2023 PhilRice R&D Highlights

MIDSAYAP BRANCH STATION

Philippine Rice Research Institute
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STATION

PhilRice Midsayap

Branch Director: SAILILA E. ABDULA

EXECUTIVE SUMMARY

To help fulfill PhilRice's goal of improving the living conditions of rice-farming communities, the Midsayap Station continues to expand its reach through the convergence platform. It primarily serves the R4D&E needs of Regions 9, 12, and the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM). Being the Pest Management Center of the Institute, Midsayap maintained collaborative initiatives with the University of Southern Mindanao (USM), and other members of the R4DE network to respond not only to regional issues besetting its areas of responsibilities (AORs), but also to the interregional or national concerns.

In 2023, the Station occupied itself with five program-based, two division-based, two station-initiated, and four extra-core-funded R4D&E projects. In addition, 12 projects were handled, nine of which were under the Research Sector and four under the Development Group. Midsayap zeroed in on the use of Entomopathogenic fungi (EPF) as control agents in crop protection research. One potential EPF was morphologically and molecularly characterized and subjected to a series of bioassay trials, after which, the ability of EPF-MES-P01 to infect and kill Brown Planthopper (BPH) after seven days of exposure was confirmed. The percentage mortality of MES-P01 is comparable to the two known EPFs. The promising preliminary results will be validated, while concentrations will be explored to efficiently control BPH and possibly other major insect pests. The best growing medium using various agricultural by-products to improve the EPF delivery method will also be identified.

Moreover, rice production areas in Midsayap are often threatened with pest problems due to the asynchronous planting pattern in the irrigated rice ecosystem. Through the Geographic Information System (GIS), the schedule of irrigation water release in different water streams was clustered and mapped out. Generally, the planting schedules of clustered Irrigators' Associations (IAs) were asynchronous. The trend showed that White Stemborer (WSB) light traps, confirmatory of field damage, and presence of field population could be influenced by the release of irrigation water in the field and possibly

by weather factors. WSB light trap population and weather factors will be correlated with each other once weather data from PAG-ASA are made available.

The Branch Development Initiatives project "Accelerating Adoption of Sustainable Rice-Based Technologies in the Zamboanga Peninsula, SOCCSKSARGEN, and BARMM" was implemented with the following components: (1) Technology Scaling component: focused on addressing farmers' issues in Regions 9 and 12; (2) Training and Extension Support Services (TESS): recent developments and breakthroughs in rice science and technologies were disseminated to Agricultural Extension Workers (AEWs) and other Extension Service Providers (ESP); (3) Station's Palayamanan Plus: improve farm productivity and profitability of the rice-based farming communities (4) Communication Support: boost the dissemination of rice production technology information. Through these modalities, the BDI project reached a total of 2,415 participants with 1,306 (54.08%) men and 1,109 (45.92% women).

The Philippine Rice Information System (PRiSM) was activated in partnership with Regional Field Offices (RFOs), as data were collected in selected monitoring fields of three regions covered. Each semester, 120 points were validated per region, securing a map accuracy ranging 92-96%. Stratified rice areas were validated to generate seasonal rice area cultivated, the start of season maps, and yield estimates. The extent of the occurrences of La Niña and El Niño phenomena was tracked and flood-prone rice areas were estimated. Actual or real-time monitoring, national retooling, and evaluation workshops were also conducted through a face-to-face platform to capacitate regional facilitators and update PRISM protocols. Outputs and information generated through PRiSM can now be accessed at https://prism.philrice.gov.ph.

Three program-based projects are also lodged at the station: Rice Seeds System (RSS), Rice Business Innovations System (RiceBIS) 2.0, and SMART-ICM. For 2023, RSS strictly implemented the protocols to maintain the genetic purity and other qualities of seeds by carrying out standard and well-organized operating procedures through internal seed quality control. Inspection and verification of farm, post-harvest, and processing implements were updated and encoded in the Rice Seed Information System (RSIS) application. Seeds produced were also subjected to Grow-Out Tests (GOT) to ensure that their genetic purity is maintained. The project rolled out a series of activities to foster close cooperation among the corporate sector, Local Government Units (LGUs), and other stakeholders along the rice value chain within the community.

RiceBIS 2.0 achieved the following: (1) collaborative forum with stakeholders, experts, and representatives from various disciplines; (2) trained SanGlad and Libungan RiceBIS Farmers Association (FA) on Good Agricultural Practices (GAP) through a partnership with DA-PhilGAP; and (3) generated net incomes of PhP154,780.24 from milled rice for Libungan RiceBIS FA and PhP55,396.00 for SanGlad FA. On the other hand, SMART-ICM scaled out Rice Integrated Crop Management (ICM) technologies for direct-seeded rice (DSR) through a systematic technology transfer and farm cluster approach.

