

2018

NATIONAL RICE R&D HIGHLIGHTS



PUBLIC HYBRID RICE COMMERCIALIZARION

PROGRAM



Table of Contents

	<i>Page</i>
Executive Summary	1
I. Breeder Seed Production	3
II. Foundation Seed Production of Hybrid Parental Lines	4
III. Performance Evaluation of Public Hybrid Rice Varieties for Commercialization	5
IV. F1 Seed Production and Monitoring	6
V. Marketing of Public Hybrid Rice Parental Seeds in Support for a Rice-Secure Philippines	7
VI. Promotion and Capacity Building on Public Hybrids in Support for a Rice-Secure Philippines	8

PUBLIC HYBRID RICE COMMERCIALIZATION

Program directors: Susan R. Brena and Leylani M. Juliano

EXECUTIVE SUMMARY

Public hybrid rice commercialization program (PHRCP) aimed to intensify the promotion of public hybrid rice varieties (either developed by PhilRice, IRRI and/or UPLB) through the production of parental seeds and securing seed availability to users. PHRCP promoted Mestizo 1 or M1 (PSB Rc72H, CMS or 3-line hybrid) and Mestizo 20 or M20 (NSIC Rc204H, TGMS or 2-line hybrid) to be planted in at least 15% of the total targeted hybrid rice areas in the country per year (from 2019 to 2022).

The components of PHRCP included pre-commercialization to validate the seed production, F1 cultivation, and grain qualities of released public hybrid rice varieties and develop a package of technology before commercialization. Three varieties were evaluated: 2 for 3-line hybrid and 1 for 2-line hybrid. One promising public hybrid is undergoing final evaluation for possible commercialization in 1-2 years.

The program also intensified breeder and foundation seed production at PhilRice stations for hybrid rice seed production of accredited seed growers. About 1,500kg breeder seeds (BS) of female parents (A and S lines) with the corresponding 250kg BS of the male parents (R and P lines) were produced and processed. More than enough seeds were produced for the program. BS of the parent lines of M20 and M1 (740kg) were dispatched to PhilRice stations enough for 40ha AxB and S-line foundation seed (FS) production. BS buffer stocks of about 1,500kg female parents and 500kg male parents were kept in the cold storage rooms at PhilRice Los Baños. FS production project produced 5,070kg A-line, 15,000kg S-line, 4,420kg P-line, and 1,975kg R-line.

The F1 seed production and monitoring component provided technical assistance and conducted field visits in Davao Oriental in Banaybanay (Davao Oriental Seed Producers Cooperative) and Lupon (Seed to Rice Cooperative) where majority of the F1 seed production areas were established. The cooperatives harvested 25,711 bags at 18kg/bag (12,337 bags in DS and 13,374 bags in WS) of public hybrid F1 seeds.

The marketing and distribution component was handled by the Business Development Division for the systematic seed deployment (development of seedgrowers' online database) to the intended market. Marketing was done through the Bureau of Plant Industry (BPI), which deployed seeds to the seed growers through the DA-Regional Offices (DA-RFOs).

The capacity building and technical support intervention conducted training for implementers and seed growers on F1 seed production, cultivation, and certification in collaboration with the BPI-National Seed Quality Control Services (BPI-NSQCS). These included training of trainers, season-long training, intensive training for seed production, and seed inspectors' training. Promotional strategies were also conducted such as techno demos on F1 cultivation in suitable environments, exhibits, distribution of IEC materials, and information campaign using social media, radio, and SMS-based and online platforms.

All of these accomplishments contribute in achieving the target outcomes: 1) increased productivity, cost-effectiveness, and profitability of rice farming in a sustainable manner; and 2) enhanced partnerships and knowledge management for rice research for development.

PROJECT 1:

BREEDER SEED PRODUCTION

LV Guittap, WB Abonitalla, AV Tandang, MAT Talavera, EE Sajise, and SR Brena

This project produced the required amount (including buffer stocks) of breeder seeds (BS) of public hybrid parental lines for the national public hybrid rice target. The project involved parental lines purification, nucleus and BS production, and BS distribution. Maintaining the purity and genetic identity of the hybrid parentals was also conducted with the hybrid nucleus and breeder seed production (NBSP) Research and Maintenance Project of the Hybrid Rice Program in PhilRice Los Baños. Production and distribution of BS were done with PhilRice stations involved in the PHRCP. For 2018, BS production focused on parental lines of M20 and M1.

