2018

NATIONAL RICE R&D HIGHLIGHTS

RICE SEED SYSTEMS

PROGRAM

PHILRICE

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PROGRAM

RICE SEED SYSTEMS

Program leader: Glenn Y. Ilar

EXECUTIVE SUMMARY

The Rice Seed Systems Program (RSSP) was established to address problems in the seed production and supply chain to improve farmers' access to adequate high-quality seeds of different varieties, which will lead to increased competitiveness and income. To do this, RSSP and its partners seek and provide solutions to the three basic parameters of a seed-security framework, namely: seed availability, accessibility/affordability, and utilization in formal and informal seed systems.

To attain all these, the program set the following objectives:

1. to evaluate and improve the current production and postharvest protocols and operations in the seed multiplication systems for better seed quality and production efficiency;

2. to increase availability, accessibility, and utilization of high-quality seeds (HQS) of released inbred varieties in areas needing HQS supply; and

3. to establish a responsive ICT-based rice information system for distribution monitoring and traceability of seeds produced by PhilRice and branch stations.

As the program was implemented only this 2018, it focused on strengthening the PhilRice's internal seed system. Project 1 evaluated the current production and post-production practices to identify gaps and bottlenecks in the existing seed production and post-production protocols. Project 2 enhanced the capacities of seed production field workers and warehouse personnel at PhilRice-CES and branch/satellite stations on inbred seed production to help address PhilRice's seed production efficiencies. Adaptability trials were also established to test the performance of newly-released varieties in different locations, and facilitated their access and adoption. Knowledge products and communication support services were also developed and implemented. To help trace the distribution of HQS produced by PhilRice-CES, a fully functional seed distribution mobile app and seed distribution monitoring system were developed under Project 3 for beta testing at PhilRice-CES and deployment to branch/satellite stations by 2019.

Cleaning of seeds using gravity separator seed cleaner machine during the 2019 DS at PhilRice Midsayap

PROJECT 1:

ASSESSMENT/IMPROVEMENT OF SEED PRODUCTION PROTOCOLS AND POSTHARVEST OPERATIONS

SR Brena, AV Capistrano, JJE Aungon, JB Regalario, and RC Ramos

The project consisted of three studies:1) assessment/improvement of seed production and postharvest protocols; 2) enhancement of rice seed production in all PhilRice branches through adoption of the minus-one element technique (MOET); and 3) ensuring genetic purity and assessing seed quality after harvest and during storage at PhilRice CES and in branch stations.

Seed production practices were assessed based on adherence to the *PalayCheck* System. It was observed that CES and branch stations do not practice the system. Land preparation, in particular, was not done properly as high and low soil spots were observed. Farm implements needed in land preparation were available but must be replaced with new ones. Fertilizers were not applied at the right time, while the kind of fertilizers to be used differ from each station. This can be attributed to the lack of soil assessment prior to planting. Field maintenance such as rouging was not

done on-time. Off-types were observed even before harvest. General maturity index used in harvesting was 85%, which means that one fifth of spikelets in the panicle is still immature. It was also recommended that non-shattering varieties should be harvested at 100% maturity.

PhilRice-Samar has a problem on irrigation water. Planting in June resulted in fields with cracks owing to lack of irrigation water. Cleaning was done twice and sometimes more passing in the seed cleaner because impurities were not removed. Thus, submitted samples were returned for re-cleaning.

PhilRice-CMU has improved its drying operation. The station used to sundry on a cement pavement; now, they use plastic liners when drying. Dried seeds were temporarily stored outside the office building and seed processing area owing to limited space in the processing area, which exposed the seeds to changing weather conditions.

Foundation to registered seed production efficiency ranged from 80-100%. Efficiency was highly variable in breeder and foundation seed production. PhilRice-Bicol and PhilRice-Los Baños registered the lowest efficiency at 47 and 55%, respectively, owing to downgraded seed class.

