



2019

PHILRICE R&D HIGHLIGHTS

RICE BUSINESS INNOVATION SYSTEMS (RiceBIS) COMMUNITY PROGRAM



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Rice Business Innovation Systems (RiceBIS) Community

Program leader: Aurora M. Corales

Executive Summary

The RiceBIS Program aims to develop rice and rice-based enterprises in key provinces of the Philippines to address farmers' recurring problems on low productivity and income. Unlike conventional development interventions, which are more focused on rice production, RiceBIS draws more on the clustering approach and agribusiness framework to address farmers' needs—from production, processing, and marketing—to ensure available and affordable rice in a resilient and sustainable manner. Specifically, the expected outcomes of the program in eight RiceBIS communities targeted for Phase 1 (2017-2022) are as follows: a) increase in yield by 1t/ha in irrigated and 0.5t/ha in rainfed areas; b) reduce cost of production by 30%; c) lower postharvest losses to 12%; d) enhance technology adoption by 70%; and e) increase farming household income by 30%. By enhancing farmers' financial condition, their capacity to avail of the technologies needed to improve their livelihood is also enhanced.

The five main components implemented under the program are: 1) Strategic Communication; 2) Community Engagement; 3) Capacity Building; 4) Rural Agroenterprise Development; and 5) Monitoring and Evaluation. All these components interplay to carry out essential services that are critical for smallholder farmers to increase their production and income.

Complementing PhilRice's efforts are strategic collaborations with partner agencies, such as the Department of Agrarian Reform (DAR), Department of Trade and Industry (DTI), Cooperative Development Authority (CDA), the Philippine Center for Postharvest Development and Mechanization (PHilMech), local government units (LGU), Department of Agriculture-Regional Field Offices (DA-RFOs), and state universities and colleges (SUCs). Each RiceBIS community is supported by these partners through the formation of site working groups.

Organized farming clusters served as key elements in enhancing farmers' access to knowledge, skills, organizational development, adoption of technologies, and agroenterprise development.

As a result, eight RiceBIS communities were established nationwide. PhilRice served 680 farmers, partnered with 20 farmer organizations, organized 54 clusters covering 750ha production farms, and implemented 20 enterprises. Strategic communication was carried out to ensure that communication initiatives and knowledge products shared to the farmers are parallel to their needs. Series of training courses and seminars were also conducted to capacitate the farmers toward agroenterprise development. Yield reduction was evident in some communities due to abiotic (typhoon, drought), and biotic (pests and diseases) stresses. Despite these stresses, an overall increase in average yield at 4.59t/ha in 2019 WS (from 4.17t/ha in 2016 WS) and 5.21t/ha in 2019 DS (from 4.91t/ha in 2017 DS) are notable. Reduction in the unit cost of production is noted from P12.96/kg in 2016 WS to P11.26/kg in 2018 WS and from P14.66/kg in 2017 DS to P10.73/kg in 2019 DS. Overall, the RiceBIS communities were able to develop profitable rice and rice-based enterprises linked to the market. These enterprises include commercial *palay* trading, seed production, well-milled and brown rice production, pigmented rice production, rice and mungbean brew, pickled onion, custom service provision of farm machineries, and agricultural inputs trading.

RiceBIS Strategic and Transformative Communication

RG Zagado, DCP Corpuz, EE Reyes, and PIH Duran

Using the power of communication, this project promoted strategies to achieve better mindsets, attitudes, and behaviors among farmers in the RiceBIS target communities toward agroenterprise development. It was carried out with three studies to achieve the following specific objectives: (1) understand men and women farmers' relevant information needs, media preference, and behavioral perceptions; (2) develop and maintain information, education, and communication (IEC) materials and collaterals for all genders; and (3) design and execute knowledge sharing and learning (KSL) activities inclusive of all genders. Procedures were: (1) behavioral analysis and studies for needs assessment and feedback gathering; (2) creation of campaign collateral, IEC, and messages; and (3) dissemination of communication materials through strategic media.

Accomplishments are as follows: (1) behavioral study that guided the team in crafting its communication interventions for its pilot site in Mayamot, Zaragoza; (2) IEC and collaterals were designed to convey three themes/core messages of the program; and (3) dissemination of these IEC and collaterals through strategic channels/media. As a result based on a behavioral change survey conducted, male and female farmers' perceptions of self-efficacy, social norms, and positive consequences related to farming as a lucrative business and their self-efficacy on organized community/marketing were improved. However, their behavioral perceptions of self-efficacy, social norms, and positive consequences related to life chances and technologies and their social norms and positive consequences on organized community/marketing appeared to be critical, which needs improvement. This implies that the communication interventions need to be reviewed to address these critical behavioral perceptions.

Building Capacity for Agroenterprise Development

RA Pineda, CS Reyes, DM Patonona, and JV Pascual

The project consisted of two studies aimed at capacitating both male and female farmers and connecting them to different government institutions. Building skills on rice production and processing; values formation, organization building and management; marketing; and entrepreneurship were implemented to enhance the technical capacity and entrepreneurial ability of the farmers and their organization toward agroenterprise development. This study focused on encouraging farmers to adopt the best management practices and technologies in order to raise the level and quality of production to meet the market demand. For an organization to be more efficient as an enterprise, values and principles should be developed among the members of the organization. While enhancing their skills, linkage and partnership contributed significantly in the implementation of development interventions. Through building relationship study, partnership was built among different partner-agencies who also shared their resources and expertise for the farmer-organization to be more competitive and knowledgeable. Better collaboration was established nationwide with signed agreements providing support in agroenterprise development. Furthermore, partnership with farmers' organizations and other agricultural and research institutions has significantly contributed to individual and organizational empowerment towards improved rice community welfare.