The purification activities followed the protocol used in the NBSP (see Hybrid NBSP Research and Maintenance Project Protocol under the Hybrid Rice Program). There were 25kg nucleus seed of IR58025A, 10kg IR68897A, and 15kg PRUP TG102 produced. Corresponding maintainer lines for the A-line nucleus seeds were harvested. The seeds were stored and would serve as source of BS.

The project aimed to produce 300kg S-line (PRUPTG102) and 200 kg P-line (TG102M) of M20; and 300kg A-line (IR58025A), 200kg B-line (IR58025B), and 200kg R-line (IR34686) of M1 to meet the needs of the parental lines production sites of the PhilRice stations. About 1,500kg BS of the female parents (840kg A-line and 610kg S-line) were produced and processed that were more than enough to meet the requirement of the program. Corresponding 250kg BS of the male parents (100kg R-line and 150kg P-line) of the hybrids were also produced during WS. The amount of S-line seeds produced could plant approximately 30-ha foundation seeds (FS). There were 740kg BS of the parent lines of M20 and M1 dispatched to PhilRice stations enough to plant 40-ha AxB and S-line FS production. Buffer stocks of BS of about 1,500kg of A and S-line and 500kg of R and P-line of the same parents were kept in the cold storage rooms (with temperature of 16-20°C and relative humidity of 40-60%) at PhilRice Los Baños.

The deployment of BS in the four branch and satellite stations: PhilRice Isabela, Midsayap, Mindoro, and Negros were for the FS production of M1 and M20 parental lines. PhilRice Isabela were provided with BS of IR58025A at 330kg with the corresponding 144kg B-line, and additional 30kg IR34686R for R-line multiplication.

PROJECT 2:

FOUNDATION SEED PRODUCTION OF HYBRID PARENTAL LINES

SR Brena, AGS Ferriol, FM Ramos, MO Palanog, and IV Boholano

The project's main objective was to make FS of public hybrid parental lines of M1 and M20 available to accredited hybrid seed growers. The project targeted 15,000kg S-line and 6,000kg P-line for M20; and 5,000kg of A-line and 2,000kg R-line for M1. The FS production project produced 5,070kg A-line, 15,000kg S-line, 4,420kg P-line, and 1,975kg R-line. Targeted seed yields particularly for the female parents were not achieved owing to unfavorable weather conditions in WS and too windy weather condition at ripening phase that caused shattering of the seeds in DS. To address this, the male fertile environments (MFE) sites established in three locations (Isabela, Midsayap, and Negros) would be expanded.

FS production of PRUPTG102 (S-line) focused on MFE in PhilRice Negros and PhilRice Isabela. PhilRice Negros and PhilRice Isabela had 5ha and 10ha MFE sites, respectively. The MFE sites chosen were at least 700m above sea level, had provisions for isolation, and with manageable control for disease and insect for the parentals.

In DS, female parents, IR58025A (M1) and PRUPTG102 (M20) were planted in PhilRice Isabela and PhilRice Negros. The male parents, IR34686R (M1) and TG102M (M20) were planted in PhilRice CES, PhilRice Isabela, and PhilRice Negros. The A-line production in DS was augmented by the 2-ha seed production of the Seed to Rice Cooperative in Davao. In 2018 WS, the MFE of PhilRice Negros was expanded and new MFE site in PhilRice Midsayap was tried with good seed yield. The restorer line, IR34686R, was only planted in PhilRice Isabela and Midsayap. Pollen parent of M20 was planted in PhilRice CES, Isabela, and Midsayap.

FS production was challenged by the availability of seeds for deployment in the F1 seed production areas at the right time. Some of the PhilRice sites harvested off-season or did not synchronize with the planting calendar of most F1 production areas.

