Department of Agriculture

PHILRICE®

PHILIPPINE RICE RESEARCH INSTITUTE

2021

PHILRICE R&D HIGHLIGHTS

DA-PHILRICE BICOL

Content

BRANCH STATION

DA-PHILRICE BICOL BRANCH STATION

Branch Director: Victoria C. Lapitan

EXECUTIVE SUMMARY

PhilRice Bicol›s mission is to enhance rice farming resilience in calamity-vulnerable regions of Bicol and Eastern Visayas. The station achieves this by developing and sharing technologies to improve rice productivity in environments that are prone to saline, drought, and flood and in the uplands.

In 2021, the station successfully implemented one program-based (RiceBIS) and two station-based projects (BDI and Palayamanan® Research). Two station-based studies (LTSFE and PRISM) and five externally-funded research studies (Multi-environment and Adaptability Test of Breeding Lines for Abiotic Stresses, Selection and Dissemination of Elite Salt-Tolerant Rice Varieties for AFACI-member Countries, National Cooperative Testing for Hybrid, Rice Crop Manager, and On-farm MP Seeder Technology Verification Trial in rainfed areas) were implemented. Overall, PhilRice Bicol executed 18 R4D initiatives spread across Bicol and EVR.

Station-based research projects and studies (e.g., Palayamanan, LTSFE, PRISM, AFACI, NCT, RCM, MPS) focused on generating and validating field data to develop a package of technologies (POT) for specific environmental conditions. Development Projects (RiceBIS Program and BDI projects) utilized this data to extend initiatives, disseminate POT, and scale mature technologies to suitable rice environments and communities

PROJECT 1

Rice Business Innovation System (RiceBIS) Community in Bicol Region

Melanie Aileen C. de Peralta

The Rice Business Innovation Systems (RiceBIS) Community was geared toward developing rice and rice-based enterprises within a province to address farmers' needs—from production, to processing, to marketing—in a resilient and sustainable manner, ensuring available and affordable rice. As it strengthened the production system, it also dealt more on a market-driven approach catering to its demand.

The project was composed of three components: (1) Engaging and Strengthening Farmers' Organizations for a Progressive RiceBIS Community, (2) Agroenterprise Development: Developing Rice and Rice-Based Enterprises, and (3) Performance Monitoring and Evaluation covering Albay (Phase I) and Masbate (Phase II and Extension) Provinces. Component 1 was focused on enhancing farmers' engagement in the community and strengthening farmers' organizations through community organizing and capacity enhancement to achieve a competitive and sustainable agroenterprise. Component 2 was centered in developing an inclusive, competitive and sustainable agroenterprise community model with income increased by 25%, while Component 3 focused on monitoring and evaluating the development interventions of the RiceBIS project both for men and women farmer beneficiaries. All of these were geared towards the institutional target of increasing palay yield (1 t/ha in irrigated, 0.5 t/ha in rainfed), reducing cost of palay up to Php 8.00/kg, reducing postharvest losses to 14%, and increasing household income by 25%.

Major outputs of the program:

- 4 FFS training on rice production in RiceBIS communities
- 2 rice enterprise identified (red and black glutinous rice; commercial rice) in Phase II and Expansion
- 2 agro-enterprise plan developed for Masbate (Phase II and Expansion)
- 3 trainings on organization building and management training with 165 participants
- 4 trainings on agro-enterprise in Milagros and Mandaon, Masbate with 250 participants
- 3 trainings on organizational management cum enterprise development (2 in Reg. 5; 1 in Reg 8)

- 2 FFS training on the production of high-quality seeds and farm mechanizations in RiceBIs communities in Masbate
- 1 special training on operating rice transplanter with 12 participants
- 4 FFS training on rice production in RiceBIS communities
- 1 market linkage established in every RiceBIS Community
- 2 RiceBIS communities (Albay and Masbate) established and maintained
- 9 clusters (Milagros, Masbate) and 10 clusters (Mandaon, Masbate) formed
- 15 and 18 RiceBIS TDF in DS and WS 2021 with yield-enhancing and cost-reducing technologies

PROJECT 2

Rice SUSTAIN (Sustainable Technologies and Appropriate Information Needs) for Increased Productivity and Profitability

Project Leader: Rona T. Dollentas, Supervising SRS (PhilRice Bicol)

PhilRice plays a vital role in making the country rice-secured by enhancing the competitiveness of Filipino rice farmers, including vulnerable groups like indigenous people (IP), persons with disability (PWD), and senior citizens. PhilRice Bicol, under the Branch Development Initiative (BDI) project, contributes to this by promoting cost-reducing and yield-enhancing rice and rice-based production technologies.

Covering Bicol and Eastern Visayas Regions (EVR), the BDI project has two main components: (1) conducting regular development and extension services and activities and (2) scaling or catalyzing the adoption of appropriate rice farming technologies. Component A includes gender-based capacity enhancement activities like training and seminars, technology promotion through media, and setting up technology demonstration farms. Component B focuses on accelerating the dissemination of mature technologies, such as Binhing Palay Farms for adverse environments, and scaling Integrated Crop Management (ICM) for saline-prone rice ecosystems in Albay, Bicol. Through collaboration with public and private entities, all target activities were successfully implemented in 2021 while scaling ICM for saline-prone rice environments is planned for 2022.