A total of 33 farmers (20 male and 13 female) were trained on rice production and post-production technologies. To strengthen and enhance the knowledge of the farmers' organizations, they were also trained on capability building through values formation, leadership, and practice of good management and governance. This capacity enhancement contributed to effective operation of the organization as an economic and social enterprise.

Farm Business School (FBS) training was also conducted in collaboration with the ATI to help the RiceBIS farmers create a successful business. The conduct of FBS served as initial intervention for enterprise development for smallholder farmers who will welcome the idea of engaging into organized production and marketing of rice and rice-based products.

For this year, the Building Relationships Study conducted three quarterly meetings attended by men and women members. Essentially, this was done to prevent duplication of development interventions within the community and synchronize the efforts being made by both men and women special working group (SWG) members. Also, one of the main focuses of this study is the

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implementation of resource-sharing and regular tapping of pool of experts from partner-agencies. Both men and women of the SWGs in the different partner-agencies shall convene and discuss points for improvement. On October 25, 2019, 31 farmers of Ugat-Uhay Farmers' Association graduated from the RiceBIS Season Long FBS funded (P120,000) and co-facilitated by ATI. This initiative created greater impact, resource efficiency, and provided better results for the farmers. Additionally, all topics and activities in the FBS were presented to the partner-agencies prior to implementation in which a range of expertise from each partner-agency was profiled to facilitate tapping of men and women trainers in delivering courses in the RiceBIS FBS. On September 13, 2019, a two-day intensive training was conducted as part of the RiceBIS FBS where experts from PHilMech and ATI discussed the characteristics of an effective entrepreneur and farm planning, budgeting, and farm record keeping. This form of support strengthened the capability of RiceBIS clusters within a community to build further and sustain their agroenterprise initiative. Furthermore, Ugat-Uhay Farmers' Association and Pinagbuklod na Adhika Agricultural Cooperative were awarded two (2) buffaloes from Philippine Carabao Center. These buffaloes were named Sai after the former PhilRice Acting Executive Director Sailila Abdula, and Tricia from the phrase "pang-three siya", being third among the siblings.

Through these accomplishments, farmers and their organization were equipped with technical knowledge and entrepreneurial ability towards agroenterprise development.

Engaging Farmers' Organizations for Sustainable and Progressive Rice-based Community

JV Pascual, DM Patonona, MJP Domingo, and CS Reyes

The project aims to enhance the farmers' social capital through community engagement and strengthening of rice-based farmers' organizations to increase the income of farming households toward sustainable and progressive farming community. The project was implemented in Zaragoza, Nueva Ecija in partnership with two farmer organizations, which led to the establishment of eight production clusters covering 207ha rice areas with 95 participating farmers.

The component on community organizing and cluster formation helped strengthen the farmer's capability through group learning model and provided farmers with the group foundation to carry out business planning and implementation. In partnership with the farmer organization, clustering was done to build on existing local resources and skills, and structures and production systems; and to serve as potential partners in agroenterprise development. The benefits of clustering helped to achieve an organized production and distribution system of agricultural products, linking group of farmers to potential market actors such as buyers, business development service providers, and development service institutions. To date, production clusters consolidated and marketed *palay* produced of 7,815 bags and 7,120 bags during 2019 DS and 2019 WS, respectively. Clusters formed at the RiceBIS community started working with other potential value-adding products like salted egg, rice and mungbean brew, brown rice, and mushroom. Cluster formation also helped the partner organizations in the promotion and adoption of sound technologies. Clustered production areas were formed and formalized into an agroenterprise clusters to ensure product consolidation and market linkage. These production areas also served as technology demonstration farms to provide a large-scale showcase of yield-enhancing and cost-reducing technologies for greater visibility and impact.

High-yielding technologies were promoted that contributed to the increase in yield during the 2019 DS among production cluster-members. The RiceBIS-Macarse production clusters in Zaragoza obtained an average yield of 6.40t/ha which was higher than their yield (baseline at 5.23t/ha) in 2017 DS; and achieved an average yield increase of 1.22t/ha. While, RiceBIS Mayamot production clusters gained an average yield of 7.30t/ha with an increment of 1.01t/ha. In

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2019 WS, RiceBIS-Macarse clusters obtained an average yield of 4.58t/ha with a yield increase of 0.58t/ha, while RiceBIS-Mayamot clusters had an average yield of 4.80t/ha.

To enhance capacity enhancement of both men and women farmers at the RiceBIS community in farm mechanization, a Quick Guide on the Seedling Preparation Using Seedling Tray and *Dapog* Methods was produced. The Quick Guide is a one-page handy leaflet that can guide farmers during seedling preparation and management for mechanical transplanter. The project provided different capacity enhancement activities on organizational building and management through the delivery of newly developed modules focused on values formation for farmer's organization, leadership, governance and planning for cooperatives, and farm bookkeeping and basic accounting.

