



2021

PHILRICE R&D HIGHLIGHTS

**DA-PHILRICE
MIDSAYAP**

Content

Executive Summary	1
Project 1: Accelerating Adoption of Sustainable Rice-Based Technologies in Region 9, 12, and BARMM	2
Project 2: Integrated Crop Management in Southwestern Mindanao	5
Project 3: Rice Business Innovations System (RiceBIS) Community (Phase I)	7
Project 4: WOKTOK: The PalayCheck System Challenge in PhilRice-Midsayap	6
Project 5: Rice-based Farming Technology Transfer Program for the Bangsamoro	8
Extracore Project 1: Rice Business Innovations System (RiceBIS) Community (Phase II)	9
Extracore Project 2: DEPLOYMENT OF GENETIC RESISTANCE IN MANAGEMENT OF RICE BLACK BUG <i>Scotinophara coarctata</i> F.: Field screening of elite lines, cultivated varieties, and in wild rice derived lines	10
Extracore Project 3: Water-efficient and Risk Mitigation Technologies for Enhancing Rice Production in Irrigated and Rainfed Environments (WaterRice) in Region 12	11
Extracore Project 4: Development of a water pumping and delivery system for enhanced productivity of hilly uplands	12
Extracore Project 5: Improving Crop Productivity in Drought-Prone Rainfed Lowlands in the Philippines with Mechanized Direct Seeding Technology (Region 12)	13
Extracore Project 6: Screening for Resistance to Major Disease	14
Extracore Project 7: Screening of Different Rice Lines Against Major Insect Pest	15
Extracore Project 8: NATIONAL COOPERATIVE TESTING (NCT) PROJECT: HYBRID RICE SELECTIONS FIELD PERFORMANCE TEST	16
Extracore Project 9: NATIONAL COOPERATIVE TESTING (NCT) PROJECT: SUBMERGENCE RICE SELECTIONS	17
Extracore Project 10: PHILIPPINE RICE INFORMATION SYSTEM	18
RCEF Project 1: Rice Competitiveness Enhancement Fund (RCEF) – Seed Component	19
RCEF Project 2: Rice Competitiveness Enhancement Fund – Extension Component: Strategic Communication	20
RCEF Project 3: RCEF–Rice Extension Services Component – Training and Training Related Component	23
RCEF Project 4: Rice Competitiveness Enhancement Fund – Seed Component: Communication	24

DA-PhilRice MIDSAYAP BRANCH STATION

Branch Director: Sailila E. Abdula

DA-PhilRice Midsayap is one of the seven stations, known as the “Pest Management Center,” tasked with developing and promoting location-specific rice production technology in its coverage area. It also provides training courses and disseminates high-impact rice and rice-based technologies to government and private stakeholders, thus contributing to increased yield by 1t/ha in irrigated and 0.5t/ha in rainfed areas, reduced production cost up to PhP8/kg, reduced post-harvest losses up to 12%, and increased farmers’ income by 25%.

In 2021, the station implemented 12 research and seven development projects/studies, comprising core, extra core, and externally funded initiatives. The projects were: (1) Integrated crop management in Southwestern Mindanao, (2) Antibiosis on larval survival of whitestem borer, (3) Field screening of elite lines, cultivated varieties, and in wild rice derived lines, (4) Water-efficient and risk mitigation technologies for enhancing rice production in irrigated and rainfed environments (WaterRice) in Region XII, (5) Development of a water pumping and delivery system for enhanced productivity of hilly uplands, (6) Improving crop productivity in drought-prone rainfed lowlands in the Philippines with mechanized Direct Seeding Technology (Region XII), (7) Screening for resistance to major diseases, (8) Screening of different rice lines against major insect pest, (9) Hybrid rice selections field performance test, (10) Submergence rice selections, (11) Multi-environment testing for hybrid rice, (12) Philippine Rice Information System (PRiSM), and (13) Multi-environment Testing for Hybrid Rice.

In the development sector, the following were implemented: (1) Accelerating adoption of sustainable rice-based technologies in Region IX, XII, and BARMM, (2) Rice Innovations System (RiceBIS) Community, (3) Rice Competitiveness Enhancement Fund (RCEF)-Seed Component, (4) RCEF-Extension Component-Strategic Communication, (5) RCEF-Rice Extension Services Component-Training and Training-related Component, (6) Upland Rice-based Farming Technology Transfer Program for the Bangsamoro, and (7) Walk the Talk (WokTok) Challenge.

Furthermore, the salient accomplishments of these R4D projects and studies also contributed to achieving the organizational outcomes of increased productivity, cost-effectiveness, and profitability of rice farming; improved rice trade through efficient post-production, better quality, and reliable supply and distribution systems; enhanced value, availability, and utilization of rice; diversified rice-based farming products; and advanced rice S&T as continuing sources of growth.