PROJECT 2

The following are the major outputs of the project's components:

Component 1: iCARE (Increasing Capacity Advancements through Rice S&T and Education) for Bisakol (Bisaya & Bikol) Farmers

- 6 *PalayAralan* in Eastern Visayas Region (3S)
- 1 skills training for women farm workers in Ligao City, Albay
- 15 KSL activities on Palaycheck System for Woktok either online or offline implemented and supervised
- Skills training on walk-type rice transplanter
- 5 *Lakbay Palay* in RiceBIS sites

Component 2: EXTEND Rice (Enhancing Extension, Technology, and Innovation Dissemination) in Bicol and EVR

- 1,510 new PhilRice Text Center registrants from Bicol and Eastern Visayas Regions
- Facebook account maintained with 26% and 32 % increase in the number of likes and followers, respectively
- 2 rice exhibits conducted during *Lakbay Palay*
- 1 Be *Riceponsible* advocacy campaign (NRAM) implemented (hanging of tarpaulin, brown rice meals for the staff, TikTok Challenge)

Component 3: Rice S&T Dissemination through Palay, Teknolohiya, at Binhi Demonstration Farms

- 1 innovation techno-demo (0.5 ha) established for WOKTOK
- 2 NRTF/ Hybrid Rice Derby sites established

Scaling of Technologies Under Branch Development Initiative: Binhing Palay Farms

- 35 *Binhing Palay* farm sites as source of high-quality inbred rice seeds especially for adverse environments
- Partnership with 18 seed growers and three seed cooperatives for the *Binhing Palay* Farms through PLGUs and MLGUs
- 2 *Lakbay Palay/ Palaytalakayan* at *Binhing Palay* farms

PROJECT 3

Reducing Vulnerability to Climate Change Through Palamayanan Approach

Project Leader: Gian Carlo C. Enot, SRS II (PhilRice Bicol)

The project aims to reduce the vulnerability to climate change of men and women farmers under drought and saline -prone rice environments by improving their productivity through the use of adapted and suitable rice varieties, efficient fertilizer rates, and appropriate water management. The project is composed of two studies that focus on the saline-prone and drought-prone rice environments. The first study is the Development of Palayamanan Plus Farming System Model for Saline Stress-prone Rice Ecosystem, and the second study is the Development of Palayamanan Plus Farming System Model for Drought Stress-prone Rice Ecosystem.

Major outputs of the project:

- Identified ICM for saline: NSIC Rc 290 (Salinas 6) and 100-30-80kg/ha NPK rate for DS; 120-30-100kg/ha NPK rate and NSIC Rc 532 for WS
- Identified ICM for rainfed environment: NSIC Rc 420 and 120-30-100 kg/ha NPK rate for DS
- 2 Palayamanan systems with mushroom and rice components established (drought and saline-prone rice communities)
- 1 training on mushroom spawn production in Camarines Sur with 19 participants.
- 1 training on mushroom product development in CamSur (saline) with 27 participants
- 1 on-station Palayamanan Plus with mushroom, vermiculture, edible-gardening, and vegetable component (Plant, Plant, Plant Program)
- 26 inbred rice varieties seed increased across Bicol and EVR
- 2 on-station inbred/hybrid techno demos of newly released rice varieties
- 1 on-station learning farm established and maintained

PROJECT 4

Long-term Soil Fertility Experiment

Gian Carlo C. Enot, SRS II (PhilRice Bicol)
Jonathan D. Tariman, Laborer I (PhilRice Bicol

Continuous and long-term use of inorganic fertilizers can significantly impact soil fertility and the sustainability of crop production. To understand the changes that occur over time, it is crucial to measure and assess the effects on the agricultural area. At PhilRice Bicol, a study was conducted starting in 2019 to evaluate the long-term effects of inorganic fertilizer use on rice productivity, yield gap, and soil fertility.

The experimental setup followed a two-factor factorial design (fertilizer by variety) using different rice varieties, namely V1-NSIC Rc 160, V2-NSIC RC 222, and V3-PR43504-14-3-1-1. Six levels of NPK fertilizers were applied: F1 (Control)-0-0-0; F2-SSNM-30-100; F3-210-0-50; F4-210-30-100; F5-210-30-100; and F6-0-30-50. The same setup was used in the wet season, except for treatments F3, F4, and F5, where 210kg/ha-N was replaced with 80kg/ha-N. Yield data were collected and subjected to statistical analysis using STAR at a 5% level of significance.

