Philippine Rice Research Institute
Central Experiment Station
Maligaya, Science City of Muñoz, 3119 Nueva Ecija

NOTABLE ACCOMPLISHMENTS
January to June 2023

DA-PhilRice currently implements 87 rice research for development (R4D) projects to continue its efforts in strengthening national rice R4DE capabilities in generating information, technologies, and other products. Through close collaboration with partners and the use of online and offline media platforms, these information, varieties, machines, and crop management options are promoted through trainings, field days, exhibits, and knowledge products and materials.

Highlights of accomplishments are as follows:

Strategic Agenda 1: Boosting local production and raising farmers' and fisherfolk's income
PAP 1.1: Conduct of regional rice R4D programs for Luzon, Visayas, and Mindanao

Integrated Crop Management

- Twenty-three sites of fall armyworm (FAW)-infested rice-growing areas in Gonzaga and Santa Ana, Cagayan were validated to determine population, assess damage, and identify risk or triggering factors to elucidate spread, damage, and yield losses in rice.

- The efficiency of the DA-PhilRice-developed mechanical weeder in suppressing major weeds and weedy rice in irrigated lowland rice was field-evaluated.

- A focus group discussion documented Sariaya, Quezon farmers' current weedy rice management practices, perceptions, and information sources. Weedy rice samples were collected in Sariaya and Lucena City, Quezon.

Extension Support, Education, and Training Services (ESETS)

- The 360 virtual tour (https://360tour.philrice.gov.ph) had 5,894 total visitors. From January to June 2023, 106 groups (1,467 males; 1,029 females) were accommodated. Visitor management was rated outstanding.

- Twelve (12) *PalayAralan* online sessions featured nutrient, water, insect pest, disease, and weed management practices. The DA-PhilRice Facebook livestream had 882 live viewers, 42,972 post views, 26,776 engagements, and reached 72,701 individual social media users. *PalayAralan* has been rated outstanding based on audience feedback.

- The March 2023 DS *Lakbay Palay* themed *RCEF, Ano na?* was participated by >1,200 farmers and LGU partners, mostly from Central Luzon, and ≈21,000 through our official Facebook page.

- Trainings conducted within January to June 2023 had Excellent rating. These were: (1) *Introduction to the PalayCheck System for Irrigated Lowland Rice* (36 participants with average 48% gain-in-knowledge); (2) combined course on *TOT on the Production of High-Quality Inbred Rice and Seeds and Farm Mechanization* and *TOT on Pest and Nutrient Management* (27 participants with average 73.56% GIK); (3) Integrated Nutrient Management in Rice (14 participants with average 38% GIK); (4) two batches of RCEF Refresher Course (38 rice specialists with average 65.50% GIK and 72% GIK); (5) two RCEF short courses on *Pest and Nutrient Management*).

- Nineteen (19) batches of training were accredited by the Professional Regulation Commission (PRC) and provided Continuing Professional Development (CPD) points to participants upon completion of the course. Seven (7) of these batches were completed within the period.

- A new training course was designed as a refresher for graduates of the RCEF Rice Specialists' Training Course (RSTC) based on the results of a training needs assessment (TNA). Two online tracer surveys for the 2019-2021 RCEF RSTC and 2014-2015 AgRiDOC graduates were conducted to gather data on their whereabouts and their feedback on the most significant change brought by the training program on their personal and professional growth.

- The DA-PhilRice Text Center registered 77,548 new users and sent out 13 text blasts on managing water field supply, and rat and stemborer infestations; importance of regular monitoring; choosing right varieties; solar drying tips; using rice straw as organic fertilizer; benefit of proper land preparation; right amount of seeds for direct seeding; reduced labor cost using mechanical transplanter; process of seed germination; and produce vigorous seedlings in 400-sqm seedbed.

- Forty-seven (47) news and features and 31 radio segments on core activities and RCEF Seed and Extension Programs were uploaded on DA-PhilRice Online and broadcasted over 7 radio stations, respectively. The *Pinoy* Rice Knowledge Bank gained 59,810 unique visits and 95% customer satisfaction rating. The DA-PhilRice Facebook page uploaded 117 original posts, resulting in 3,566,979 reach. Four major DA-PhilRice publications were published: On the Front Lines (2017-2022 Strategic Plan Terminal Report) and magazines titled 'Be water-smart,' 'Keeping farming communities to heart,' and '*Serbisyong Maaasahan, RCEF 'Yan*!'

