2022 PhilRice R&D Highlights

PhilRice Midsayap

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CONTENTS

BRANCH STATION

PHILRICE MIDSAYAP

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EXECUTIVE SUMMARY

DA-PhilRice Midsayap as the Institute's Pest Management Center, addresses pest and disease constraints in rice production in Regions 9 and 12, and the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM). This is achieved by strengthening its research, development, and extension (RDE) linkages to collect and analyze data, deliver information and knowledge, and package technologies tailored to the needs of farmers and other rice stakeholders. In 2022, the station implemented eight projects and studies two core projects, one division-based, and five extra core projects.

More focus was placed on the use of biological control agents, particularly like entomopathogens microorganisms (EMs), in crop protection research. Three fungal isolates were morphologically and molecularly characterized and subjected to bioefficacy trials. Improving the EM delivery system and its additional role as rice endophytes are within the research and development (R&D) goals to support agricultural sustainability. The station also evaluated transgressive rice lines for morpho-agronomic, pests damage, and yield performance. Twenty elite lines were generated and two entries were submitted to National Cooperative Testing (NCT) Rice Varietal Improvement Group (RVIG) for multi environment testing (MET) evaluation. The Philippine Rice Information System (PRiSM) was deployed in Midsayap to facilitate data gathering on rice yields, yield gaps, and their causes.

For development initiatives, the station worked with various partner-agencies such as the Agricultural Training Institute (ATI), state colleges and universities (SCUs), local government units (LGUs), and other public and private institutions to promote and provide packages of technologies and information to rice farmers and stakeholders. The Branch Development Initiative (BDI), the station's major thrust, was implemented through four components: (i) technology scaling, (ii) training, (iii) station's *Palayamanan*, and (iv) communication support. Through the BDI, six trainings were conducted, five technology demonstration sites were established, one production protocol was developed, one *Lakbay Palay* was implemented, and 12 knowledge-sharing and learning (KSL) activities were executed.

The station also sustained the implementation of Rice Business Innovations System (RiceBIS), the Institute's banner development program. The project formed 14 production clusters in its Phase 2 in Libungan, North Cotabato, which were later formed into an organization and registered under the Department of Labor and Employment (DOLE). To support the farmers' agroenterprise activities, three site working group meetings were conducted. Monitoring and evaluation (M&E) activities reported a decline in yield and income due to pest damage, which project implementers addressed by re-capacitating the farmers through pest management training.

The station also implemented four other extra core-funded R&D projects: the deployment of genetic resistance in managing rice black bug *(Scotinophara coarctata F.)*, which identified six resistant entries; OneRicePH: development of product concepts for target rice market segments and establishment of the breeding network that was able to evaluate three accession lines; nutritionally enhanced rice finishing and delivering golden rice and high iron and zinc rice varieties that was able to establish three seed production areas and facilitated the passing of one resolution in support of Golden Rice cultivation; and the NCT that screened 414 entries.

The station has also secured the approval for a Department of Science and Technology (DOST)-funded project for implementation in 2023.

Lastly, gender and development (GAD) activities were conducted to raise awareness among staff regarding their personal, social, reproductive, and economic responsibilities. These activities emphasized the importance of health and well-being, addressed the impacts of gender inequality, and emphasized the essential roles of both men and women in fostering the economic development within their community.

CORE-FUNDED PROJECT 1

Integrated Crop Management in Southwestern Mindanao

Gina D. Balleras, Sailila E. Abdula, Isagane V. Boholano, Cristine G. Flores, and Victor Zeus B. Uyangurin

Climate change, functional agrobiodiversity depletion, and pest incidence adversely affect crop productivity. Rice production systems in Southwestern Mindanao are threatened with insect pests and diseases, leading to significant yield losses. To mitigate these impacts, local farmers have heavily relied on synthetic chemical pesticides. However, with growing awareness of environmental protection and biological diversity conservation, rice growers are seeking alternative crop protection methods. To address this concern, this project aimed to: (1) evaluate the yield performance and agronomic traits of developed candidate transgressive lines (CTLs) in Region 12; (2) evaluate the bioefficacy of entomopathogenic fungi against the rice black bug (RBB) or *Scotinophara coarctata*; (3) assess the combined effects of potassium humate and gibberellic acid as a potential control for bacterial leaf blight in rice; and (4) monitor the population density of adult RBB and rice stem borer (RSB) using light trapping technique.

