

2023

PhilRice R&D Highlights



NEGROS BRANCH STATION



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PhilRice Negros

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EXECUTIVE SUMMARY

DA-PhilRice Negros addresses regional issues on low productivity, profitability, adaptability to climate change impacts, lack of labor, among other concerns. Its R&D projects were pointed to increasing the productivity and profitability of rice farmers and stakeholders of Western and Central Visayas.

This year, the station established and pursued four branch research initiatives to develop integrated crop management approaches for water-scarce environments (VIZ 231 000), organic rice production (VIZ 232 000), improved direct seeding (VIZ 233 000), and the rice-sugarcane intercropping system (VIZ 234 000). A branch development initiative (BDI), the Collaborative Rice Extension for Achieving Community Transformation and Empowerment (CREATE) for Regions 6 and 7 envisions to increase productivity and profitability of rice farmers by enhancing knowledge-sharing activities and to address location-specific concerns through collaborative partnerships. The project also maintains a Palayamanan Model and organic rice production demonstration at the station. The Negros station also implemented six program-based projects and studies, and two externally funded projects.

CORE-FUNDED PROJECT 1

Rice Research for Development (R4D) for Water-scarce Environment in the Visayas- Phase II

Cielo Luz C. Mondejar, Gerald E. Bello, and Leo T. Sta. Ines

Visayas regions are highly vulnerable to the dreaded impacts of climate change, including sea level rise, more frequent weather events, rising temperatures, and extreme rainfall. To address the problem of water scarcity, the project was proposed to develop a model for managing crops under this condition. To characterize rainfed environments in Negros Occidental

based on their water scarcity, water data were collected from four sites: (1) PhilRice Negros, Murcia, (2) Brgy. DSB, Pontevedra, (3) Cambahug, Hinigaran, and (4) Su-ay, Himamaylan City. In 2023, rainfall and groundwater data in these four sites were collected using a rain gauge and piezometer. Other data were collected to define the conditions in the sites using satellite data (Sentinel 2 at 10m grounded resolution) obtained from EOS crop monitoring from different time points. With rainfall as the only source of water for rice crops at PhilRice Negros and Himamaylan, only ratoon crop was feasible to increase the rice cropping intensity in the areas. However, ratoon crop yield was very low (<0.3t/ha) in all of the varieties. In Hinigaran, irrespective of the type of rice cropping, a second crop was not recommended on account of extremely low yield (less than 500kg/ha). Seventeen rainfed varieties previously selected for their ratooning ability were evaluated in four sites, none of which could yield 1t/ha. It may be because water was only at saturation or below during the ratoon period, thus no fertilizer could be applied. Water-related data will be obtained and field experiments will be set up for another cropping cycle to validate the results.

CORE-FUNDED PROJECT 2

Validation and Improvement of Existing Management Practices for Organic Rice Production

Alvin D. Palanog, Ellie Zandrew S. Ganela, May O. Palanog, and Le-Ann G. Dogeno

Organic farming is one of the flagship initiatives of Negros Occidental, the so-called Organic Bowl of Asia. PhilRice Negros, being the agency that leads the development of high-yielding and cost-reducing technologies, and practices centered on rice production, needs to live up to the expectations of not only farmers but also stakeholders of organic agriculture. Hence, this study has to calibrate and improve existing management practices on organic rice production.

The project evaluated the efficacy of popular nutrient concoctions used by organic rice farmers such as fermented plant juice (FPJ), fermented fruit juice (FFJ), and Golden Apple Snail amino acid (GAA). It used commercial foliar fertilizer as positive control and water as negative control. FPJ use resulted in substantially higher productive tillers and yield than other treatments. The project also investigated plant spacing, age of seedlings, and seedling density for transplanted systems. Wider planting distance (25x25cm) and lower seedling density (1 seedling/hill) presented remarkable yield advantages over other treatments. Evaluation of organic-based biopesticides for efficacy against rice bugs found that tobacco

extract at 33.33% concentration recorded higher rice bug mortality than other biopesticides, not to mention the positive control (Cypermethrin).

CORE-FUNDED PROJECT 3

Improving Direct Seeding System in Western and Central Visayas

Alvin D. Palanog, Rica M. Rentino, Rene E. Valdez, Garry R. Roda, and Dindo King M. Donayre

Western Visayas is one major rice-producing region in the country where DSR is the most common method of crop establishment. The region's per unit area production (kg/ha) is relatively low compared to the national average. DSR reckons with several challenges that prevent farmers from achieving optimum yields such as appropriate management practices and problems with weeds, particularly weedy rice. Addressing these challenges can help boost the productivity and profitability of rice farmers in the Visayas.