Rural Agroenterprise Development

AB Mataia, RG Abilgos-Ramos, PM De Gracia, ESA Labargan, JF Ballesteros, RR Mendoza, RB Miguel, and PIH Duran

Poverty remains a rural phenomenon wherein majority of the farmers are poor. One of the major causes of poverty is low farm income since most farmers are small scale, production focused, less competitive, and are less business oriented. The recent approval of the rice liberalization law posed also a major challenge to the income of farmers due to continuous decline of *palay* prices. Agripreneurship is a key to move farmers out of poverty by engaging them in profitable agroenterprises. Inspired by the benefits of agripreneurship in improving welfare, the rural agroenterprise development project was conceptualized and initially implemented in RiceBIS community in Barangay Macarse, Zaragosa, Nueva Ecija, designed to transform the rice farming community into agripreneurs. Specifically, it aimed to develop gender sensitive, profitable, and sustainable agroenterprises; improve market access for marketing engagement; and develop value-added rice and rice-based food products for market opportunities. Three interrelated component studies were implemented to achieve the project's objectives. The studies are the following: (1) Development of gender sensitive, profitable, and sustainable agroenterprises; (2) Improving market access to better markets for marketing engagements; and (3) Development of value-added rice and rice-based food products for market opportunities.

Rice is a major commodity and source of livelihood in RiceBIS community in Zaragosa. At present, most farmers are only engaged in producing *palay* that are mostly sold to traders who carry out most of the value-adding activities in the rice value chain and hence they capture most of the value additions and profits. Using the rice value chain development (VCD) approach, farmers' cooperative was mobilized to perform series of value-generating activities in the rice value chain from input and service provision, production, processing to marketing of the final product to the consumers to increase their farm income. In addition, rice and rice-based food products were developed for additional income especially of women farmers.

In 2019, the project team facilitated the establishment of various agroenterprises across the rice value chain, which were successfully engaged to both input and output markets, namely; custom service provision of farm machine (such as combine harvester and mini 4-wheel tractor), agri-inputs trading, and *palay* trading. Profitability of each enterprise was analyzed using farm enterprise budget. Overall, the farmers' cooperative earned a gross margin of P491,158 of which, service provision of combine harvester obtained the highest income (P268,519), followed by *palay* trading (P180,829), while custom provision

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of mini-wheel tractor and agri-inputs trading earned P36,920 and P4,890, respectively. In addition, the cooperative received P123,511 as incentive development fund for availment of the Institutional Procurement Program (IPP) of the National Food Authority (NFA), which the cooperative used to augment their capital for the agri-inputs trading.

Moreover, test market of premium/brown rice and rice/mungbean brew in trade fairs and exhibits provided an additional income to the farmers' cooperative amounting to P2,810 and P4,334, respectively. Intervention results suggest that transforming a rice farming community into agripreneurs was done effectively by empowering a community through participatory, community-focused and market-driven approaches along with a strong enabling support from government and non-government institutions.

Monitoring and Impact Evaluation of the RiceBIS Community Program

AC Litonjua, RG Manalili, AB Mataia, IA Arida, MAM Baltazar, RF Ibarra, JP Curibot, AS Juliano, and JP Jimenez

PhilRice envisions having a rice-secure country. This means the population has an access to affordable, high-quality, and nutritious rice at all times. To realize this, the industry has to be more competitive through improved profitability, resiliency, and sustainability. Hence, the RiceBIS Community Program aimed to help in materializing this vision. Monitoring and evaluation of the socioeconomic indicators and postharvest losses in RiceBIS communities can serve as a reference of implementers in determining the effectiveness of interventions provided to farmers in attaining the program targets.

The project implemented three component studies: (1) Baseline and end-season assessments of the socioeconomic indicators in the RiceBIS communities; (2) Monitoring and analysis of harvest losses in RiceBIS communities; and (3) Impact assessment of the RiceBIS Program. The first two studies intended to monitor and assess the seasonal effect of the program on yield, income, cost, and postharvest losses before and during program implementation. The third study aimed to determine whether these quantified effects can be sustained even after the program implementation. This will partly use the baseline data generated by the first study. The findings of these studies can serve as decision guides of program implementers to help them craft interventions based on the needs of farmers.

During the wet and dry seasons of implementation, farmers obtained better yield than in the baseline seasons. This may be attributed to the use of high-quality seeds and better fertilizer application. Per kilogram cost in the latest wet-season implementation was almost the same with that of the baseline's; and lower cost in the latest dry season. Unit cost was affected by the level of yield and price of *palay*. Net income and return on investment (ROI) in both implementation periods were better than the baseline seasons.

Based on the study conducted by the Philippine Center for Postharvest Development and Mechanization (PHilMech) and PhilRice, a total of 16.47% grain losses obtained during postharvest activities. The losses obtained were due to the following: harvesting (2.03%), piling (0.08%), threshing (2.18%), drying (5.86%), milling (5.52%), and storage (0.8%). Postharvest losses were gathered from the RiceBIS communities with a target reduction of 2% from the national average of 16.47% to 14%. The coverage of data gathering was from harvesting to threshing only since most farmers still sell their produce immediately after

harvest. Postharvest losses data for both manual and mechanical harvesting were gathered by the RiceBIS team from branch stations. Three farmer-cooperators per RiceBIS community were pre-identified before harvest time. Results showed that the average actual manual harvesting losses are 6.4% during DS and 7.3% during WS, while for combine-harvested crop is 2.9% and 2.6% during DS and WS, respectively. Generally, losses can be attributed to harvest and threshing method, harvest time, type of variety and its physical properties, and crop condition in terms of maturity, lodging and soil condition. This may coincide with the study conducted by the PHilMech and PhilRice, where grain losses in combine-harvested crops were not more than 3%. Losses can also be attributed to machine setting such as forward speed and opening of blower air inlet and the skill of the operator. Postharvest losses were reduced from 16.47% (national average) to 15.08% (DS) and 14.78% (WS) through the use of combine harvester.