PROJECT 1

Accelerating Adoption of Sustainable Rice-Based Technologies in Region 9, 12, and BARMM

OH Abdulkadil, IV Boholano, STC Quiring, DAN Sumlay, and MB Gandawali

The project titled, “Accelerating adoption of sustainable rice-based technologies in Region 9, 12, and Bangsamoro Autonomous Region in Muslim Mindanao (BARMM),” aimed to address production constraints, hasten technology adoption and help increase rice production and farmers’ productivity. This branch development initiative complemented the development projects such as RiceBIS and RCEF Seed and Extension components. It employed development approaches and extension service modalities to enhance the competitiveness of the men and women stakeholders through area-based technology promotion.

It also simplified the understanding of the importance of rice science among men and women rice farmers in intended farming communities. The project was implemented with four interrelated project components to offer rice solutions.

The first project component is the “Technology scaling,” which focused on improving the nutrient management practices. Sarangani, South Cotabato, and Maguindanao were identified as low yielding provinces due to low fertilizer application. Thus, the technology scaling was emphasized through technology demonstration of INM options including RCM, and MOET-based recommendations.

- During WS 2021, the rice yield increased to 6.2–7.2t/ha following the RCM and MOET-based recommendations in Maguindanao,

PROJECT 1

which it was higher than the baseline yield data of 4t/ha. For South Cotabato, the yield increment was recorded from 6.6–6.8t/ha using the RCM and MOET-based recommendations higher than the baseline yield of 4.5t/ha. Consequently, rice yield in Sarangani increased from 2.4–2.8t/ha, which is also higher than the baseline yield (2.5t/ha).

The second project component, “Training or capacity building,” is one of the important activities in enhancing knowledge and improving skills of the men and women rice industry stakeholders. Teaching them with the right information and technologies is vital in understanding the science of the practices and recommendations. Learning and adopting the appropriate rice production technologies helped to increase rice yield and achieve rice sufficiency in a certain farming community. Thus, series of trainings were conducted to a select group of individuals.

- In 2021, four batches of trainings were conducted for new agriculture graduates and barangay executives in March, September, and October in Midsayap, Cotabato. Seventy-five industry stakeholders were trained while 41 new agriculture graduates learned the PalayCheck System and Palayamanan Plus in a three-day Rice Boot Camp. Thirty-four chairpersons of the Committee on Agriculture also joined the two-day appreciation course on S&T updates. Training participants obtained an average knowledge gain of 45.01% and 40.98%, respectively.

The third project component, “Palayamanan Plus,” aimed to improve farm productivity and profitability of the rice-based farming community. The Palayamanan Plus model farm was established to showcase rice farming systems that are cost-saving and yield-enhancing management practices that maximize resources, reduce farming risks, and enhance sustainability, productivity, and profitability. The component assessed the rice-based farm productivity and profitability of identified rice-based farming enterprises. The components included rice and vegetable, mushroom, vermicompost, and inbred and hybrid rice.

- A protocol for rice and vegetables production and cropping calendar were produced to provide science-based information. The three-year (2018–2020) Palayamanan Plus implementation of rice and vegetable production was evaluated based on its return of investments (ROI). Results showed that the rice production enterprise gained PhP46,095.67/ha net income.

PROJECT 1

- Income from eggplant production was registered PhP93,889.03/ha; tomato, PhP105,791.67/ha; bitter gourd, PhP67,729.33/ha; string beans, PhP74,753.33/ha; bottle gourd, PhP40,664.67/ha; and cucumber, PhP60,076.33/ha. The Palayamanan Plus concept is now being adopted by the LGU Midsayap and became part of their regular agriculture programs through the office of municipal agriculture and services.

Inbred and hybrid rice varieties (public and private) were tested in an on-station technology demonstration. In WS 2021, NSIC Rc 442 achieved the highest yield of 6.5t/ha, followed by NSIC Rc 222 with 6t/ha, and NSIC Rc 506 with 5.8t/ha for inbred rice. Among the hybrid rice varieties, NSIC Rc 204H recorded the highest yield of 8t/ha, followed by SL-19H with 6.1t/ha, and TH82 with 5.9t/ha. Farmers' Field Day was also participated by 100 male and 50 female-farmers who rated the activity as good (9.71%), mahusay (38.10%), and pinakamahusay (52.14%).

- The fourth project component, "Communication support," aimed to boost the dissemination of information on rice production technologies. This was achieved through the implementation of quad media and communication strategies, resulting in the creation of 11 knowledge products, 2 campaign collaterals, 4 knowledge-sharing and learning (KSL) activities, and the maintenance of 1 official social media account. The knowledge products developed were primarily in the form of newsletters and radio plugs. Campaign collaterals such as shirts, tarpaulins, and ecobags were produced to support promotional activities. The KSL activities were conducted in conjunction with the National Rice Awareness Month (NRAM). Given the ongoing COVID-19 pandemic, the presence of a social media account proved to be an effective means of responding to inquiries and providing information. The PhilRice Midsayap Facebook page generated 40 original materials.

PROJECT 2

Integrated Crop Management in Southwestern Mindanao

PS Torreña, SE Abdula, and IV Boholano

Southwestern Mindanao, particularly the SOCCSKSARGEN region, has been a significant contributor to rice production. Despite its potential, rice cultivation faced challenges due to adverse weather conditions and the prevalence of pests and diseases. To address these obstacles, the project focused on exploring integrated crop management strategies.