The project assessed the extent and intensity of weedy rice (WR) infestation in major DSR provinces in Western Visayas and observed 5-10% WR infestation in farmers' fields. A baseline survey documented the practices of 250 DSR farmers in Iloilo, Capiz, Antique, and Negros Occidental that might be influencing the prevalence of weedy rice in their fields. One practice that favors the prevalence of weedy rice is the short land preparation period (2 weeks) with no fallow period observed. Also, farmers tend to augment seeds from RCEF with their saved seeds. Farmers also do not know much about weedy rice. More than 100 weedy rice biotypes were collected from different provinces and 32 of them have already been morphologically characterized using the Rice Biodiversity Manual.

A replicated field experiment at PhilRice Negros evaluated various seeding rates, varieties, and direct seeding options in terms of yield and selected agronomic traits. Treatments (T) were: T0 - Manual broadcast with 160kg/ha seeding rate; T1 - Manual broadcast with 40kg/ha seeding rate; T2 - Drumseeder with 40kg/ha seeding rate; T3 - Seed spreader with 40kg/ha; T4 - Manual broadcast with 80kg/ha; T5 - Drumseeder with 80kg/ha; T6 - Seed spreader with 80kg/ha. NSIC Rc 506 (medium-maturing) and Rc 27 (early) were used during 2023 DS; NSIC Rc 222 (medium) and PSB Rc 10 (early) in the 2023 WS. During DS, Rc 506 yielded higher than Rc 27. Using NSIC Rc 27, T0 yielded the highest but was not remarkably different from T3, T4, T5, and T6; T1 yielded lowest. For Rc 506, T6 yielded highest but was not statistically different from T0, T2, and T1. For 2023 WS, T5 consistently yielded higher in both varieties, trailed by T2, T3, and T4. T0 flowered earlier (around 7 days) and lodged during maturity (owing to higher plant density) than other treatments.

CORE-FUNDED PROJECT 4

Development of Optimum Management Option for Rice-sugarcane Intercropping System

Alvin D. Palanog, Michael Dan M. Angay, Garry R. Roda, and May O. Palanog

Sugarcane is planted less densely than other crops; hence, enough space is left for intercropping with mungbean, corn, and even rice. Intercropping sugarcane with other crops particularly legumes, can help improve soil properties (Tang et al., 2021, Pang et al., 2022) and increase farm productivity. Intercropping upland rice with sugarcane can be an option. Negros Occidental has started demonstrating sugarcane-rice intercropping for several seasons as part of its pursuits of increasing production and attaining provincial rice self-sufficiency. However, average yields were low (0.3t/ha) considering that the average yield NSIC Rc 27 they used is 2.7t/ha. Thus, developing appropriate management practices that will optimize the yield of the sugarcane-rice cropping system is important.

In the project, we tested the adaptability of NSIC Rc 27 and PSB Rc 10 using the rates 40kg/ha and 80kg/ha established in two furrow spacings - 1.5m and 1m - in a replicated trial using split plot in RCBD. Rc 10 sown/planted at a wider spacing (1.5m) yielded higher; Rc 27 yielded higher than Rc 10 only at 1m.

PROGRAM-BASED PROJECT 1

Seed Production of Rice Varieties for Special Markets

Alvin D. Palanog, Michael Dan M. Angay, Melanie Aileen C. De Peralta, Glenn C. De Peralta, Sharen T. Rivas, Albert Christian S. Suner, and Loida M. Perez

Availability and access to quality pure seeds are among the challenges in special-purpose rice production, with farmers often relying on their own seeds. Seeds of the special-purpose rice varieties released by the BPI-NSIC are hardly available to farmers, hence the need to produce. It is also important to evaluate the varieties' adaptability to the localities, especially the released rice varieties. Productivity and quality should come together to achieve optimum profitability.

A baseline survey was conducted in the provinces/areas where special rice is cultivated and management practices of rice farmers were documented.

