2023 PhilRice R&D Highlights

AGRONOMY, SOILS AND PLANT PHYSIOLOGY DIVISION

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Contents

DIVISION

Agronomy, Soils and Plant Physiology Division

Jovino L. De Dios

EXECUTIVE SUMMARY

The ASPPD plays a role in modernizing rice and rice-based agriculture by creating diagnostic tools and technologies focused on crops, fertilizers, soils, and water management to boost rice production. Given the diverse conditions across regions and production systems, rice yields and yield gaps differ, requiring location- and season-specific strategies to address these gaps. Moreover, technologies must align with local conditions and environmental characteristics. To achieve this, ASPPD implemented nine core projects, one extra core project, and one externally funded initiative, alongside managing the soil laboratory, all aimed at enhancing farm productivity and increasing yields.

The Division focused on matching technologies with crop and environmental profiles, recognizing the diversity of rice production conditions across the country. This approach is crucial for designing effective strategies, plans, and interventions at various decision-making levels.

Modernizing rice and rice-based practices through diagnostic tools and location-specific technologies is timely and essential. The Division also explored alternative rice production methods such as using organic materials, soil amendments, and biofertilizers, to address emerging needs.

ASD-231-000: Laboratory Support for ASPPD Research and Development

Annie E. Espiritu

The ASPPD research laboratory had passed all the requirements for a Permit to Operate a Soil Chemical Research Laboratory imposed by the Bureau of Soils and Water Management (BSWM). It catered to 1,488 samples for different analyses, comprising 2,355 for N; 1,618 for P; 1,702 for K; 938 for organic carbon; and 793 for pH measurements.

The laboratory served research projects and delivered quality outputs in developing and improving plant, water, soil, and nutrient management practices, particularly in cost-effective and resource-use-efficient farming without creating any potential harm to the environment. It passed the 1st Surveillance Audit for the License to Operate and was cited as an outstanding research laboratory by the BSWM. It was recognized by the BSWM for demonstrating superior quality in the measurement of soil fertility parameters during the conduct of the Philippine National Soil Laboratory Network (PhilNasolan) Proficiency Testing Scheme Cycle 2022. The annual preventive maintenance service and calibration of laboratory equipment is conducted by accredited service providers to ensure quality data.

ASD-232-000: PhilRice Soil Information System for Decision Makers

Mary Rose O. Mabalay

The project provided comprehensive and accessible soil information for effective crop management that helps rice-based farming communities select suitable crops and their appropriate management practices. It updated the Soil Information Database: field-validated and characterized 18 soil series in seven provinces; soil productivity analyses for lowland rice, suitability for rice and other crops, taxonomic classification, and soil management recommendations in nine target provinces are now available.

The PhilRice Soil Information System (PSIS) is a comprehensive and user-friendly soil information tool for farmers, decision-makers, and planners regarding suitable crops with appropriate management strategies (https://dbmp.philrice.gov.ph/dbmp_main/services). The gallery of validated soil series profiles with physical and soil fertility descriptions, datasets for soil series taxonomic classification, soil management recommendations on rice and other crops, soil limitations, soil productivity indicators for lowland rice production, and crop suitability analysis for major Philippine crops were updated.

The guidebook, "Keys to Soil Series," for Agusan provinces, Laguna, and Quezon was developed and edited to serve as a tool for identifying the soil series right in the field using the soil color, texture, pH, and other observable properties. It includes the characteristics of the soil series, a picture of the soil profile, physical and soil fertility description, soil properties that affect crop growth, soil taxonomic classification, soil productivity index for lowland rice, crop suitability analysis, and soil management recommendations for each of the soil series identified in each province. All data collected and validated were uploaded to the PSIS database.

Soil productivity index determines the capacity of the soil to produce a given yield naturally (inherent) and after corrective soil constraints have been remedied (potential). The soil productivity for lowland rice production, suitability for rice and other crops, taxonomic classification, and soil management recommendations of each of the soil series identified in the Agusan provinces, Bukidnon, Davao del Norte/Sur, Davao Oriental, Quezon, Laguna, and Ifugao were analyzed. The soil productivity indices from Agusan, Bukidnon, Davao provinces, Laguna, and Quezon vary depending on local conditions.