On insect pests screening, 125 entries and 124 were respectively evaluated against WSB and Rice Black Bug (RBB) damage in both seasons. Some 50-80% of the entries exhibited resistance to WSB and RBB under field conditions. Also, 129 entries in the DS and 123 in the WS were evaluated against rice blast (Rb), sheath blight (ShB), bacterial leaf blight (BLB) and Rice Tungro Virus (RTV) diseases. A total of 82 entries were resistant to RB, 4 for ShB, and 25 for BLB, while most of them (81.40%) showed resistance to RTV due to minimal disease pressure. Similar trend was also observed during the WS, except that no entry was resistant to ShB.

In its last year, "Deployment of Genetic Resistance in the Management of Rice Black Bug, Scotinophara coarctata (F.)" evaluated 1,576 entries in DS and 558 entries in WS following the protocol of Heinrichs, 2007. Unfortunately, no entry exhibited resistance at 100 days after transplanting (DAT), as was observed in F4s and F5s rice lines. Of the 1,037 entries evaluated for RBB reaction at 100 DAT, none was resistant although 526 lines were intermediate, including check varieties.

Deepwater lines were seed-increased and evaluated, and traditional varieties were collected. Among the five lines and varieties, Nagara exhibited notable differences in terms of plant height. The varieties produced 13 F1 crosses that are being evaluated for blight, tungro resistance, and floating rice characteristics. The project "Nutritionally Enhanced Rice Finishing and Delivering Golden Rice and High-Iron and Zinc Rice Varieties" facilitated various engagements and attended partnership events, exhibits, and outreach programs.

The Rice Competitiveness Enhancement Program maintained its engagement with farmers, technicians, and various agencies through the following components: (1) RCEF - Seed Component that aims to expedite the adoption and access of farmers to inbred certified rice seeds; (2) RCEF-Strategic Communication that heightens awareness, skills, and acumen on rice production technologies through quad media and other communication initiatives; and (3) RCEF - Extension that strengthens the knowledge, skills,

and confidence of the farmer- technicians on Pest and Nutrient Management; and (4) RCEF PalaySIKATAN that showcases and demonstrates the benefits of using certified seeds and mechanized farming systems.

Aside from the core functions, the station's Agricultural and Biosystems Engineering (ABE) unit is in place with five major functions: (1) Technical Services – provides support through capacity enhancement; (2) Custom service provision - available to internal and external clients; (3) R4D operations – caters to the needs of the station's operations through research rice engineering and mechanization technologies; (4) Vehicle monitoring and dispatching – organizes, and documents vehicle dispatch and maintenance; and (5) Sustainability - adheres to and ensures the continuity of systematic processes through skills enhancement of personnel and its clients. For 2023, it handled 815 approved travel orders for vehicle dispatch, and 18 agricultural machines repaired.

CORE-FUNDED PROJECT 1:

Harnessing Emerging Agricultural Technologies for Mindanao Rice Protection Strategies (HEATMinRice)

Gina D. Balleras, Isagane V. Boholano, Cristine G. Flores, Michelle S. Ocenar, Excellaine M. Elumba, Liza Mae Amor D. Domo, and Leah E. Endonela

This project aimed to: (1) optimize the mass production, formulation, and application protocols of fungal entomopathogens; (2) establish entomopathogenic fungi (EPF) as rice endophytes in rice and their effects on rice blast, Pyricularia oryzae, and sheath blight, Rhizoctonia solani; (3) survey on the seasonal population dynamics and damage of WSB at different planting schedules.

Two known and one unknown EPF were characterized based on morphological and molecular techniques, and their efficacies against BPH were compared. Based on the results, morphological data did not complement the results of molecular analysis. The sequence data of 3 isolates, namely: MES-M01, MES-B01, and MES-P01 were highly homologous to Beauveria bassiana, Metarhizium anisopliae, and Micruacus gracilis, respectively. After several trials, the ability of EPF-MES-P01 to infect and kill BPH after seven days of exposure was confirmed.

The promising preliminary results will be validated, while concentrations will be explored to efficiently control BPH and possibly other major insect pests of rice. The best growing medium using various agricultural by-products to improve the

EPF delivery method will also be identified. The potential of these isolates as rice endophytes can be further explored following the newly established protocol on seed inoculation and subsequent endophytic colonization.