Seeds were downgraded to lower class, and some seed lots were rejected owing to varietal mixture, which resulted in low seed production efficiency. Seed quality of rice varieties produced in CES, Bicol, Negros, and Los Baños were assessed in DS 2018. Seed viability and vigor, and seedling emergence were assessed three and six months after harvest. Seed viability and vigor remained high in test periods however, there was a slight decline in the latter test parameter. The result showed that high-quality seeds produced in DS can stil be sold six months after harvest. This was further supported by the percentage seedling emergence values of more than 85% six months after harvest.

PhilRice Business Development Division, which is in-charge of the institute's seed production, still uses a blanket approach of nutrient management. Minus-One Element Technique (MOET) can diagnose nutrient deficiencies similar with the Nutrient Omission Plot Test, but takes lesser time and easier to conduct. Soil fertility assessments at CES and in branch stations are being conducted to determine actual fertilizer requirement leading to reduced production cost. Fertilizer recommendations will be released with the availability of MOET results and computation for N, P, and K requirements. Quality of seeds to be produced will also be assessed.

In 2018 WS, 17 field trials were established in four stations where MOET and conventional fertilization in seed production were applied. With one traditional variety and 10 modern inbred varieties, 102 crop cut areas were obtained for yield component computation at 100% maturity. MOET technologies showed an average yield advantage of 0.6 t/ha across sites over the conventional fertilizer application.

Training on the production and maintenance of high-quality inbred rice seeds for Business Development Division staff members

PROJECT 2:

ESTABLISHING THE RICE DISTRIBUTION PATHWAYS

RA Pineda, GY Ilar, MJ Manalang, RG Zagado, MAA Abando, AJ Castañeda, CA Frediles, FM Saludez, AC Biwang Jr., and DCP Corpuz

The project aimed to develop options or strategies for effective rice seed system development for the rapid delivery and deployment of quality rice seeds of new or improved rice varieties at the farm level.

To achieve the project goal, there is a need to capacitate farmers, extension workers, and partner stakeholders on the production and distribution of high-quality seeds, and develop a package of LST to help improve the rice seed system in the target areas. To enhance the capacities of the major players on rice seed system and implementers of technology development and promotion, the project developed strategies for them to access rice information and knowledge products.

The challenge remained in encouraging farmers to adopt the technology. Addressing this, a training curriculum on the production and exchange of high-quality inbred rice seeds was developed and training module on the production and maintenance of high-quality inbred rice seeds for PhilRice's seed production field workers was adapted.

Four batches of training of trainers were conducted with 133 participants to enhance the capacity of the regional/local teams to train more rice farmers on the production of high-quality inbred rice seeds in collaboration with the DA-BPI. Series of training were also conducted for 233 PhilRice field workers on the production and maintenance of high-quality inbred rice seeds to improve PhilRice's seed production operations and seed quality with funding from DA-BPI. Training impact will be monitored in 2020. One hundred forty-four (144) farmers were trained to produce their own high-quality seeds and become reliable seed sources for their communities.

Farmers Field School (FFS) was also conducted in six project sites in Region 3, where utilization of high-quality seed is low and yield is below 4 t/ha. Three farmers from Bataan, Zambales, and Aurora were identified as seed producers.

The adaptability varietal trial and informal seed production demonstration were used as learning field on producing high-quality inbred rice seed. Hands-on activity on rouging also provided the farmers with easier understanding on how to produce their own high-quality seed.

Of the six varieties tested in Casiguran, Aurora, NSIC Rc 300, Rc 440, and Rc 442 emerged as the most preferred varieties. In Limay, Bataan, Rc 400, Rc 216, and Rc 442 were mostly preferred by the FFS participants..

Seven knowledge products were produced in partnership with the Development Communication Division: 1 PhilRice Magasin, 1 rice technology bulletin, 1 Q&A, 2 handouts, and 2 promotional materials. For PhilRice Text Center (PTC), 209 mobile numbers of farmers and seed growers were registered. A total of 2090 messages on seeds and rice seed systems were sent through PTC.