PROJECT 3:

PERFORMANCE EVALUATION OF PUBLIC HYBRID RICE VARIETIES FOR COMMERCIALIZATION

LV Gramaje, FC Waing, RM Manaois, JP Rilon, AV Morales, MSF Ablaza, VP Luciano, PLH Duran, JOS Enriquez, LM Juliano, MV Corpuz, JV Galapon, and FM Ramos, and IV Boholano

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The project aimed to identify and evaluate released public hybrids ready for commercialization by validating the National Cooperative Test results through multi-environment confirmatory performance test. Pre-commercial hybrids were included in technology demonstration trials to assess their performance in larger plots using existing hybrid rice cultivation technologies. Pre-commercial hybrids were also evaluated for seed production capacity and grain quality performance.

In 2018 DS, yield performance of three released public hybrid rice varieties: Mestiso 32 (M32), Mestiso 55 (M55), and Mestiso 73 (M73) were evaluated in PhilRice Isabela, PhilRice CES, and PhilRice Los Baños. The actual yields recorded for M32 were 7.6t/ha and 8t/ha for PhilRice Los Baños and PhilRice CES, respectively. M55 yielded 8.4t/ha in PhilRice CES. In WS 2018, M32 attained a maximum yield of 9.62t/ha; M55, 6.55t/ha; and M73, 7.63t/ha. No serious damage caused by insect pest and diseases was observed during the trial.

The performance of these varieties was validated in Tabuk, Kalinga; Batac, Ilocos Norte; San Mateo, Isabela; Science City of Munoz, Nueva Ecija; WESVIARC, Iloilo; and RTR, Agusan through multi-environment testing. Across sites, F1 grain yield of M32 ranged from 5.3 to 6.02t/ha; M55, 5.4-8.5t/ha, and M73, 6.02-8.5t/ha. The harvested yield per hectare was derived from the three 600-hill yield plots.

Parents of M32 and M55 were screened in separate set-ups to confirm their resistance to major insect pests and diseases. Parent lines had susceptibility to some major insect pests and diseases but had dependable resistance to blast, bacterial leaf blight, sheath blight under induced method, and stem borer in field conditions.

For the A x R seed production, M55 attained a seed yield of 1,115kg/ha and 1,826.91kg/ha in Nueva Ecija in DS and WS, respectively. M32 had a seed yield of 800kg/ha in PhilRice Los Baños during the DS and 600kg/ha in PhilRice Isabela during the WS. The seed yield in (AxR/ SxP) seed production of pre-commercial varieties would determine its viability for commercialization. Moreover, parents of M32 and M55 were planted in PhilRice Isabela to gather heading dates and leaf number. Result showed that heading ranged from 77 to 81 days with an average leaf number of 13-19 for M32 and M55. Moreover, seed kits of M32 were distributed to two major seed producers, particularly Davao Oriental Seed Producers Cooperative (DOSEPCO) and Seed to Rice Cooperative (S2R) for the flowering synchronization and other important data that would be useful in developing a seed production protocol under Davao Oriental condition.

M32 and M55 had higher seed yield during the DS. Days to heading, flowering, and leaf number would be used in developing seed production protocol for specific seed production sites and gathered important information on the confirmatory trials were also needed to support the commercialization of these hybrids.

F1 SEED PRODUCTION AND MONITORING

FM Ramos and IV Boholano

This project aimed to promote and ensure the good quality of F1 seed production in Luzon, Visayas, and Mindanao by providing technical assistance to seed growers and conducting field visit of their hybrid rice seed production areas. Majority of F1 seed production areas were established in Davao Oriental in Banaybanay (DOSEPCO) and Lupon (S2R). During the 2018 DS, total area planted to F1 seed production was 172.30ha: 68.6ha for AxR (M1) and 103.70ha for SxP (M20). In 2018 WS, area visited was 198.95 ha: 32.9ha for M1 and 166.05ha for M20. The M20 achieved an average yield of 1,379kg/ha in DS and 1,356.21kg/ha in WS across sites. M1, on the other hand, only produced 607.95kg/ha in DS and 472.16kg/ha in WS across sites. The M1's low yield was due to late planting resulting in drought stress during the flowering to ripening stage of the crop.

The two cooperatives harvested 25,711 bags at 18kg/bag (12,337 bags in DS and 13,374 bags in WS) of public hybrid F1 seeds. Yield performance for the AxR of M1 declined but the SxP of M20 had higher seed yield for both DS and WS. The coops adjusted their planting calendar 1-2 months later; hence performance of F1 seed production was affected by pests and diseases in WS.

