2019

PHILRICE R&D HIGHLIGHTS

MIDSAYAP BRANCH STATION

Contents

STATION

PhilRice Midsayap

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Executive Summary

PhilRice Midsayap is mandated to develop and promote location-specific rice and rice-based technologies in Southwestern Mindanao (Region IX, XII, and BARMM). Its R&D thrust is on pest management given the prevalence of pest outbreaks in its areas of operation. In 2019, the station implemented five studies in which three studies were under the core fund research (MNC). These projects include: MNC-201-000: Effects of Yield-related Traits to Rice Grain Yield of Hybrid Released Varieties in a Non-Simulated Environment of Type 4 Climate in Mindanao; MNC-202-000: Weather and pest monitoring at PhilRice Midsayap ; MNC-205-000: Sustaining productivity through efficient use of *Metarhizium anisopliae* for the management of rice black bugs; ASD-200-000: Philippine Rice Information System (PRISM); and HRP-005-003: Evaluation of CMS parentals, breeding lines, and promising hybrids. For development projects, the station implemented four projects in which two projects were under the Midsayap station initiatives (MNC): MNC-101-000: Rice Seed Systems; MNC-102-000: Branch Development Initiatives: Accelerating Adoption of Sustainable Rice-Based Technologies; RBS-014-000: Rice Community Business Innovations System (RiceBIS)-Midsayap; and RCP-001-000: Rice Competitiveness Enhancement Program (RCEP).

The station's released hybrid varieties were validated for their performance in a type 4 climate. Among the 13 hybrid rice varieties tested, M1 had the highest grain yield of 9.57t/ha and grain length of 9.75mm. Thus, M1 is recommended to farmers.

Monitoring of insect pests through light trapping recorded the highest population of rice black bug (RBB) in February with 8,685 bugs/catch. Highest population of white stem borer was observed in January with 10 adults/catch while green leafhopper (GLH) peaked in January and May with 13 hoppers/catch. The information derived from this monitoring activity informs pest management recommendations to reduce yield loss.

Results showed that 45% of RBB substrate (without food) and 54% of the RBB (fed with gabi stalks) were infected with Metarhizium. Complex species of entomopathogens such as Metarhizium, Paecilomyces, Beauveria, and Aspergillus were also found on RBB cadaver during the assay. Other species of entomopathogens like Paecilomyces sp. (84%) and Beauveria sp. (9%) were found to be more abundant in field-infected RBB than in fields treated with Metarhizium (7%). The results are not yet conclusive; however, it can be deduced that aside from Metarhizium, other insect pathogens must be looked into as potential biocon agents against RBB.

For the Rice Seed Systems (RSS) project, the performance of 15 new inbreds and one new hybrid variety (NSIC Rc 204H) were showcased in Regions 9, 12, and BARMM. During the wet season, NSIC Rc 222 (6.6t/ha), Rc 218 (6.4t/ha), Rc 204H (6t/ha), and Rc 400 (6.3t/ha) stood out. Seed growers' database was also established, which enabled the station to program the appropriate rice varieties to plant and the right quantity of seeds to produce. Twenty-two seed growers' stores (i.e., cooperative or a private store) in the provinces of Region XII [North Cotabato (13)], Sultan Kudarat (5), and South Cotabato (4)] were also geotagged to provide an easier access of their location.

Adoption of *PalayCheck* System was evaluated thru a survey with 269 rice farmer respondents (175 males and 54 females) randomly selected across the three provinces in Region XII. The project identified four KeyCheck management areas that could contribute to at least 5t/ha yield, which include: seed selection, land preparation, crop establishment, and nutrient management.

There were 2,132 (1,069 males/1,063 females) stakeholders who participated in training and initiatives that aimed to enhance understanding, appreciation, knowledge, and skills on rice. These include: Appreciation Course on Rice S&T updates with emphasis on *PalayCheck* System and *Palayamanan* Plus for local executives, Rice Boot Camp on Rice S&T Updates for new Agriculture graduates, Knowledge Sharing and Learning (KSL) activity for Extension Intermediaries, and *Mangunguma, Kumusta Ka*? Rice Competitiveness Enhancement Fund (RCEF)-Seed Component technical briefing. Communication campaigns and platforms were also employed to strengthen and accelerate the dissemination of information and updates on rice production technologies. Among the modalities used were: 1-minute radio plugs on *PalayCheck* system and updates on rice industry; social media (i.e., DA-PhilRice Midsayap Facebook page); information, education, and communication materials in the form of magazines, brochures, booklets, leaflets, exhibits, and campaigns.

