

## NOTABLE ACCOMPLISHMENTS

### January to December 2022

DA-PhilRice implemented 68 rice research for development (R4D) projects to continue developing varieties, machines, and crop management options. In close collaboration with partners and through the use of online and offline media platforms, these technologies are promoted through trainings, field days, exhibits, and knowledge products and materials.

Highlights of accomplishments are as follows:

#### ***OBJECTIVE 1: Boost local production and raise the farmers' and fisherfolk's income***

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

#### *Variety Development, Germplasm Conservation, and Seed Production*

1. Five PhilRice-bred varieties (NSIC 2022 Rc 670, Rc 672, Rc 684, Rc 686, and Rc 714H or Mestiso 132) were approved for commercial release (Mestiso 132 for Central Luzon).
2. Rice germplasm (705) were analyzed for amylose content (AC); 703 for gelatinization temperature (GT); 340 pigmented were characterized for physicochemical properties, phytochemical content, and antioxidant activities. Resistance to pests of 2,498 accessions and 2,479 promising lines and hybrid parentals was evaluated.
3. Traditional rice varieties (629) were seed-increased; 577 were characterized for post-harvest data. Seed requests (36) were fulfilled, covering 910 seed packets. DNA fingerprints of 1,019 TRVs, 8 wild rice, and 69 weedy rice were generated. Evaluated were 1280 TRVs using nine SNP markers.
4. Heirloom rice varieties (180) of indigenous peoples of Ifugao (78) and Lake Sebu, South Cotabato (102) were conserved at the DA-PhilRice Genebank. Blackbox agreements were signed on Oct 4, 2022.
5. Elite lines for stressed and unstressed environments
  - 40 new elite lines in NCT: 3 advanced lines in MAT; 11 in transplanted irrigated lowland (IL), 11 in direct-seeded IL; 2 early mutant lines in IL; 5 cold-tolerant and 8 saline-tolerant lines;
  - New donor lines were generated: 18 with combined abiotic stress tolerance (drought, salinity, submergence, and high temperature); 3 for rice tungro disease (RTD) resistance; 5 with pyramided resistance to bacterial leaf blight and RTD; and 4 mutants for grain and nutritional traits;

- Developed were 23 elite lines tolerant to complete submergence, and are ready for multi-site trials; 17 varieties were identified to have multiple abiotic stress tolerance, and their sub-lines will be re-screened and evaluated in 2023 for validation;
  - 100 elite lines were entered in multi-adaptation yield trials for rainfed drought-prone locations;
6. Nucleus seeds (46,800 panicles) were produced from 51 rice varieties (42 irrigated; 2 adverse – rainfed and high temperature; 6 special purpose; and 1 upland); breeder seeds (105 to 570 kg, @5kg packaging) were produced from 42 varieties: 29 irrigated, 6 saline-prone, 3 special purpose, 3 rainfed-drought, and 1 upland.

### Smarter Crop Management including Digital Agriculture

7. Ecological and non-chemical ways of managing pests and diseases currently being developed and evaluated include: (a) trap designs for rice bugs and paddy eels, and baits for rats; (b) canalet design against golden *kuhol*; (c) two *Trichoderma harzianum* isolates against major diseases of rice; and (d) identification and mitigation of spread of multiple herbicide-resistant weeds.
8. Near-infrared reflectance spectroscopy (NIRS)-based calibration models for rapid analysis of rice physicochemical properties were established.
9. Prototype of a seeding robot with 1000W BLDC motors, four truck batteries, and Bluetooth remote control using a smartphone (Dabble App) is now operational. Four units of electronic seeding units are ready for testing. Three units of irrigation gate control linked to an AWD sensor were installed for automated opening and closing of the farm turn-out sluice gate in the REMD Model Farm.
10. Our DA-BAR-funded WaterRice project completed the field trial of a landscape-level irrigation advisory service (IAS) using an automated field water level monitoring system called AutoMon<sup>PH</sup>.
11. Platforms were developed for the Physical Inventory System (PIS), Rice Seed Production Traceability Monitoring (RSPTM), Germplasm Management System, and Oryza GEMS online system (<http://gems.philrice.gov.ph>). The Minus-One-Element Technique (MOET) and Leaf Color Computing (LCC) Apps have total installs/downloads of 14,126 and 4,819, respectively. The MOET App along with the soil- type maps of the DA-BSWM are currently being used by the RCEF-Seed Program.
12. The Philippine Rice Information System (PRiSM) monitored situations in 16 rice-producing regions using earth observation satellite technology and crop growth simulation models. PRiSM acquires the most updated information on rice area planted, time of planting, yield and production estimates, and rice areas at risk.