On the other hand, through the Geographic Information System (GIS), the schedule of irrigation water release in different water streams was clustered and mapped out. Generally, planting schedules of clustered IAs were asynchronous. The trend showed that WSB light trap, confirmatory of field damage, and the presence of field population, could be influenced by the release of irrigation water at the field and possibly by weather factors. WSB adult population is generally higher during dry season when standing crops are at vegetative to early reproductive phases, and decreases during wet season. The observed WSB damage is very low at reproductive to ripening, and is not commensurate to the WSB light trap population. Hence, the frequency of sampling will be increased to efficiently capture the WSB field population.

1. Optimization of mass production, formulation, and application protocols of fungal entomopathogens

Characterization and identification of fungal isolates collected from infected insect pest cadavers

Morphological characters of Entomopathogenic fungi (EPF). EPF isolates grown in a Potato Dextrose Agar (PDA) medium exhibited distinct morphological features at different growth stages. Initially, at 3-4 DAI, EPF-MES-M01 had white powdery developing colonies that gradually changed to light green and then to olivaceous green at maturity; composed of cylindrical conidia borne in either long or short parallel chains with densely intertwined conidiophores forming compact hymenium. In contrast, EPF-MES-B01 produced white compact, feathery, and lanose colonies and gradually toward maturity at 21-28 DAI, the colonies became yellowish-white with smooth rugose cottony-like structure. Meanwhile, EPF-MES-P01 had white colonies, particularly the edges. The latter growth gradually turned powdery or suede-like lavender.

Bioassay of known and unknown EPF against Brown planthopper (BPH)

Virulence of EPF against BPH. The pathogenicity of the MES-B01, MES-P01, and MES-M01 against BPH was evaluated for three consecutive trials. One trial was discarded due to higher (25-30%) BPH mortality. EPF isolates with higher concentrations (1x108) showed a greater efficiency in killing BPH than EPF isolates with lower concentrations. Interestingly, the newly discovered EPF, MES-P01 performed the same with the two known EPF, M. anisoplae (MES-M01) and EPF, B. bassiana (MES-B01). These early results imply that MES-P01 holds great potential as a biological control agent for incorporation into an integrated pest

management against BPH and possibly other major insect pests of rice. Fungal suspension concentration will also be increased.

2. Surveillance on the seasonal population dynamics and damages of white stem borer (WSB) at different planting time schedules in Midsayap rice production areas

Characterization of Midsayap rice production areas. These irrigated lowland areas are divided into three streams: downstream, midstream, and upstream. Each stream has its schedule of NIA water release, utilization, and cut-off, and is further divided into water divisions. Planting dates or schedules have a wide variation across water divisions.

Characterization of study sites. The locations of the study sites were based on the actual schedules of water release provided by the NIA-LIBRIS. These were digitally mapped through Global Positioning System (GPS). Four clusters and five clusters were respectively used in the DS and WS as field monitoring sites. Each cluster encompassed 2-3 barangays with a field monitoring site area of 2,500m2 wherein individual light traps were installed to regularly monitor the occurrence of WSB, RBB, planthoppers, and leafhoppers.

Farmers' crop and pest management practices. Each cluster was planted twice a year, where preparation, sowing, and transplanting practices were not uniform. Not many of the farmers were aware of the seed classes, with most of them using good seeds from co-farmers. For nutrient management, farmers applied inorganic fertilizers based on their previous yields with a rate of 70-20-30 NPK. Their water source is NIS and they irrigate their fields 4-5 times. In managing pests, specifically the WSB, applying pesticides four times based on the crop stage was the practice. Most of them were not aware of pest forecasting, insect pests' life cycle, and integrated pest management (IPM) principles.

Population dynamics of White Stemborer (WSB) and its damage. WSB population build-up started in August and drastically increased until December 2023 DS. During the fallow period, WSB population declined and grew again from November to February. Traces of WSB damage were mostly observed at the vegetative phase but started to ease as the crops matured. Occurrence of WSB and its damage is neither affected by the schedule of water release nor planting schedule and weather conditions.

CORE-FUNDED PROJECT 2:

Accelerating Adoption of Sustainable Rice-Based Technologies in Zamboanga Peninsula, SOCCSKSARGEN, and Bangsamoro Autonomous Region in Muslim Mindanao (BARMM)

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The project aims to facilitate technology dissemination while educating rice farmers to hasten technology adoption in the target sites. Also, it provides solutions to specific rice production constraints to help pull up rice yields and farmers' productivity.