Five radio segments related to high-quality seeds were produced and aired 21 times covering Nueva Ecija, Pampanga, Pangasinan, Tarlac, Isabela, Aurora, Bulacan, Zambales, Davao Occidental, Davao del Sur, Davao Oriental, and Saranggani. Eight broadcast releases were produced and aired 32 times on PhilRice radio program segments. These broadcast releases were also sent to 81 media partners. Nine stories were also published online and in Manila Bulletin's Agriculture Magazine. For social media, there were 62 posts uploaded related to rice seed systems. The posts had 343,233 reach; 11,538 reactions; 2,183 shares; and 555 comments.

Pilot Testing of Seed Distribution App with Cabanatuan City Seed Growers Multipurpose Cooperative

PROJECT 3:

DEVELOPMENT OF RICE SEED INFORMATION SYSTEM

AC Arocena, Jr., JL de Dios, LSS Doronio, RD Rimando, HDC Cayaban, and JP Gamilla

A nationwide scale seed information system was developed covering the whole aspect of the rice seed production and distribution monitoring system (Fig.1). It covers the major stages of rice seed system starting from registered and foundation seed production at PhilRice, post production processing and storage, and distribution monitoring to seed producers. The system used the commonly available information infrastructures to facilitate data collection, data transfer, feedback mechanisms, and monitoring systems.

In 2018, the project developed the Seed Distribution Monitoring System consisting web and mobile apps, and the Seed Ordering Kiosk. These components include

the field data collection tool (seed distribution mobile application) and the web application that handles the data turnout from the mobile application.

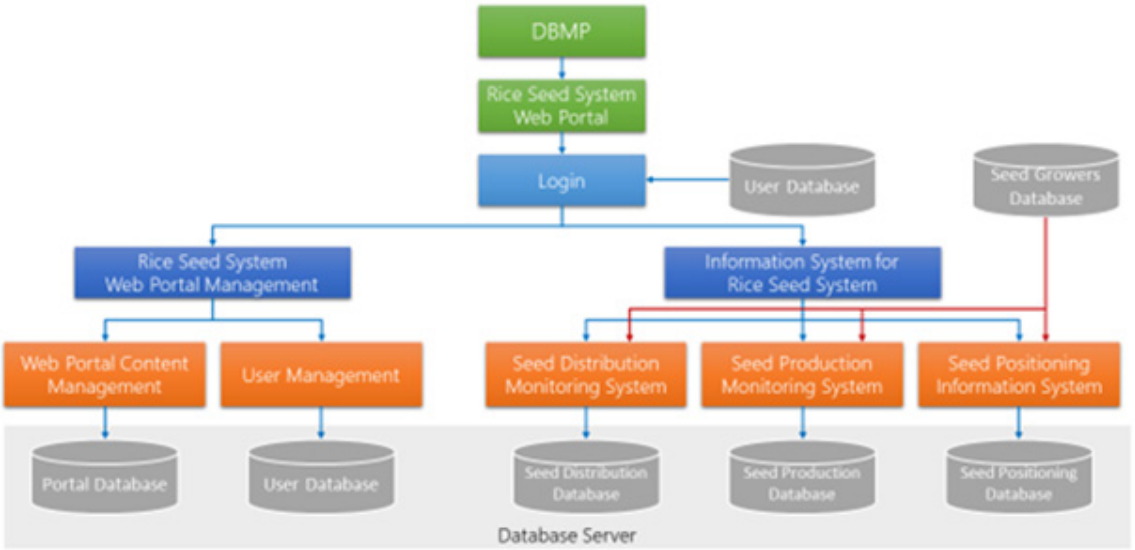

Figure 1. Rice Seed System web portal conceptual design

The seed distribution mobile application collects data such as seed source, seed class, and seed variety planted, area planted, amount of seeds used, ecosystem, and date planted from the seed growers. These data were used to provide and calculate seed production volume estimate (Fig 2a). These were also used to fill up the agreement on seed production and application for certification forms.