13. Features of the Rice Crop Manager Advisory Service (RCMAS) are continuously enhanced with the migration of RSBSA data into the RCMAS system now at 47%. It was transferred to Azure Cloud from AWS to guarantee 99% service uptime running. In terms of deployment, 14,18 RCM users, 816,436 farmers, and 762,537 farm lots were registered. The PhilRice Soil Information System (PSIS) helps decision-makers and planners in the selection of suitable crops. RiceLytics was developed and made operational. This is a web-based dashboard for data analytics based on current data of PSA, DA-PhilRice, and RCEF.

#### Machines and Mechanization

14. The final prototype of the gear-transmission power tiller (GTPT) has completed 20-ha endurance testing. A final prototype of the riding-type boat tiller for deep mud was field-tested. The Isabela-based ACT Machineries and Metalcraft has manufactured eight units of the boat tiller. The multi-crop reduced-till planter (MC RTP) has been field-tested for rice, corn, and mungbean seeding in Cauayan City, Isabela. Two working prototypes of the localized riding-type rice transplanter were tested at DA-PhilRice and in Laguna.
15. Remotely piloted aircraft systems (RPAS) or agricultural drones can reduce rice seeding rates to 20 kg/ha, and can apply fertilizers and monitor crops.
16. The improved prototype of the gender-neutral three-row portable mechanized weeder for straight row-planted rice crop has completed its 50-hour endurance test. The second pre-commercial unit of the rice cutter-bar combine harvester was modified and tested. The rice husk gasifier gasoline engine-pump system installed at our model farm irrigated a 4-ha seed production farm and completed 120-hour endurance testing.
17. A newly developed system of drying paddy rice in bulk was established in a RiceBIS community in Zaragoza, Nueva Ecija for performance testing. Newly harvested palay was successfully dried in 4.5 hours from MC 17.7% to 11.5%, consuming 65 kg rice hull with 30% carbonized rice hull as by-product.
18. A book titled “Model Farm: Guidelines in Developing a Consolidated and Mechanized Farm for Irrigated Rice” was published and is available online at:  
[https://www.philrice.gov.ph/wp-content/uploads/2021/12/THE-MODEL-FARM\\_D19.pdf](https://www.philrice.gov.ph/wp-content/uploads/2021/12/THE-MODEL-FARM_D19.pdf).

#### Socioeconomics and Policy Analysis and Advocacy

19. 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 (FPA and NIA) and international agencies (FAO and World Bank) are being monitored, maintained, and updated (weekly, monthly, quarterly, and annually) with the latest data available in rice production, area, and yield as well as imports and exports, prices, and supply and demand. These statistics are being made available through the *PalayStat* information system, which has been viewed 20,005 times and accessed by 3,939 unique users from January to December 2022.

- Requested position papers, policy notes, and infographics were crafted and submitted to the DA-OSEC for policy and technical support, including:
  - a) *Masagana Rice Program briefer;*
  - b) *2022 Rice supply and demand outlook;*
  - c) *Sources of 2021 palay production growth;*
  - d) *Sources of 2022 Semester 1 production performance;*
  - e) *How do escalating fertilizer prices affect rice production?*
  - f) *Rice farmers' response to the rising fertilizer and fuel prices: Effect on rice production cost and domestic supply;*
  - g) *Palay and rice price subsidy to support the PhP20/kg milled rice aspiration of PBBM;*
  - h) *Philippine rice industry facts and figures; and*
  - i) *Technical report on the preliminary results of the quick survey on rice farmers' response to the rising prices of fertilizers and fuel – used as basis for the fertilizer support program of DA for DS 2023.*
- Policy papers and briefs, and technical reports were prepared:
  - a) *Reinforcing right E-A-T for improved fertilizer application;*
  - b) *Promotion, adoption, and performance of direct-seeded rice;*
  - c) *Regional analysis on farmers' response to the rising prices of fertilizers and fuel in CAR, Regions 1, 2, 3, 4A, 4B, 5, and 8;*
  - d) *Factors influencing the palay and rice price formations;*
  - e) *Sources of rice production growth / provincial rice production competitiveness;*
  - f) *Knowledge, attitude, and perception (KAP) on Golden Rice; and*
  - g) *Assessing the potentials and profitability of glutinous rice production in the Philippines.*