Evaluation of the Yield Performance and other Agronomic Traits of Developed Candidate Transgressive Lines (CTLs) in Region 12

In 2021, 115 CTLs were evaluated based on yield-related parameters and responses to insect pests and diseases. Based on the results, 19 CTLs with yields greater than 3t/ha were selected for screening in 2022. Entries RF 41 and RF 11 are the top two performing CTLs across DA-PhilRice Midsayap, Maitum, Surallah, and Tacurong with yield advantages ranging from 5.2 to 5.8t/ha over check varieties. The total number of productive tillers, resistance to major insect pests and diseases have directly contributed to rice grain yield of identified entries. These top two performing CTLs will be forwarded to NCT rice technical working group (RTWG) for multi environment testing (MET) evaluation.

Evaluation of Bioefficacy Potential of Entomopathogenic Fungi against the Rice Black Bug (RBB), Scotinophara coarctata

The probability of the five fungal isolates to infect *Tenebrio molitor* and third instar *Scotinophara coarctata* nymph were assessed. The fungal isolates were characterized based on morphological technique. The morphological characterization of the isolates was supported by molecular analysis. The

sequence data of five isolates—BbA RCPC, BbA PM, Ma RCPC, Ma PM3, and PRBB PM—were highly homologous to *Beauveria sp. Metarhizium sp.*, and *Purporiucillium sp*. After multiple trials, the isolates demonstrated the ability to infect and kill *T. molitor* and third instar *S. coarctata* after eight days of exposure. The potential of these isolates as endophytes can be further explored using a newly established protocol for seed inoculation and subsequent endophytic colonization.

Assessment of the Combined Effects of Potassium Humate and Gibberellic Acid as Potential Control against Bacterial Leaf Blight (BLB) in Rice

Four field trials were conducted to assess whether potassium humate and gibberellic acid (GA3) could enhance grain yield and reduce bacterial leaf blight infestation. Results showed that the combined application of 200g/ha potassium humate and 5-10g/ha of gibberellic acid (GA3) resulted in higher grain yield and delayed onset of bacterial leaf blight. Hence, the combined application of potassium humate and GA3 is recommended to improve yield performance and minimize economic damage due to bacterial wilt.

Monitoring of Population Density of Adult Rice Black Bug (RBB) and Rice Stem Borer (RSB) using Light Trapping Technique

Population monitoring using light traps over 11 consecutive cropping seasons revealed that the occurrence of white stemborer (WSB), rice black bug (RBB), and green leafhopper (GLH) was 10% higher during the dry season (DS) compared to the wet season (WS). Notably, a new species of green leafhopper, *Nephotettix cincticeps*, was recorded for two consecutive seasons in 2022. This monitoring strategy can be further enhanced to establish a reliable database on insect pest occurrence, dispersal, and population density, which are essential for developing site-specific pest control strategies.

CORE-FUNDED PROJECT 2

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

Ommal H. Abdulkadil, Isagane V. Boholano, Sylvia Therese C. Quiring, and Datu Ali N. Sumlay

The project titled "Accelerating Adoption of Sustainable Rice-Based Technologies in Region 9, 12, and BARMM," aimed to facilitate DA-PhilRice's matured technology dissemination while educating rice farmers, to hasten technology adoption in the target sites. It also provided solutions to specific rice production constraints to help improve rice yields and farmers' productivity in the countryside.

This branch development initiative complements other development projects within the station's area of responsibility (AOR). It employed various development approaches and extension service modalities to enhance the competitiveness men and women rice industry stakeholders through area-based technology promotion. Moreover, it simplified the understanding of the importance of rice science among target farming communities. The project was implemented with four interrelated project components to offer solutions to the specific farming constraints.

Project component 1: Technology scaling focused on improving the nutrient management practices of men and women rice farmers. Sarangani, South Cotabato, and Maguindanao were identified as low yielding provinces due to low fertilizer application. The technology scaling was emphasized through technology demonstrations of various integrated nutrient management (INM) options, including rice crop manager (RCM), Minus-One-Element Technique (MOET)-based recommendations, other pest management practices, and the use of the plastic drum seeder.