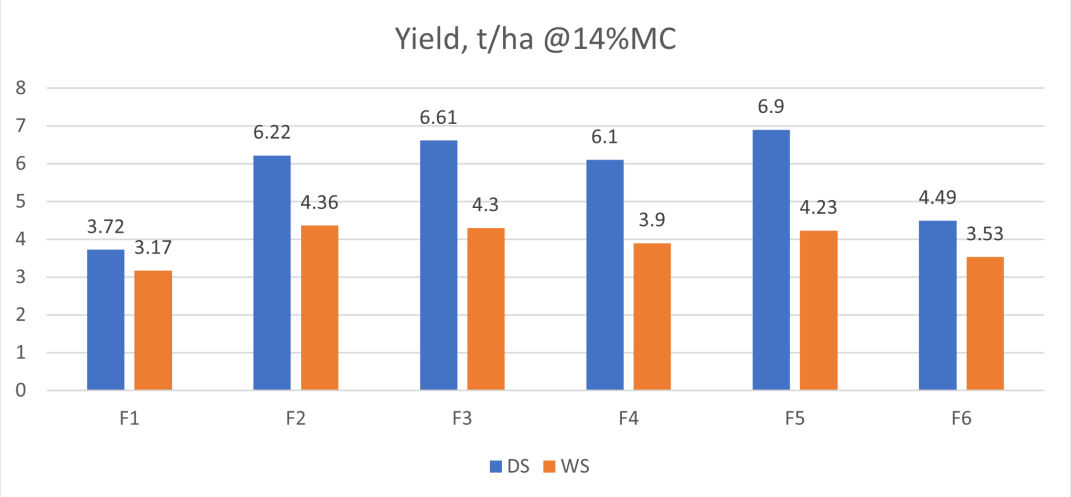

Figure 1. Yield among the six fertilizer treatments during DS & WS 2021.

PROJECT 4

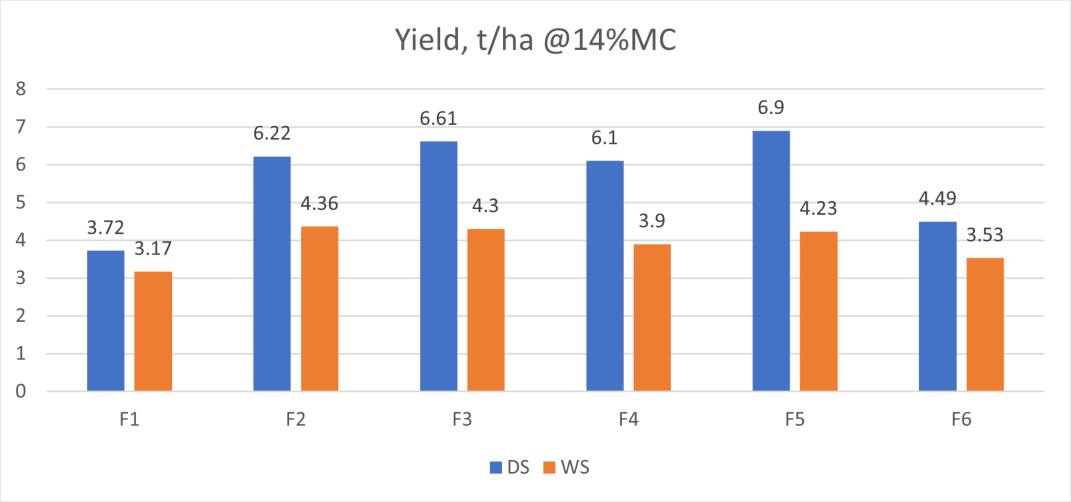

Figure 2. Average yield of variety by fertilizer combination during 2021 DS & WS.

During the DS, the treatments showed varying yields with the highest yield observed in F5 at 6.9t/ha, followed by F3 at 6.61t/ha, F2 at 6.22t/ha, F4 at 6.1t/ha, F6 at 4.49t/ha, and the lowest yield in F1 at 3.72t/ha (Figure 1). Treatment F5 showed a significant difference compared to treatments F1 and F6. In terms of the effect of variety and fertilizer combinations, the highest yield was observed in V3F5 at 7.9t/ha, followed by V2F3 at 7t/ha, and V1F5 at 6.1t/ha (Figure 2).

During the WS, the treatments also showed varying yields, with the highest yield observed in F2 at 4.36t/ha, followed by F3 at 4.3t/ha, F5 at 4.23t/ha, F4 at 3.9t/ha, and lastly, F1 at 3.17t/ha (Figure 2). The effects of the combination of variety and fertilizer on yield were observed, with the highest yield in V2F2 at 4.9t/ha, followed by V3F2, V3F3, and V3F4 at 4.6t/ha. There were no significant differences in yield among the variety and fertilizer combinations.

PROJECT 5

Philippine Rice Information System (PRISM)

JRF Mirandilla, SRS 1 (PhilRice Bicol)
GB de Mesa, SRS 1 (PhilRice Bicol)
DB Bañares, SRS 1 (PhilRice Bicol)

The Philippine Rice Information System (PRiSM) project maintained and improved an online system that consolidates timely information on the rice crop's status. This information is crucial for the Department of Agriculture (DA) in planning and decision-making to address production gaps effectively. PRiSM uses SAR satellite images and smartphone-based field surveys to gather actual crop growth parameters, which are processed using remote sensing and GIS software. The data and outputs are made accessible to target users, project partners, and decision-makers through the PRiSM website (https://prism.philrice.gov.ph/).