Ilocos Norte RiceBIS Community

MAU Baradi, LMC Tapeç, JM Solero, NI Martin, NQ Abrogena, MM Yere, KMP Martin, BM Catudan, and MB Alupay

The RiceBIS Community Project in Ilocos Norte was established in 2017 with pilot site in Brgy. Rayuray, City of Batac. The project aimed to increase the yield of the farmers, minimize production costs and postharvest losses, and establish marketing channel and engagement. The project is comprised of four components: 1) assessment of communication strategies implemented in the RiceBIS community; 2) development of agribusiness ventures of the RiceBIS community; 3) development of man and woman farmer competence in agribusiness in the RiceBIS community; and 4) monitoring and evaluation of the performance of the RiceBIS community. There are already farmer-partners (35 male, 24 female) initially from three associations formed into a cooperative, the Rayuray Farmers Agriculture Cooperative. The RiceBIS community is comprised of six clusters with 32.07-ha farm.

During 2019 DS, technology demonstration on *PalayCheck* System on integrated crop management vs. farmer's practice, and rice challenge were conducted as communication strategies. Result of the technology demonstration showed that the yield from the PhilRice technology field using NSIC Rc 160 and PSB Rc 82 were higher than the farmer's field, and this is mainly due to interventions made such as fertilizer management and pest management. Moreover, the rice challenge was attended and participated by 18 men and 8 women farmers. The highest yielder was attained by a woman farmer with 9.38t/ha.

For 2019 WS, three technology demonstrations were conducted: 1) *PalayCheck System* on integrated rice crop management and farmer's practice; 2) different crop establishments (manual transplanting based on recommended technology, mechanical transplanting using riding-type transplanter machine, wet direct seeding using PhilRice drumseeder); and 3) varietal trial using five varieties. The mechanically transplanted setup had the highest yield owing to the presence of more tillers, which may be attributed to the 5-7 seedlings/hill and spacing (30cm x 15cm).

Moreover, benchmarking activity through a cross visit to a multibillion cooperative in Nueva Ecija, participation to *Lakbay Palay* at PhilRice Central Experiment Station and field day on MP Seeder Project in Cabugao, Ilocos Sur, and field day at the RiceBIS community site were undertaken.

To develop farmer competence, both men and women farmer-partners were trained on rice production technologies, agro-enterprise development, and cooperative and financial management. A total of 11 training-courses were

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successfully done in collaboration with partner agencies/offices such as the Mariano Marcos State University, Cooperative Development Authority, and Department of Trade and Industry.

With the newly organized cooperative, product consolidation, processing (value-adding), and marketing of products (*palay*, brown rice, milled rice, pickled) were successfully started. From P93,400 initial capital (membership fees and share capital), the cooperative has a total asset of P1.82M including grants (cash, equipment, machineries) from partner agencies such as the Department of Agriculture Region 1, Agricultural Training Institute, Provincial Government of Ilocos Norte and Department of Science and Technology. Participation in exhibits and trade fairs, and Producer to Consumer (P2C) Program of the provincial government of Ilocos Norte; and selling at market stall were undertaken by the RiceBIS community to sell and promote the products, and expand market outlets and linkages.

The performance of the project particularly on rice production (increased in yield, income, adoption of technologies) is monitored and evaluated throughout the year starting 2017 WS. During 2019 DS, the production cost was reduced by 37% (from P99,769 to P62,658) while the net income was increased by 241% as compared with the baseline income in 2017 DS. Aside from these, additional income has been achieved from the agroenterprises (*palay* trading, milled rice, brown rice, pickled onion). To date, the cooperative has now realized a net surplus of P53,010.80. This is due to the gain in knowledge and adoption of farmers of the recommended rice production technologies they learned from the various training courses and technology demonstrations.

Isabela RiceBIS Community

OC Malonzo, JVE Adolfo, and JMB Baguilat

The RiceBIS Community Project with pilot site in San Mateo, Isabela generally aimed to increase yield, reduce production cost and losses, and link farmers to market. To realize these objectives, two studies were implemented specifically for San Mateo that sought to enable RiceBIS farmers and their organization, engage, and sustain their engagement in agro-enterprises. The first component is the enabling component. It is composed of capacity building activities related to rice production, organizational building and management, and enterprise development. This component served as the preparatory stage prior to the farmers' engagement in their chosen agro-enterprises, which is the second component. At this stage, farmers are guided to prepare and implement their agro-enterprise plans. Farmers' engagement is meant to be sustained through various strategic communication activities.

This year (2019), MarDag RiceBIS Association is now a fully registered farmers' association by the Department of Labor and Employment as well as by the Bureau of Internal Revenue, which now permits them to engage in business activities. Moreover, MarDag is now endorsed to the Department of Agriculture – Regional Field Office II for accreditation so that they can be qualified to access benefits from various government programs. MarDag covers eight production clusters involving 85 farmers (43 male and 42 female). MarDag officers and cluster members were given continuous capacity enhancement activities related to rice production, organization building and management, and enterprise development to further strengthen and equip members with the knowledge and skills to run their own enterprises. This year's implementation of training activities were based on the results of the assessment of the 24-hour activity profile of the members. Results showed that leisure time for both men and women is between 11:00 in the morning and 4:00 in the afternoon. Thus, cluster interventions were conducted in the afternoon. In terms of technology adoption by the men and women members, results showed that adoption of recommended seeding rates and fertilizer application were low at 37.93% and 44%, respectively. Thus, our interventions were tailored to focus on these areas.