Integrated crop management aimed to adopt ecologically and economically efficient methodologies to effectively manage and safeguard crops against diseases and pests. By integrating various approaches, the project sought to enhance rice production and overcome the hurdles posed by unfavorable weather and pest-related issues.

- Study 1 evaluated the yield performance and other agronomic traits of developed candidate transgressive lines (CTLs) in Region XII. There were 115 lines tested at PhilRice Midsayap during the DS 2021 season to determine their yield performance and other agronomic characteristics. Out of the tested CTLs, 61 lines exhibited early maturity, with maturity days ranging from 106 to 112, outperforming the three check varieties (NSIC Rc 222, PSB Rc72H, and NSIC Rc 204H). Twenty-two lines displayed shorter plant heights, ranging from 100 to 116 cm, compared with the three check varieties. Moreover, seven entries produced 11–16 productive tillers, and they outperformed the three check varieties in terms of yield, achieving yields ranging from 3.3 to 3.7t/ha.
- Study 2 focused on the integrated pest and disease management. Study 2.1 used the biological control agent, a green muscardine fungus, *Metarhizium anisopliae*. *M. anisopliae* was mass produced in three different substrates viz: cracked corn, low-germ palay, and laon milled rice. Rice black bug field infection increased from 0–1.36% to 8.13–10.08% after *M. anisopliae* was applied. Study 2.2 evaluated the effect of potassium humate and gibberellic acid (GA3) against bacterial leaf blight disease in rice and its yield components and other agronomic traits. The application of potassium humate and GA3 significantly increased grain yield, spikelet

PROJECT 2

number per panicle (SNP), and 1,000 grain weight (OTGW) of NSIC Rc 132H, Rc 204H, Rc 218, and Rc 160.

- Study 3 was conducted to monitor the occurrence of insect pests through light trapping at PhilRice Midsayap. In 2021, the highest population of rice black bug (RBB) was recorded in March with an average of 3,105 bugs caught per night. The peak population of white stemborer (WSB) was observed in February with an average of 23 adults caught per night. For green leafhopper (GLH) and brown planthopper (BPH), their highest populations were recorded in August (29 adult hoppers) and January (15 hoppers), respectively. From 2017 to 2021, the highest RBB population was observed in January 2018 with 32,577 adults caught in a single trapping. As for WSB, its highest population was recorded in July 2018 with 56 adults captured during light trapping. During lunar cycles, the highest RBB population was recorded three days before the full moon (3DBF) in March with a count of 21,868 bugs.

Antibiosis on Larval Survival of White Stemborer *PS Torreña, CG Flores, and KMB Abejar*

The study investigating antibiosis on WSB larval survival assessed this aspect in selected promising rice lines. In the first trial conducted during the vegetative phase, no significant difference was observed in WSB survival and adult weight among the treatments. However, in the second trial, larvae that fed on Dinorado rice displayed the highest survival rate, reaching 58%, while the lowest survival rate was recorded in Red 18 at 17.67%.

During the first and second trials, there were no significant differences observed in the weight of WSB larvae and pupae across all treatments. Interestingly, no adult emergence was observed in any of the treatments during the second trial. In the reproductive phase, no significant differences were found in the percentage of survival, larval weight, and pupal weight among all treatments during the two trials.

PROJECT 3

Rice Business Innovations System (RiceBIS) Community (Phase I)

PS Torreña, WP Bugtay, EB Tabelin, JO Edraira, RP Jayme, and RB Jubida

The RiceBIS Phase I project of Midsayap was composed of four components. The results focused on 1t/ha yield increment, cost-reduction up to PhP8/kg in producing fresh palay and at least 25% increase of household income from rice farming.

- First component is “Empowering rice farming communities through clustering approach.” Three commodity and production clusters were formed from the two organizations with 46 male and 36 female-farmers during the DS and WS 2021. These clusters and the facilitators underwent regular meetings for continued capacity enhancement and preparation for agroenterprise engagement.
- The second component is “Building resilient pathway to prosperity: The Midsayap RiceBIS Community capacity enhancement approach,” which focused on the second DS 2021 and third WS 2021 batches of farmers from Midsayap, Cotabato.
- Eight capacity enhancement activities were conducted for DS 2021 and WS 2021 with an average knowledge gain of 59.42%. This component addressed the lack of yield-enhancing and cost-reducing rice technologies.
- The third component is “Engaging farmers in profitable rice and rice-based enterprises,” which taught farmers to view farming as a business. Among the RiceBIS farmers, 67% were engaged in marketing of dry palay, good seeds, well-milled rice, and rice by-products. An average net income of PhP898 and PhP63,528 were recorded in the dry and wet season, respectively.
- Implementers of the fourth component, “Monitoring and evaluation (M&E) of Midsayap RiceBIS communities” conducted two end-season monitoring surveys covering WS 2020 and DS 2021. In WS 2020, farmer-partners achieved an average of 0.97t/ha yield increase, PhP2.09 cost reduction, and 97% income increment. During the DS 2021, data showed a yield increase of 0.71t/ha; PhP3.91, cost reduction; and 120% increase in household income. Reduction of postharvest losses using combine harvester recorded 2.06% in DS and 2.02% in WS.