RiceBIS community in Midsayap was established in four barangays: Central Glad, Upper Glad-I, Bual Sur, and San Pedro covering 62.94ha and with 71 farmer members (35 female and 36 male). Yield in 2019 DS increased by 15.48% from 4.40t/ha baseline to 5.08t/ha. Production cost of fresh palay was reduced by 31.34% from P12.47 to P8.56. The large reduction on the production cost of fresh *palay* and yield increment resulted in an increased farmers' net income from P18,618.00 to P43,278.62.

These accomplishments contribute to all the seven strategic outcomes of the Institute.

Effects of Yield-Related Traits to Rice Grain Yield of Hybrid Released Varieties in a Non-Simulated Environment of Type 4 Climate in Mindanao

IV Boholano, AY Cantila, and AM Fordan

Understanding the effects of yield-related traits to rice grain yield of hybrid varieties and validating their performance in type 4 climate helps in fully utilizing these genetic resources. Grain yield (GY), primary trait, and secondary traits such as days to 50% flowering (DF), days to maturity (DM), grain length (GL), grain weight (GW), number of filled grains panicle-1 (NFGP), one thousand grain weight (OTGW), panicle length (PL), panicle weight (PW), spikelet fertility (SF), and spikelet number panicle-1 (SNP) of 13 hybrid rice in two environments (E1 and E2) were analyzed using combined analysis of variance (ANOVA) and correlation analysis. High significant variation was found among hybrids (G) in all traits except for GW, while there was least significant result among environments (E) in DF, DM, GL, GW, PW, and OTGW, and in GxE in DF, DM, GW, NFGP, PW, and SNP. Among the 13 hybrid rice, M1 had the highest GY and GL in each environment with a mean of 9.57t/ha and 9.75mm, respectively. Correlation analysis, on the other hand, found 15 and 17 significant correlations in E1 and E2, respectively. Of the correlation results, it was found that among the secondary traits, only NFGP was consistently, significantly, and positively correlated with GY in two environments. The result implied that attaining higher yield in hybrid rice cultivation can be possible by giving more attention to the plants during the grain filling stage.

Pest Monitoring in PhilRice Midsayap

PS Torreña and CG Flores

The study determined the occurrence of insect pests through light trapping at PhilRice Midsayap. For 2019, highest population of rice black bugs was observed in February with 8,685 bugs/catch. On white stem borer population, highest population was observed in January with 10 adults/catch. Highest number of green leafhoppers were caught in January and May with 13 hoppers/catch. Regular and proper monitoring of pest population should be done for appropriate pest management actions to reduce yield loss.

Sustaining productivity through efficient use of Metarhizium anisopliae for the management of rice black bugs

PS Torreña, KMB Abejar, and WP Bugtay

Results showed that 45% of RBB substrate (without food) and 54% of the RBB (fed with gabi stalks) were infected with Metarhizium. Complex species of entomopathogens such as Metarhizium, Paecilomyces, Beauveria, and Aspergillus were also found on RBB cadaver during the assay. Other species of entomopathogens like Paecilomyces sp. (84%) and Beauveria sp. (9%) were found to be more abundant in field-infected RBB than in field treated with Metarhizium (7%). Follow-up trial is required to validate result. However, it can be deduced that aside from Metarhizium, other insect pathogens must be looked into as potential biocon agents against RBB.

Rice Seed Systems in Southwestern Mindanao

PLP Sabes, OH Abdulkadil, DAN sumlay, MAM Macadildig, IV Boholano, and MC Romarez

The availability of high-quality seeds (HQS) to the rice farmers is essential in the productivity growth of the local rice industry. Thus, the Rice Seed Systems (RSS) promoted newly-released varieties and developed a comprehensive and efficient system to ensure that HQS is accessible and available at the right time to farmers in Southwestern Mindanao. Sixteen newly-released varieties were showcased in Region IX, XII, and Bangsamoro Autonomous Region of Muslim Mindanao (BARMM). Fifteen of the varieties were inbred and one was hybrid (NSIC Rc 204H). In the WS, Rc 222 (6.6t/ha), Rc 218 (6.4t/ha), Rc 204H (6t/ha), and Rc 400 (6.3t/ha) performed well across sites recording 6.6t/ha, 6.4t/ha, 6t/ha, and 6.3 t/ha, respectively.