Rice Business Innovations System (RiceBIS) Community Program

- Partnerships with RestoPH, Nueva Ecija LGU, and Bayambang LGU were set in motion. The Zambales RiceBIS Community was linked to Kiwanis International, who, in turn, ordered five tons of brown rice on cash-based payment. The Mangatarem RiceBIS community was linked to MayaniPH with five tons of initial delivery.

- Partnership with DA-Bureau of Plant Industry was established for the training of program implementers on the process of Good Agricultural Practices (GAP) certification of RiceBIS community farms. This is to ensure quality and safety of farmers' produce.

PAP 1.2: Location-specific rice R4D projects in support of the National Rice Program and in line with the National Agriculture and Fisheries R4D Agenda

Germplasm Conservation, Variety Development, and Seed Production

- Germplasm collections (530) regenerated in 2023 DS were harvested. Fifteen seed requests covering 166 seed packets were processed and attended to.

- Two promising lines (one for special purpose, one for rainfed) were recommended as varieties by the Rice Technical Working Group to the Technical Secretariat.

- Breeding for rice adapted to complete submergence and flash floods identified 33 promising lines with 100% survival 21 days after de-submergence. These lines were completely submerged under low-quality water in field condition for 8 days. The lines will be evaluated for yield performance under non-stress and submergence stress conditions in 2024 DS.

- Quality seeds of 55 breeding lines with combined tolerance to salinity and submergence were produced. Lines will be shuttled to 3 different locations for onsite evaluation. The identified sites experience sea water intrusion and flooding during heavy rainfall.

- A total of 440 entries from 2022 WS were completely evaluated for milling recovery, amylose content (AC), and gelatinization temperature (GT) while 392 (89%) for physical attributes. Meanwhile, 224 (90%) of 249 rice germplasm samples were completely assessed for milling recovery while another 130 germplasms (52%) were evaluated for AC and GT.

- Elite and donor rice lines (922) were evaluated against major insect pests (BPH, GLH) and diseases (blast, BLB, ShB), where many rice lines were resistant to blast and all entries were susceptible to tungro and ShB. Intermediate reactions of rice lines were observed for resistance to BLB, GLH, and BPH.

- To identify varieties that can also be recommended under limited water conditions, 20 irrigated rice varieties were evaluated for drought tolerance and field performance under irrigated and managed drought stress conditions.

- Promising lines with salinity tolerance applied for Plant Variety Protection were field-evaluated. Eight promising lines with drought tolerance were nominated to NCT rainfed-drought prone rice ecosystem.

- Nucleus seeds were produced: 800 panicles each for 4 nationally recommended rice varieties (NSIC Rc 222, Rc 402, Rc 216, and Rc 480), and 400 panicles each for the 13 regionally recommended and 20 other rice varieties. Breeder seeds of 4 nationally recommended, 20 regionally recommended, and other rice varieties (new release, for adverse environments, and special rices) were harvested, certification of which is in progress.

- F1 hybrid seeds of NSIC Rc 714H (Mestiso 132), the newly released DA-PhilRice-bred CMS-based hybrid for Central Luzon recommendation, was produced for technology demonstration trials.

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

- For DS 2023, 73 participants established field trials in seven DA-PhilRice stations. Average yield at CES was 6.81 t/ha at ₱9.51 average production cost per kilogram of palay; Isabela with 5.59 t/ha at ₱11.29/kg cost; Batac with 4.39 t/ha at ₱16.00/kg cost; Bicol with 3.93 t/ha at ₱12.44/kg cost; Negros with 4.90 t/ha at ₱10.44/kg cost; Midsayap with 2.40 t/ha at ₱24.04/kg cost (at 24.5% stemborer damage); and Agusan with 4.42 t/ha at ₱11.52/kg cost (very wet season).

- For WS 2023, 89 participants registered in seven field evaluation sites. Nine new products will be evaluated in addition to the existing 21 products. DA-PhilRice nutrient management protocol and farmers' practice in each station will remain as protocols for comparison.

Rice Business Innovations System (RiceBIS) Community Program

- The RiceBIS Zaragoza (Nueva Ecija) farmers participated as *Kadiwa ng Pangulo* concessionaire during the DS 2023 *Lakbay Palay* of DA-PhilRice CES, selling RiceBIS products worth ₱14,395.50 in a day.