PROJECT 4

WOKTOK: The PalayCheck System Challenge in PhilRice–Midsayap

*Sailila E. Abdula, IV Boholano, OH Abdulkadil, STC Quiring,
MB Gandawali, RS Salazar, and GD Balleras,*

WokTok is the epitome of “practice what you preach” in a modern setting. This innovative platform has presented the PhilRice staff with a challenge to fully adopt and embrace the technologies developed by the Institute through the PalayCheck assessments. Its primary focus is to showcase the successful integration of PalayCheck strategies with location-specific agricultural practices, leading to a remarkable increase of at least 1 ton per hectare in yield while concurrently reducing production costs by a minimum of 30% compared to the baseline data.

The comprehensive package of activities offered by WokTok includes: a 0.5-hectare farm demonstration trial, showcasing the innovation setup; a substantial 20.08-ha technology demonstration dedicated to PalayCheck seed production; and knowledge, learning, and sharing (KSL) activities that facilitate the exchange of valuable insights and experiences.

- Fifty-one participants completed 10 KSL activities. The shared-learning was done through small-group discussions, hands-on activities, and group dynamics, which resulted in 37% shared-knowledge gain.
- The 1-ha techno demo for PalayCheck seed production achieved a maximum fresh yield of 5.87t/ha (NSIC Rc 442), displaying a notable yield increment of 1.77t/ha compared with the baseline yield of 4.1t/ha. Meanwhile, the 20.08-ha seed production area delivered an impressive average yield of 5.83t/ha with an outstanding yield increment of 1.90t/ha and a cost of production per kilo of Php8.88.
- The 0.5-ha rice production planted with NSIC Rc222 and incorporating five location-specific packaged innovations setup, yielded a maximum fresh yield of 5.8t/ha. This achievement is expected to foster a deeper appreciation for the initiated platforms and their positive impacts.

PROJECT 5

Rice-based Farming Technology Transfer Program for the Bangsamoro

OH Abdulkadil, Sailila E. Abdula, AK Talib, AK Sanday, HK Glang, BM Unas, SB Siraman, and NP Subat

The Bangsamoro Autonomous Region in Muslim Mindanao (BARMM) remains one of the country's poorest regions, primarily due to longstanding conflicts that have hindered agricultural productivity and economic growth. To address this situation and bring about positive change, concerted efforts are being made to uplift all sectors, particularly agriculture, to unlock the region's potential and ensure sustainable progress.

One significant initiative in this regard is the implementation of the Rice-based Farming Technology Transfer Program for the Bangsamoro, as part of JICA's Capacity Development Project for the Bangsamoro (CDPB). This project has been instrumental in addressing the agricultural needs of the Bangsamoro people and enhancing the delivery of public services. Notably, it has played a crucial role in improving the technical capabilities of farmers, MAFAR Municipal Agricultural Officers (MMOs), and Agricultural Extension Workers. Through well-designed capacity enhancement programs, these stakeholders have been equipped with essential knowledge and skills to effectively utilize their lands and drive agricultural development in the region.

- In 2021, two batches of training of trainers (ToT) were conducted along with the training of 38 MAFAR-Maguindanao technical staff (29 male; 9 female), focusing on upland rice production technologies and facilitation skills. The average knowledge gain from these sessions was calculated at 7.99%. In parallel, Farmer Field Schools (FFS) were organized to provide on-site training for farmers with 180 farmer-participants taking part in these sessions (168 male; 12 female).
- Six participatory technology demonstrations (PTDs) were established, each dedicated to showcasing different upland rice varieties, namely NSIC Rc 27, Sakilan, Dinorado Premium, Kapucan, Upland Dinorado, and Kiraban. Among these demonstrations, the highest yield of 3.80t/ha was recorded in Barangay Langkong, Matanog.
- Six farmers' field day and graduation ceremonies were conducted to culminate the farmer's training activity and recognize farmer participants' success for completing the four-month FFS training.

Extracore Project 1

Rice Business Innovations System (RiceBIS) Community (Phase II)

PS Torreña, WP Bugtay, EB Tabelin, JO Edraira, RP Jayme, and RB Jubida

The RiceBIS Phase II project of PhilRice Midsayap was implemented in Libungan, Cotabato. It was composed of four interconnecting project components. The project aimed to increase yield by 1t/ha, reduce cost of producing fresh palay to PhP8/kg, and increase household income of at least 25%.

