34
	crop care and maintenance cost	812.15
	harvesting and threshing cost	1,509.38
	Subtotal	8,865.87
	Added costs due to change:	
	Seed cost	1,061.00
	Herbicide cost	647.00
Irrigated ecosystem	Insecticide cost	144.00
	Reduced income due to change:	
	Yield reduction (kg)	433.00
	Farmgate price (PhP/kg)	16.22
	Value (PhP/ha)	7,023.26
	Subtotal	8,874.39
	Net change	–8.52
	Added income due to change:	None
	Reduced costs due to change:	
	crop establishment cost	8,043.75
	crop care and maintenance cost	675.58
	harvesting and threshing cost	799.16
	Subtotal	9,518.49
	Added costs due to change:	
	Seed cost	919.00
	Herbicide cost	668.00
Rainfed ecosystem	Insecticide cost	125.00
	Reduced income due to change:	
	Yield reduction (kg)	72.00
	Farmgate price (PhP/kg)	16.22
	Value (PhP/ha)	1,167.84
	Subtotal	2,879.69
	Net change	6,638.80

Source of basic data: PhilRice RBFHS

PROJECT 3

CROP DIVERSIFICATION: A STRATEGY TO INCREASE FARMERS' INCOME

APG Bautista, AB Mataia

As an agronomically stable and resilient farm practice, crop diversification can potentially increase the income of less competitive rice farmers under the liberalized rice trade system. This study assessed the potential of crop diversification on increasing farmers' income using net income comparisons of different farming systems for 2010-2018 period from the costs and returns data of the Philippine Statistics Authority. The results revealed that the net income from rice- non-rice cropping systems have 1% to over 500% income advantage over rice-rice cropping system. Rice-onion bulb and rice-string beans pose the highest net returns inspite of the considerable capital requirement.

However, despite the substantial income opportunity of crop diversification, the data from the Rice-based Farm Household Survey (RBFHS) showed that farmers' adoption remains low at 11% in 2016 and 9% in 2017, most of which are in rainfed areas. The constraints to farmer adoption include technology constraint due to limited production technologies for non-rice crops, market risks owing to relatively more volatile prices of non-rice crops, high capital investment, land suitability given varying location-specific conditions, and irrigation infrastructure given contrasting water management requirement between rice and non-rice crops. Enabling agricultural policies are suggested to minimize the risks of crop diversification like developing technologies such as crop mixes, crop zoning to promote planting of different crops, establishing wholesale market centers for non-rice crops in major rice-producing areas, using media platforms to improve farmers' access to timely market information, providing farmers with non-collateral credit for capital formation, and improving farm drainage systems to make farm areas also conducive for non-rice crop cultivation.

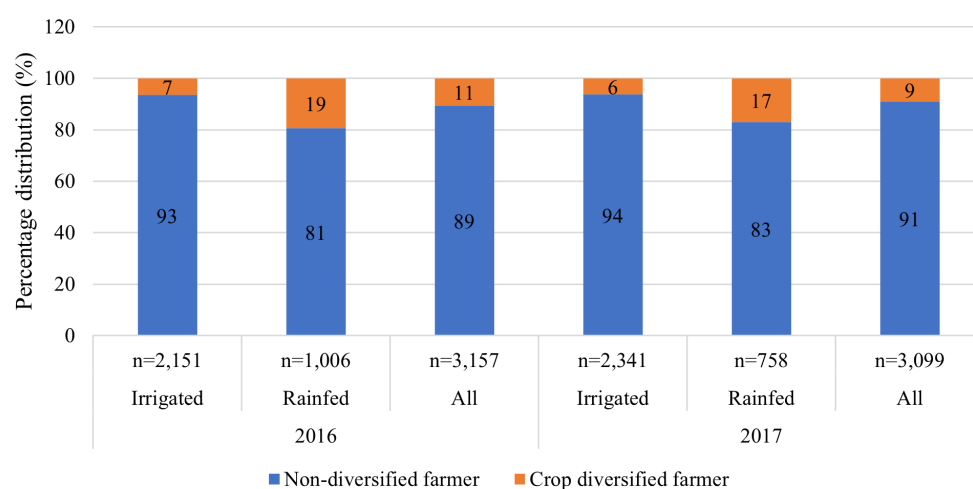**Figure 1.** Adoption of crop diversification of rice farmer-respondents, 33 provinces, Philippines, 2016-2017
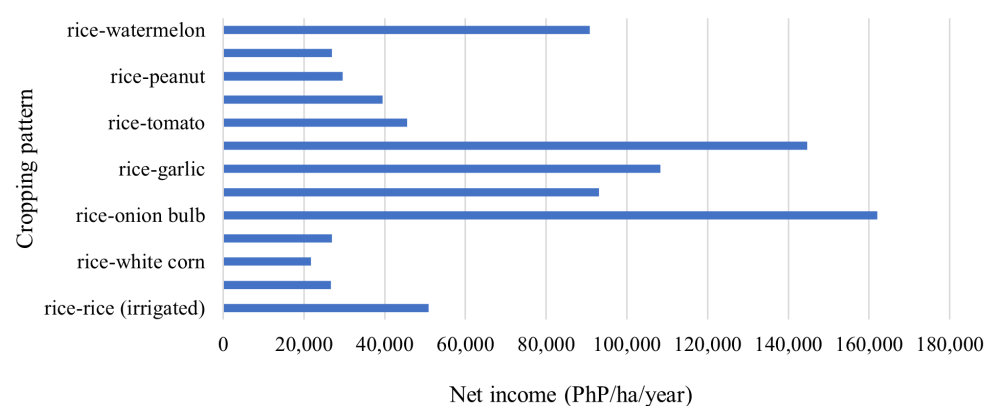