Database on the actual profile of seed growers was generated and established for business development division (BDD)to program the appropriate rice varieties to plant and the right quantity of seeds to produce. The benchmark survey of 18 respondents showed that seed growers allocated >2ha for HQS in DS and <2.0 ha in WS. The average yield across seasons ranged from 3.57t/ha to 5.18t/ha.

Moreover, 22 of the seed growers' stores (i.e., a cooperative or a private store) in the provinces of Region XII [North Cotabato (13)], Sultan Kudarat (5), and South Cotabato (4)] were geotagged for farmers to easily find their exact location. A seminar was conducted to 38 PhilRice staff and rice farmers (34 male, 4 female) on the epidemiology and management of rice tungro disease.

Rice Seed Distribution Pathway along Supply Chains in Southwestern Mindanao

PLP Sabes, MAM Macadildig, IV Boholano, and MC Romarez

Available and easily accessible high-quality seeds are factors in increasing the productivity of the local rice industry. Planning, continuous coordination to local seed growers, and gathering their farm history were conducted to formulate efficient strategies in the Rice Seed Systems in Southwestern Mindanao. Three coordination meetings were attended in the regional and provincial level. Farming history was also gathered, which showed that most of the seed growers in North Cotabato planted NSIC Rc 158, Rc 160, Rc 222, Rc 226, and Rc 420. Seed growers devote more than 2ha to seed production during DS and less than 2ha during WS. Average yield ranged from 3.67t/ha to 5.18t/ha across seasons. Twenty-two seed growers' stores were geotagged so farmers can easily locate them. Marketing scheme was also developed. Thirty-eight participants (34 male, 4 female) also attended a seminar on the epidemiology and management of rice tungro disease.

Table 1. Average yield of seed growers in North Cotabato Province (n=18)

Year	Season	Average Area	Average Yield (t/ha)	Certified Seeds produced (t/ha)
2017	Dry	2.28	4.69	3.75
	Wet	1.25	5.18	4.22
2018	Dry	2.77	3.67	3.59
	Wet	1.78	4.71	4.05

Table 2. Coordinates of Seed Growers' Store in Region XII

NAME OF SEED GROWER	LATITUDE	LONGITUDE
FABILA MLNG	6.962458	124.88736
PALAYCHECK	6.890768	124.89643
STAR SEEDS	6.88868	124.89673
MARISPA	6.888276	124.89638
AMYON	6.829841	124.87279
LAGON KALANAWIN 2	6.734106	124.69982
LAMBAYONG	6.782956	124.64047
ESPERANZA	6.722447	124.52002
BAGUMBAYAN	6.533393	124.56279
SKSGMC	6.623982	124.59676
TACURONG	6.693589	124.6761
SOCOSEPCO	6.693583	124.6761
BANGA	6.693583	124.6761
BINTIKU	6.693583	124.6761
NORALA	6.52132	124.66133
KILADA CISPMC	7.087902	124.89085
CARD	7.170234	124.79863
USPMC	7.104762	124.83676
PRES ROXAS	7.15781	125.0514
MAGPET LGU	7.103043	125.12467
LGU MAGPET	6.958779	125.08896
LGU KID CITY	7.008547	125.0897

Table 3. Rice seeds delivered (kg) in Region IX, XII, and BARMM under marketing scheme as of November 2019

Regions	Rice seeds delivered (kg)
Soccsksargen	15,242
Zamboanga Peninsula	12,660
BARMM	2,000
Total	**29,902**