Crop suitability determines the potential of the soil to grow different crops based on the physical and chemical properties and environmental factors. The crop suitability analysis for 15 annuals and 12 perennials for each soil series of the nine provinces was completed.Based on taxonomic classifications of the Agusan Provinces, soils were mostly loamy to clayey with mixed mineralogy, non-acidic, and hyperthermic>22°C. Quezon was mostly loamy, with some clayey and sandy-textured soils with mixed mineralogy, non-acidic and isohyperthermic >22°C. Most soils belong to the order Inceptisols, followed by Alfisols, Vertisols, Ultisols, Molise's like the Faraon series, and Entisols.

ASD-233-000: Assessment and Management of Soil Fertility and Soil Health

Jayvee C. Kitma

Double lowland rice cropping is a common practice in the major rice-producing areas in the country. The soil fertility status of this cropping pattern was continuously monitored in a representative area at PhilRice Central Experiment Station (CES). The new formulations of fertilizer materials like biofertilizers and biostimulants, and the recent shift of rice crop residue management practices due to the use of combine harvesters were included in the long-term soil fertility trial. The datasets on the effects of long-term nutrient management on grain yield, indigenous nutrient supply, and soil microbial functional diversity were generated. The soil microbial diversity status of three experimental areas at PhilRice CES and soil fertility map of the station were updated.

The high yields were in plots with 50% RRF + BioGroe, and + Rhizo-N; lowest yields were from control plots. The balance of several factors including sink size, source strength, and carbohydrate translocation determined the yields. Improvement of sink size during the grain-filling period includes increasing grain weight and number of filled spikelets. The 50% RRF + BioGroe setup produced the highest straw weight. The lowest straw weight was observed in the control treatment and plots applied with 50% RRF + MykoPlus. Rice straw is rich in K; hence, the application of rice straw is encouraged to recycle K in rice soils. In this aspect, the importance of rice stubble for increasing soil fertility has not been given due attention. Most of the rice farmers have a multitude of uses for rice straw and are reluctant to return straw to the rice fields.

The determinants of soil microbial functional diversity were well color development (WCD) and curve integrated variables (Reimann's Sum and Area Under Kinetic Curve) representing relative sole carbon source utilization. All results were based on the 24, 72, 96, and 168-hour incubation period. The WCD is the sum value of all the optical densities of the 31 carbon substrates in the EcoPlate, a representation of microbial activity. WCD was significantly high in most treatments; control plots recorded the highest WCD. This shows that there is a varietal response to soil microbial diversity. The plants may be capable of releasing root exudates that can affect soil microbial diversity.

The higher microbial diversity observed in a rice field can have several implications on the ecosystem and agricultural practices. Higher microbial diversity suggests a more balanced and efficient nutrient cycling in the rice field. Diverse microbial communities can contribute to the breakdown of organic matter, releasing nutrients that are essential for plant growth and development. Microbial diversity is often an indicator of soil health. A diverse microbial community can indicate a well-balanced and thriving soil ecosystem. This can result in improved soil structure, water infiltration, and overall soil fertility. Microbial diversity is just one aspect of a complex ecosystem.

ASD-234-000: Philippine Rice Information System (PRiSM)

Eduardo Jimmy P. Quilang and Jovino L. de Dios

PRiSM uses earth observation satellite data and simulation models complemented by ground observations and other information sources to generate more accurate and timely information on rice area planted, planting time, growth, yield, production, and potential rice areas that can be affected by extreme weather events.

During the fifth year of PRiSM's successful operation, its potential and challenges were reviewed and assessed. Issues on related information needs and comments from clients were discussed before the formulation of a strategic action plan for 2024-2028. The PRiSM's response highlighted the current data frequency delivery need of the Department of Agriculture (DA) and issues during the wet season (WS) detection of rice area planted. Related to these, PRiSM has widened its institutional, national, and international collaborations. Currently, PRiSM delivers monthly information on rice areas planted, planting dates, rice yield, rice production, and areas at risk during extreme weather events.