In terms of yield, the group performed well during the 2019 DS with 6.87t/ha yield or an increase of 1.15t/ha compared with the 2017 DS baseline yield of 5.72t/ha. However, during the WS, the group did not get a good harvest because during the maturity phase, strong rainfall during night time and strong winds occurred. In terms of production cost, there was a reduction of 3.5/kg from 14.18/kg in 2017 DS to 10.68/kg in 2019 DS.

The group is now engaged in two gender-friendly agro-enterprises, namely: branded well-milled rice and brown rice production and marketing that involve all cluster members as the project aims for inclusive growth and development for all men and women farmer members. The branded well-milled rice started after this year's DS harvest while the brown rice production and marketing started very recently upon the awarding of the brown rice milling machine by the PhilRice's Rice Engineering and Mechanization Division. The association bought all harvests from the two learning farms and each member sold two bags of his or her produce to the association. This served as the initial supply for their enterprises. In both enterprises, all members were given the opportunity to make money by selling well-milled and brown rice. For every bag of rice sold, the member-seller gets P70.00, the organization gets P10.00, the cluster also gets P10.00, and the manager gets P10.00. The positive impact of the enterprises had already benefited not only the men and women cluster members but their other family members as well who became engaged in selling. The activity boosted the members' self-confidence as they contributed to increasing their household income.

Aside from the two established enterprises, the association also provided production loan assistance to all its members with very minimal interest. This is to ensure that they have money to buy the needed fertilizer as indicated in the soil analysis results and in the RCM-based fertilizer recommendations.

To sustain the two agro-enterprises that were initiated, continued mentoring and coaching sessions were conducted and series of knowledge sharing and learning activities were undertaken. Most importantly, after this year's implementation, it can be concluded that the agro-enterprise is a very effective strategy that unites all individual members. It also challenges them to deliver and do their share for the successful implementation of their chosen enterprises that later on boils down to the growth of their organization.

Quezon RiceBIS Community

EE Sajise, KCS Labita, RMO Tumanguil, PJD Alborida, and TR Punzalan

The RiceBIS Community Project in Sariaya, Quezon aimed to develop a model of a community transformation that is participatory and market-driven while improving the competitiveness of rice and rice-based farming communities in a cost-effective, climate-smart, and gender-responsive farm technologies. The project comprised of three studies namely: 1) Communication Strategies in Promoting Better Mindsets, Attitudes, and Behaviors of Rice Farmers and other Stakeholders in the RiceBIS Community; 2) Development of Rice and Rice-based Enterprise in Region IV-A; and 3) Socioeconomic Indicators of RiceBIS Community in Region IV-A.

The first study helped the rice farmers to think about rice farming as a business. Different KSL activities and training courses were conducted to increase the knowledge and awareness of the participants. It served as an eye opener for the rice farmers on what they can do and how it can be done. Different media interventions were done such as *PalayTxtmate*; *PalayKaalaman*; *PalayTalakay*; *PalayTambayan*; mindsetting and KSL activities; and development and design of information, education, and communication (IEC) materials to change the farmer-members' behavior, attitude, and mindset. About 10 gender-responsive mindsetting and KSL activities were conducted that largely concentrated on topics related to marketing, enterprise development, and strengthening of the participating organizations, and values formation. It was attended by a total of 329 (196 male and 133 female) for the entire year. Meanwhile, four gender-sensitive and appropriate strategic IEC materials were developed and designed for printing and distribution.

The second study aimed to develop a business model that can improve the income of the rice farmers. Product identification was conducted by the rice farmers by understanding the needs of the market. For 2019 WS, the five clusters identified inputs trading, milled rice production, and pigmented rice production as their enterprise. The profits from the inputs trading were used as capital for milled rice and pigmented rice production. During this season, the expected return on investment for milled rice is 5% and for pigmented rice is 20%. The enterprise was expected to increase its volume since the organization planned to cater to the demand in nearby resorts around Sariaya, Quezon.

The third study of the project involved the assessment and monitoring of important indicators in a RiceBIS community all throughout the implementation.

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It served as a guide for the implementers on the progress of the farmers in terms of their production marketing practices as well as technology adoption. About 0.5t increase increment was observed from 2016 to 2019. The increase in yield could be attributed to the increase in the number of farmers who used high-quality seeds and followed the recommended timing of fertilizer application. Also the results showed an improvement in the net farm income of the farmers, there was a P5,000 to P20,000 increase from the baseline income. The increment was a result of the increase in gross revenue and decline in total costs of production. Moreover, reduction in cost per kg of *palay* resulted in an average of P11.57 in 2019 DS from P19.20 during 2017 DS.

Albay RiceBIS Community

MAC de Peralta, SO Sabaria, MAR Orbase, MC Nayve, IS Menolas, and AR Rivera

The RiceBIS Community Project of PhilRice Bicol initiated the development of rice and rice-based enterprises through the formation of RiceBIS clusters. The project aimed to increase *palay* yield by 1t/ha in irrigated lowland and 0. t/ha in rainfed ecosystem; reduce *palay* cost up to P8/kg; reduce post-harvest losses to 14%; and enhance the capacity of farmers and improve access to better markets and marketing agreements that will increase their income up to 25% per household.

The project was able to organize 10 clusters composed of different associations and cooperative in Albay. To promote better mindsets, attitudes, and behaviors and to effectively deliver communication strategies to target farmers, various communication channels were employed and several knowledge sharing and learning activities (KSL) were conducted in 2019.