Table 4. List of Rice Seed Growers in Region XII, 2019

Province	Municipality	No. of seed growers				Total	
		Accredited	Area	Expired accreditation	Area	No. of seed growers	Area
Cotabato	Carmen	16	119	0	0	16	119
	Kabacan	37	992.5	0	0	37	992.5
	Kidapawan City	2	6.5	1	10	3	16.5
	Libungan	5	54.5	1	5	6	59.5
	Magpet	1	13	0	0	1	13
	Makilala	1	2	1	25	2	27
	Matalam	11	435.44	4	50	15	485.44
	Midsayap	16	561.1	7	92.1	23	653.2
	M'lang	67	520.5	7	29	74	549.5
	Pigcawayan	8	65.2	5	57.75	13	122.95
	Pikit	3	22	0	0	3	22
	Pres. Roxas	13	33	0	0	13	33
	Tulunan	15	208	10	100.5	25	308.5
Sub-total		**195**	**3033**	**36**	**369**	**231**	**3402**
Sultan Kudarat	Bagumbayan	6	19	4	35	10	54
	Columbio	3	33.5	0	0	3	33.5
	Esperanza	7	63	0	0	7	63
	Isulan	44	930.3	13	355	57	1285.3
	Lambayong	32	298	2	50	34	348
	Lebak	7	152	1	8	8	160
	Lutayan	2	8	3	25	5	33
	Pres. Quirino	2	11.5	51	51	53	62.5
	Tacurong	8	65.91	1	25	9	90.91
Sub-total		**111**	**1581**	**75**	**549**	**186**	**2130**
South Cotabato	Banga	19	263.5	10	110.5	29	374
	GENSAN	5	32	0	0	5	32
	Koronadal	21	220.74	13	92.5	34	313.24
	Lake Sebu	4	19	2	7	6	26
	Norala	7	76	16	139.5	23	215.5
	Polomolok	1	10	1	2	2	12
	Sto Niño	19	339.35	11	179.9	30	519.25
	Surallah	18	184.5	2	9.5	20	194
	Tampakan	0	0	1	5	1	5
	Tantangan	1	4	7	52.75	8	56.75
Sub-total		**95**	**1149**	**63**	**599**	**158**	**1748**
Sarangani	Alabel	1	10			1	10
Grand total		**402**	**5773**	**174**	**1517**	**576**	**7290**

Source: BPI-NSQCS 12

Figure 1. Seminar on Rice Tungro Disease in PhilRice Midsayap Social Hall on November 11, 2019

Figure 2. Meeting with Soccsksargen seed growers

Adaptation of Newly-Released Rice Varieties in Southwestern Mindanao through Techno Demos

OH Abdulkadil, DAN Sumlay, and PLP Sabes

Six 1-ha demonstration farms were established to showcase and determine the performance of newly-released inbred and public hybrid rice varieties in (1) PhilRice Midsayap Experiment Station (MES); (2) Barangay Agriculture; and (3) Barangay South Manuangan Pigcawayan in North Cotabato; (4) Barangay Tapayan and Lower Pinaring, Sultan Kudarat, Maguindanao; (5) Barangay Labrador, Buug, Zamboanga Sibugay; and (6) Barangay Pasingkalan, Ramon Magsaysay, Zamboanga del Sur. The top three performing varieties across project locations were NSIC Rc 400 (6.1t/ha), NSIC Rc 218 (6t/ha) for inbred varieties and NSIC Rc 204H (6.26t/ha) for public hybrid variety.

Thirteen newly-released varieties were demonstrated across sites in the DS; 11 of the rice varieties were inbred (NSIC Rc 158, Rc 160, Rc 218, Rc 222, Rc 238, Rc 354, Rc 360, Rc 390, Rc 400, Rc 402, and Rc 420) and 2 were hybrid (Rc 72H, and Rc 204H). Four additional rice varieties were planted in WS: Rc 358, Rc 442, Rc 438, and Rc 440.

Aside from on-farm demonstration, one additional site was established particularly in the rice production area of the university of Southern Mindanao (Kabacan, North Cotabato). The varieties planted were Rc 72H, Rc 204H, Rc 216, Rc 222, Rc 368H, Rc 480, Rc 506, Rc 508, Rc 510, Rc 512, and Rc 514.
Results showed that Rc 400, Rc 218, and Rc 204H were the top performing inbred and hybrid varieties. Rc 400 gained the highest average yield of 6.1t/ha; followed by NSIC Rc 218 (6t/ha) and Rc 204H (6.26t/ha).