- Partnerships with farmers' and irrigators' associations from Abaga, Batiocan, Cabpangi, Sinawingan, Ulamian, Montay, and Gumaga in Libungan, Cotabato were established. The goal was to leverage the existing local resources, skills, structures, and systems for mutual benefit. Through these collaborations, new commodity and production clusters were formed, comprising 340 farmers (165 male and 175 female) for dry and wet season in 2021. To ensure continuous progress and development, these clusters, along with facilitators, held regular meetings for capacity enhancement. Additionally, these meetings served as preparation for future agro-enterprise engagement.
- Twelve capacity enhancement activities were conducted during the dry and wet seasons, resulting in 68.83% knowledge gain among the participants. This success was further facilitated by strong collaboration, which enabled the sourcing of essential farm inputs like seeds and fertilizers, as well as accessing other vital services from collaborators within the region.
- Sixty-seven percent of the RiceBIS farmers have participated in the marketing of well-milled rice and rice by-products. The recorded average net income for the dry season stood at PhP43,967, while for the wet season, it amounted to PhP27,156. These figures signify the success of the agro-enterprise initiative in empowering farmers and generating substantial income for them.

In the WS 2020, results showed a significant increase in yield by 0.97t/ha, cost reduction up to PhP9.80/kg, and an impressive 97% increase in income. Similarly, the DS 2021 results demonstrated a yield increase of 0.71t/ha, reduced cost to PhP9.93/kg from PhP13.84/kg, and an outstanding 120% increase in household income. To enhance efficiency, the project monitored the reduction of postharvest losses using a combine harvester, which resulted in an average loss of 2.06% during DS 2021 and 2.02% during WS 2021.

Extracore Project 2

DEPLOYMENT OF GENETIC RESISTANCE IN MANAGEMENT OF RICE BLACK BUG *Scotinophara coarctata* F.: Field screening of elite lines, cultivated varieties, and in wild rice derived lines

PS Torreña, WP Bugtay, EB Tabelin, JO Edraira, RP Jayme, and RB Jubida

To develop cultivars with heightened resistance to Rice Black Bug (RBB), *Scotinophara coarctata* (Fabricious), a field screening test was initiated, focusing on elite lines, cultivated varieties, and wild rice derived lines. The screening assessed the responses of four batches (dry season) and two batches (wet season) of rice lines to RBB damage and population at 40, 60, 80, and 100 days after transplanting (DAT), following the guidelines described by Heinrichs (2007).

In DS 2021, all entries of batch 1 and 2 exhibited resistance to RBB damage, showcasing promising outcomes.

However, during WS 2021, batch 3 set 1 presented varying levels of interactions with RBB damage and population. Of the 300 entries, 155 demonstrated resistance to RBB at 40 DAT. None of these donor entries maintained resistance against the increasing population build-up of RBB at 60 DAT with RBB damage increment ranging from 5 to 7 on the rating scale.

Similar observations were made in batch 3 set 2, with 32 entries displaying resistance only at 40 DAT. Interestingly, PMRS 022, PMRS 142, and PMRS 229 exhibited comparable reactions to the check varieties, PMRS 048 (Resistant Local check), and PMRS 001 (Heinrichs check) at 40 DAT for two consecutive trials.

Extracore Project 3

Water-efficient and Risk Mitigation Technologies for Enhancing Rice Production in Irrigated and Rainfed Environments (WaterRice) in Region 12

Ommal H. Abdulkadil and Raffy S. Salazar

WaterRice Project aimed to develop and demonstrate packages of best management practices (BMP) that provide better flexibility and productivity gains and to reduce risks in rice and rice-based cropping systems. Nine adaptive research trials were established in M'lang, Cotabato in 2021 dry and wet season. Location-specific package of technology developed included: (1) variety – NSIC Rc 216 and Rc 440 (registered seeds); (2) weed management – Pretilachlor and Fenoxaprop-ethyl+ethoxysulfuron; (3) nutrient management – Rice Crop Manager (RCM); and (4) use of plastic drum seeder for crop establishment.

- In DS 2021, the implementation of BMP+PDS (Best Management Practices + PalayCheck Decision Support) resulted in an average actual yield increment of 16.62% (equivalent to 0.62t/ha) when compared with farmers' practice (FP). Notably, the unit production costs for BMP+PDS were recorded at PhP9.85/kg, which is 7.86% lower than the FP unit production costs of PhP10.69/kg. Based on the actual yield, BMP+PDS exhibited a remarkable 33.66% (amounting to PhP6,649.62) increase in net income per hectare compared with FP. Similarly, BMP+MB (Best Management Practices + Modified Broadcast) demonstrated an average actual yield increment of 10.53% (equivalent to 0.38t/ha) compared with FP. Moreover, the unit production costs for BMP+MB were recorded at PhP10.41/kg, representing a substantial 11.93% (equivalent to PhP1.41/kg) reduction from the FP unit production costs of PhP11.82/kg. Based on the actual yield, BMP+MB showed a 46.99% (amounting to PhP6,483.37) increase in net income per hectare over FP.
- During WS 2021, the implementation of BMP+PDS (Best Management Practices + PalayCheck Decision Support) resulted in an average yield increment of 12.33% (equivalent to 0.64 t/ha) over FP. The unit production costs for BMP+PDS were recorded at PhP8.06/kg, representing an 8.30% (equivalent to PhP0.73/kg) reduction compared with FP at PhP8.79/kg. BMP+PDS achieved a 26.50% increment in net income per hectare, amounting to PhP7,986.83. BMP+MB (Best Management Practices + Modified Broadcast) demonstrated an average

yield increment of 7.90% (equivalent to 0.41t/ha) over FP. The unit production costs for BMP+MB were recorded at PhP8.00/kg, reflecting a 2.44% (equivalent to PhP0.20/kg) reduction from the FP unit production costs of PhP8.20/kg. As a result, BMP achieved an incremental net income of 12.04% or PhP3,935.13/ha compared with FP.