20. Socioeconomic studies being conducted to help understand the complexities of our rice-farming communities:

- a) Results of “*What happened to the PhilRice-developed microtiller: A scaling study*” were presented through a webinar; a paper was submitted to a journal for publication;
- b) Paper for *What happened to the PhilRice-developed Laboy tiller?* has been drafted;
- c) Preliminary results of the study “*What are the aspirations of the Filipino rice farmers?*” are now available; “*Identifying ways to strengthen the Filipino farming families,*” and “*Exploring mental health issues among rice farmers in relation to climate change impacts*” are being coded;
- d) *Economics of hybrid and inbred rice seed production* report is being drafted. For *Crop diversification: An alternative production system for rice farmers*, a set of qualitative and survey results were generated and analyzed.

21. A policy analysis and stakeholder consultation on the barriers and opportunities under the wider adoption of direct-seeded rice (DSR) was conducted. *Policy Talks* on the salient aspects of rice importation was conducted on 15 November, with representatives from the

Department of Trade and Industry, Bureau of Plant Industry, Philippine Rice Industry Stakeholders Movement, and Federation of Free Farmers as resource persons. The almost 300 participants were composed mostly of municipal and provincial agriculturists across the country, physical and virtual. Published were three monographs on the emerging outcomes of the Philippine RCEF Seed Program: 2020 Dry Season, 2020 Wet Season, and 2021 DS highlighting its accomplishments and outcomes.

Extension Support, Education and Training Services (ESETS)

22. Popularized information and knowledge were shared through various platforms such as printed knowledge products, and online DA-PhilRice Text Center, *PinoyRice* Knowledge Bank, and DA-PhilRice Facebook page.
  - Knowledge Products (KPs). Nine new titles developed (English and Filipino Magazines, journal, impact video on the PAG-AHON project, techno-guide for saline-prone areas, RiceBIS portfolio, milled rice clustering, and six collaterals). More than 10,000 copies of the magazines were distributed.
  - DA-PhilRice Text Center. 91% of 45,087 queries were answered within an hour during office hours. Twelve text blasts on water management; pest management options on weeds, rats, and stemborer; leaf color chart; ecological engineering as a pest management approach; high-quality seeds; *dayami* as organic fertilizer; *Abonong Swak* campaign; DA-PhilRice Facebook as other platform for rice queries; and importance of proper planting distance were disseminated. A total of 54,705 new registrants were recorded from January to December 2022. Some 91% of texters were very satisfied with the answers they received from the agents.
  - Media relations. Radio interviews (38) and 20 broadcast releases related to our core programs were dispatched.
  - Online platforms (website, social media, chatbot). Four news/feature stories on our regular programs published every month; two each on Golden Rice and hybrid rice published online received 80% satisfaction rating, with an average of 18 media outlets picking up the stories per month.
  - The *PinoyRice* Knowledge Bank, a one-stop information hub on Philippine rice, sustained a record of 1,218 downloads.
  - A total of 405 posts (313 from PhilRice FB page, 92 from Rice Science Museum) had 2.71M reach. Our fan page that featured cost-saving technologies reached 5,936,990 viewers from January to September, which is 45% higher year-on-year.
23. The campaign called “*Abonong Swak*”, which promoted balanced/combined use of organic and inorganic fertilizers, used various media platforms complemented with technical briefings and technology demonstrations. Briefings conducted reached 8,652 farmers in 23 provinces; campaign materials included 117,000 brochures, 8,000 handouts, and 9,000 posters.
24. A total of 23 *PalayAralan* livestream sessions (online lecture) on various rice production and management practices were conducted following the regular rice planting calendar from

January to December 2022. Some 2,616 live viewers; 128,900 video views; 90,908 engagements; and 294,324 people on social media (Facebook) were reached. The 360 virtual tour now includes online feedback form and had 4,763 total number of online visitors. A total of 156 groups (2,404 pax) had visited the Institute from January to December 2022.