Surveyed were Camarines Norte (n=16), Northern Samar (n=13), Cabaatuan, Iloilo (n=21), and San Carlos City, Negros Occidental (n=51). Areas planted and required seeds were also estimated and pigmented purple and black rice seeds (Tapol) were produced in PhilRice Bicol for RiceBIS farmers in Masbate. Seeds multiplied and purified were six traditional varieties - Calatrava, Red 64, Red 18, Arabon, Dinorado, and Total Black; and six released varieties - NSIC Rc 646SR, 31SR, 344SR, 638SR, 218SR, and 644SR at PhilRice Negros. The project produced 620kg of high-quality seeds for 2023 DS and 540kg for 2023 WS and was able to distribute/release 500kg of special rice to farmers as a source of seeds. The station has also showcased the performance of released special rice varieties and traditional rice in Cabaatuan, Iloilo; Jagna, Bohol; Catarman, Northern Samar; and at PhilRice Negros.

PROGRAM-BASED PROJECT 2

Scaling out Rice ICM Technologies for Increased Yield and Reduced Production Cost (SMART-ICM Project)

Gerald E. Bello, Gilbert C. Anquillano, Ailon Oliver V. Capistrano, and Dindo King M. Donayre

The use of matured and adaptable integrated crop management technologies for rice was scaled out in the RiceBIS communities in San Carlos City, Negros Occidental. According to the DA - Western Visayas Rice Program, it has 3,500ha of rice physical area of which, 2,800ha are for the irrigated environment; 700ha for rainfed. San Carlos City has participated in the RiceBIS Program since 2021, with five farmers' associations composed of 115 members tilling 155.3ha. With its good reputation, the community secured access to stable and bigger market opportunities as well as grants and support from other organizations (BPI Foundation).

The project introduced matured nutrient management technologies that will increase rice farmers' yields. The use of Rice Crop Manager fertilizer recommendations that guided farmers in the right amount, element, and timing of fertilizer application was upscaled and recommended to the farmer-recipients. The project coordinated with the Office of the Provincial Agriculturist-Negros Occidental (OPA-Neg. Occ.), the Agricultural Promotion and Coordinating Office (APCO), and the City Government of San Carlos. Technical briefings and meetings with selected members of the community were also conducted. The RCEF Seed Program with its PalaySikatan Techno-Demo also took part. Farmer-cooperators became members of a pilot cluster of the MASAGANA Rice Program and

received support such as fertilizers and seeds. PhilRice also distributed 100 bags of complete fertilizers under the fertilizer roll-over scheme. Baseline yield data during the 2023WS are 2.92t/ha and 3.02t/ha in the DS with average production cost of PhP9.90/kg in WS and PhP9.18/kg in DS. The project had also linked with private partners such as AgriDOM as a service provider of agricultural drones for rice production.

PROGRAM-BASED PROJECT 3

Philippine Rice Information System (PRiSM) for Western and Central Visayas

Gerald E. Bello, Frij C. Bimbao, Jimmy G. Eledia Jr., Fernando S. Doroy, and Eduardo Jimmy P. Quilang

PRiSM is a rice monitoring system that utilizes satellite imaging, simulation models, and information and communications technologies (ICTs) to generate data products in support of the DA in its policy-making, planning, and development, and disaster preparedness undertakings. PhilRice made PRiSM operational since 2018. A set of field protocols and forms was developed for seasonal field data collection on monitoring field locations, farm profiles, photos, field status, crop growth stages, crop management practices, crop damages due to flood and drought, and yields. These data were collected in active monitoring fields (MFs) as identified by the regional partners, and random farmers' fields for the damage assessment and additional ground validation as needed.

PhilRice Negros and its regional partners implement the project in Western and Central Visayas by continually gathering and validating data to provide accurate, reliable, and specific data products in response to the needs of the DA and other stakeholders. There were 114 active MFs for the 1st semester and 121 for the 2nd semester of 2023 in Region 6, while all 20 MFs were active for both semesters in Region 7. The data turnout for Regions 6 and 7 for the 1st semester was 89% and 97%, respectively. In the second semester, 81% of data submission was attained in Region 6, while 97% was reached in Region 7. Ground validation activities such as rice and non-rice area validations and land cover-land use change mapping were also conducted to confirm the converted rice areas and other vegetation to other land covers. The datasets gathered through the PRiSM regular activities were uploaded to the PRiSM website, processed into GIS-ready format, and submitted to be processed into data products by the mapping and yield estimation teams. The data products generated were reflected in monthly releases, and mid-season and end-season bulletins. A series of monthly meetings and workshops were also conducted at the national and regional levels.