Figure 1. Varietal demonstration farm in South Manuangan, Pigcawayan, North Cotabato

Figure 2. Varietal demonstration farm in Barangay Pasingkalan, Ramon Magsaysay, Zamboanga del Sur

Accelerating the Adoption of Sustainable Rice-Based Technologies

OH Abdulkadil, STC Quiring, IV Boholano, DAN Sumlay, MB Gandawali, JO Edraira, RS Salazar, and RP Jayme

This project aimed to increase the productivity of rice farmers and stakeholders by utilizing various development approaches and extension service modalities to enhance the competitiveness of the rice industry stakeholders. Along with the participatory approach employed in the project, the communication and campaign strategies were also utilized to amplify the dissemination of knowledge, information, and updates on rice to intended participants affected

by the constraints in the Philippine rice sector. Hence, the project carried out interrelated components that specifically offer equal solutions and involvement to male and female rice farmers and stakeholders to address the current rice farming scenario within the station's area of responsibility.

The Branch Development Initiative (BDI) is composed of four components: Assessment of Local Rice Farming Practices in Area of Responsibility of PhilRice-Midsayap, RISE for Quality Rice (Relevant Innovations through Strategic Empowerment for Quality Rice), *Palayamanan* Plus in PhilRice-Midsayap, and REACH for Quality Rice (Rice Education through Advocacies and Communication Hosts for Quality Rice).

Component 1: Assessment of Local Rice Farming Practices in Area of Responsibility of PhilRice-Midsayap

The project evaluated and assessed farmers on *PalayCheck* system adoption. The results will be the basis for conceptualizing localized packages of technology for promotion of best practices and addressed yield gaps in the station's area of operation. There were 269 rice farmer respondents (175 male and 54 female) selected randomly across the three provinces of Region XII. Interviewees were generally male (65%) as they are mostly the rice farm operators. The consolidated data on interviews showed the KeyChecks with low adoption rate (30%-60%) included: KeyCheck 1 (Seed Selection), KeyCheck 2 (Land Preparation), KeyCheck 4 (Crop Establishment), KeyCheck 5 (Nutrient Management), and KeyCheck 6 (Water Management). Conversely, the KeyChecks with high adoption rate (80%-85%) was KeyCheck 3 (Synchronous planting), KeyCheck 7 (Pest management), and KeyCheck 8 (harvest management). The project identified four key management areas that could contribute to 5t/ha or more yield that was unique and locally practiced by most of the farmers. These practices were seed selection, land preparation, crop establishment, and nutrient management. Moreover, the study found that rice farmers in Region XII can achieve a higher yield if they use high-quality seeds suitable in their area and practice proper land preparation and crop establishment following appropriate integrated crop management such as nutrient, water, and pest management.

Component 2: RISE for Quality Rice (Relevant Innovations through Strategic Empowerment for Quality Rice)

To enhance the understanding, appreciation, knowledge, and skills of male and female rice stakeholders (e.g., students, farmers, and professionals) on rice production, specifically on the principle of *PalayCheck* System and *Palayamanan* Plus and other technology interventions being promoted by PhilRice, various training and initiatives were conducted such as: Appreciation course on Rice

S&T updates with emphasis on *PalayCheck* System and *Palayamanan* Plus for local executives, Rice Boot Camp for new Agriculture graduates on Rice S&T Updates with emphasis on *PalayCheck* System and *Palayamanan* Plus, Knowledge Sharing and Learning (KSL) activity for Extension Intermediaries, and *Mangunguma, Kumusta Ka?*: Rice Competitiveness Enhancement Fund (RCEF)-Seed Component Technical Briefing.