Extracore Project 4

Development of a water pumping and delivery system for enhanced productivity of hilly uplands

RF Orge, OH Abdulkadil, and NM Dipatuan

The development of the Package of Technologies (POT) for drip-irrigated aerobic rice aimed to establish an efficient system for pumping and distributing water, ensuring a continuous and reliable water supply for upland rice production. This system addresses common scenarios encountered in upland areas.

One such scenario involves having a creek present in the vicinity, but it is located far below the existing or potential production areas. In such cases, using typical centrifugal pumps becomes impractical due to limitations caused by distance and challenging terrain. Installing centrifugal pumps near the water source is an option, but it poses a risk of theft due to their remote location, including the pump, its prime mover (engine), and other accessories.

To address these challenges, the implementation of a ram pump system is recommended. Unlike centrifugal pumps, ram pumps do not require electricity or gasoline engines. Instead, they utilize the water's natural flow from high elevation, utilizing pressure to pump the water without the need for external power sources. This solution provides a more cost-effective and secure approach to ensure a stable water supply for upland rice production.

- In 2021, a re-evaluation of the project site showed that the fabricated ram pump was no longer functional due to the minimal elevation difference between the water source and the service area. As a result, the decision was made to discontinue the water pumping and instead rely on gravity to deliver the water, which was deemed more practical and feasible. To facilitate the irrigation process, the water

discharged from the water source was measured at 100l/min. To regulate water distribution and minimize variations in the discharge of the emitters, two mini tanks made from plastic pails were connected to the main water tank. An A-Frame was also constructed to accurately map the contour lines of the service area.

Extracore Project 5

Improving Crop Productivity in Drought-Prone Rainfed Lowlands in the Philippines with Mechanized Direct Seeding Technology (Region 12)

PLP Sabes, MAB Macadildig, and GD Balleras

Dry direct seeding has become a popular practice among rice farmers in the Philippines. In line with the Department of Agriculture's vision of ensuring food security in the country, the project "Improving crop productivity in drought-prone rainfed lowlands in the Philippines with mechanized direct-seeding technology" was crafted. The primary goal of this project was to enhance the productivity of rice-based farming in rainfed environments while reducing production costs. This was achieved by implementing the multi-purpose compact seeder (hand tractor-mounted seeder), tailored to suit the local conditions, and introducing the customized machine as a valuable tool to enhance crop management practices.

The Multi-Purpose Seeder (MPS) underwent testing on major crops like rice, corn, and mungbean across the country. For the testing site in Mindanao, Region XII was selected, specifically focusing on the provinces of Sultan Kudarat and South Cotabato. Through these initiatives, the project aimed to revolutionize farming practices in drought-prone rainfed lowlands, ultimately contributing to greater agricultural productivity and food security in the Philippines.

Extracore Project 6

Screening for Resistance to Major Diseases

Pernelyn S. Torreña and Victor Zeus B. Uyangurin

To minimize crop loss, one effective approach is the use of improved varieties that exhibit resistance to major diseases. This study characterized and compared the reactions of different selections to these major diseases; thereby, avoiding the recommendation of commercial varieties that are highly susceptible.

In DS 2021, 88 NCT entries were screened, while in WS, 154 NCT entries underwent screening. Results showed that 40 entries displayed a resistant reaction to rice blast during DS 2021, while 3 entries showed resistance to sheath blight, and none exhibited resistance to bacterial leaf blight. In WS 2021, 95 entries demonstrated resistance to rice blast, 86 entries exhibited resistance to sheath blight, and 22 entries displayed resistance to bacterial leaf blight. No tungro incidence was observed in the experimental area, indicating that the NCT entries were not infected with the virus.

Extracore Project 7

Screening of Different Rice Lines Against Major Insect Pest

Pernelyn S. Torreña and Cristine G. Flores

The cultivation of pest-resistant varieties remains the most convenient, environmentally sound, and economical approach for farmers in effectively managing rice pests. To aid in this process, this study was conducted to characterize and compare the reactions of NCT lines to major insect pests, thus avoiding the recommendation of varieties that are highly susceptible.

In DS 2021, 83 entries were evaluated for their response to white stemborer (WSB) and RBB damage during the vegetative and ripening phases. Out of these entries, only eight demonstrated resistance to deadhearts caused by WSB, while no data was recorded for whiteheads due to bug burn damage.

Regarding RBB damage, 25 entries exhibited resistance to deadhearts during the vegetative phase. However, at the ripening phase, all entries, including the resistant check (TKM6) and susceptible check (TNI), experienced bug burn damage.