Strategic Agenda 2: Ensuring accessibility to affordable, safe, and nutritious food that benefit all Filipinos

PAP 1.1: Conduct of regional rice R4D programs for Luzon, Visayas, and Mindanao

Safe and nutritious rice and rice-based food products

- Harvesting of the second on-farm planting of *Malusog* Rice (NSIC 2022 Rc 682GR2E), which took place in the 2023 DS on 47 ha in 10 regions with a maximum yield of 8.3 t/ha attained in Isabela, was almost completed. The first planting was established in the 2022 WS on 38 ha in the same

regions with a maximum yield of 7.8 t/ha in Maguindanao. Farmers' feedback indicates that *Malusog* Rice is the same as conventional inbred rice in terms of crop standing and management practices. Eighty percent (80%) of the commercial production's harvest in the DS will be bought back by the LGUs and National Food Authority for their nutrition/buffer stock programs. Preparations for the 2023 WS planting are underway with an increased target production area of 200 ha.

- Milled *Malusog* rice (5 kg/household) was distributed to 100 households each in Quirino, Catanduanes, Antique, and Samar. A consumer sensory evaluation and acceptability survey were conducted in tandem with the milled rice distribution. Initial results indicate that all respondents characterized *Malusog* Rice as similar to ordinary white rice in terms of taste, cooking quality, and aroma. The color of *Malusog* Rice is appealing to children. All consumer-respondents are willing to buy *Malusog* rice once it becomes available in the market. They are willing to buy it at PhP25-50/kg, same as the price of the rice they normally consume. The supplied 5 kg *Malusog* Rice per household lasted 2 to 14 days depending on the number of rice-consuming household members.

PAP 1.2: Location-specific rice R4D projects in support of the National Rice Program and in line with the National Agriculture and Fisheries R4D Agenda

Safe and nutritious rice and rice-based food products

- In collaboration with the DA-Philippine Carabao Center-Central Luzon State University, buffalo milk-based yogurt products have been enriched with antioxidants and dietary fiber by co-fermentation of stabilized pigmented rice bran.

- A guidebook on value-added rice-based food product development has been drafted for use during trainings for various farmer-groups and other interested entities.

- A patent for salt bread (*pandesal*) was filed at the IPOPhil and patent disclosure for buffalo milk-based scoop-type yogurt supplemented co-fermented with stabilized rice bran was drafted. Agreements for prototype/market testing and technology transfer of fermented rice bran (FRB) and FRB-based products are underway.

- Protocol on the determination of GT of rice flour using rapid visco analyzer was validated using 50 rice lines (2022WS).

Technologies developed for coping with negative impacts of climate change

- *Palayamanan* Plus components like rice-other crop production, Sorjan cropping system, integrated rice-duck-vegetable production system, mushroom production, and vertical hydroponic garden are being maintained in DA-PhilRice CES.

  Six rice varieties – NSIC Rc 216, Rc 218, Rc 402, Rc 440, Rc 506, and Rc 512 – planted in the 0.36-ha rice production area had a total yield of 2,482.6 kg (~6.44 t/ha). Four inbred rice varieties for the wet season were transplanted in June. The Sorjan cropping system generated an estimated gross sale of ₱57,158.05 from rice and vegetables. NSIC Rc 160 planted in the 238-sqm sink area of Sorjan cropping yielded 132 kg (~5.1 t/ha). In the rice-duck-vegetable integration, three rice varieties planted in 1,326 m^2 yielded 902.37 kg (~6.3 t/ha). Around 1,900 eggs were collected from 45 mallard ducks. Part of the eggs collected were incubated and hatched. Ducklings will be released in the rice paddy by July. About 20 kg of oyster mushrooms were harvested from 300 ramified fruiting bags. There are currently 444 fruiting bags in the incubation room for ramification. Twelve bottles of pure culture, two bottles of subculture, and 60-grain spawn bags of oyster mushroom were prepared as stocks.

Strategic Agenda 3: Developing strong, modernized, and climate-resilient value chains through the delivery of quality services

PAP 1.2: Location-specific rice R4D projects in support of the National Rice Program and in line with the National Agriculture and Fisheries R4D Agenda

Machines and Mechanization

- The improved prototype of *MakiSiG* (*Makina para sa pabago-bagong Klima at Sari-saring Gawain sa bukid*) showed that it can already travel and maneuver in wet fields. An attachment is currently being fabricated to make the machine able to bury the weeds and rice stubbles while also providing additional buoyancy when traveling in deep muddy fields.