PROGRAM-BASED PROJECT 4

Evaluation and Packaging Fertilizer Products for Balanced Nutrition of Irrigated Lowland Rice

Cielo Luz C. Mondejar, Stefanie Ann M. Pagunsan, Wilfredo B. Collado, and Eduardo Jimmy P. Quilang

The Fertilizer Derby project brandishes the performance of new fertilizer products and nutrient management technologies and provides the DA with packages of nutrient management technologies that rice farmers can use to increase their rice productivity and profitability. It aimed to determine and package the best nutrient management technologies in achieving the balanced nutrition of the rice crop in a profitable, sustainable, and environmentally safe manner. Field setups each at 1,000m² were established in PhilRice Negros in three cropping seasons from 2023 WS and DS. The required area was used to determine the actual yield. PalayCheck recommendations for the cultural management of rice were followed in all entries except nutrient management. Nutrient omission plots (NOP) for N, P, K, Zn, S, and +NPKZnS were established within the field plots. The target DS yield, and production cost were 8t/ha at PhP7/kg. The Farmer's Practice yielded highest at 6.71t/ha; Inavet Nutrition Technologies Inc. at 6.84t/ha got the highest potential yield. The WS target yield and production cost are 5t/ha at PhP8/kg. The Gamechanger Agriculture Corporation achieved the highest actual yield of 7.75t/ha and Ka's Angel Trading had the highest potential yield of 8.54t/ha. Entries including PhilRice's recorded lower than the target actual yield of 8t/ha for 2023 DS; only the WZ Corporation Incorporated produced lower than the targeted yield (5t/ha) for WS.

PROGRAM-BASED PROJECT 5

Nutritionally Enhanced Rice – Finishing and Delivering Golden Rice and High-iron and High-zinc Rice Varieties: The Malusog Rice Project in Western Visayas

Albert Christian S. Suñer, Francis L. Tejada, and Leo T. Sta. Ines

Pilot-scale deployment of the Malusog Rice took place in Antique as one of the areas surveyed with the most increasing number of VAD. The first technology demonstration was conducted in Sibalom and Patnongon towns, each having

2ha for seed production and the same are for commercial production. Together with the provincial governments of Antique and Iloilo, the project identified farmer-cooperators and selected areas for Malusog Rice production. The Malusog Rice team at PhilRice Negros continues to explore opportunities to bring beta-carotene-enriched rice to target communities. One such activity was the 2023 Agro-industrial Exhibition in Patnongon. The Sangguniang Panlalawigan of Antique adopted Resolution Number 176-2023 for the Cultivation and Consumption of Modern Biotechnology Products (Malusog Rice). Seed and commercial rice production areas were established in WESVIARC, Iloilo, and in Patnongon, respectively.

EXTRA-CORE FUNDED PROJECT 1

National Cooperative Tests (NCT) for Rice Tungro Virus Resistance

Ellie Zandrew S. Ganela, Alvin D. Palanog, and Juliet Rillon

Evaluation of rice pest resistance is crucial in producing high-quality rice varieties as it acts as the first line of defense against yield-devastating diseases. To evaluate new resistance traits, NCT disease trials are being conducted nationwide. PhilRice Negros, with its areas' high susceptibility to Rice Tungro Disease (RTD), was strategically chosen as site for these NCT trials to allow researchers to assess the effectiveness of new resistance traits under real-world conditions of high disease pressure.

Evaluated were 248 entries in 2023: 125 of the 128 DS entries were resistant; only three were susceptible. Eight of the 120 WS entries were susceptible; the rest were resistant to RTD. The experimental design was Alpha Lattice, with three replications each having 15 hills per entry. Percent infection was then computed to determine the disease reaction of entries.

EXTRA-CORE FUNDED PROJECT 2

OneRicePH: Demand-driven Production Development and Deployment in Target Market Segments (2023) – PhilRice Component: The PhilRice Negros Trials

Roselyn G. Alfetche, Alvin D. Palanog, Jonathan Niones, Rustum Bracerros, and Oliver E. Manangkil

The project is a field trial that forms part of the unified national rice varietal development trials involving PhilRice, IRRI, and UPLB. It had two field setups in every season (DELS-R and TELS-I) that evaluated promising lines per setup assembled from the three collaborators and developed through a market-centric approach to framing product concepts. The experiment was laid out in augmented design with a different number of entries in each setup established through dry-direct seeding and transplanting.