Project component 1: The Technology-Scaling component addressed issues among rice farmers in Regions 9 and 12 where rice productivity is low due to limited technical knowledge and access to rice technologies. "Rice Experts to the Barrios" was mobilized among 72 rice farmers in Region 9 (Lower Irasan, President Manuel A. Roxas, Zamboanga del Norte) and Region 12 (Midpapan I, Pigawayan, North Cotabato). Through the rice experts, technology was disseminated by putting up a techno-demo farm in each area, together with the farmer-cooperators. Technical support was extended through a series of site visits and lectures such as on nutrient, water, pest management, and Palayamanan Plus.

Project component 2: Recent developments and breakthroughs in rice science and technologies were disseminated to Agricultural Extension Workers (AEWs) and other extension service providers.

Recipients of information and training were local executives and new agriculture graduates in Regions 9, 12, and BARMM. Curriculum was anchored on the PalayCheck System and Palayamanan Plus in six batches of training conducted: (1) 3 Appreciation Courses; and (2) 3 Rice Boot Camps.

Project component 3: Station's Palayamanan Plus aimed to improve farm productivity and profitability of the rice – based farming community. The model farm has been established on-station and off-station at Renibon, Pigkawayan, North Cotabato. This component showcased rice farming systems that employ cost-saving and yield-enhancing management practices, maximizing the utilization of resources. The farms included rice, vegetable, mushroom, vermicomposting, and poultry/tilapia production. Inbred and hybrid rice were also demonstrated,

altogether reducing farming risks and enhancing sustainability, productivity, and productivity.

The On-station farm grossed PhP116,578.00. The Off-station model grossed income of PhP24,030.00 from its vegetable production, and netted PhP17,010.00. On-Station and Off-Station Varietal Technology Demonstrations were also established at (1) Barangay Darussalam, Languyan, Tawi-Tawi; (2) Bambad, Isulan, Sultan Kudarat; (3) Tayugo, Isulan; (4) Bual Sur, Midsayap, North Cotabato; (5) Bual Norte, Midsayap; and (6) Lagag, Sindangan, Zamboanga del Norte. The top three performing varieties were: (1) LP 201H with 7.27 t/ha; (2) NSIC Rc204H with 6.62 t/ha; and (3) Rc622 with 5.6 t/ha.

Moreover, Lakbay Palay/Farmers' Field Days/Cross visits were participated in by 843 stakeholders (473 men; 370 ladies).

Project Component 4: The Communication Support Component aimed to boost the dissemination of rice production technologies. It conducted eight Communication Needs Assessments (CNA), facilitated five information caravans, handled 100% of BeRICEponsible activities, produced and distributed three campaign collaterals, and maintained one social media account. In partnership with the National Irrigation Administration, the CNAs involved 131 (99 men; 32 women) Irrigators Association (IA) presidents from the provinces of the station's AOR. Acting on the consolidated CNA results, information caravans on rice pests, diseases, and nutrient management were conducted and were attended by 368 (237 men; 131 women) farmer-participants. The info caravans were incorporated with the knowledge-sharing and learning (KSL) activities of the Rice Competitiveness Enhancement Fund (RCEF) – Strategic Communication. In celebration of the 2023 National Rice Awareness Month (NRAM), the station conducted six activities with 897 (415 men; 482 women) participants to promote the consumption of local rice and its other alternative crops.

CORE-FUNDED PROJECT 3:

Operationalization of the Agricultural and Biosystems Engineering (ABE) Unit in PhilRice Midsayap in support of R4D

Nasrudin S. Gandawali, Sailila E. Abdula, Peter Lyod P. Sabes, Isagane V. Boholano, Abdulradzak P. Makakua, Rolando R. Narisma, and Arnel C. Cadiao

The ABE unit has five major functions: (1) Technical Services – provides support through capacity enhancement; (2) Custom service provision – available to

internal and external clients; (3) R4D operations – research rice engineering and mechanization technologies; (4) Vehicle monitoring and dispatching - organizes, and documents vehicle dispatch and maintenance; and (5) Sustainability - adheres to and ensures the continuity of ABE's systematic processes through skills enhancement of personnel and its clients. The ABE catered to the requests and demands for technical assistance and managed the repair and maintenance of farm machinery and equipment from land preparation to post-harvest facilities. It also developed electronic procedures to monitor the processes and get feedback through performance data collection and findings to improve service delivery to clientele.

The unit also rendered lectures and technical support on training under the RCEF - Training of Trainers (TOT).