With the use of RCM and MOET-based recommendations, rice yields improved significantly. In Maguindanao, yields ranged from 5.0-7.2t/ha during 2022 DS, and from 4.6-6.4t/ha during 2022 WS, both higher than the baseline yield of 4t/ha. In South Cotabato, yield increased from 5.3t/ha to 8.1t/ha (2022 DS) and from 3.9t/ha to 5.9t/ha (2022 WS), which was higher than the baseline yield of 4.5t/ha. Consequently, rice yield in Sarangani also increased from 2.7t/ha to 5.4t/ha in 2022 DS and from 3.8t/ha to 4.4t/ha during 2022 WS, exceeding the baseline yield of 2.5t/ha.

Fertilization practices improve through the use of the right elements, optimal timing, and proper fertilizer application rates. Across multiple sites and two seasons, yield increased by 1.7t/ha in the DS and 1.1t/ha in the WS.

Project component 2: Training and capacity building is one of the important activities focused on enhancing knowledge and skills of the men and women rice industry stakeholders. Providing right rice information and technologies was vital in deepening farmers' understanding of rice science, which led to improved farming practices. A series of training sessions were conducted to selected farmer groups.

In 2022, six training batches were conducted for new agriculture graduates and barangay local executives on March-April, June-July, and September 2022 in Maguindanao, South Cotabato, Midsayap, Cotabato, Zamboanga Sibugay, and Zamboanga del Sur. A total of 137 (82 male and 55 female) stakeholders were trained in rice production technologies with emphasis on PalayCheck System and *Palayamanan* Plus. Sixty-six committee on agriculture chairpersons benefited from the two-day appreciation course on science and technology (S&T) updates while 71 new agriculture graduates participated in a three-day PalayCheck System and *Palayamanan* Plus Rice Boot Camp.

Moreover, training participants obtained an average knowledge gained of 45.23% and 47.41% (local executives), respectively. In addition, the overall training satisfaction rating was excellent (2.85).

Project component 3: Station's *Palayamanan* Plus aimed to improve farm productivity and profitability in rice-based farming communities. The *Palayamanan* Plus model farm was established on-station at PhilRice-Midsayap and off-station at Brgy. Renibon, Pigcawayan, Cotabato. This component showcased cost-saving and yield-enhancing management practices, maximizing the utilization of resources. Enterprises included rice, vegetables, mushrooms, and vermicomposting, alongside on-station technology demonstrations of inbred and hybrid rice varieties. These efforts contributed to risk reduction, enhanced sustainability, productivity, and improve farm income.

In 2022, a production protocol for rice and vegetable production was developed to provide rice farmers with science-based information. The five-year (2018-2022) *Palayamanan* Plus implementation of rice and vegetable production was evaluated based on its return of investments (ROI). Results showed that each *Palayamanan* Plus enterprise contributed valuable insights towards improving farmer productivity and income in rice-based farming communities. For the rice production enterprise, a net income of P44,948.73/ha was recorded. Similarly, the small-scale vegetable enterprise reported net incomes as follows: P90,699.65/ha for eggplant, P109,267.13/ha for tomatoes, P65,326.27/ha for ampalaya, P84,436.73/ha for pechay, P103,188.73/ha for cucumber, P16,446.67/ha for squash, and P11,068/ha for okra. These results highlighted the value of diversified farming and showed that small plots of land can be highly productive when rice-based technologies are accessible to small farmers.

Technology demonstrations were conducted in Brgy. Manungkaling, Mamasapano, Maguindanao, and on-station at PhilRice Midsayap. The on-farm varietal technology demonstration in Barangay Manungkaling recorded the following yields for dry and wet seasons: NSIC Rc 204H yielded 8.6t/ha (highest); Rc 506, 7.65t/ha; Rc 222, 6.4t/ha; Rc 442, 6.25t/ha; Rc 508, 6.12t/ha; Rc 160, 5.8t/ha; Rc 400, 5.7t/ha; PSB Rc72H, 5.6t/ha; NSIC Rc 534, 4.8t/ha, Rc 520H, 4.7t/ha; Rc 440, 4.6t/ha; and Rc512, 4.5t/ha.

At the on-station demonstration at PhilRice Midsayap, yields for the same period were as follows: NSIC Rc 204H yielded 8t/ha (highest); Rc 506, 7.3t/ha; Rc 222, 6.8t/ha; Rc 442, 5.9t/ha; Rc 510, 5.5t/ha; Rc 508, 4.7t/ha; Rc 512, 3.6t/ha; PSB Rc72H, 3.6 t/ha; NSIC Rc 534, 2.5 t/ha; and Rc 520H, 2.2t/ha.