PhilRice Negros established on-station trials of two pipeline groups (direct-seeded & transplanted) for dry and wet seasons. During the DS, the direct-seeded rainfed trial (DELS-R) was composed of 420 entries while the transplanted irrigated lowland (TELS-I) had 444 entries composed of promising lines from the three breeding institutions. The DELS-R DS trial failed due to seed germination problems.

CORE-FUNDED PROJECT 1

Collaborative Rice Extension for Achieving Community Transformation and Empowerment for Regions 6 and 7 (CREATE Visayas)

Alvin D. Palanog, Shaireen L. Magbanua, Cielo Luz C. Mondejar, Rene E. Valdez, and Albert Christian S. Suñer

There is a need to amplify the extension services of PhilRice Negros to cater to a larger group of men and women rice farmers by enhancing the knowledge and sharing activities through various modalities that will fit their needs and conditions. The information dissemination activities will cut across various groups, genders, and ages to include students, researchers, teachers, technicians, farmers, and emerging farmers, with emphasis on the provinces not covered by the RCEF

Program. One strategy is to provide the clientele with a tangible avenue for them to see the significance of various technologies promoted and enhance their decision-making skills. Location-based constraints are tackled through collaboration with other extension partners and government units to cover more areas. Next, is an extension opportunity during field trips and visits, from SCUs, LGUs, partnerships, among others, when dispensing of knowledge products is required. This includes the establishment of rice-based information hubs to give all farmers and other stakeholders fast, accessible, and available technical services and procurement.

The development unit of the station also caters to location-specific technology promotion such as organic rice production technologies and the Palayamanan Plus. The project has focused on scaling matured technologies on direct seeding. Multiple technology demonstrations were established in Antique, Capiz, Negros Occidental, and Bohol that showcased newly released varieties suitable for direct seeding, the use of drum seeder with a seeding rate of 40kg/ha, and Abonong Swak as a nutrient management option. Farmer-partners on average obtained a 1t/ha increase from their previous yield before the technology intervention. At the end of the season, Lakbay Palays invited rice farmers in the community, and participatory variety selections were conducted.

The 2023 Lakbay Palays satisfied 1,032 participating rice farmers, Agricultural Extension Workers, and other rice stakeholders. Two sessions of the stakeholders' forum conducted in Negros Occidental were participated in by the NIA, DAR, PSA, PCIC, BPI-NSQCS, and OPA-Negros Occidental, local state university, and non-government associations particularly the seed growers' federation. Three webinar series with relevant topics were also initiated by the station. A two-week Rice Bootcamp that trained 18 senior high school students on basic rice production was also conducted.

The station likewise endorsed the feasibility and profitability of DiscoverRice: Palayamanan plus components consisting of special-purpose rice production during the wet season, vegetable cropping patterns during the dry season, animal and fish components, and rice-onion cropping patterns. It also demonstrated three organic-based farming systems: azolla-based, locally available organic inputs, and farmers' practice. Azolla cropping yielded highest (3.5t/ha). Rice varieties were also tested for adaptability under organic production along with the multiplication of high-quality seeds for organic farming advocates. NSIC Rc 400 yielded consistently higher than other varieties in both seasons.

Rice Business Innovations System – Negros Community

**Anileen O. Pajarillo, Christer John Celiz, Retchie Ann B. Artigosa, Rodrian A. Repique,
and Alvin D. Palanog**

The project identified, catalyzed, and assessed various inclusive agro-enterprise models available in the RiceBIS communities. Assessment of communities in Murcia and San Carlos City saw divergent levels of organizational capacity. Also, the organizational structure of the San Carlos Community was finalized, and a grant was secured from the Bank of the Philippine Islands Foundation (BPIF) for the procurement of a truck and rice mill, and operational needs. One Memorandum of Understanding (MOU) solidified partnerships, and training sessions enhanced farmers' capacity in agroenterprise development and Philippine Good Agricultural Practices (PHILGAP). Efforts were trained on strengthening farmers' market linkages through product development, branding, and marketing initiatives. Policy recommendations were drafted and submitted to key stakeholders, emphasizing the increased participation of rice farmers in the value chain. These efforts collectively fostered stronger market linkages and promoted the economic empowerment of local rice farmers, aligning with the project's objectives.