In 2021, rice area estimates and start of season (SOS) maps were generated for provinces in Regions 5, 6, 7, and 8 using satellite images and field validation data. There were some differences in generated areas between the two semesters (1st and 2nd) for the four regions. The accuracy of the estimates ranged from 92.9% to 100% during the 1st semester and from 92.3% to 100% during the 2nd semester, based on validation points collected by PRISM regional implementers. However, Region 5's number of collected validation points in the 1st semester was not sufficient to check the accuracy of the generated output.

Estimated monthly planting and harvesting in each province and region were generated from the SOS maps. In the 1st semester of 2021, farmers in Western Visayas had the earliest peak planting in November 2020, while most Bicol rice farmers planted their rice fields in January. Central and Eastern Visayas had their peak planting in December. In the 2nd semester of 2021, most farmers in Bicol, Central and Eastern Visayas established their rice fields in July, while Western Visayas had its peak planting in August.

PROJECT 5

In 2021, three typhoons (Bising, Dante, and Jolina) were monitored. Due to travel restrictions in affected areas, PRISM facilitators collected information and reports in their assigned regions and submitted them to the mapping team. Damage reports from DA RFOs brought by typhoons Bising, Dante, and Jolina were requested.

Photodocumentation:

Consultative meeting with the new LGU partners in Region 8

Region 8 Hands on training on data collection

EXTERNALLY-FUNDED PROJECT 1

Selection and Dissemination of Elite Salt-Tolerant Rice Varieties for AFACI Member Countries

NL Manigbas, Chief SRS (PhilRice CES)
MAR Orbase, SRS II (PhilRice Bicol)
FB Carido, Laborer I (PhilRice Bicol

The Philippines has a significant agricultural area exposed to coastal-saline conditions, and with rising sea levels due to climate change, this area is at risk. Farmers in these regions depend on salt-tolerant rice varieties to ensure good harvests. However, the adoption of these varieties is limited due to the lack of available seeds and suitable production guidelines. The project aimed to increase the adoption of salt-tolerant rice varieties by testing different lines developed by PhilRice and IRRI.

On-farm trials were conducted during both the dry and wet seasons, using normal and salt-affected fields. The experiments included 48 breeding lines and varieties, organized in an alpha-lattice design with two replications and plot size of 1x5m2. Thirteen entries were selected based on their strong performance in terms of yield under both irrigated and saline conditions, lower leaf salinity score at 7 DASI, high plant survival, good phenotypic acceptability, and high stress tolerance index (Table 1).

Table 1. Selected Breeding Lines with Good Performance under both Normal and Saline Conditions, 2021WS.

Entry No.	Designation	Yield (kg/ha)		Delay in Flowering	Phenotypic Acceptability		Yield Reduction (%)	Leaf Score at 7 DASI	Stress Tolerance Index (STI)
		N	S		N	S			
2	IR16T1009	7017	3034	18	3	3	56.8	3	0.61
9	IR16T1075	6861	4203	19	3	3	38.7	2	0.82
16	IR18R1204	7529	3249	15	3	3	56.9	3	0.70
17	IR18R1208	6890	4139	22	3	3	39.9	2	0.81
20	IR18T1014	6868	3993	16	2	1	41.9	1	0.78
24	IR16T1661	6565	2934	21	4	3	55.3	2	0.55
25	IR16T1652	7415	3628	11	5	5	51.1	2	0.77
27	IR18T1045	6110	3616	10	3	1	40.8	3	0.63
28	IR18T1135	5515	3775	17	4	3	31.5	3	0.59

EXTERNALLY-FUNDED PROJECT 1

34	IR18T1029	5825	3716	15	2	2	36.2	1	0.62
40	PR45274-3	6423	3214	19	3	3	50.0	3	0.59
45	NSIC Rc 290	7702	2937	19	4	3	61.9	3	0.65
47	NSIC Rc 468	6346	3176	17	1	1	49.9	3	0.58

**Selected based on correlated traits with yield.

Photodocumentation:

Experimental setups under normal (top) and salinized (below) conditions in Malinao, Albay

EXTRACORE PROJECT 1

National Cooperative Test - Hybrid

Marie Antoinette R. Orbase, SRS II (PhilRice Bicol)
Marco C. Pontejos, Laborer I (PhilRice Bicol)

Rice plant growth, productivity, and distribution are significantly influenced by the environment and location. Therefore, it is crucial to test new hybrids across different environments to assess their yield stability and adaptability to specific locations. This assessment is essential for nominating hybrids for national or regional recommendations.

In WS 2021, 24 hybrids from maturity groups I (Maturity <115) and II (Maturity >116) were evaluated. No trial was conducted during the dry season due to changes in NCT guidelines. The trial followed a randomized complete block design (RCBD) with three replications, and each entry had a plot size of 10m2. For Group I, maturity ranged from 102-118 DAS, plant height ranged from 108-137cm, and the number of productive tillers ranged 12-15. In Group II, maturity ranged 110-120 DAS, plant height ranged 116-146 cm, and the number of productive tillers ranged 14-17. The yield for Group I ranged 1.5-4.2t/ha while for Group II, 2.3-4.1t/ha. Yields were generally low due to high disease pressure and drought stress during the reproductive stage. There were high significant differences in yield among the hybrids in Group I while significant differences were observed in Group II ($p>0.05$).