Across sites, the top three newly released varieties were NSIC Rc204H, which achieved an average yield of 8.3t/ha; Rc 506, 7.48t/ha; and Rc 222, 6.6t/ha.

The 2022 Lakbay Palay/Farmer's Field Day was drew 531 participants (294 male and 237 female). The event received positive feedback with 3.8% of participants rating it as "good," 47.6% as "mahusay" (very good), and 51.6% as "pinakamahusay" (excellent). Additionally, 69% of participants recommended holding the event annually, while 31% suggested improvements or modifications.

Project Component 4: The communication support component of the Branch Development Initiative (BDI) aimed to boost the dissemination of rice production technologies, through quad media and communication strategies. The team conducted 12 knowledge-sharing and learning (KSL) activities, published one newsletter, aired six radio plugs, and maintained one social media account. The KSL activities were attended by PhilRice Midsayap staffers, partners, and other rice stakeholders from nearby municipalities. The radio plugs shared key messages on the PalayCheck System. A video highlight was also produced for the National Rice Awareness Month (NRAM) celebration. A special newsletter issue featured the station's accomplishments. The DA-PhilRice Midsayap Facebook Page also reached 7,123 followers.

PROGRAM

Philippine Rice Information System (PRiSM)

Gina D. Balleras and Liza Mae Amor Domo

In 2022, the PhilRice Midsayap PRiSM team visited 120 monitoring fields (MFs) in 11 municipalities across the provinces of Region IX (60 MFs), XII (40 MFs), and BARMM (20 MFs). Field data including field characteristics, crop management practices, field status, crop stages, production data, and crop cuts were collected

in the first and second semesters. In the 1st semester, the estimated total rice production area was 70,185ha in Region IX; 139,771ha, Region XII; and 50,354ha in BARMM. The peak planting time in Region IX and BARMM is in October, while in Region XII, it is in December. However, in the second semester of implementation, the rice production area in these three regions increased from 7.76% to 16.14%, with most farmers in Region XII planting in May and those in Regions IX and BARMM planting in June.

The majority of rice growers used certified and registered seeds and employed transplanting methods for both rainfed fields (BARMM) and irrigated fields (Regions IX and XII). The estimated average yields were 4.02mt/ha in Region IX, 4.06mt/ha in Region XII, and 3.73mt/ha in BARMM. Rice and non-rice (RNR) areas across the identified provinces in Mindanao were validated each semester, with at least 120 fields per region assessed per semester. Additionally, data on the occurrence of tropical cyclones and damage impact assessments in directly affected areas, particularly in Region XII, were gathered from the three regions.

The PRiSM project, implemented by PhilRice in collaboration with the International Rice Research Institute (IRRI) since 2014, collects data and generates rice production information using mobile technology, remote sensing, geographic information systems, and crop modeling in selected areas of Luzon, Visayas, and Mindanao. As part of this collaborative project, PhilRice provided the template and guidelines to DA-RFOs to develop site-specific rice-based programs that address national food security and agricultural resilience issues.

EXTRA CORE-FUNDED PROJECT

Rice Business Innovations System (RiceBIS) in Libungan, Cotabato (Phase II)

Ommal H. Abdulkadil, Wynrich P. Bugtay, Evelyn B. Tabelin, and Jesrel O. Edraira

The RiceBIS Phase II project in Libungan comprises four key components aimed at improving farming communities by achieving a 1t/ha yield increment, reducing production costs by up to P8/kg for fresh *palay*, minimizing postharvest losses to 12%, and increasing household income from rice farming by at least 25%.

The first component is empowering rice farming communities through a clustering approach. Fourteen production clusters were formed from eight barangays in Libungan: Gumaga, Baguer, Abaga, Batiocan, Cabpangi, Ulamian,

Sinawingan, and Montay. Members of these clusters were organized into the Libungan RiceBIS Farmers Association, which was registered with the Department of Labor and Employment (DOLE). Out of 412 farmers reached, 122 became members. The clusters and their facilitators regularly held meetings to enhance capacity and prepare for agroenterprise engagement activities.