CORE-FUNDED PROJECT 3:

Improvement of the Rice Seeds System through Quality Seed Production Operations at PhilRice Midsayap

Isagane V. Boholano and Mohammad Baser J. Saydin

High-quality seeds of suitable varieties are major components in crop production. Thus, the Rice Seeds System (RSS) at Midsayap continuously improves its seed production operations to produce seeds that are genetically pure, suitable, preferred, and in sufficient quantities. During seed production, strict attention was accorded to maintaining genetic purity and other qualities of seeds by carrying out standard and well-organized operating procedures. It institutionalized the internal seed quality control team that conducted three field inspections (vegetative, reproductive, and maturity phases). The team checked all harvest machines, post-harvest, and processing facilities that immediately update and encode their observations in the Rice Seed Information System (RSIS) application. All seeds were also subjected to Grow-Out Tests (GOT) to make sure that seeds of certain rice varieties were maintained in the true form of their genetic purity in each seed lot.

The 60-ha Registered Seeds (RS) production area at the station got an average of 99.89% field purity; 99.69% field purity at the USM Kabacan areas. For Foundation Seeds (FS), the 3.5 ha production area got an average of 99.93% field purity, with 23 separate varieties. Furthermore, GOT results reflected that higher seed classes certified by NSQCS got a higher number of off-types and were comparable to

field-rejected seeds. This implies that some of the field-rejected seeds have the potential to pass as registered or certified seeds had they undergone laboratory analysis.

CORE-FUNDED PROJECT 4:

Scaling out Rice Integrated Crop Management Technologies for Increased Yield and Reduced Production Cost

Ommal H. Abdulkadil, Raffy S. Salazar, and Norman G. Anta

The SMART-ICM program proposed a potent initiative to address the limited adoption of mature rice production technologies developed by PhilRice. Despite efforts to disseminate these technologies, their sporadic deployment to target recipients or communities have hindered widespread adoption. The project focused on scaling out Rice Integrated Crop Management (ICM) technologies for direct-seeded rice (DSR) through a systematic technology transfer and farm cluster approach.

RiceBIS farmers (79) with 101.25-ha rice area were identified as farmer-cooperators in five select Barangays of Libungan, North Cotabato. The project carried out a series of activities to foster close cooperation among the corporate sector, LGUs, and other stakeholders along the rice value chain in a community. A ceremonial crop establishment was conducted with 150 participants, thus fostering convergence among various entities involved in rice production within the area.

CORE-FUNDED PROJECT 5:

Marketing Innovations: Linking farming communities with the market

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

The RiceBIS 2.0 program aims to create a more sustainable, inclusive, and resilient rice industry that can adapt to the changing needs of consumers and the environment. It encourages rice farmers and agri-entrepreneurs to embrace innovation and entrepreneurship as key drivers of growth and development and to work together to build a more prosperous future for themselves and

their communities. The program consists of three projects, namely: (1) Process Innovations: Transforming Farmers towards Value Chain -Oriented Rice-Based Farm Cluster Enterprises ; (2) Product Innovations: Integrity Assurance for Safety and Quality; and (3) Marketing Innovations.

Process Innovation. The project aimed to transform the farmer clusters toward commercially viable value chain-oriented rice-based farm cluster enterprises to drag up on- and off-farm incomes. In 2023, the project evaluated the two existing communities of RiceBIS in Midsayap and Libungan, North Cotabato. Results point out that both SanGlad RiceBIS FA Farmers' Association (SanGlad RFA) and Libungan RiceBIS FA (Libungan RFA) have a medium level of business capacity, or the FCA is almost ready to engage sustainable markets but needs improvement in some aspects. Milled Rice for sustained enterprise was identified in both 2 FCAs. The Site Working Group (SWG) Meeting brought stakeholders together, experts, and representatives from various disciplines to discuss and coordinate activities related to the functioning and development of a particular site.

Not only that, in an initial evaluation of the arising problems in communities, majority of the officers and respondents interviewed voiced out the need to source additional capital for bulk procurement of paddy rice to meet the required volume of the market and achieve economies of scale. This challenge was addressed by the program and linked both FAs to the DA-Agricultural Credit Policy Council (DA-ACPC), which helped them draft a business plan as one of the requirements to avail of a start-up capital.

Product Innovation. The project operated hand in hand with the two other RiceBIS 2.0 projects so farmers can gain more by offering quality and market-driven products. It enabled both SanGlad and Libungan to enhance the capacity of their farmer-members who were trained on Good Agricultural Practices (GAP). Through a partnership with DA-PhilGAP personnel, 51 farmers underwent two days of training as a prerequisite in applying for the certification of their farms. They were taught the principles and importance of product safety and quality in producing milled rice. The training ended with a benchmarking activity in a PhilGAP-certified farm in Tacurong City, Sultan Kudarat.