The establishment of PRiSM helped the DA in its decisions but other demands and requests for PRiSM data posed challenges and opportunities. Thus, the general review and planning workshop in 2023 assessed, analyzed, and resolved past challenges and formulated a detailed and strategic action plan for 2024-2028. Activities and accomplishments (July 2018-November 2023) from the regional facilitators' presentations were presented and discussed.

In PhilRice Batac, the facilitator's strategy focused on spreading awareness about PRiSM across municipalities that later involved other towns. Centralized data collection and meetings between Ilocos region and PRiSM were proposed to synchronize local government units (LGU) and PRiSM data. Despite recognizing the challenge as a long-term process, both parties are committed to achieving success with the support of rice focal persons. The plan includes utilizing the LGU-provided base map for PRiSM, organizing a meeting to discuss harmonization steps, and requesting a PRiSM raster file for regional partners to be monitored by the IT team.

In PhilRice Isabela, the low field data turnout from 2019 to 2023 can be attributed to the shift in farmer planting and harvesting schedules brought about by harvester machine availability and weather conditions. Data collection was hindered as farmers missed system reminders due to their busy schedules. Additionally, changes in data collector designation or assignment impacted the process.

Limited vehicles in CAR's regional office and the considerable travel time to each location aggravated the challenges. With the slope areas in Region 2 and CAR, a proposed solution involves facilitators creating a specialized mask that aids the mapping team in effectively detecting rice in sloped terrain.

NSIC Rc 218 stands out as the top variety in Region 3. The limited data turnout can be attributed to the insufficient budget allocated for data collection at the regional/LGU level. This should be brought up to the management for consideration in determining the next course of action. In the meantime, resources can be utilized to support their field activities.

PhilRice Los Baños proposed a revision of the manual to incorporate the facilitator's role in data collection, fostering collaboration with regional/LGU data collectors, some of whom were not fully committed. A "convention by cluster" that recognizes and supports their efforts was proposed.

NSIC Rc 222 has consistently been the top variety in PhilRice Bicol. Region 5 has yet to fully adopt the Bantay Palay App. In response, an online training/presentation facilitated by PhilRice ISD was proposed.

PhilRice Negros plans to put up monitoring fields (MF) in all municipalities, allowing them to simultaneously utilize and gather information on cultural management—a two-in-one approach. Given the positive track record of data turnout in Regions 6 and 7, the facilitator advised to ensure effective data collection by maintaining strong communication and coordination with the Regional Field Offices (RFOs) and data collectors.

PhilRice Agusan pointed out two main issues: rapid staff turnover among data collectors and political problems impacting data collection in Misamis Occidental. To mitigate the impact of staff turnover, a careful filtering process for the data collected on the facilitator's side was forwarded.

Notable challenges include a low turnout of crop-cut data during 2019 in PhilRice Midsayap and implementation and limited data collection using the Bantay Palay app. MFs in Maguindanao del Norte, Sarangani, and South Cotabato were suggested to address these challenges and enhance data.

PRiSM's involvement in the CS map project was discussed especially on how PRiSM could contribute to and integrate with the CS map or other initiatives in the future. This move is part of PRiSM's strategic plan to enhance its data integration and collaboration efforts.

ASD-235-000: Enhancement of Palayamanan Components

Myrna D. Malabayabas

Palayamanan is continuously leveling up and showcasing models with specific components matching the local conditions of farming communities. A protocol to scale it out nationwide was prepared to allow technical assistance to 16 regional Palayamanan clusters. The rice-other-crops component, had a total gross sale of PhP47,434.83 with yields ranging from 6.42 to 8.34t/ha. The Sorjan Cropping System had a gross margin of PhP77,823 and a net income/m^2 of PhP88.85. More than half (54%) of the gross margin came from dry-season vegetables planted in raised beds, side bunds, and trellis. Six high-value vegetables (lettuce, sweet basil, celery, pechay, mustard, and pak-choi) were grown in a vertical garden from which 192.86kg were harvested giving a gross value of PhP48,209.19 from an area of 100m^2.