Among the hybrids in Group I, one test hybrid (Entry 3) showed a high yield advantage of 6.1% over the high-yielding check, but Entry 11 only had a 3.7% advantage. However, based on Turkeys' HSD, there was no significant difference in means between the two entries. On the other hand, in Group II, no hybrid had an advantage of more than 5% over the check variety, M99 (4.1t/ha).

Photodocumentation:

BLB incidence observed in some entries, NCT 2021WS

EXTRACORE PROJECT 1

BLB incidence observed in Entry 3 and 2 at 95 DAS (left) and 103(DAS), NCT 2021WS.

Diseases observed during the cropping season, NCT 2021WS.

Lodging incidence observed in Entry 24 (left) and Entry 14 (right) at 113 DAS.

EXTRACORE PROJECT 2

Rice Crop Manager Philippines Phase III: Transition to operational sustainability for research and dissemination from IRRI to DA-2020 (PhilRice Component).

WC Collado, Chief SRS (PhilRice CES)
SD Cañete, Senior SRS (PhilRice CES)
RT Dollentas, Supervising SRS (PhilRice Bicol)
MAR Orbase. SRS II (PhilRice Bicol)
GM Vejel, Laborer I (PhilRice Bicol)

RCM Advisory Service Crop Manager (RCMAS) is a digital agriculture information service that offers farmers with information to increase rice farming productivity and profitability through targeted integrated crop management. The project aimed to validate and enhance the site-specific nutrient management component (along with an enhanced crop management component such as weed, seed, etc.) of Rice Crop Manager across the rice growing Regions in the Philippines.

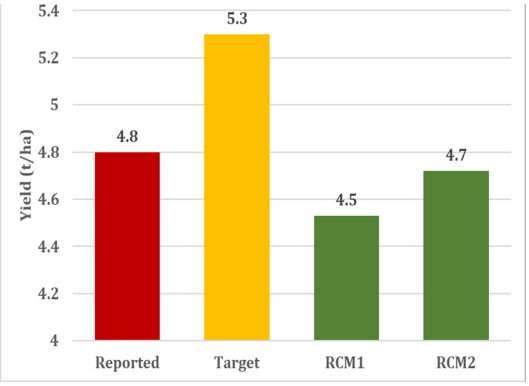

Figure 1. Yield difference of Standard RCM vs Enhanced RCM, On-Station, 2021DS.

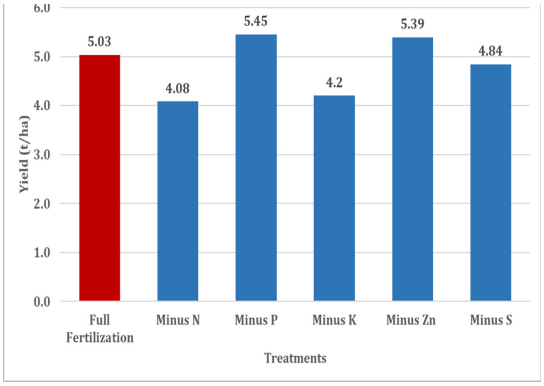

Figure 2. Yield difference under Nutrient Omission Plot Technique, On-Station, 2021DS.

One on-station trial on Standard RCM vs. Enhanced RCM + 1-ton yield increase and Nutrient Omission Plot Technique (NOPT) was conducted on DS 2021. No significant differences in yield were observed between treatments in RCM and NOPT Trials. Standard RCM obtained a yield of 4.5t/ha while Enhanced RCM obtained a yield of 4.7t/ha. Yields obtained from both RCM treatments were lower by 6% and 2% from the reported yield of 4.8 t/ha from the previous DS (Figure 1). In NOPT trial, the absence of N and Zn showed a yield advantage of 7.7% and 6.7% over the fully fertilized plots while removing N will result to 0.95 t/ha decrease in yield (Figure 2).

EXTRACORE PROJECT 2

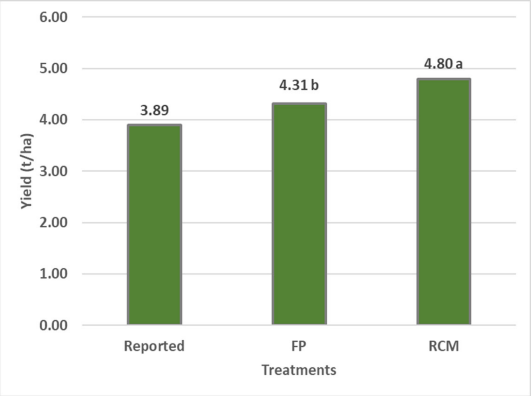

Figure 3. Yield Difference between treatments and reported yield, 2021WS.

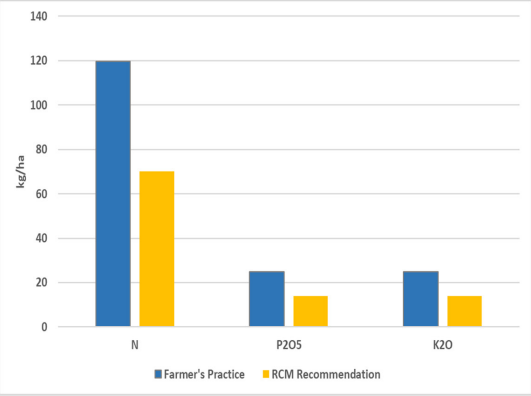

Figure 4. Difference in NPK applied by farmers and RCM Recommendation, 2021WS.