Analyses on the field performance for F1 seed production showed that F1 seed yield can still be improved provided that there is a consolidated effort to address challenges. Capacity enhancement or retooling on enhanced technologies of seed growers can be provided especially that crop management issues (biotic stresses, need for mechanization) are becoming more serious under a changing environment. There's also a need for seed growers to be organized to improve production and supply.

PROJECT 5:

MARKETING OF PUBLIC HYBRID RICE PARENTAL SEEDS IN SUPPORT FOR A RICE-SECURE PHILIPPINES

FP Bongat, MP Capistrano, and JA Orcino

The need for a marketing and distribution arm for the provision of hybrid parentals was essential to ensure adequate supply and sustained presence of public hybrids in the market. Thus, this project worked on the following objectives: 1) determine suitable and strategic areas for F1 seed production in the demonstration and learning areas; 2) identify seed producers and partners for F1 seed production, in coordination with the training component group; and 3) market and distribute hybrid parentals to accredited and trained F1 seed producers and partners for F1 seed production.

The potential sources of F1 seeds for 2019 were gathered from BPI-NSQCS that accredits F1 seed growers.

The project distributed the following FS parentals: 14,750kg S-line and 4,420kg P-line for M20, and 5,070kg A-line and 1,975kg R-line for M1 seed production. Bulk of the parentals were delivered to BPI for distribution to seed growers through the DA-RFOs. Major seed growers were S2R and DOSEPCO in Davao Oriental. Other seed growers for F1 seed production will come from CAR, Regions 1, 2, 3, 4-B, and 11. PhilRice also used 102kg F1 seeds of M20 for research.

The project also collaborated with the training component in exploring suitable areas for F1 seed production for M20 in Pangasinan and Southern Nueva Ecija. However, yield from the exploration study was low owing to tungro infestation and non-synchronization of male and female parents. There is a need to conduct capacity enhancement among seed growers as the environmental condition is favorable for seed production.

PROJECT 6:

PROMOTION AND CAPACITY BUILDING ON PUBLIC HYBRIDS IN SUPPORT FOR A RICE-SECURE PHILIPPINES

FM Ramos, RD Romanillos, FD Garcia, and HHB Manalo

This project promoted public hybrid rice seed production and enhanced the capacity of various stakeholders. Project had three components: 1) capacity enhancement for project implementers and seed growers on F1 seed production, F1 cultivation and certification to handle the training of potential hybrid seed growers, project implementers, and deputized seed inspectors; and the creation of functional training and monitoring teams; 2) development and promotion of high-yielding location-specific technology for F1 seed production and F1 cultivation; and 3) strategic and transformative communication in support of the PHRCP to promote public hybrid rice through technology demonstration (techno demo), technical briefing, and field days; and print, online, and broadcast media, respectively.

Capacities of 715 seed growers, implementers, and deputized rice seed inspectors on hybrid rice seed production were enhanced through the conduct of 11 series of three-day intensive training for project implementers and 13 series of season-long training for seed growers. There were 35 seed growers who committed to engage in hybrid rice seed production in 2019 WS and 2019 DS with a total area of 35ha. The monitoring and training teams were also created and led the provision of technical assistance, capacity enhancement, and field visits.

There were four techno demo and learning fields on F1 seed production established in Nueva Ecija and Pangasinan for the accreditation of seed growers. Six clustered techno demo farms of M20 (F1 cultivation) were established during the 2018 DS in Tarlac, Pangasinan, Bulacan, Pampanga, Nueva Ecija, and Bataan with a total area of 44.7ha. There were 480 bags of M1 and M20 seeds distributed to farmers and project implementers in Pangasinan, Isabela, Kalinga, Nueva Ecija, Tarlac, Pampanga, Bulacan, Aurora, Bataan, Quezon, Laguna, Batangas, and Lanao del Norte for increased public hybrid adaptability and promotion. During the 2018 DS, the average yield of M20 across sites was 7t/ha. The highest yield recorded for mechanically transplanted M20 was 8.3t/ha. Results of techno demo showed that M20 performed well in the field using any crop establishment method although the use of mechanical transplanter and manual transplanting had a yield advantage of 0.2t/ha compared with the use of direct seeding. From the results of the techno demos, a package of technology on mechanized hybrid rice cultivation or commercial hybrid rice production was developed, published as rice technology bulletin, and promoted.