Implementers of the second component, building a resilient pathway to prosperity: the Libungan RiceBIS community capacity enhancement approach, trained farmers in rice production from 2020 to 2021, the 2022 capacity enhancement focused on agroenterprise development, culminating in a formal mass graduation ceremony where participants received training certificates. This component also empowered farmers to develop agroenterprise plans, including supply, marketing, financial, and management strategies to be implemented in 2023. Additionally, three site working group (SWG) meetings were held in 2022, attended by implementers and farmer leaders to address issues, concerns, and field updates.

In the third component, engaging farmers in profitable rice and rice-based enterprises, farmers are encouraged to view farming as a business. Out of the 412 farmers reached, 122 (29%) engaged in the marketing of well-milled rice through commitment and roll-over supply. Participation in agroenterprise activities resulted in an additional annual net income of P1,067 for the farmers.

The fourth component, monitoring and evaluation (M&E) of Libungan RiceBIS communities, involved interviewing farmers to assess project progress from the baseline to the present. Two end-season monitoring surveys were conducted in 2022, covering the 2021 WS and 2022 DS. To enhance analysis, the performance of non-RiceBIS farmers in the locality was also assessed and compared with the survey results for RiceBIS farmers.

Results showed a significant yield loss in Libungan due to stemborer damage, affecting the majority of farmers during 2022 DS. The average yield dropped from a baseline of 4.38t/ha to 3.88t/ha, a 0.50t/ha decrease. This decrease was comparable to the 2022 DS yield of non-RiceBIS farmers, which was 3.75t/ha. The yield loss contributed to a rise in production costs, from P11.33/kg in 2020 DS to P12.59/kg in 2022 DS, while non-RiceBIS farmers faced a cost of P12.10/kg. Average net income per hectare also decreased due to the yield reduction, falling from P22,704.00/ha to P6,280.00/ha for 2022 DS.

The M&E component also tracked post-harvest losses with the use of combine harvesters. Since 2020 WS, post-harvest losses have been reduced to 2%, which is lower than the national average baseline of 4.47%. However, due to the stem borer infestation, a significant decline in both production and income performance was observed among farmers in Libungan.

EXTRA CORE-FUNDED PROJECT

Deployment of Genetic Resistance in Management of Rice Black Bug (RBB) *Scotinophara coarctata F.*

Field screening of elite lines, cultivated varieties, and in wild rice derived lines

Gina D. Balleras, Michelle S. Ocenar, and Jemuel R. Garcia

Breeding resistant rice varieties is considered one of the most viable methods to mitigate agricultural losses caused by rice black bug (RBB) infestations. To identify strong donors of resistance genes against RBB, using elite lines, cultivated varieties, and wild rice-derived lines were tested under field conditions using standard procedures. In 2022, the screening was conducted in batches—two during the dry season and four during the wet season —at 40, 60, 80, and 100 days after transplanting (DAT), following the method described by Heinrichs (2007).

Out of the 630 entries evaluated during the DS, six entries (RBB 507, RBB 585, RBB 598, RBB 619, RBB 627, and RBB 635) showed resistance to RBB, with bug populations ranging from 2 to 30 RBB/hill. In contrast, almost all of the 1,287 entries planted during the WS were completely bug-burned with RBB populations ranging from 2 to 62 RBB/hill at 78-100 DAT. However, five entries (RBB 012, RBB 037, RBB 484, RBB 549, and RBB 599) exhibited an intermediate reaction to RBB, with populations ranging from 1 to 6 RBB/hill at 100 DAT. These donor entries remained vigorous despite increasing RBB populations.

EXTRA CORE-FUNDED PROJECT

OneRicePH: Development of Product Concepts for Target Rice Market Segments and Establishment of the Breeding Network

Sailila E. Abdula and Badrudin M. Unas

The Philippines' *palay* production in 2020 reached 19.441 million metric tons (Mmt), harvested from 4.731M ha (PSA 2020). The national average yield was 4.11t/ha, an increase of 0.07t/ha from the 2019 average of 4.04t/ha. The DA National Rice Program set a 2021 target of producing 20.472Mmt from 4.737M ha, aiming for a national average yield of 4.32t/ha, a 5.15% yield increment.

The project aimed to develop floating or deepwater rice lines adaptable to flood-prone areas, following the Standard Evaluation System (SES) 2013. In the 2022 WS trial, three accession rice lines—IRGC 52694 (Madhukar), IRGC 74591 (Nagara), and IRGC 74592 (Tapus)—were evaluated. Each accession displayed varying agronomic traits. Among these, IRGC 74592 showed the best performance, with 10-15 tillers, compared with the other two accessions.