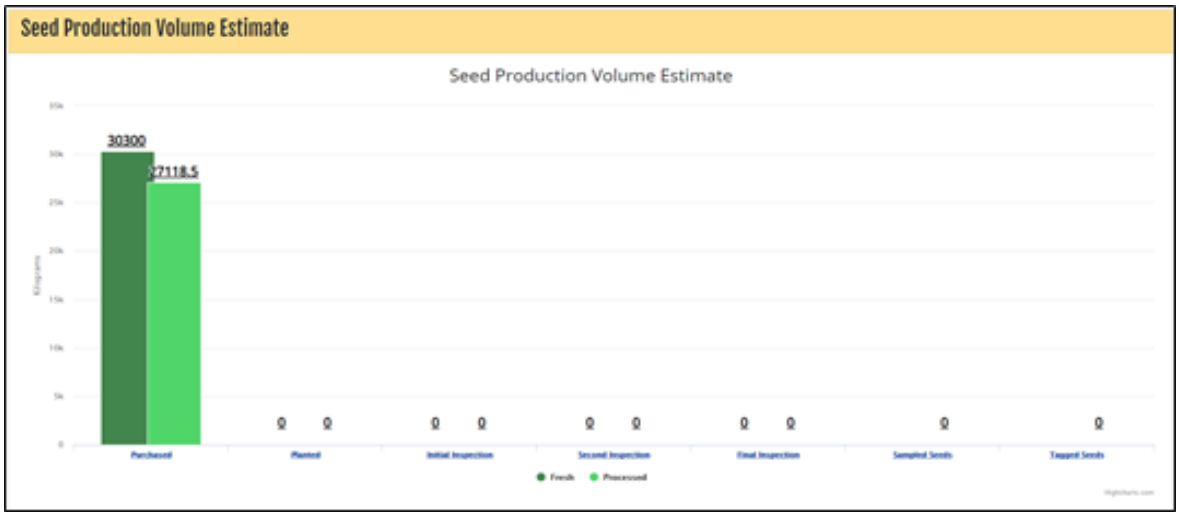

Figure 2a. Seed Production Volume Estimate (Purchased seeds)

The seed distribution web app processes the generated data from the seed distribution mobile app, which are presented through maps, tables, and charts (Fig 2b). The web app is also connected to the seed ordering system (kiosk) and seed inspection app databases. These data are then processed to provide seed production volume estimate. The kiosk (Fig 3) to be installed at the Business Development Division will be used by the seed growers to purchase registered seeds.