In the rice+duck+vegetable production component, NSIC Rc 222, Rc 160, and Rc 402 had yields of 6.80, 5.80, and 6.27t/ha, respectively, during the dry season. Egg production failed on account of the high cost of commercial feeds. A total sale of PhP25,587 was generated from six batches of fruiting bags of mushroom. The cost of fruiting bag was PhP9.43/bag if a shredding machine is used, and PhP10.47/bag if rice straw is manually chopped. Vermicomposting was started in 2022. Biomass collected within the Palayamanan farm and nearby areas was used. Live African night crawlers were added to each 1m x 1m vermi bed at 1kg/m^2. The harvested vermicompost was used as organic fertilizers for vegetables in the demonstration farm. Consistent with 2022 results, the quality of produced vermicompost was best using 70% spent mushroom substrate + 30% buffalo manure in terms of yield, physical appearance, and with more friable texture.

Nutraceutical/herbal crops including herbs and spices were continuously collected and cultivated in the Palayamanan area. In 2023, there were 18 herbal plants maintained: oregano, mugwort (damong maria), insulin plant, sweet and Thai basil, ginger, turmeric, Aloe vera, chives, peppermint, pandan, lemongrass, akapulko, taheebo, sambong, serpentina, green tea, thyme, and lagundi. These collections are maintained in a 32- m^2 greenhouse.

Technologies developed through the Palayamanan were actively communicated to various audiences. The model farm was visited on 59 different occasions by groups and individuals both from the private and government sectors, as well as staff and students of various schools/universities since January 2023. Palayamanan technologies have also been featured in 17 radio program interviews across the country and in one Facebook live interview.

ASD-236-000: Evaluation and Packaging of Fertilizer Products for Balanced Nutrition of Irrigated Lowland Rice

Leylani M. Juliano

The project evaluated fertilizer products across seven agroclimatic zones. In the DS, 73 participants joined from 28 companies; 89 from 33 companies in the WS. On a hectare basis, the best fertilizer and production costs in the DS were PhP19,789.36 and PhP57,999.49; in the WS, PhP16,798.07 and PhP54,033.42. The highest yields of 8.53t/ha in the DS and 7.75t/ha in the WS were attained by using a combination of inorganic fertilizer and biofertilizer plus biostimulants.

Combinations of inorganic fertilizers, biofertilizers, biostimulants, and foliar-applied fertilizers with growth promoters formulated by participating companies, PhilRice recommendations, and the farmers' practice showed some promising results. The application rates and times were also variable depending on the location and their specific recommendations. Comprehensive information on the effects of different fertilizer packages on rice productivity was generated. The target yield and production cost in the DS were set at 8t/ha at PhP7/kg input cost; 5t/ha at PhP8/kg input cost in the WS.

At PhilRice CES, the highest actual yield obtained was 8.53t/ha applied with 168.5-42-42-24kg/ha N-P2O5-K2O-S2O4 plus 300g Humus WSG 56.9% as foliar at 10 Days after sowing (DAS) (seedbed) and 65 days after transplanting (DAT) as fertilizer mixed. The PhilRice entry had the highest crop-cut yield of 8.89t/ha. In Batac, Inavet Nutrition Technologies Inc. achieved the highest crop cut and actual yields of 8.15t/ha and 5.88t/ha. In Isabela, the highest crop cut yield was from Allied Botanical Corporation (10.02t/ha); from Enviro Scope Synergy Incorporated (4.46t/ha) in Midsayap. Farmer's practice (5.99t/ha), Allied Botanical Corporation (5.02t/ha), and Gamechanger Agriculture Corporation (5.61t/ha) got the highest actual yields in Negros, Agusan, and Bicol, respectively.

In terms of production costs, Allied Botanical's entry in Isabela recorded the highest at PhP88,555.45; Envireau Pacific Inc.'s entry in Bicol posted the lowest at PhP33,395.85/ha. Each participant spent on fertilizer and related products some

3.77-54.47% of the total production costs. The costs of the materials were variable because they depended on the prevailing market cost of the product.

Profitability was calculated based on the average buying price of dry palay at PhP19/kg and the actual grain yield in kg/ha; net income used the actual production costs per hectare. The highest gross and net incomes of PhP162,119.09 and PhP91,865.08 were from CES. During the dry season, most participants at CES and in Isabela and Negros achieved 6-8t/ha at PhP7-10/kg. In the other stations, limitations are related to agro-climatic factors that hindered the achievement of the target yield performance. In the wet season, field performance in most stations achieved at least 5t/ha but with higher production costs per unit yield.