Figure 2. Net income from common cropping patterns of rice farmer-adopters, Philippines, 2010-2018

POLICY ADVOCACY
JA Manalo, AB Mataia, JLD Bugayong, APG Bautista

In 2021, this study packaged and published four issues of the *Rice Science for Decision Makers* (RS4DM) that were all anchored on the One DA Agenda: (1) Farmers adapt to climate change and increase yield through community action; (2) Digital agriculture: How do we make it work?; (3) Are there good reasons to push for Varmix in unfavorable rice-growing areas in the Philippines; and (4) What are some of the ways to support farmers in drought-prone communities? News releases were written and published in various media channels. In 2021, the directory of recipients of the RS4DM was updated. This work enabled the team to send the issues of the RS4DM to all members of both Houses of Congress, i.e., more than 300 recipients for each issue, and policy champions such as the DA-Philippine Council for Agriculture and Fisheries. Agency partners such as National Economic and Development Authority and Department of Finance also received

copies of the RS4DM. A significant accomplishment of this study was the passage of the *Truthful Labelling* provincial ordinance in Nueva Ecija, drawn from the research conducted under Policy Research. The PRAP team forged a collaboration with Community Relations Office of PhilRice and Central Luzon State University. The team has had several brainstorming and actual fieldwork activities and collaborations in advocating policies at the local level.

Figure 2. Sample RS4DM on Digital Agriculture and Facebook promotional material for the RS4DM on VarMix