Farm areas were measured using GPS. Two treatments were implemented namely, Rice Crop Manager (RCM) and Farmers' Practice (FP). Reported yield was 3.3t/ha and RCM-DSR target yield was 4.0t/ha using the recommended rate of 70-14-14. Significant difference was observed on yield between treatments, whereas RCM-DSR (4.8t/ha) obtained a yield advantage of 10.2% over the FP (4.31t/ha) while 31.2% yield increase was observed over the reported yield (3.3t/ha) (Figure 3). Average NPK applied by farmers was 120-25-25 RCM NPK Recommendation generated was 70-14-14 (Figure 4).

Established on-farm trials on RCM + Enhanced Weed Management in Mampirao, San Jose, Camarines Sur.

RCM-Domain Specific Recommendation Trials in Oas, Albay, WS 2021.

EXTRACORE PROJECT 3

Mechanized Seeding Technology: Improving Crop Productivity and Increasing Income in Rice-Based Rainfed and Water Scarce Environments in the Philippines (Establishment of Verification Trial for MP Seeder Project in Bicol)

JO Mosquite, SR Analyst (PhilRice Bicol)
RT Dollentas, Supervising SRS (PhilRice Bicol)
GM Vejel, Laborer I (PhilRice Bicol)
MC Pontejos, Laborer I (PhilRice Bicol)

RCM Advisory Service Crop Manager (RCMAS) is a digital agriculture information service that provides farmers with targeted integrated crop management information to enhance rice farming productivity and profitability. The project's goal was to validate and improve the site-specific nutrient management component of Rice Crop Manager (RCM) across rice-growing regions in the Philippines.

During DS 2021, one on-station trial compared Standard RCM with Enhanced RCM + 1-ton yield increase and Nutrient Omission Plot Technique (NOPT). No significant differences in yield were observed between the RCM and NOPT Trials. Standard RCM obtained a yield of 4.5t/ha while Enhanced RCM achieved a yield of 4.7t/ha. The RCM treatments had yields lower by 6% and 2% than the reported yield of 4.8t/ha from the previous DS. In the NOPT trial, the absence of N and Zn resulted in a yield advantage of 7.7% and 6.7% over the fully fertilized plots, respectively while removing N caused a decrease of 0.95t/ha in yield.

Farm areas were measured using GPS and treated with RCM and Farmers' Practice (FP). The reported yield was 3.3t/ha while the RCM-DSR target yield was 4t/ha using the recommended rate of 70-14-14. A significant difference was observed in yield between the treatments. RCM-DSR (4.8t/ha) obtained a yield advantage of 10.2% over the FP (4.31t/ha), resulting in a 31.2% yield increase compared to the reported yield (3.3t/ha). The average NPK applied by farmers was 120-25-25 while the RCM NPK recommendation generated was 70-14-14.
Manual broadcasting and dibbling are the primary methods used in

Table 1. Comparative technology components of the Multi-purpose seeder + Best Management Practices (MPS+BMP) and Farmer's practice, Albay, Cam Sur, & Sorsogon, 2021 DS.

TECHNOLOGY COMPONENTS	MPS	FARMER'S PRACTICE
Land Preparation	Same- plow & rotavator	Same- plow & rotavator
Method of planting	Dry direct seeding	Dry direct seeding
Crop establishment	MP Seeder (row seeding)	Line seeding: Dibbling- seeds is placed at specific depth and spacing by dibbler using wooden tools or by hand. Seeding behind the plough- man drops seeds in the furrow walking behind the plough.
Seeding Rate	18-21 kg/ha	17-23 kg/ha
Seeds variety	Hybrid: NK6410	Pioneer, Dekalb
Seed Cover	Using a furrow closer which is immediately back close the canal by dragging soil beside the dropped seeds.	Cover the seeds with soil using a foot or wooden tool.
Herbicide Application	Pre-emergence: 15DAS Post-emergence: 35DAE	Post-emergence: Round-up application
Fertilizer Rate (kg/ha)	130-65-65	Albay: 143-16-16 Cam Sur: 112-30-30 Sorsogon: 234-80-80
Timing of Application	Basal: 14-14014 Side dress (25DAE): 46-0-0	Basal: chicken manure + carbonized rice hull 8-15 DAS: 14-14-14 + 46-0-0 30-35 DAE: 46-0-0
Water Management	100 % rainfall	100 % rainfall
Pesticides Management	Spraying pesticides (corn borer)	Spraying pesticides (corn borer)
Other crops planted		Rice- depends on timing of rainfall (November-December)

these areas for planting rice seeds. However, the broadcast method has its drawbacks such as vulnerability to bird and rat damages, uneven seed distribution, and weed infestation. Farmers typically broadcast palay seeds at 80kg/ha. On the other hand, the MP seeder results in a slightly lower seeding rate of 50-65kg/ha than the FP's usual seeding rate.