Six field days and fora were also conducted during the 2018 DS and attended by 2,419 farmers, agricultural extension workers, and LGU partners/other stakeholders. There were also three technical briefings on hybrid rice seed production and F1 cultivation conducted in Nueva Ecija and Pangasinan.

M1 and M20 were also showcased in the Rice Board-organized National Rice Technology Forum in Dipolog City and Talibon, Bohol. M20 was also showcased in five hybrid rice derby sites in Region 1 during 2018 WS.

There were 11 knowledge products (KPs) produced in various formats such as Q&A, handouts, and rice technology bulletin. These KPs were distributed to farmers during exhibits and field days. A campaign tagline “Mestiso. Mura. Maani. Masarap” and logo were also produced. There were also 26 social media contents produced and posted, 7 radio interviews conducted, 5 magazine and 8 website articles published, and 118 queries answered via the PhilRice Text Center.

The promotion of public hybrid rice should always be supported by the availability of seeds for use of potential growers. While we continue to target promotional activities, the project is also constrained with the availability and/or access of seeds from seed growers due to proximity (available in Davao but needed in Luzon or Visayas). Hence, there is a need to continuously intensify efforts of at least the PhilRice stations to produce F1 seeds to be available for F1 cultivation.

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).

PhilRice Central Experiment Station; Maligaya, Science City of Muñoz, 3119 Nueva Ecija
Tel: (44) 456-0277 • Direct line/Telefax: (44) 456-0354

BRANCH STATIONS:

PhilRice Batac, MMSU Campus, Batac City, 2906 Ilocos Norte
Telefax: (77) 772- 0654; 670-1867; Tel: 677-1508; Email: batac.station@philrice.gov.ph
PhilRice Isabela, Malasin, San Mateo, 3318 Isabela
Mobile: 0908-875-7955; 0927-437-7769; Email: isabela.station@philrice.gov.ph
PhilRice Los Baños, UPLB Campus, Los Baños, 4030 Laguna
Tel: (49) 536-8620; 501-1917; Mobile: 0920-911-1420; Email: losbanos.station@philrice.gov.ph
PhilRice Bicol, Batang, Ligao City, 4504 Albay
Tel: (52) 284-4859 to 60; Mobile: 0918-946-7439 ; Email: bicol.station@philrice.gov.ph
PhilRice Negros, Cansilayan, Murcia, 6129 Negros Occidental
Mobile: 0949-194-2307; 0927-462-4026; Email: negros.station@philrice.gov.ph
PhilRice Agusan, Basilisa, RTRomualdez, 8611 Agusan del Norte
Telefax: (85) 343-0768; Tel: 343-0534; 343-0778; Email: agusan.station@philrice.gov.ph
PhilRice Midsayap, Bual Norte, Midsayap, 9410 North Cotabato
Tel: (64) 229-8178; 229-7241 to 43; Email: midsayap.station@philrice.gov.ph

PhilRice Field Office, CMU Campus, Maramag, 8714 Bukidnon
Mobile: 0916-367-6086; 0909-822-9813
PhilRice Liaison Office, 3rd Floor, ATI Bldg, Elliptical Road, Diliman, Quezon City
Tel: (02) 920-5129

SATELLITE STATIONS:

Mindoro Satellite Station, Alacaak, Sta. Cruz, 5105 Occidental Mindoro
Mobile: 0917-714-9366; 0948-655-7778
Samar Satellite Station, UEP Campus, Catarman, 6400 Northern Samar
Mobile: 0948-754-5994; 0929-188-5438
Zamboanga Satellite Station, WMSU Campus, San Ramon, 7000 Zamboanga City
Mobile: 0975-526-0306; 0910-645-9323

 www.philrice.gov.ph www.pinoyrice.com  (0917) 111-7423  [rice.matters](https://www.facebook.com/rice.matters)  prri.mail@philrice.gov.ph

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