Fifty-one local executives (40 male, 11 female) from Brgy. Labu-Labu I, Datu Hoffer Ampatuan, Maguindanao and Brgy. Borongotan, North Upi, Maguindanao were trained on the Appreciation Course on Rice S&T updates with emphasis on *PalayCheck* System and *Palayamanan* Plus on April 10-11, 2019 and August 30-31, 2019, respectively. Most of the elected local executives in the area were men (almost 80%). Forty (24 male, 16 female) new agriculture graduates from four universities and colleges in Region XII and BARMM were trained on Rice Boot Camp on Rice S&T Updates with emphasis on *PalayCheck* System and *Palayamanan* Plus on June 11-13, 2019 and September 24-26, 2019, respectively. There were 496 farmers (230 male, 266 female), agricultural extension workers (AEWs) and other stakeholders who attended and participated in KSL activity on June 10 in Brgy. South Manuangan, Pigcawayan, Cotabato, July 26 in Brgy. Rangaban, Midsayap, Cotabato, and on November 12, 2019 in PhilRice Midsayap Compound. Participants in the *Mangunguma, Kumusta Ka?*: RCEF-Seed Component Technical Briefing conducted on October 17 at Southern Christian College (SCC) Gymnasium, Midsayap totalled 814 (449 male, 365 female). During the conduct of technical briefing, project management team/staff highly regard the priority lane for person with disabilities (PWD), pregnant women, and senior citizens for their convenience during the registration and distribution of meals and snacks. Male and female farmers were also given equal opportunities to raise questions and concerns so the panels from different line agencies can clarify their queries as RCEF farmer beneficiaries. All staff involved in this project is actively engaged in GAD activities in the station to promote equality among gender identities in implementing extension activities.

Component 3: *Palayamanan* Plus in PhilRice-Midsayap

Palayamanan Plus model farm was established in PhilRice-Midsayap to showcase and employ practical system; cost-saving and yield-enhancing management practices that maximizes utilization of resources; reduce farming risks; and promote sustainability, productivity, and profitability. Different commodities include production of rice, vegetable, mushroom, and vermicompost that were established in almost 0.75-ha area within the station. Results showed that rice production component still shared the largest contribution to income (60%)

followed by vermicompost (27%), vegetable production (5%), mushroom (4%), and others (4%).

This model scheme in farming has income potential to female rice farmers as most of the commodities are grown in the backyard and require minimal labor. This year, 169 farmers and students (58 male, 111 female) from different municipalities underwent training on mushroom production as source of income.

Component 4: REACH for Quality Rice (Rice Education through Advocacies and Communication Hosts for Quality Rice)

Communication campaigns and platforms were employed to strengthen and accelerate the dissemination of information and updates on rice production technologies. Among these communication and campaign channels were: 1-minute radio plugs on *PalayCheck* System and updates on rice industry; social media (DA-PhilRice Midsayap Facebook page); Information, Education and Communication (IEC) materials in the form of magazines, brochures, booklets, and leaflets; exhibits; and campaigns.

A. 1-minute radio plugs

To reach the far-flung rice community areas, 1-minute radio plugs were aired in collaboration with Kiss FM 103.3 Radyo ni Juan, a local radio station in Midsayap, Cotabato. The 1-minute plugs contain the *PalayCheck* System 1-8 namely. Other radio plugs about the 2019 National Rice Awareness Month (NRAM) were also aired to inform the public of their role in the current challenge of the rice sector in the Philippines.

After airing the radio plugs, 88 randomly selected farmer-participants (64 males, 24 females) were surveyed. Results showed that participants listened to radio plugs 3-4 times a day. They agreed that technologies aired were all relevant in their farming practices especially KeyChecks 1,2,3,5, and 7. Most of the farmer-respondents said that they shared the technologies they learned from the radio to their co-farmers.

B. Social Media (DA-PhilRice Midsayap Facebook Page)

To fully extend the reach of the station to disseminate information and knowledge to all farmers and stakeholders, all activities, advisories, news, tips, and updates on rice issues and other related undertakings were posted in the official page of the station. Every week, 3-4 posts or shared activities are uploaded in the page.

C. Print
There were 2,568 copies of IEC materials in the form of magazines, techno bulletins, leaflets, and pamphlets distributed to the target rice stakeholders as ready references.

D. Exhibit
Two exhibits were established during the Kalivungan Festival, Amas, Cotabato on August 26-September 1 and Midsayap Foundation Anniversary on November 18-22. Participants totaling 190 (109 male, 81 female) visited PhilRice booth and received IEC materials on rice production. Some of the innovations on rice farming were also displayed such as the plastic drumseeder, registered seeds, Minus-One-Element-Kit (MOET), and Leaf Color Chart (LCC).