EXTRACORE PROJECT 3

Regarding nutrient management, the recommended NPK rate of 100-40-40 by MPS is the same as the NPK rate in Sorsogon. However, in Cam Sur, lower N from FP with an average NPK rate of 69-42-42 was observed. The timing of nutrient application depends on the crop maturity of a specific variety and the emergence of plants after sowing on dry soil.

Table 2. Comparative technology components of the Multi-purpose seeder (MPS) and Farmer's practice, Albay, Cam Sur, & Sorsogon, 2021 WS

TECHNOLOGY COMPONENTS	MPS	FARMER'S PRACTICE
Land Preparation	Same- plow & rotavator	Same- plow & rotavator
Method of planting	Dry direct seeding	Dry direct seeding
Crop establishment	MP Seeder (row seeding)	Line seeding: Dibbling- seeds is placed at specific depth and spacing by dibbler using wooden tools or by hand. Seeding behind the plough- man drops seeds in the furrow walking behind the plough.
Seeding Rate	50-65 kg/ha	80 kg/ha
Seeds variety	NSIC Rc 480	NSIC Rc 480
Seed Cover	Using a furrow closer which is immediately back close the canal by dragging soil beside the dropped seeds.	Cover the seeds with soil using a foot or wooden tool.
Herbicide Application	Pre-emergence: 0-4DAS Post-emergence: 12-15DAS 1-2 hand weeding (30-35DAS & 40-45 DAS)	Pre-emergence and post-emergence herbicides application.
Fertilizer Rate (kg/ha)	100-40-40	Cam Sur: 69-42-42 Sorsogon: 100-40-40
Timing of Application	Basal: 0-15DAS (14-14-14) 30-35DAS (46-0-0) 50DAS (46-0-0)	Basal: 14-14-14 18-21DAS: 14-14-14 & 25-35DAS: urea 40-45DAS & 45-55 DAS: 14-14-14+urea

EXTRACORE PROJECT 3

Water Management	100 % rainfall	100 % rainfall
Pesticides Management	Spraying pesticides (rice bugs)	Spraying pesticides (rice bugs)
Other crops planted		After rice harvest- corn, cassava, peanut & vegetables.

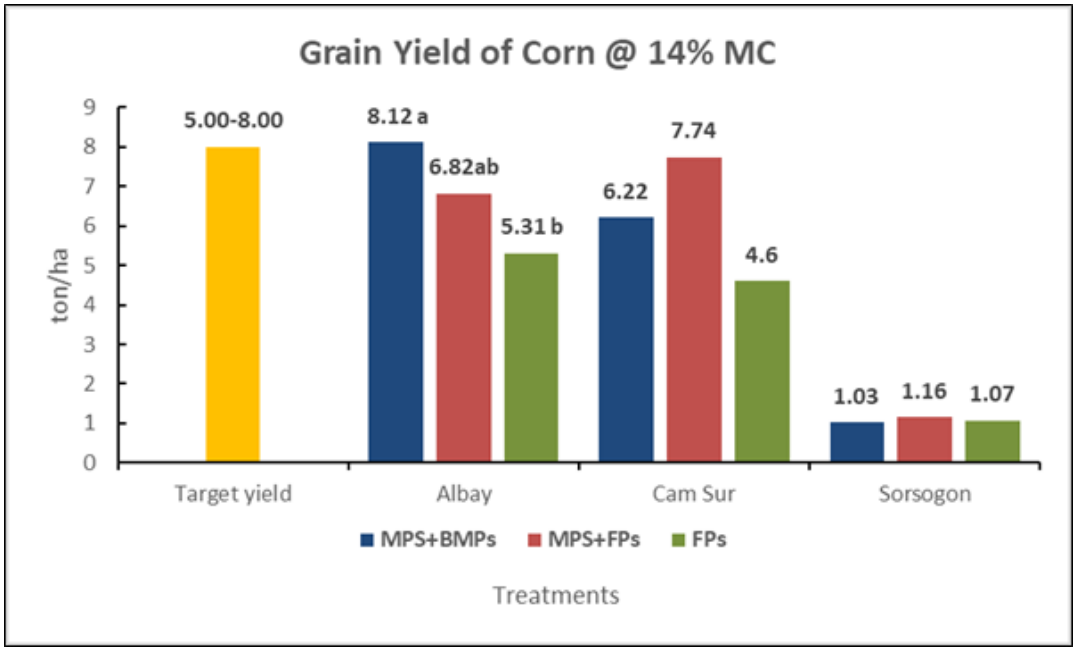

Figure 1. Measured mean grain yields (t/ha) by treatment in Albay, Cam Sur, and Sorsogon, 2021DS.