ASD-237-000: Climate-smart Maps for Strengthening the Adaptation Plans of Farming Communities (CS Map)

Leylani M. Juliano

The project helped develop a sustainable rice value chain by addressing the negative impacts of climate change on rice production. It has conducted participatory climate risk-mapping workshops in 17 provinces with local partners and different sectors (agriculture, disaster risk reduction and management, environment and natural resources, and irrigation) that generated 17 comprehensive technical reports on climate hazards, risks and severity, hazard calendars, and coping mechanisms. The project has developed and presented the proposed adaptation plans to the provincial governments of Pangasinan, Cagayan, Nueva Ecija, Iloilo, and Sultan Kudarat. Weather, soil, and environmental data from 1990 to 2022 were analyzed to update the agroecological zone characteristics and identify limitations and opportunities in crop production. Furthermore, the simulated optimal planting calendar and crop management practices for maximum yield in Nueva Ecija (pilot province) were developed. These serve as the basis for potential interventions using CAMDT and Oryza models. Additionally, maps of consistently planted rice areas from PRiSM, vulnerable rice areas, and irrigated areas from the National Irrigation Administration (NIA) were produced.

To support the analysis of the identified climate risks in the provinces, base maps of consistently planted rice areas, vulnerable rice areas, and irrigated areas of NIA were generated. Secondary maps on drought and vulnerable rice areas (PRiSM), flood (PhilLIDAR), and irrigation systems (NIA) were validated through participatory mapping and collaboration with partner agencies.

To facilitate understanding, tabular data were transformed into maps to show other layers of information such as geographic location, spatial distribution, general form, and patterns. Digital maps of climate-related hazards such as drought, flood, and salinity from various sources were reprocessed into a format suitable for overlaying with other data/maps needed for mapping climate risks. The base maps generated were: (1) stable rice areas derived from PRiSM 2016-2022; (2) NIA operational areas overlaid on physical rice areas of PRiSM; (3) crop suitability maps for rice-based soil series (PSIS); (4) map of vulnerable rice areas (VRA) to drought identified from PRiSM rice areas data not planted in 2016 and 2019 El Nino events; and (5) rice areas and the climate types.

Relevant data for the development of climate risk maps, information on local adaptation strategies, and documentation of key issues and challenges encountered were gathered. Field validations and presentations of participatory mapping results, climate risk maps, and proposed adaptation plans to the key provincial officials were conducted in priority provinces including Nueva Ecija, Pangasinan, Cagayan, Iloilo, and Sultan Kudarat.

To update agro-ecological zones (AEZ) for hazard and risk verification, a weather database with the 32-year data set and other inputs (1990-2022) was processed. Thresholds for climate indices such as rainfall, temperature, wind speed, and drought were identified together with a standardized precipitation and evapotranspiration index.

Climate extremes for rainfall were identified as 300mm/day while for dry days <2mm/day. High-temperature thresholds were pegged at 35oC. Crop suitability was also analyzed using the information generated by the Philippine Soil Information System.

Technology-based adaptation strategies for climate-related hazards in the target provinces were framed. The proposed plans for Nueva Ecija, Pangasinan, Cagayan, Iloilo, and Sultan Kudarat were packaged and presented to their provincial representatives. The adaptation strategies are composed of mature technologies including key points and the implementing office. The technologies include the use of adaptable and climate-resilient varieties, appropriate and efficient farm machinery, water/pest management strategies, suitable crop establishment methods, crop diversification, and water harvesting, among others. Likewise, the proposed adaptive measures are anchored on the existing coping mechanisms of farmers and interventions in the locality, available resources as well as the support of the province.

The project generated processed secondary data relative to the requirements of the DA's Masagana Rice Industry Development Program (MRIDP). Specifically, the project conducted the following activities with specific results submitted to MRIDP:

Generated data on consistently planted rice areas, analyzed by PRiSM from 2018 to 2022. These areas were based on physical rice areas planted in 2022 to ensure the same areas continue to exist.