Market Innovation. The project aimed to create, improve, and widen farmers' target market by linking them to institutional markets and introducing new marketing and distribution processes. In Libungan and Midsayap, strategic marketing and partnerships have been established, allowing farmer-members to process their produce to milled rice, have bulk deliveries to identified partners, and boost their income. From zero to a PhP 154,780.24 net income from milled rice and PhP55,776 from rice bran was earned by Libungan. SanGlad generated net income from milled rice amounting to PhP55,396 and an additional PhP6,420 from rice bran. The incomes of both associations prove that milled rice marketing is profitable.

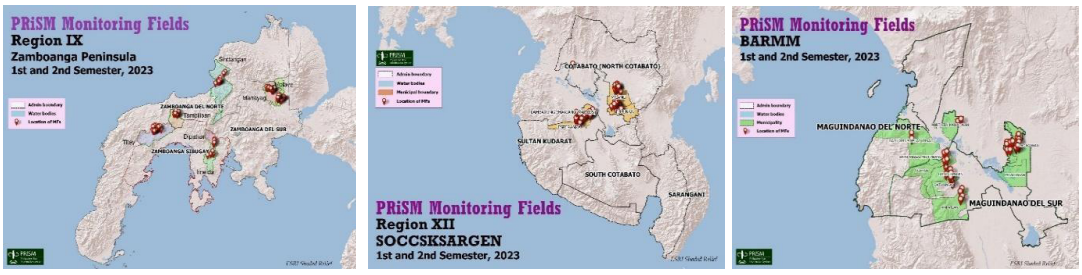
CORE-FUNDED PROJECT 6:

Philippine Rice Information System (PRiSM)

Gina D. Balleras, Liza Mae Amor D. Domo, and John Kenneth F. De Leon

The project supports the Department of Agriculture (DA) in its strategic planning, decision-making, project implementation, and disaster preparedness. With a good partnership with the DA-Regional Field Offices (DA-RFOs), PRiSM is evolving from 2014 up to the present. A total of 120 monitoring fields were strategically distributed and monitored monthly in three regions following the satellite pass schedule based on the footprint from Sentinel 1A by synthetic aperture radar (SAR) (see Figure below). The estimated total rice area planted in the country for the 1st semester was 2,062,702ha, which increased by 1.64% in the 2nd semester (2,401,100ha) planted extensively from November to January (1st semester) and June to August (2nd semester). Among the three regions, Region 12 consistently had the largest rice area cultivated in 2023 at 140,275ha in 1st sem and 165,274ha in 2nd sem. Meanwhile, the estimated rice areas in Region 9 for the 1st and 2nd semesters were 68,757ha and 74,284ha, relative to the rice areas detected in BARMM at 50,786 ha and 58,445ha, respectively.

Widespread planting activity in Region 12 and BARMM happened in October and May (1st semester); Region 9 was in December and June (2nd semester). The average rice yields per semester in Regions 9 (3.68 and 4.64t/ha) and BARMM (3.08 and 3.65t/ha) increased. Average palay prices ranged from PhP12.00/kg to PhP27.50, and PhP15 to PhP29 for fresh and dried, respectively. Each semester, 120 points were validated per region, securing a map accuracy of 92-96%. The extent of the occurrences of the La Niña and El Niño phenomenon were tracked and rice areas at risk of flooding were estimated. The total flooded standing crop in the regions for 1st semester was 27,334ha, and in 2nd sem was 54,314ha, of which vegetative was the major growth phase. Capacity enhancement was well-executed and enabled participants to improve their knowledge and skills in field operation, strong partnership with the DA, and non-stop project implementation.



PRiSM monitoring fields in Regions 9, 12, and BARMM for the 1st and 2nd semesters, 2023.

Seed Distribution Component

Ommal H. Abdulkadil, Norodin M. Dipatuan, Dherby Jey A. Sillon, Nerio F. Pon, Richelieu M. Notorio, Saud I. Mama, Anisa B. Solaiman, Ezrafil E. Nandang, Jan Dave O. Panaguiton, Monera S. Pendaliday, Eloisa G. Oblero, Muhamad C. Sumael, Salih S. Zacaria, Joseph Elmer Fuerte, Melissa G. Concepcion, Haron P. Bansilan, Jessica A. Dumlao, Martin P. Jawom, Jose Nori M. Buhat, and John Kenneth F. Gulmayo

The RCEF – Seed Program (RCEF - Seed) develops, propagates and promotes inbred rice seeds to farmers for free in coordination with Local Government Units (LGUs) in Regions 9, 12 and BARMM. Specifically, it aimed to (1) increase the adoption of certified seeds (CS) of inbred rice; (2) improve quality, availability of, and access to inbred rice; and (3) increased equitably the number of farmers' organizations engaged in seed production and trade. In 2023, 12 seed cooperatives engaged in seed production and trade were accredited as RCEF seed suppliers covering Regions 9, 12 and BARMM.