The RiceBIS clusters have engaged into businesses such as dried *palay*, milled rice, *palay* trading, and custom service/machine rental. Market survey and price watch were also conducted. In 2019 DS, price of *palay* was higher compared with the price in 2019 WS.

Moreover, market linkage was established through the project. To develop a sustained enterprise, there should be a long-term business partnership with input providers and institutional buyers. An agreement should be made between the organization, and BDS providers and buyers. They should also form network with other cooperative or association to sustain the demand/need of the customers. To maintain the good standing in the market, the farmer should ensure consistent, quality, and regular deliveries of the product to build market satisfaction.

Through M&E component of the project, one database on farm profitability of 100 farmer-cooperators per season generated. A total land area of 22.07ha (Batang, Albay) and 16.18ha (Busang, Albay) was allocated for the RiceBIS community project.

New technologies have been developed to help farmers increase their yield as well as to reduce the cost of production. Seventy percent (70%) of the farmers have used high-yielding quality seeds in their locality. Leaf color chart (LCC), Minus-one Element (MOET), Rice Crop Manager (RCM), and FRK (Farm Record Keeping) were also introduced to the farmers.

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Data on postharvest (PH) losses using manual and mechanical harvesting were gathered. Results showed that PH losses using manual harvesting averaged at 5.3% during the 2019 DS while combine harvesting obtained lower PH losses (0.5%) than manual harvesting (7.1%) in 2019 WS.

Negros Occidental RiceBIS Community

JAE Cordova, CU Seville, AO Pajarillo, MO Etchon, and RA Repique

This project aimed to improve the competitiveness of rice and rice-based farming communities, particularly in the provinces of Negros Occidental and contribute for a rice-secure Philippines. Specifically, the project aimed to showcase location-specific, yield-enhancing and cost-reducing technologies on a 50-ha rice area, to enhance the technical and organizational building and management capability of men and women farmers and farmer organizations in undertaking rice and rice-based agro-enterprise by developing a marketing plan and linking farmers to local markets and rice value chain. It also aimed to provide opportunities to maximize the skills and role of each family member to engage/participate in the process and develop a built-in sustainability mechanism for the identified rice-based enterprises.

One rice hub in Negros Occidental composed of two associations from Victorias City and one cooperative in Murcia was created, both engaged in rice-based agro-enterprise. Overall, these farmer associations were composed of seven clusters with an average of 10 members per cluster and a total of 74 farmers (26 female and 48 male). These farmers have been capacitated through lectures and on-farm problem solving. They were provided with a package of location-specific, yield-enhancing and cost-reducing technologies presented comprehensively as Rice Production Module. This module was formatted according to farm size of farmers from both communities. The module was able to increase the yield and decrease the production cost of adopting farmers. In the case of Donato R. Melgaso, his yield increased from 3t (baseline WS) to 4.1t in a hectare in 2018 WS, and from 3.5t (baseline DS) to 5.3t/ha in 2018 DS. The production cost in DS was also lowered from P9.62 to P8.66/kg of produced *palay*.

Men and women farmers were also capacitated in leadership, negotiation, marketing, and other basic business skills. As a guide, a business plan was crafted with the assistance of various partners from other government agencies like PHilMech. The provision of brown rice processing complex resulted in value-adding and increase in income of participating farmers by immediately adding P6-10.00 per kilogram of dried *palay* sold to the cooperative as raw materials for brown rice. An agro-enterprise day was also conducted to promote agricultural products and ensure support from the locals. It is also important to note that women farmers, who attended the training on rice production, were capacitated and empowered, which has resulted in higher yield and income.

Agusan del Sur RiceBIS Community

ST Rivas, PR Guindang, and EM Gaquit

The RiceBIS Community Project in Esperanza, Agusan del Sur aimed to improve the competitiveness of rice and rice-based farming communities for a rice-secure Philippines. Specifically, the project aimed to showcase location-specific, yield-enhancing and cost-reducing technologies on a 50-ha area; enhance the technical and organizational building and management capability of farmers and farmer organizations in undertaking rice and rice-based agro-enterprise; and develop a marketing plan by linking farmers to markets and financing institutions in the local rice value chain.

The project implemented three studies namely: 1) Strategic Promotion of Yield-enhancing and Cost-reducing Technologies in RiceBIS Agusan; 2) Establishing Baseline Information and Monitoring Impacts of RiceBIS Interventions in Agusan; and 3) Developing Feasible and Viable Rice and Rice-based Agro-enterprise in RiceBIS Agusan.

Study 1 utilized and integrated several extension platforms to enhance awareness, and increase knowledge and skills of farmers in rice production, value-adding, and agro-enterprise development. Through this study, a modified *PalayCheck* farmer field school, short-term training courses, and farm business school were conducted. A technology demonstration was also established to enforce knowledge and skills learned from the classroom. The study was able to organize clusters into a farmer association. Study 2, on the other hand, mapped out business development providers to help farmers in their respective agro-enterprises. It assessed the progress achieved by the project in terms of practices, costs, yield, and net income. The third study facilitated the clustering of farmers, exploration of agro-enterprises, conduct of market chain studies, and signing/execution of agreements with farmers and institutional buyers.