Mapped irrigated rice areas in collaboration with NIA and validated vulnerable rice areas that could not be accommodated by existing irrigation systems, in partnership with DA and NIA Regional Field Offices.

Processed monthly weather forecasts from DOST-PAGASA related to the El Niño phenomenon (starting July 2023) using the consistently planted rice areas. The resulting maps were then provided to the National Rice Program, DA-RFOs, and NIA for validation and as reference materials for interventions.

ASD-238-000: Ratooning Ability of Popular and Recommended Rice Varieties under Best Management Practices for Rice Intensification

Maria Corazon J. Cabral

Rice ratooning is emerging as an important planting system to support food security, especially amid rising farm input costs. However, rice varieties vary in their ability to ratoon, making it worthwhile to investigate this trait in the current pool of NSIC-released varieties. This project evaluated rice varieties suitable for ratooning as a way to increase farmers' income by maximizing farm resource efficiency and boosting national rice production.

Of the 10 entries evaluated, eight produced ratoon tillers, although not all yielded a ratoon harvest, as some dried up and eventually died. Site surveys in Nueva Ecija mapped municipalities practicing ratooning, including Sto. Domingo, Talavera, Quezon, San Jose City, Llanera, Rizal, and Gen. Natividad. Farmers or tenants were also interviewed to gather information about their ratoon crop management practices. Some even remarked that ratoon rice was "more delicious" than the main crop, attributing this to its being pesticide-free.

ASD-239-000: Preparing the Future of Rice Crop Establishment: Field Validation and Improvement of the Direct-seeded Rice Package of Technologies

Leylani M. Juliano

Direct wet-seeded rice production offers more efficient use of farm resources such as labor and water compared with transplanting. With this premise, however, two conditions should be satisfied. First, the rice field is excellently prepared: no high nor low spots after final leveling that exceed 5cm difference. Second, there should be a very uniform distribution of healthy seedlings in every paddy field that have emerged or survived 10 to 14 days after seeding. Field validation and improvement are ongoing to determine the field performance of direct seeding packages of technologies that can increase yield and reduce costs. Drum seeder, seed spreader, drone, and manual broadcast including drone application of fertilizers were evaluated.

The dry season yield was lower than in the wet season as it was heavily infested by stem borer resulting in 48-57% crop loss. The drum seeder with manual fertilizer application yielded highest (2.38t/ha) during the DS; lowest yield (3.65t/ha) in the WS. The use of a seed spreader and drone required less time to seed compared with manual and drum seedings. The use of drones, though, was more expensive by 20-53%. In general, the use of mechanized seeding methods does not affect the agronomic performance and grain yield.

Panicle production showed no significant difference among treatments and all other agronomic traits. In terms of seeding duration and uniformity of seed dispersal, the Seed spreader and drone seeding were faster than manual broadcast. Drum seeder required a longer duration because of forward speed and loading time compared to the other seeding methods. Manual broadcast was the cheapest (PhP700t/ha) among the treatments.

Treatments with drone-applied fertilizers incurred a higher cost than manual application in both cropping seasons. Among the seeding technologies, drone yielded highest (5.48t/ ha) while the seed spreader with manual fertilizer application achieved the highest net income (PhP64,813t/ha) at a yield level of 5.27t/ha.

ASD-240-000: Development of Appropriate Nutrient Management for Newly-released Irrigated Lowland Rice Varieties

Myrna D. Malabayabas

The appropriate NPK fertilizer rates for NSIC Rc 436, Rc 438, Rc 440, Rc 442, and Rc 580 were determined under two methods of water management (continuous flooding and alternate wetting and drying) in the dry season. The treatments were (T1) high NPK uptake x full rate of 10/ha target yield; (T2) high NPK uptake x half rate of 10/ha target yield; (T3) low NPK uptake x full rate of 10t/ha target yield; (T4) low NPK uptake x half rate of 10t/ha target yield; and (T5) no NPK fertilizer application. The N fertilizer was applied in three splits (30% at 10-14 days after transplanting, 30% at mid tillering, and 40% at panicle initiation), while all the P and K fertilizers were applied at 10-14 DAT.