EXTRA CORE-FUNDED PROJECT

Nutritionally Enhanced Rice Finishing and Delivering Golden Rice and High Iron and Zinc Rice Varieties

Ommal H. Abdulkadil and Khidhr Ahmad A. Murray

As part of the effort to deploy Golden Rice in the Philippines, the station established a 2ha seed production site for Golden Rice (1ha at PhilRice Midsayap station and 1ha at a seed grower's farm) and a 2ha grain production area in Sultan Mastura, Maguindanao, during 2022 WS. A series of stakeholder engagements were conducted in BARMM, North Cotabato, Bukidnon, and LGU-Sultan Mastura to introduce Golden Rice and its deployment plans in Maguindanao. Golden Rice production management followed stewardship protocols, with one local resolution passed in support of its cultivation in Sultan Mastura.

National Cooperative Testing (NCT)

Screening of different rice lines against major insect pest

Gina D. Balleras and Cristine G. Flores

This study aimed to characterize and compare the reactions of different entries/cultivars against RSB and RBB. In 2022, 267 entries were screened: 120 during the DS and 147 during the WS, following the National Cooperative Testing (NCT) manual. During DS, out of 120 entries, only 10 showed resistance to RSB. No data on RSB whiteheads were recorded due to RBB bug-burn. Despite this, all entries exhibited resistance to RBB at the vegetative stage, though all—including check cultivars—suffered bug-burn damage at the ripening stage. For RBB, all entries resisted deadhearts, but all, including the checks, were susceptible to whiteheads.

Screening of different rice lines against major rice diseases

Gina D. Balleras and Victor Zeus B. Uyangurin

There were 134 entries evaluated during DS and 148 entries during WS against rice blast (RB), sheath blight (ShB), bacterial leaf blight (BLB), and rice tungro virus (RTV). During DS, 74 entries exhibited resistance to RB, one to BLB, and 64 to RTV. During WS, 83 entries resisted RB, two resisted BLB, and 164 resisted RTV. All entries, including checks, were susceptible to ShB, possibly due to low disease pressure in the area compared to RTV.

Screening of Hybrid Rice Selections against Major Insect Pests and their Agronomic Characteristics under Field Condition

Gina D. Balleras, Cristine G. Flores, and Jemuel R. Garcia

This study evaluated the yield potential, resistance to major insect pests and diseases, and yield-related traits of promising NCT hybrid rice selections. During DS, 30 entries from both Group 1 and Group 2 were severely infested by RBB, with infestation rates ranging from 15-46% (Group I) and 26-68% (Group II). Despite the infestation, entry #14 outyielded the check entries, producing 1.7t/ha and reaching maturity in 104 days. In WS Group I trial, entry #12 achieved the highest yield of 6.3t/ha, with a moisture content of 10.9%, 77 days to heading, and 108 days to maturity, surpassing the check entries M103 and SL-8H. Other entries yielded between 2.9-5.6t/ha, but none surpassed the M99 check entry.

Screening of NCT-sub Entries through Induced Submergence Stress

Gina D. Balleras, and Cristine G. Flores

Nineteen NCT sub-entries were evaluated for their ability to survive induced submergence stress. Ten entries survived after 14 days of complete submergence, with PR415566-SubMSal270-1-1-1-1-1-3 showing a survival rate of 90-93%, outperforming the check varieties. This entry also exhibited vigorous growth and a higher number of tillers (10-11 tillers/hill) at seven and 14 days post-de-submergence.

RCEF-FUNDED PROJECTS

Rice Competitiveness Enhancement Fund (RCEF)-Extension Component: Strategic Communication

Sylvia Therese C. Quiring and Cheshire Faye R. Pagarigan

The communication component of the Rice Competitiveness Enhancement Fund Seed Program (RCEF Seed) focused on strengthening project documentation and information dissemination. To support the RCEF Seed distribution activities, the component produced video highlights, radio plugs/ engagement, broadcast releases and articles, and social media content. These media materials and knowledge products aimed to reach farmers, partners, and other rice stakeholders in Regions 9, 12, and BARMM.