In Albay, the highest average grain yield of 8.12t/ha was achieved in the MPS+BMP treatment while the lowest average grain yield of 5.31t/ha was obtained in the FP treatment. The MPS+BMP treatment exceeded the target yield by 0.12t/ha and gained 2.99t/ha more than the FP treatment. The higher grain yield in the MPS+BMP treatment can be attributed to better nutrient management (130-65-65kg/ha). This also resulted in the longest average ear length (19.21cm) and ear width (4.62cm). FP treatment with an average NPK rate of 143-16-16 resulted in ear length of 16.76cm and ear width of 4.3cm. However, no significant differences among treatments were observed in Cam Sur and Sorsogon. In Cam Sur, the MPS+BMP treatment with an average yield of 6.22t/ha did not significantly differ from the MPS+FP and FP treatments, which had yields of 7.74t/ha and 4.6t/ha, respectively. Similarly, in Sorsogon, the MPS+BMP treatment with an average yield of 1.03t/ha did not significantly differ from the MPS+FP and FP treatments, which had yields of 1.16t/ha and 1.07 t/ha, respectively. The

field trials were affected by corn borer (40 DAE) and typhoon "Jolina" (April 2021) during the flowering to tasseling stage, which affected the development of cobs.

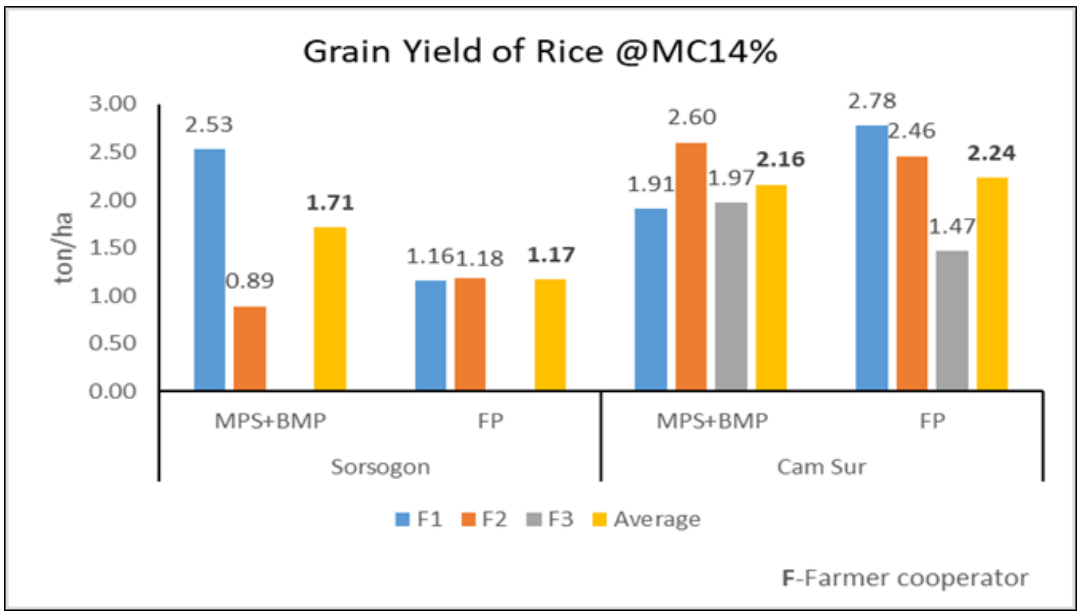

Figure 2. Measured mean grain yields (t/ha) by treatment in Cam Sur, and Sorsogon, 2021WS.

Collected data on yield and other agronomic characteristics were submitted to UPLB partners for further verification and analysis. The highest average grain yield of 2.24 t/ha was harvested by FP in Cam Sur, followed by the MPS+BMP treatment with 2.16t/ha. Despite rice bug infestation in Sorsogon, the highest average grain yield was recorded in the MPS+BMP treatment with 1.71t/ha, which was higher by 0.44t/ha than the FP treatment.

Photodocumentation:

Crop establishment using MPS for corn with PhilRice CES & UPLB partners in Goa, Cam Sur, 2021 DS.

Set-up of hopper: 4 rows (No. 1 hopper- Seeds, No.2 hopper- Fertilizer, No. 3 hopper- Fertilizer, & No. 4 hopper- Seeds)

EXTRACORE PROJECT 3

Corn production (maturity stage) in rainfed lowland areas in Oas, Albay, 2021 DS.

The field trials were damaged (flowering stage) by typhoon "Jolina" (April 2021) in Sorsogon City, Sorsogon, 2021 DS.

Hybrid: NK6410
Crop cut samples of Corn (maturity stage) at Brgy. Manga, Oas, Albay, 2021 DS

Hybrid: Super Sweet Sunshine
Due to typhoon "Jolina" (April 2021) in Sorsogon City, Sorsogon, 2021 DS

Crop establishment using Multi-purpose seeder (dry direct seeding) for rice with UPLB partners at Brgy. Calalahan, San Jose, Cam Sur, 2021 WS

Crop establishment using Multi-purpose seeder (dry direct seeding) for Rice with UPLB partners at Brgy. Mampirao, San Jose, Cam Sur, 2021 WS.

EXTRACORE PROJECT 3

Data collection for plant height with UPLB partners at Brgy.Calalahan, San Jose, Cam Sur, WS 2021.

Crop cut samples with the assistance of UPLB partners and PhilRice laborers at Brgy. Mayon, Castilla, Sorsogon, WS 2021.

Variety: NSIC RC 480
Rice production in rainfed lowland areas (maturity stage) in San Jose, Cam Sur, WS 2021.

Variety: NSIC RC 480
Rice production in upland areas (maturity stage) at Brgy. Mayon, Castilla, Sorsogon, WS 2021.