Figure 2. PhilRice staff member presenting the Truthful Labelling research at the Sangguniang Panlalawigan of Nueva Ecija.
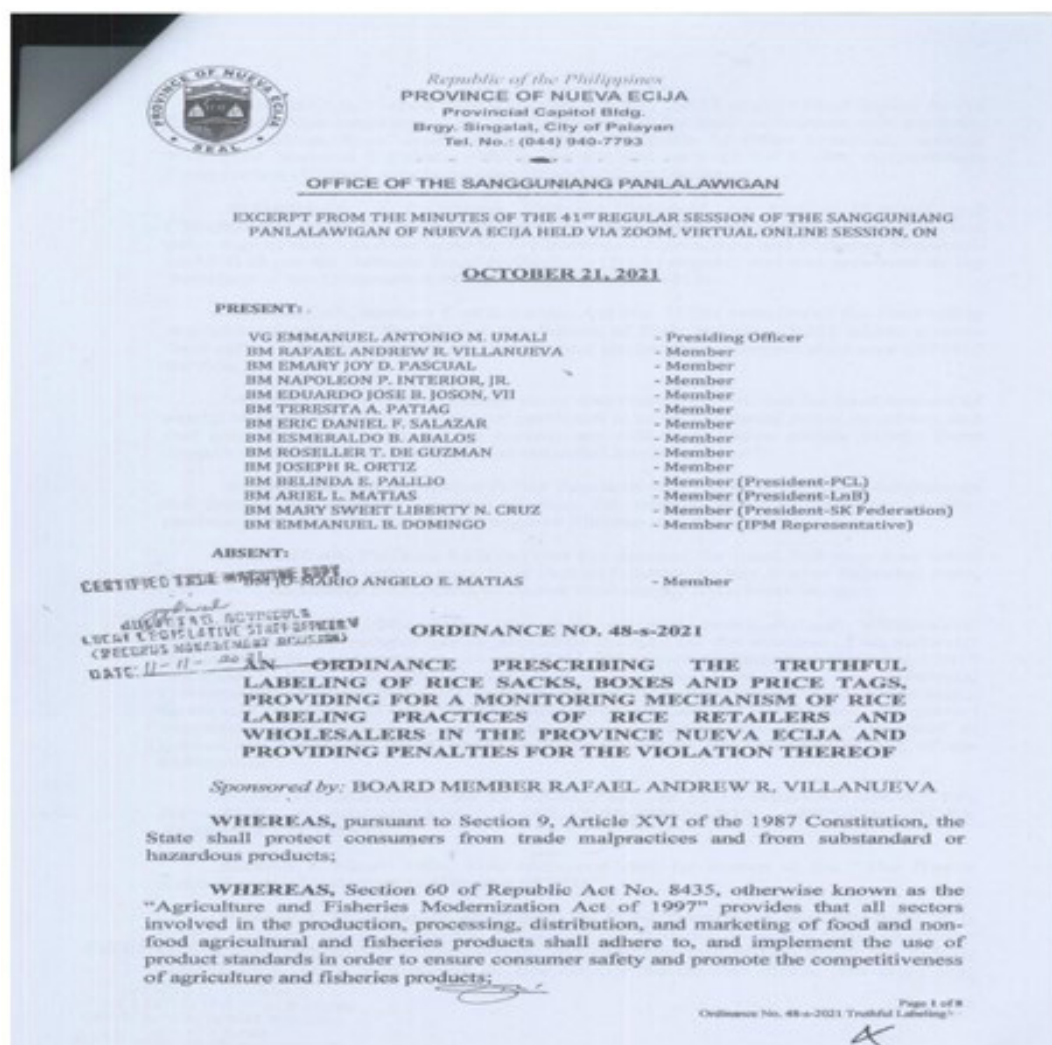
PROJECT 3

Figure 3. Ordinance on truthful labeling signed and approvedby the local government of Nueva Ecija

Rice-Based Farm Households Survey in 19 Provinces (RBFHS 2)

JCBeltran, AAArida, RGManalili, MAMBaltazar, ACLitonjua, CPAustria, ACFlores, NMFrancisco, RMAlmario, AAOrtiz, TEParis, BCMendoza, KALGonzalez, MCEspanto, MJVAng, RCFrancisco, DAMajan, RRSurat, RFTabalno, TJPDeLeon, , LDMorales, NSSebastian, and JDChua

One of the major thrusts of the Socioeconomic Division is to monitor rice-based farm households nationwide regularly. It addresses the need to provide rice and rice-related information to PhilRice's major stakeholders. Additionally, in support of the RCEF Seed Program's data requirement, survey results will serve as baseline information for monitoring and evaluation (M&E) of the emerging outcomes and impacts of the program. National and provincial profiles will be generated to provide inputs to researchers, development workers, and policymakers for planning and informed decision-making. To carry out this goal, the project characterized rice-based farmers' technological, social, and economic profiles, identified and documented rice-based farmers' apparent demand for technology specific to their production environment as well as their socioeconomic strata; updated, organized, and stored location-specific data in an accessible database system for use by rice researchers; and provided policymakers with a sound database in formulating and advocating location-specific agricultural policies for sustainable and economic growth of the rice sector.

In 2021, the project notable outputs include the following:
- Conducted training workshops on the following: RBFHS refresher course for Luzon-cluster enumerators; concepts of a phone survey and use of the e-questionnaire and MS Access database for Luzon enumerators; series of virtual workshops to revamp the questionnaire; and provincial editing for research staff;
- Developed an e-questionnaire and MS Access database for the 2019 WS provincial profile survey;
- Matched 2019 DS RBFHS list and RCEF seed recipient list and generated 19 provincial master lists of farmers;
- Conducted risk assessment in 19 provinces to determine the appropriate methodology to use in conducting the 2019 WS survey;
- Conducted 2019 WS survey through phone interviews, with 1,114 successful calls/interviews in 19 provinces;
- Consolidated database for 19 provinces;
- Produced 19 provincial rice production profiles; and
- Generated results were used in crafting the monographs of 2020 DS and WS and 2021 DS M&E of RCEF Seed Program emerging outcomes

Extracore Project 2

Baseline Information Survey of RCEF Rice-Based Farm Households Beneficiaries on the 38 Provinces (RBFHS 3)