Two testimonial videos were posted on the conduct of RCEF PalaySikatan Farm Walk at Buluan, Maguindanao, and Ampatuan, Maguindanao. Two testimonial videos were also posted on the conduct of *Binhi e-Padala* and Qomen's contribution in seed distribution in BARMM. One article titled "DA-PhilRice seeks to further digitize RCEF seed distribution" was uploaded at the PhilRice website. Forty-four original posts were made for RCEF Seed Comms in DA-PhilRice Midsayap FB Page. And, one radio engagement on *Binhi e-Padala* was conducted.

RCEF Seed Distribution

Sailia E. Abdula, Ommal H. Abdulkadil, Gilbert V. Romarez, Martin P. Jawom, Jose Nori M. Buhat, Aldrin C. Onis, Derby Jey A. Sillon, Wilson C. Gaton, Joseph Elmer F. Fuerte, Saud I. Mama, Nasrudin S. Gandawali, Ezrafil E. Nandang, Salih S. Zacaria, Akrima S. Bansilan, and Anisa B. Solaiman

RCEF Seed focuses on the development, propagation, and promotion of inbred rice seeds which are distributed free to farmers in coordination with local government units (LGUs) in Regions 9, 12, and BARMM. The program aimed to (1) increase the adoption of certified inbred rice seeds; (2) improve seed quality, availability, and accessibility; and (3) expand the number of farmers' organizations engaged in seed production and trade.

In 2022, 12 seed cooperatives were accredited as RCEF seed suppliers, producing 222,400 bags (20kg/bag) of certified seeds for 2022 DS and 283,866 bags for 2022 WS. On average, they delivered 97% of the contracted certified seeds during 2022 DS and 92% during 2022 WS. Seed distribution reached 106 municipalities during DS and 119 during WS in Regions 9, 12, and BARMM. A

total of 107,728 bags were distributed during 2022 DS, benefitting 18,055 male farmers (54%) and 15,382 female farmers (46%) in Region 9, with a majority receiving NSIC Rc 160 (26%) and NSIC Rc 222 (24%). Similar distributions were recorded in Regions 12 and BARMM.

RCEF PalaySikatan

Sailia E. Abdula, Ommal H. Abdulkadil, Gilbert V. Romarez, Martin P. Jawom, Jose Nori M. Buhat, Aldrin C. Onis, Monclair T. Vicente, and Nurjohn P. Subat

PalaySikatan is a technology demonstration strategy under RCEF designed to showcase the benefits of using certified inbred seeds and mechanized farming systems. The initiative aims to increase farmers' productivity by at least 1t/ha and reduce production costs by P3/kg of paddy rice.

In 2022, 16 PalaySikatan sites were established during DS in Regions 9, 12, and BARMM, and 24 sites during WS. In Region 9, NSIC Rc 222 yielded the highest average of 6.06t/ha in 6 sites during 2022 DS, while NSIC Rc 506 achieved the highest yield of 6.38t/ha during 2022 WS, followed by NSIC Rc 160 at 5.60t/ha. Across all sites, production costs ranged from P40,254 to P55,995 per hectare during 2022 DS, with the highest costs incurred in Zamboanga Sibugay and Zamboanga del Sur. Higher net incomes were recorded in Zamboanga Sibugay and South Cotabato, with a 44% and 45% share of gross income, respectively.

RCEF Minus-One-Element Technique (MOET)

Sailia E. Abdula, Ommal H. Abdulkadil, Gilbert V. Romarez, Martin P. Jawom, Jose Nori M. Buhat, Aldrin C. Onis, Derby Jey A. Sillon, Wilson C. Gaton, Joseph Elmer F. Fuerte, Saud I. Mama, Nasrudin S. Gandawali, Monclair T. Vicente, Nurjohn P. Subat, and Yasrinah A. Yacob

To boost rice yield, the Minus-One-Element Technique (MOET) was used to assess soil nutrient status due to its reliability, practicality, and simplicity under field conditions.

During 2022 DS , 168 MOET setups were established in 14 municipalities across Region 9 (45%), Region 12 (32%), and BARMM (23%). For 2022 WS, 208 setups were established across 22 municipalities, with 34% in Region 9, 13% in Region 12, and 54% in BARMM. A total of 168 and 208 farmers cooperated in the MOET setups during DS and WS, respectively, with 63-72% being male farmers and 28-37% female farmers.