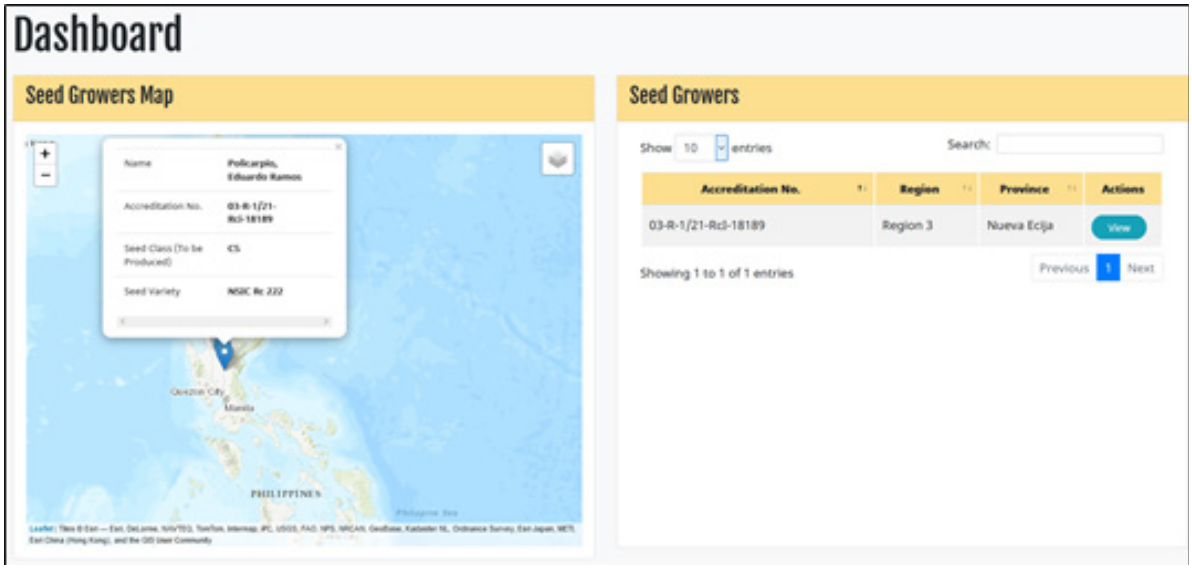

Figure 2b. Seed Growers Distribution Map Dashboard

Figure 3. Seed Ordering Kiosk user interface

The connection between the seed ordering system (kiosk) and the FMIS database was also initiated. The connection will streamline the ordering and buying process of seeds at PhilRice and the automatic and real-time updating of seed stock.

A series of field testing were also conducted to seed growers in four provinces of Region 3: Pampanga, Bulacan, Tarlac, and Nueva Ecija. They were oriented on the use of the seed distribution mobile app and interviewed on how the mobile app will be improved. The project will also develop the Seed Production Traceability Monitoring System (Fig 4) of nucleus to breeder seeds and the Rice Seed System Web Portal.

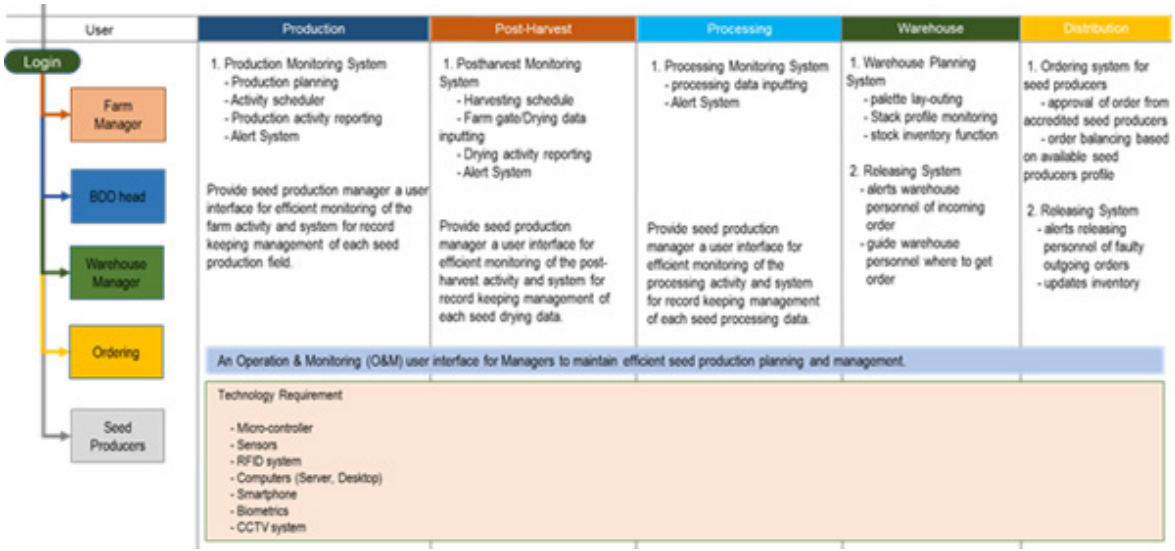

Figure 4. Seed Production Traceability and Distribution Monitoring System Framework

We are a government corporate entity (Classification E) under the Department of Agriculture. We were created through Executive Order 1061 on 5 November 1985 (as amended) to help develop high-yielding and cost-reducing technologies so farmers can produce enough rice for all Filipinos.

With a "Rice-Secure Philippines" vision, we want the Filipino rice farmers and the Philippine rice industry to be competitive through research for development in our central and seven branch stations, coordinating with a network that comprises 59 agencies strategically located nationwide.

We have the following certifications: ISO 9001:2008 (Quality Management), ISO 14001:2004 (Environmental Management), and OHSAS 18001:2007 (Occupational Health and Safety Assessment Series).

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