Under CF, yield was significantly highest in T1 averaging 8.76t/ha across varieties. Across NPK treatments, most varieties had comparable yields except NSIC Rc 438. In the AWD setup, yields in T1 and T3 were comparable across varieties. Across NPK treatments yields did not substantially differ. Higher fertilizer-use efficiency was achieved in high and low NPK uptake with half the rate of the target yield.

RCEF-FUNDED PROJECT 1

RCS-0003-004: Agro-specific Profiling of Newly-released Rice Varieties for Nutrient POT Development

Ailon Oliver V. Capistrano

Fertilizer recommendations based on variety-specific nutrients profile and target yields are currently being explored by a project. Its objective is to develop variety-specific optimum NPK rates for maximum yield and nutrient-pest interactions. In the wet season, NSIC Rc 438 (5.3t/ha) was the highest yielder compared to Rc 436, 440, 442, and 580. Across fertilizer treatments, plots with half of the high NPK rate had the highest average yield at 5.1t/ha. In nutrient-pest interaction, NSIC Rc 436, 438, and 440 were moderately susceptible to bacterial leaf streak (BLS) during the panicle initiation stage under continuous flooding while Rc 442 and 580 found least susceptible. During the dough stage, Rc 436, 438, and 440 were very susceptible to BLS while the Rc 442 and 580 were moderately susceptible.

EXTRA CORE PROJECT 1

Lowland Rice Ecosystem for the Packaging of Best Nutrient Management Technologies

Ailon Oliver V. Capistrano

The actual NPK uptake per variety to serve as a basis in the formulation of appropriate fertilizer application rates concerning their potential yields under wet direct-seeded rice is being identified in this study. The nutrient-omission plot technique was used for NSIC Rc 622, 624, 628, 632, and 636. Results showed that the nitrogen uptake range was 11.06 - 12.64kg/t if N was applied and 9.19 - 10.26kg/t if none. Recovery Efficiency of N ranged 0.38 - 0.49. NSIC Rc 506 got the highest yields in WDSR (9 tha-1) under the maximum and full NPK rates during the dry season while Rc 512 and 514 both had 8.7t/ha. In the wet season, Rc 580 consistently yielded >4t/ha across different NPK rates under the WDSR.

EXTERNALLY FUNDED PROJECT 1

RTF-061-349.Y2: Evaluation of the BioPrime 5-5-5 on the Growth and Yield of Irrigated Lowland Rice

Jayvee C. Kitma

The targeted grain yield (7t/ha) based on the Rice Crop Manager (RCM) recommendation for the cropping season was not achieved. However, the highest grain yield (5.60t/ha) was obtained from RCM + 15g BioPrime, applied 3 times. Data on grain yield with BioPrime 5-5-5 treatments plus 50% RCM ranged 4.88 - 5.55t/ha while the lowest grain yield was recorded in the No-Fertilizer plots. Higher yields obtained from the untreated plots possibly were associated with the high indigenous nutrient-supplying capacity of the soil.

The 15g/ha BioPrime 5-5-5 combined with 50% reduced inorganic fertilizer rate (50% RCM) applied during seed soaking, as soil treatment, and at 30 DAT showed a higher grain yield with an added net income of PhP16,368. On the other hand, it was observed that 15g/ha BioPrime 5-5-5 treatments applied during seed soaking (5g/ha), at seedbed (5g/ha), and as foliar fertilizer applied 30 DAT (5g/ha) combined with 50% and plots with No-Fertilizer applied, produced a lower added net income.

At harvest, the tallest plants were in the plots applied with 50% inorganic fertilizer combined with 15g/ha of BioPrime 5-5-5 applied during seed soaking, as soil treatment and 30 DAT while the shortest plants were observed in the plots with no fertilizer applied.

Carbon substrate utilization showed that the addition of the recommended amount of fertilizer and augmenting the nitrogen requirement of the crop based on morphological symptoms modified the metabolic profile of microbial communities. Results indicate complete color development after a 120-h incubation period (Kong et al., 2006). The highest AWCD from 24-h to 168-h incubation period was observed in plots fertilized with 50% RCM and BioPrime.