The project organized an inbred seed agroenterprise, which was able to deliver certified seeds worth P741,000.00 in 2019 DS and P6,819,400.00 in 2019 WS. Two rounds of farmer-led benchmarking were conducted during the DS, and two rounds of benchmarking in WS. The monitoring and evaluation results showed that in 2018 WS, yield was increased to about 32.3%, which is 1t/ha as compared with the baseline data. In 2019 DS, yield was increased to 40%, which is 40% of the baseline yield from 2017 DS. Similarly, the net income from 2018 WS as compared with the 2016 WS is 390.3% and net income from 2019 DS is 347.4% higher than the baseline net income in 2017 DS. The increase in yield and net income could be attributed to effective pest and water management, use of recommended varieties in the area, mechanization, favorable weather condition, and additional income in seed production.

North Cotabato RiceBIS Community

PS Torrena, WP Bugtay, JO Edraira, MB Gandawali, and PM Ostique

The RiceBIS Community project in PhilRice Midsayap is composed of four components namely: 1) Empowering rice farming communities in Midsayap through clustering approach; 2) Building resilient pathway to prosperity: the Midsayap RiceBIS Community capacity enhancement approach; 3) Assessment of harvesting practices that contribute to postharvest losses in Midsayap; and 4) Monitoring and evaluation (M&E) of Midsayap RiceBIS communities.

The Component 1 of the project aimed to improve the competitiveness of rice and rice-based farming communities in Midsayap, Cotabato while Component 2 sought to help RiceBIS farmers to fortify their technical capabilities in rice production through Farmer Field School (FFS), field Day and forum, social media, and other information, education and communication (IEC) materials. Component 3 is intended to reduce postharvest losses in the RiceBIS community with a target reduction of 2% from the national average of 16.47% to 14%. The last component aimed to monitor and evaluate farmers at the RiceBIS community every season in terms of increase in yield of at least 1t/ha, cost reduction of up to P8/kg and increase in household income by 50%.

Technology demonstration farms were established in four barangays of Midsayap, Cotabato covering a total of 62.94ha with 71 farmers (35 female and 36 male). After series of consultative meetings with the recently formed cluster at Barangay San Pedro, 10 farmers (4 female and 6 male) were convinced to use drumseeder at the rate of 60kg/ha, which was much lower than their usual seeding rate of 100-180kg/ha. In 2019 DS, three organizational building activities were conducted to further strengthen farmers' management skills. Clustered farmers engaged in group marketing and continued to sell *palay* seeds product up to DS 2019. For 2018 DS and WS, clustered farmers marketed a total of 240 bags of *palay* seeds and additional 105 bags for 2019 DS sold at P32.5/kg with an ROI of 1.21. The opportunity to market *palay* seeds is high, however, there are still challenges because most of the farmers have no storage facility, dryer, and machinery needed for processing. Hence, to boost farmers' agro-enterprise productivity, the project team negotiated an affiliation of clustered farmers to established seed growers' cooperative in the locality.

This year (2019), a modified FFS for two Irrigators' Association was conducted. Two batches of FFS were also attended and participated by 120 farmers (84 male and 36 female). RiceBIS farmer members attended different programs and activities of PhilRice Midsayap to boost their commitment and enhance their appreciation on the technologies adopted by their co-farmers: 1) Farmers' Field

Day & Forum and field tour with 49 farmer-attendees (17 male and 32 female) at Central Glad and PhilRice Midsayap; 2) Briefing on Rice Competitiveness Enhancement Fund seed support component with 20 farmers (16 male and 4 female) attended; and 3) Agripreneurship KSL during the National Rice Awareness Month celebration with 12 farmer-members (7 male and 5 female) attended.

Postharvest (PH) losses were gathered from the RiceBIS communities with a target reduction of 2% from the national average of 16.47% to 14%. Data gathered were from harvesting to threshing only since most farmers still sell their produced immediately after harvest. The data on PH losses were taken from manual harvesting using sickle, and mechanical harvesting using a combine harvester. On manual harvesting, data were gathered from three farmer-members (2 male and 1 female) using the same variety, NSIC Rc 222, with harvest maturity of 100-103 days after sowing. Recorded yield losses were 585.79kg/ha (9.61%), 340.49kg/ha (5.58%), and 252.38kg/ha (4.15%). On combine harvesting, data were gathered from two farmer-members (1 male and 1 female) using NSIC Rc 226. The average PH loss in terms of yield was 52.27kg/ha equated to 2.33%. For manual harvesting, the PH losses initial data of 7.47% in WS 2018 were reduced to 6.44% during the WS 2019 or 1.03%. In contrast, the baseline PH losses of 3.65% in 2018 WS for using the combine harvester were reduced to 2.34% or a 1.31% during 2019 WS. The data showed that farmers experienced a lesser percentage of PH losses when using a combine harvester than manual labor. In manual harvesting it must be noted that harvested *palay* may shatter during reaping, hauling, and piling thus contributed to its losses. The lower percentage of losses recorded in using combine harvester as compared with manual harvesting can be attributed to its combined harvesting operations of reaping, threshing, and winnowing/blowing into a single process.

For the M&E, data were taken from 42 farmer-respondents (24 male, 18 female) of Central Glad. Farmers' performances were monitored every after harvest. Results were compared with the baseline data so that project management team can come up with strategic recommendations to address the challenges in the RiceBIS community (eg. schedule of FFS, initial inputs, etc). 2019 DS yield in RiceBIS community at Midsayap was increased by 15.48% or 0.68t/ha (from 4.40t/ha baseline to 5.08t/ha). Production cost of fresh *palay* was reduced by 31.34% from P12.47 to P8.56. The significant reduction in the cost of production of fresh *palay* and an increment in the yield resulted in an increased net income of farmers, from P18,618.00, it was more than doubled (P43,278.62) in 2019 DS. It was concluded that M&E for 2019 DS observed a positive trend on the production performances of RiceBIS farmers in Midsayap, Cotabato.