25. The April 2022 DS *Lakbay Palay* themed *Abonong Swak: Swak sa Badyet, Swak sa Palay* was participated in by over 500 farmers and LGU partners. The event was also livestreamed through the Institute's Facebook page and via Zoom. Day 1 livestream gained 9.8K post-views, 18.7K reach, and 4.6K engagements while Day 2 had 8.7K post-views, 16.3K reach, and 3.9K engagements.

The September 2022 WS *Lakbay Palay* themed *Bukid Tipid Tips, SUBUKAN!*, was attended by some 600 farmers and extension workers.

26. Eight training courses for rice farmers and extension intermediaries had 219 participants that include 53 persons under the Filipino Young Farmers Internship Program (FYFIP) in Taiwan; 24 researchers and field staff of a private seed company, and 28 regional rice R&D centers and stations, schools of agriculture and training centers across Sri Lanka under a partnership with DFA-TCCP and RRDI.

#### Rice Business Innovations System (RiceBIS) Community

27. Together with its partners from various government agencies, DA-PhilRice led the formation and strengthening of 23 RiceBIS communities across 16 provinces nationwide, engaging 215 farmer-clusters and covering 7,501 rice farmers with 9,555 ha of farm area. Farmers learned how to increase the volume and quality of their harvest using principles of integrated crop management and entrepreneurial skills.

#### Partnerships

28. Collaboration with the Korea Program on International Agriculture (KOPIA) resulted in the awarding of two (2) rototillers and 13 greenhouses to farmer-clusters and associations in Nueva Ecija. 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.

### **OBJECTIVE 2: Ensure accessible, affordable and nutritious foods that benefit all Filipinos**

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

29. The beta carotene-enriched NSIC Rc 682GR2E (Golden Rice/Malusog 1) was approved for commercialization, and was cultivated on 38 ha in 10 regions this wet season. Six popular rice varieties were evaluated for their *in vitro* starch digestibility and glycemic index (GI) scores. Three varieties under *in vivo* GI determination by UP Diliman were analyzed for their physicochemical properties; total phenolic, amylose, and amylopectin contents; antioxidant capacity, and total carbohydrate content.

30. The first prototype of an infrared heating system (IHS) for stabilizing brown rice to prolong its shelf life up to eight months can process 40 to 80 kg of brown rice per hour.
31. The *Palayamanan*, a rice-based crop diversification and intensification technology showcase, is being maintained and continuously improved. Planting multi-crop with animal integration maximizes resource-use and increases productivity and income. The system helps address food security, poverty, and climate change risks in rice-based farming communities.

## **GENERAL ADMINISTRATION AND SUPPORT SERVICES**

### Human Resources

32. A total of 28 staffers were appointed to regular plantilla positions; 96% (242/254) of regular employees were provided with developmental interventions, and five regular staffers have availed of scholarships in local and foreign universities. PhilRice now has 14 DOST/CSC career scientists, five of whom are women. A total of 138 personnel enjoy Magna Carta benefits, including GASS personnel. In-house trainings and workshops were conducted.

### Physical Resources

33. In support of R4D thrusts, 13 infrastructure and repair and maintenance projects were completed amounting to ₱11.0M; one agricultural and two laboratory equipment and five motor vehicles were procured. One of our laboratories has been issued the License to Operate-Soil Laboratory valid up to 15 September 2025.

### Management Information Systems

34. New features were added: the Rice Seed Information System (RSIS) modules and applications were officially deployed to PhilRice branch stations and DA-BPI-NSQCS Regional and Satellite Laboratories; the Property and Supply Inventory System (PSIS) is already being used in PhilRice branch stations; the Laboratory Users Information System (LUIS) has been developed and due for pilot-testing. DA-PhilRice and the Central Luzon State University are establishing the Science City of Muñoz Internet Exchange (SciMIX). To mitigate the effects of the COVID-19 and to support the 'new normal' strategies of the Institute, several applications were strengthened.

### Subsidy Utilization

35. Funds utilization rate has reached 98% as of December 2022. The Institute has implemented austerity measures to save government funds in view of inflation.