- A pilot test unit of the riding-type boat tiller with reverse mechanism, leveler attachment, and bigger wheel axle of 1.5" diameter (for longer operation) was improved in preparation for actual field operation by a Cabanatuan City-based farmer organization.

- Field test results of a gear transmission power tiller with plastic drum seeder attachment showed acceptable performance. Other land preparation attachments such as improved 4-row rice transplanter and multi-purpose seeder attachment for dry field conditions are expected to be completed before the start of the 2023 wet season.

- Two drying tests of the combined conduction, convection, and far-infrared radiation dryer installed at a farmers' cooperative in Butuan City were conducted using paddy rice harvested this 2023 DS. Paddy grain throughput ranged from 600-950 kg/h while drying capacity varied from 500-760 kg/h, with moisture content (MC) reduction rate of 0.9 percentage point per hour. Rice husk fuel consumption was about 100 kg/h.

- The first prototype of the infrared heating system for stabilizing brown rice was tested for heat treatment of 81 1.5-kg NSIC Rc 160 brown rice samples. Results showed that the setting with highest grain throughput of 72.5 kg/h, maximum drying efficiency of 47.6%, and mean MC reduction rate of 2.1 percentage points per minute was found at an infrared heater temperature of 250°C; conveyor belt linear speed of 0.26 m/s; and distance between infrared heater and conveyor belt of 12.5 cm.

- The precision seeder prototype used pre-germinated seeds of inbred rice variety at 20 to 40 kg/ha seeding rate. It achieved an actual field capacity of 2.5 ha/day with notable field mobility and consistency of seeding quality without breakdown and malfunctioning parts.

- Field test run of rice stripper combine showed promising results with improved field mobility, maneuverability, and actual field capacity of 2.6 ha/day.

Smarter Crop Management including Digital Agriculture

- The Philippine Rice Information System (https://prism.philrice.gov.ph/) consistently provided nationwide updates on rice production situation to the DA-National Rice Program, DA-Regional Field Offices (DA-RFOs), and other partners. PRiSM duly responded to 116 data requests: rice area (54), yield estimates (21), damage assessment (15), and planting dates (26). Information dissemination is also carried out through our Facebook page and TikTok account to reach out to the public. With 2,836 followers, the PRiSM FB page provided timely updates and relevant information, resulting in 4,100 post reach. The TikTok account has 23 followers to date and uploaded 19 informational videos.

  PRISM-led capacity-building activities had with 1,840 participants. These included trainings on field protocols (34), damage assessment (7), remote sensing (6), and ICT-related data management

(10). PRISM participated in one institutional training and four national workshops held in Butuan City (May 31 to June 3), Legazpi City (June 6 to 8), Iloilo (June 12 & 13), and Davao City (June 20 to 22).

- From January to June 2023, 18 soil series in Mindanao were validated in the field, and uploaded to the PhilRice Soil Information System database. Taxonomic classification of 67 soil series including horizon designation from Agusan del Norte, Agusan del Sur, Bukidnon, Davao, Ifugao, Laguna, and Quezon were conducted. The Rice Crop Manager Advisory Service generated >100K recommendations, responded to about 1K queries, sent >300K messages through SMS, and verified >70K farm lots.

- As of June 30, the RiceLytics dashboard has 38 datasets that tell the story of the rice industry, rice farmer profile, and rice farming practices. The RiceLytics had 71,876 page views from 15,193 unique users. Its traffic consists of 90% from search results, 8% from direct access, and 2% from social media.

Strategic Agenda 4: Institutionalizing policy reforms and strengthening institutions to enhance efficiency and accelerate the modernization of the sector

PAP 1.1: Conduct of regional rice R4D programs for Luzon, Visayas, and Mindanao

Socioeconomics and Policy Research and Advocacy

- Updated rice-related statistics, policy briefs, position papers, and policy memos on emerging issues were provided to DA and other research institutions. Some 100 statistical tables from the PSA and other local (FNRI, FPA, and NIA) and international agencies (FAO and World Bank) are being monitored, maintained, and updated regularly with the latest data available in rice production, area, and yield as well as imports and exports, prices, and supply and demand. Data from collected statistical tables were processed to make a condensed report on the current Philippine rice industry to orient trainers, farmers, and extension workers during training sessions and meetings. These statistics are made available through the *PalayStat* information system (https://palaystat.philrice.gov.ph/) and has been viewed 9,856 times and accessed by 2,219 unique users from January to June 30, 2023. On average, a session lasts 2 minutes and 15 seconds.