Abbreviations and acronyms

AYT - Advanced Yield Trial	GIS - Geographic information system
ABE - Agricultural and Biosystems Engineering	GEMS - Germplasm Management System
AEW - Agricultural Extension Worker	GAS - Golden apple snail
ATI – Agriculture Training Institute	GL - Grain length
AESA - Agro-ecosystem Analysis	GQ - Grain quality
AC - Amylose Content	GW - Grain Weight
BLB - Bacterial Leaf Blight	GY - Grain Yield
BLS -Bacterial Leaf Streak	GLH - Green Leafhopper
BCA - Biological Control Agent	GOT - Grow Out Test
BS - Breeder Seeds	HR - Head Rice
BPH -Brown Planthopper	HRA - Heat Recovery Attachment
BPI - Bureau of Plant Industry	HIPS – Highly-intensified Production System
CGMS - Cytoplasmic Genic Male Sterility	HQS - High-quality Rice Seeds
COF - Commercial Organic Fertilizer	HON - Hybrid Observational Nursery
CDA - Cooperative Development Authority	HPYT - Hybrid Preliminary Yield Trial
DAS - Days After Sowing	ICT - Information and Communication Technology
DAT - Days After Transplanting	IEC - Information Education Communication
DF - Days to Flowering	IBNM - Inorganic-based Nutrient Management
DM- Days to Maturity	ICM - Integrated Crop Management
DAR - Department of Agrarian Reform	IPM - Integrated Pest Management
DA-RFOs - Department of Agriculture-Regional Field Offices	JICA - Japan International Cooperation Agency
DoF - Department of Finance	IRRI - International Rice Research Institute
DOLE - Department of Labor and Employment	IA - Irrigators’ Association
DTI - Department of Trade and Industry	KP - Knowledge Product
DSR - Direct-seeded Rice	KSL - Knowledge Sharing and Learning
DS - Dry Season	LCC - Leaf Color Chart
FBS – Farmers’ Business School	LFT - Local Farmer Technicians
FC - Farmers’ Cooperative	LGU - Local Government Units
FSM - Farming Systems Models	LPS - Low Pressure Steam-operated
FAA - Fish Amino Acid	SB - Stemborer
FGD - Focused Group Discussion	LE-CYPRO - Lowland ecotype Cyperus rotundus
FSP - Foundation Seed Production	MFE - Male Fertile Environment
FRK - Farm Record Keeping	MSE - Male Sterile Environment
GABA - Gamma-aminobutyric Acid	MAS - Marker-assisted Selection
GT - Gelatinization Temperature	MRL - Maximum Root Length
GAD - Gender and Development	MR - Milled Rice
GYT - General Yield Trial	MER - Minimum Enclosing Rectangle
GCA - Genetic Combining Ability	MOET - Minus-one Element Technique
	MC - Moisture Content

MAT - Multi-Adaptation Trials	RTV - Rice Tungro Virus
MC RTP - Multi-crop Reduced Till Planter	RBFHS - Rice-based Farming Household Survey
MET - Multi-environment Trial	KQ - Kernel Quality
MYT - Multi-location Yield Trial	SV - Seedling Vigor
NAAP - National Azolla Action Program	ShB - Sheath Blight
NCT - National Cooperative Test	ShR - Sheath Rot
NFA - National Food Authority	SMS - Short Messaging Service
NRAM - National Rice Awareness Month	SNP - Single Nucleotide Polymorphism
NSIC - National Seed Industry Council	SWRIP- Small Water Reservoir Irrigation Project
NSQCS - National Seed Quality Control Services	SRB - Stabilized Rice Bran
N - Nitrogen	SUCs - State Universities and Colleges
NBSP - Nucleus and Breeder Seed Production Project	SB - Stem Borer
NFGP - Number of Filled Grains Panicle	TESDA - Technical Education and Skills Development Authority
ON - Observation Nursery	TDF - Technology Demonstration Farm
OSIS - One Stop Information Shop	TRV - Traditional Rice Varieties
OBNM - Organic-based Nutrient Management	TOT - Training of Trainers
PL - Panicle Length	TPR - Transplanted Rice
PW - Panicle Weight	URBFS - Upland Rice-Based Farming
PVS - Participatory Varietal Selection	WS - Wet Season
PWD - Person with Disabilities	WCV - Wide Compatibility Variety
PhilMech - Philippine Center for Postharvest Development and Mechanization	YSB - Yellow Stem Borer
PRISM - Philippine Rice Information System	
PhilRice - Philippine Rice Research Institute	
PSA - Philippine Statistics Authority	
PTC - PhilRice Text Center	
P - Phosphorus	
PVS - Plant Variety Selection	
K - Potassium	
QTL - Quantitative Trait Loci	
RCBD - Randomized Complete Block Design	
RSP - Registered Seed Production	
RBB - Rice Black Bug	
RCEF - Rice Competitiveness Enhancement Fund	
RCEP - Rice Competitiveness Enhancement Program	
RCM - Rice Crop Manager	
RHGEPS - Rice Hull Gasifier Engine Pump System	
RPH - Rice Planthopper	
RSTC - Rice Specialists' Training Course	

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

With a "Rice-Secure Philippines" vision, we want the Filipino rice farmers and the Philippine rice industry to be competitive through research for development in our central and seven branch stations, coordinating with a network that comprises 59 agencies strategically located nationwide.

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

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