In the wet season, 162 entries were evaluated for their response to deadhearts and whiteheads caused by WSB and RBB. Impressively, 159 entries displayed resistance to deadhearts caused by white stemborer, comparable with the performance of the checks. Furthermore, 110 entries were resistant to whiteheads, also comparable to the performance of the resistant check TKM6, with only one entry found to be susceptible. In terms of rice black bug damage, all entries, including the checks, exhibited resistance to both deadhearts and whitehead damage.

Extracore Project 8

National Cooperative Testing (NCT) Project: Hybrid Rice Selections Field Performance Test

Pernelyn S. Torreña and Karen May B. Abejar

Released hybrid rice varieties showed yield advantage over certified inbred varieties. The National Cooperative Testing (NCT) Project aimed to determine hybrid rice lines with at least 15% yield advantage over the check varieties that could be considered for national or regional recommendation. The study was conducted at PhilRice Midsayap Experiment Station, Bual Norte Midsayap Cotabato. Two NCT-hybrid set-ups were established in PhilRice Midsayap in 2021.

- In the dry season trial, entry #25 achieved the highest yield of 4.4t/ha, with a moisture content (MC) of 9.72%, 66 days to heading, and 91 days to maturity. In the WS 2021 trial, entry #17 recorded the highest yield of 7.3t/ha, with 11.16% MC, 80 heading days, and 115 maturity days. However, despite their impressive yields, the highest-yielding entries in the WS trial did not surpass the yield of the check varieties, M103, and M99, which achieved yields of 7.7t/ha and 8.1t/ha, respectively. Although entry #17 obtained a remarkable yield, it was still outperformed by the check varieties in terms of overall productivity during the WS trial.

Extracore Project 9

National Cooperative Testing (NCT) Project: Submergence Rice Selections

Pernelyn S. Torreña and Karen May B. Abejar

- The NCT-submergence test evaluated the performance of 20 NCT-sub entries for induced submergence stress. Among the entries tested, PR42167-B-B-9-1-3-2-1 did not survive under 14 days complete submergence, while other entries had a survival percentage of 50% comparable to check sub-entries.
- In terms of plant vigor, PR45816-B-B-Drt1-1-3-1-2, PR42188-B-25-3-Sub1-1-1-2, (IR16F1036 (New), and (IR15F1887 (New) rated extra-vigorous which were comparable to check sub-entries.

Extracore Project 10

Philippine Rice Information System

PS Torreña, MPA Tejada, and GD Balleras

PRISM is a collaborative project designed to provide reliable, timely, and location-specific seasonal information related to rice cultivation. It offers valuable insights into yield estimates, crop health assessments, and the impact of flood and drought on rice areas. Leveraging state-of-the-art technologies such as remote sensing, crop growth simulation models, and smart information and communication technology (ICT) tools, PRISM expedites data generation and information dissemination.

Through its online portal and bulletins, PRISM makes all the gathered information available to partner agencies. The web-based tool incorporates both existing and new sources of information, drawing from previous field researches. Continuous research and development activities remain an essential aspect of the project.

At present, the PhilRice Midsayap station plays a crucial role in direct communication and facilitation, catering to the monitoring needs of Regions IX, XII, and BARMM across PRISM monitoring fields (MFs). These monitoring fields are characterized based on their ecosystems, common cultural management practices, and other relevant information. It is important to note that the characteristics of these monitoring fields, as well as the practices employed by farmers, may vary at the regional level. This divergence can be attributed to farmers' adoption of trial and error to fine-tune best practices suited to their specific locations. Such adaptability demonstrates the dynamic nature of rice farming, as farmers continually seek optimal approaches to achieve the best outcomes in their respective regions.

- In 2021, a total of 160 monitoring fields (60MFs for Region IX, 40 MFs for Region XII, and 60 MFs for BARMM) were identified based on the adjusted protocol and mapping schedule with an estimated area of 71,736ha, 140,081ha, and 53,300ha., respectively.
- Planting schedules in Regions IX and XII, commenced in the months of November and September and peaked in May and April. Majority of MFs were irrigated, which were planted with certified, registered, and good seeds using the direct and transplanted methods except in BARRM region. Interestingly, Regions IX and XII have an increment of 7-9% in terms of percentage area planted during the second semester due to favorable agro-climatic condition and sufficient supply of water.

- Finally, process-based crop growth simulation model (ORYZA) analysis, recorded a maximum yield ranges from 4.00–4.20t/ha in Region IX, 3.86–3.49t/ha in Region XII, and 3.34–2.54t/ha in BARMM.

RCEF Project 1

Rice Competitiveness Enhancement Fund (RCEF) – Seed Component

OH Abdulkadil, Sailila E. Abdula, GV Romarez, MP Jawom, JNM Buhat, AC Onis, DJA Sillon, WC Gatton, JEF Fuerte, SI Mama, NS Gandawali, MT Vicente, KAA Murray

The program aimed to improve the competitiveness and income of rice farmers through increase in yield and productivity and to increase adoption of certified inbred rice seeds and its corresponding integrated crop management. Specifically, it aimed to increase utilization of certified inbred rice seeds in areas with high potential for increasing competitiveness, improve quality, availability, and provide access to certified inbred rice seeds.