These Seed Coops were contracted to produce 221,824 bags of CS at 20kg/bag for DS 2023 and 280,142 bags at 20kg/bag for WS to guarantee the availability and access to inbred rice seeds in the regions.

Strategic Communication

Ommal H. Abdulkadil and Kimbie A. Pedtamanan

The component is aimed at strengthening documentation and information dissemination under the project. It developed gender-sensitive information, education and communication (IEC) materials on the production and use of certified seeds and appropriate ICM, and distributed these to women and farmer-beneficiaries through strategic extension and media platforms.

In 2023, two IEC materials were produced. One was an impact video taken from the Salam Farm School situated at Siay, Zamboanga Sibugay. It showcased the learnings acquired by farmers from the RCEF through Farmers Field School. The man and lady interviewees outlined the best technology and farming practices they adopted after the season-long training. The Abonong Swak brochure localized in the Bisayan language was the other IEC material produced primarily for Zamboanga del Norte based on the Communication Needs Assessment (CNA).

Extension Component

Ommal H. Abdulkadil, Gilbert V. Romarez, Mark Macadildig, and Rhealyn Nambong

Eight batches of TOT on Pest and Nutrient Management (PNM) were conducted with 225 (133 men; 92 ladies) participants with an average GIK of 71.83 %. Three batches of short courses were rolled out with 86 (59 men; 27 ladies) farmer-participants.

Participants collected insects, weeds, and diseased plants in the station's experimental field. The participants rated all the criteria of this activity as excellent and they also enjoyed the cooperation, sharing of ideas and teamwork with co-trainees, and the very hands-on facilitators.

PalaySikatan

Sailila E. Abdula, Gilbert V. Romarez, Martin P. Jawom, Jose Nori M. Buhat, Nurjohn M. Subat, Monclair T. Vicente, John Kenneth Gulmayo, and Yasrinah A. Yacob

Showcasing the benefits of using inbred certified seeds and mechanized farming systems, PalaySikatan demonstrates the national and regional recommended and newly released varieties to create farmers' option in increasing their productivity.

Established were f 23 sites in Regions 9, 12 and BARMM.

Among six varieties tested in Region 9, NSIC Rc 506 averaged highest at 5.21t/ha in six sites in Zamboanga Sibugay and Zamboanga del Sur during DS 2023 and 6.15t/ha during WS. Rc 400 averaged at 5.98t/ha in eight sites in Sarangani and South Cotabato during DS 2023. Rc 222 yielded highest at 6.18t/ha and 6.66t/ha during 2023 DS and WS in that order.

The walk-behind transplanter was demonstrated in seven PalaySikatan sites in Region 9; Seed Spreader for direct seeding in four sites and riding-type transplanter in four sites in Region 12; and drum seeder and walk-behind transplanter in four sites in BARMM during DS 2023. The same machines were demonstrated in the WS. Field days (17) were conducted in the three Regions in 2023 which about 3,600 farmer-participants attended - 60% of whom were men. They preferred NSIC Rc506 because of its maturity (medium), yield performance, good eating quality, and tolerance to pests. Rc 222 and Rc 160 were also picked in Region 9; Rc 440 and Rc 438 in Region 12; and Rc 160 and Rc 438 in BARMM.

RCEF-FUNDED PROJECT 1:

National Cooperative Tests

Gina D. Balleras, Cristine G. Flores, Michelle S. Ocenar, and Rodith M. Getigan

Screening against major rice diseases

Evaluated were 129 entries in DS and 123 in WS against rice blast (Rb), sheath blight (ShB), bacterial leaf blight (BLB) and rice tungro (RTV) diseases. Of the DS entries, 82 lines showed resistance to RB, 25 to BLB, and 4 to ShB; most of the entries (81.40%) showed resistance to the low RTV pressure. WS entries (34) showed resistance to RB, 31 to BLB, and 121 lines resisted the very low RTV pressure. None of the entries manifested resistance against ShB.

Screening against major insect pest

Entries (125) were evaluated against WSB and RBB damage at vegetative and ripening phases in the 2023DS, 39 of which were resistant to deadhearts; 106 to whiteheads. For RBB damage, all entries showed resistance to deadhearts; at the ripening phase, six entries were resistant to whiteheads. Closely similar results surfaced in 2023 WS.