JCBeltran, AAArida, RGManalili, MAMBaltazar, ACLitonjua, CPAustria, ACFlores, NMFrancisco, RMAlmario, AAOrtiz, TEParis, BCMendoza, KALGonzalez, MCEspanto, MJVAng, RCFrancisco, DAMajan, RRSurat, RFTabalno, TJPDeLeon, LDMorales, NSSebastian, and JDChua

PhilRice is mandated to lead the Rice Competitiveness Enhancement Fund (RCEF) Seed Program for developing, propagating, and promoting inbred rice seeds, including the organization of rice farmers into groups engaged in seed production and trade. The RCEF Seed Program commenced in the 2020 Dry Season and is expected to be completed in the 2025 Dry Season. It covers 57 major rice-producing provinces selected using the criteria of yield, area harvested, cost of production, and percentage of irrigated area. The distribution of certified seeds of inbred rice varieties to farmers is the major component project of the RCEF Seed Program, with a budget allocation of 3 billion per year.

The immense public resources and efforts poured into the RCEF Seed Program warrants empirical evidence of its target outcomes. It prompted the need for monitoring and evaluation (M&E) and impacted assessment to gauge the success of the interventions and to determine constraints in implementation. To carry out this goal, baseline information is needed to characterize sample target recipients from 57 RCEP priority provinces. Nineteen out of 57 provinces are covered by the ongoing RBFHS project (2019 DS – 2019 WS). The remaining 38 were covered by the previous RBFHS project (2016 WS – 2017 DS). However, both surveys differ in their target populations and cropping seasons. Therefore, a new baseline survey for the 38 provinces is needed to complete, synchronize, and have the same coverage as the current survey of the 19 provinces. This survey is related and complements the Philippine Statistics Authority (PSA) data on rice but it provides more detailed information on rice-based farm households and their farming practices. The project aims to provide a sound database for measuring and evaluating government interventions for informed decision-making of stakeholders toward sustainable and economic growth of the rice sector.

In 2021, the project notable outputs include the following:
- Conducted a series of training programs and workshops for the revamp of the baseline survey questionnaire, concepts and use of e-questionnaire, and guidelines and rules for the provincial editing for research staff;

Extracore Project 2

- Developed an e-questionnaire and MS Access database for the 2019 WS Baseline Survey;
- Consolidated 38 provincial master lists of sample farmers;
- Conducted risk assessment in 38 provinces to determine the appropriate methodology to use in conducting the 2019 WS Baseline Survey;
- Conducted 2019 WS baseline survey through phone interviews for 38 and additional 19 provinces with a total of 1710 sample farmers;
- Consolidated database for 38 provinces and 19 additional provinces to cover the 57 provinces' RCEF baseline data;
- Produced national and provincial baseline rice profiles covering 2019 WS for 57 provinces;
- Provide national (for 57 and 42 provinces) and provincial summary tables with notes to DA-Operations to be used for the regional and provincial planning for the 2022 rice program; and
- Generated results were used in crafting the monographs of 2020 DS and WS and 2021 DS M&E of RCEF Seed Program emerging outcomes

Production Growth, Price Formation, and Provincial Competitiveness in the Philippine Rice Sector

JCBeltran, HGAValera, RZRelado, PFMoya, RGManalili, NMFrancisco, LLicong, MSVAlencia, MGimutao, and FHBordey

This project will contribute to an enhanced decision support system for informed decision-making in the Philippine rice sector, leading to improved productivity, competitiveness, and price stabilization. The project will leverage the interplay of the quantitative data based on existing household surveys of PhilRice and IRRI and qualitative data to be collected based on consensus analysis from experts. Accordingly, information and policy recommendations generated from quantitative and qualitative analyses will be used to support the government's priority setting and investment to improve rice productivity, competitiveness across provinces, and price stability.

In 2021, the notable project outputs included the following:
- Consolidated data on sources of rice production growth based on Rice-Based Farm Households Survey (RBHFS) data for the period 2006-2017;
- Generated quantitative and qualitative information on sources of production growth;
- Consolidated data on rice yield, input use, and cost of production and marketing at the provincial level based on RBHFS data from 2006 to 2017;
- Generated quantitative information on provincial competitiveness;
- Consolidated secondary time-series and RFBFHS data on factors that influence rice prices;
- Generated quantitative and qualitative information on rice price formation; and
- Produced summary output tables for the sources of yield growth, determinants of rice price formation, and provincial competitiveness.