- Farmer beneficiaries received two bags per hectare at 20kg/bag depending on the rice areas declared per Registry System for Basic Sector in Agriculture (RSBSA) registered in 42 target provinces. In DS and WS, 478,660 bags at 20kg/bag (DS=170,600 bags and WS=308,060 bags) were allocated and 443,047 bags (DS=171,096 bags and WS=271,951 bags) were distributed (92%) across Region IX, XII, and BARMM.
- During DS 2021, 42,500 bags were allocated and 42,611 bags were distributed (100%) in Region IX; 127,200 bags allocated and 127,585 bags were distributed (100%) for Region XII; and 900 bags distributed (100%) in BARMM. During WS, 141,000 bags were allocated and 115,332 bags were distributed (81%) in Region IX; 112,060 bags allocated and 98,748 bags were distributed (88%) in Region XII; and 55,000 bags allocated and 57,871 bags were (105%) distributed for BARMM. In addition, 90,001 of the farmer-beneficiaries were male (DS 2021=41,727 and WS 48,274) while 47,227 were female (DS 2021=23,120 and WS 2021=24,107).
- Twenty-four PalaySikatan sites were established in Region IX, XII and BARMM. During DS, four sites were established in Region IX while 8 sites in Region XII. In WS 2021, three sites in Region IX were established, five in region XII, and four in Maguindanao.

RCEF Project 1

- During DS 2021, results showed that NSIC Rc 442 got the highest average yield of 4.61t/ha in Region IX, NSIC Rc 440 (6.09t/ha), followed by PSB Rc18 (5.74t/ha) in Region XII. While in WS 2021, NSIC Rc 222 got the highest yield of 5.50t/ha followed by NSIC Rc 442 with 5.41t/ha in Region IX, NSIC Rc 506 (5.69t/ha) in Region XII, and NSIC Rc 222 (6.85t/ha), followed by NSIC Rc 506 (6.36t/ha) in Maguindanao.
- During DS 2021, incremental yield was recorded ranging from 21 to 84% and 1-43% in WS. Highest yield increment was recorded in South Cotabato with 43% increase, followed by Sarangani with 32% while lowest incremental yield was observed in Zamboanga del Sur with 1%.
- Production cost per hectare was determined in DS and WS in Region IX, XII, and BARMM. Seed, crop establishment, and nutrient management incurred a higher production cost of 20% while in WS, nutrient and harvest management incurred a higher production cost of 29% and 20%, respectively, in Region IX. For Region XII, land preparation, pest, nutrient, and harvest management obtained production cost from 19 to 25% in DS and WS. In Maguindanao, land preparation and harvest management, 21% and 32% total production cost were recorded. In addition, cost per kg ranged from PhP7 to PhP11/kg in WS and PhP9 to PhP14/kg during DS across three regions.

Rice Competitiveness Enhancement Fund (RCEF) – Strategic Communication

STC Quiring, KA Pedtamanan and MB Gandawali

In support to the Rice Competitiveness Enhancement Fund – Seed Component (RCEF-Seed), the Strategic Communication component under RCEF-Extension sought to increase awareness, skills, and knowledge on rice production technologies. Through quad media and communication initiatives, it aimed to reach farmers, implementing agencies, and other rice stakeholders to disseminate rice knowledge, and rally support for the rice sector.

- Strategic communication produced 5 videos, 2 campaign collaterals, 4 new designs of knowledge products, 9 articles, 24 original social media contents, and conducted 3 communication activities. The knowledge products were distributed mainly to RCEF-Seed farmer-beneficiaries while campaign collaterals were given to partners and other stakeholders. There were 80,714 knowledge products distributed in Region XII; 68,725 in Region IX; and 35,372 in BARMM.

RCEF Project 3

RCEF–Rice Extension Services Component – Training and Training Related Component

STC Quiring, KA Pedtamanan and MB Gandawali

This component aimed to enhance the knowledge and skills of rice farmers to become competitive in their farm operation and production management adopting the PalayCheck System.

Due to the pandemic, RCEF training and extension activities of the station reduced its targets. The training team conducted four batches of training that included Training of Trainers (TOT), Farmer Field School (FFS), short courses for RCEF program staff, and TOT for Pest and Nutrient Management in the Production of High-Quality Inbred Rice, Seed Certification, and Farm Mechanization.

- There were 113 (82% male; 18% female) participants who graduated from the following training: 34 AEWs for TOT, 40 rice farmers for FFS, 11 RCEF staff, and 28 AEWs and local farmer technicians with an average knowledge gain of 51.78%.

RCEF Project 4

Rice Competitiveness Enhancement Fund – Seed Component: Communication

MB Gandawali, STC Quiring, and KA Pedtamanan

The Communication component of the Rice Competitiveness Enhancement Fund-Seed Component aimed to strengthen documentation and information dissemination of the project.

- Video highlights, radio plugs, broadcast releases, articles, and social media contents were produced.