EXTRA CORE PROJECT 1:

Fungal Entomopathogens from Insect Cadavers and their Potential Effects as Endophytes in Rice

Gina D. Balleras, Leah E. Endonela, and Michelle S. Ocenar

Entomopathogenic fungi (EPF) can colonize and establish symbiotic relationships with plants as endophytes. Recently, EPF has been reported to suppress insect pests and disease-causing pathogens by inducing plant resistance to pests' damage. However, the successful establishment of select EPF remains fragmentary. This study aims to characterize and identify the collected EPF isolates from infected insect cadavers using light microscopy and molecular techniques. The isolated fungi were cultivated in petri dishes using potato dextrose agar medium and their mycelia separated after seven days of incubation. DNA amplification of the internal transcribed spacer (ITS) region indicated that the isolates obtained from N. lugens cadaver belong to B. bassiana and M. anisopliae. Rice seeds inoculated with fungal suspension of EPF-Beauveria and Metarhizium germinated better and had longer and heavier roots and shoots than the uninoculated rice seeds.

EXTRA CORE PROJECT 2:

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

Gina D. Balleras, Rodith M. Getigan, and Julius L. Guloy

Field screening of elite wild rices-derived lines, and cultivated varieties

Breeding of RBB-resistant varieties is considered a practical means of controlling this pest. To identify good donors of resistance genes against RBB, field setups of elite lines, cultivated varieties, and wild rice-derived lines were established under field conditions. The screening focused on the responses of rice lines against RBB damage and populations at 40, 60, 80, and 100 DAT as described by Heinrichs (2007). Established were 1,576 entries in DS and 558 entries in WS, following the protocol of Heinrichs, of which 11 DS entries showed resistance to RBB. For WS, only one entry (RBB 316) showed moderate resistance to RBB at 80 DAT; no entries manifested resistance at 100 DAT. For F4s and F5s rice lines, 1,037 entries including check entries were evaluated for RBB reaction at 100 DAT. No entry exhibited resistance but 526 lines showed intermediate reaction.

EXTRA CORE PROJECT 3:

Development of Breeding Lines for Deep Water or Floating Environments

Sailila E. Abdula, Mahadeya S. Pakil, and Badrudin S. Unas

The project aimed to produce floating/deepwater rice lines suitable and adaptable in the target area that is underwater throughout the year. Three IRRI deepwater and two traditional rice lines were screened for agro-morphological characters. Nagara exhibited notable differences in terms of plant height (see Table below). F1 crosses (13) are still being evaluated for blight and tungro resistance, and floating rice characteristics. The preliminary results were promising but an ideal variety for flash-flood areas must be identified. A graduated stick that serves as a water meter in such areas will record the levels of water. Establishment of setups must follow the traditional practices of farmers living in such areas where sowing of seeds begins in March when water is low.

Table 16. *Qualitative agro-morphological traits of **Madhukar, Nagara,** and **Tapus** rice cultivar during vegetative stage. DA-PhilRice Midsayap, Dry Season 2023*

Rice Lines	Leaf Sheath		Leaf Blade				Leaf Pubescence	Auricle Color	Collar Color	Ligule		Flag Leaf
	(Basal) Color	Anthocyanin Coloration	Anthocyanin Coloration	Distribution of Anthocyanin	Intensity of Green Color	Attitude (Penultimate Leaf)				Shape	Color	(Attitude of Blade) *early observation
Madhukar	Green	Absent	Absent	Absent	Medium Green	Droopy	Glabrous	Yellow Green	Light Green	Acute	White	Erect
Nagara	Green	Absent	Absent	Absent	Dark Green	Semi-erect	Intermediate	Yellow Green	Light Green	Cleft	White	Semi- Erect
Tapus	Green	Absent	Present	Absent	Dark Green	Semi-erect	Intermediate	Yellow Green	Light Green	Cleft	White	Erect

EXTRA CORE PROJECT 3:

Nutritionally Enhanced Rice-finishing and Delivering Golden Rice and High-iron and Zinc Rice Varieties

Sailila E. Abdula, Ommal H. Abdulkadil, Khidhr Ahmad A. Murray, Omar A. Mamento, and Kristian Mae P. Gutierrez

The Station has allotted half hectare each for Malusog Rice seed and commercial production; techn-demo sites were also put up in Maguindanao del Norte. In WS 2023, the MR team facilitated various engagements and attended partnership events, exhibits, and outreach programs.