- The policy paper on *Adoption and Performance of Direct-seeded Rice (DSR) Technology in the Philippines* has been published in the Philippine Journal of Science. Policy/research papers submitted to journals for publication were: (a) *What happened to DA-PhilRice's laboy tiller?*; (b) *What are the aspirations of the Filipino rice farmers?;* (c) *Affordances in crop diversification: Three cases from the Philippines;* (d) *Identifying ways to strengthen Filipino family members;* and (e) *Exploring mental health issues amongst rice farmers in relation to climate change impacts*.

- Policy briefs (Rice Science for Decision-makers, RS4DM) were published/drafted: (a) *Enabling the shift from transplanted to direct-seeded rice system in the Philippines* (published and disseminated); and (b) *What does our balanced fertilization study say?* (drafted).

- Requested position papers, policy notes, and infographics were crafted and submitted to DA for policy and technical support: (a) proposed agricultural and credit governance reform, with collated status of/updates on DA rice-specific and other relevant programs; (b) potential project for public-private partnership with Cargill, in preparation for the DA's meeting with the US-ASEAN Business Council; (c) rice supply and utilization projection for 2023-2028 and sources of 2022 production growth/decline; (d) inputs on the prices of agricultural inputs for the State of the Nation Address (SONA); and (e) Philippine Ecosystem and Natural Capital Accounting System (PENCAS)-related bills.

- Policy brokering was conducted in five provinces and three municipalities from May to June 2023. Policy recommendations contained in the issues of the RS4DM were presented to the Provincial Agriculturists of Aurora, Zambales, Pampanga, Iloilo, and Capiz, and to the Municipal Agriculturists of Talavera, Science City of Muñoz, and Bongabon, in Nueva Ecija for endorsement to the local executives to be adapted into a local ordinance. Two proposed ordinances have also been presented to the members of the Sangguniang Bayan of Bongabon, Nueva Ecija in June, for their deliberation. Additionally, partnerships with Bulacan Agricultural State College and Central Luzon State University were established, specifically for policy brokering activity.

PAP 2.1: General Administration and Support Services / Support to Operations

Human Resources

- Nineteen staffers were appointed to plantilla positions; 78 permanent employees were sent to various trainings conducted by different accredited institutes while two permanent staff availed of the Institute's study grant. DA-PhilRice has 13 DOST/CSC career scientists (9 Scientist I, 3 Scientist II, and 1 Scientist III), five of whom are women. A total of 131 personnel enjoy Magna Carta benefits.

- Twenty-five in-house trainings, workshops, and knowledge sharing and learning activities (11 face-to-face, 14 online) had 1,150 participants (436 males, 714 females).

Physical Resources

- In support of R4DE thrusts, eight infrastructure and repair and maintenance projects were completed amounting to about ₱39.45 million. The most significant of which are the construction of seed warehouses (DA-PhilRice Midsayap-USM seed farm and DA-PhilRice Batac), and head house and screenhouse (DA-PhilRice CES).

Subsidy Utilization

- Obligation rate is at 57% as of June 2023. The Institute continues to implement austerity measures to save government funds in response to inflation.

Awards and Recognition

- DA-PhilRice received the Gold Award in the 2022 ITSO 2.0 Clustering Program for having provided to internal and external clients the required number of IP capacity-building activities, patent search services, and drafted and filed at least 6 invention patents in 2022.

- The Agronomy, Soils, and Plant Physiology Laboratory was recognized by the Bureau of Soils and Water Management as a Laboratory of Excellence for achieving 100% acceptable data on soil fertility parameters during the Philippine National Soil Laboratory Network (Phil NASOLAN) Proficiency Testing Scheme Cycle 2022. DA-PhilRice participated and provided inputs in the crafting of the five-year National Strategic Development Plan for DA Laboratories.

Partnerships

- We have continuing close collaborations with other rice industry players and stakeholders such as other government and non-government agencies, state universities and colleges, and other private academic institutions.

- A collaborative undertaking has recently been established with the Manila Water Foundation in the use of the PhilRice-developed continuous-type rich hull (CtRH) carbonizer to help solve the water hyacinth pollution problem in Laguna Lake. The CtRH carbonizer can successfully carbonize chopped and dried water hyacinth. Hence, the MWF plans to create livelihoods in the affected fishing communities through the production of charcoal briquettes from the carbonized water hyacinth.