E. 2019 National Rice Awareness Month Campaign
Two Be Riceponsible campaigns were conducted in Tupi National High School (TNHS) and Polonuling National High School (PNHS) on November 19. Junior and senior high students totaling 284 were dominated by 67% female during campaign activities. Students were briefed on how to be riceponsible through series of videos and short lectures. They were also briefed about the Rice Competitiveness Enhancement Fund (RCEF) and how they can help the rice farmers become competitive. Career opportunities in agriculture were also presented so they will be encouraged to take agriculture or agriculture-related courses. After the presentations, 10 students (6 male; 4 female) were asked on the programs they are planning to pursue in college and their reasons. Eight of 10 students preferred agriculture or agriculture-related programs to help their family.

Games and exercises were also prepared for the students to stimulate their knowledge and interest on rice and agriculture. One of the activity highlights included the serving of brown rice champorado to promote its nutritional benefits.

Assessment of Local Rice Farming Practices in Area of responsibility of PhilRice Midsayap

IV Boholano, STC Quiring, MB Gandawali, and DAM Sumlay

The study assessed and evaluated the extent of *PalayCheck* System adoption to develop localized packages of technology and address yield gaps in the station's area of responsibility. A multi-stage sampling procedure was employed

resulting in the selection of 175 male and 54 female farmer-respondents in Region XII. Male dominated the total rice farmers interviewed as they are mostly the rice farm operators. Data were analyzed using descriptive such as frequencies and percentages. Results showed that rice farmers in Region XII were still on their productive years with a mean age of 52 years old, have 4 household members, and have at least 1 member working on the farm. Majority of them were involved in farmer's organization and have long experienced in rice farming, averaging 26 years. Almost all have formal education with a high percentage of farmers with secondary and college education. Based on *PalayCheck* evaluation, KeyChecks with a low adoption rate ranging 30%-60% were KeyCheck 1 (Seed Selection), KeyCheck 2 (Land Preparation), KeyCheck 4 (Crop Establishment), KeyCheck 5 (Nutrient Management), and KeyCheck 6 (Water Management). KeyChecks with high adoption rate (80%-85%) included KeyCheck 3 (Synchronous planting), KeyCheck 7 (Pest management), and KeyCheck 8 (harvest management). Thus, the study identified four localized key management areas that could contribute a 5t/ha or more yield. These practices were incorporated in seed selection, land preparation, crop establishment, and nutrient management. Based on the results, rice farmers in Region XII can achieve a higher yield if they use high-quality seed of suitable rice variety in their area and practice proper land preparation and crop establishment following appropriate integrated crop management such as nutrient, water, and pest management.

Table 5. Socio-demographic profile of farmer-respondents in three provinces of Region XII.

Parameters	Provinces			All (n=229)
	North Cotabato (n=80)	South Cotabato (n=69)	Sultan Kudarat (n=80)	
Age	52.67	52.32	51.1	52.03
Household size	5.43	4.7	4.3	4.81
No. of household working in the farm	1.73	1.5	1.45	1.56
Farming experience	28	25	27.08	26.69
Average rice farm area (ha)	1.24	1.98	1.98	1.73
Male : Female	80%: 20%	70%: 30%	86%: 14%	79%: 21%
Tenurial Status			Percentage (%)	
Owner	47.5	65.2	71.25	61.32
Renter/Lessee	13.75	17.4	6.25	12.47
Tenant/ Shareholder	38.75	17.4	22.5	26.22
Total	**100**	**100**	**100**	**100**

Organization's Involved			Percentage (%)	
Irrigator's Association	52.5	49.28	32.5	44
Farmer's Association	42.5	26.09	41.25	26
Cooperatives	21.25	15.93	11.25	14
None	25	8.7	15	16
Total	**100**	**100**	**100**	**100**
Educational Attainment			**Percentage (%)**	
Elementary Graduate	15	15.94	10	13
High School Graduate	51.25	44.93	50	48
Vocational	3.75	34.78	5	15
College Graduate	30	4.75	35	24
Total	100	100	100	100

Table 6. Percent distribution (%) on rice varieties used by farmer respondents that contributed 5-t/ha yield or more in three provinces of Region XII.

Variety Used	North Cotabato		South Cotabato		Sultan Kudarat	
	5-6.99 (n=36)	7-8.99 (n=10)	5-6.99 (n=23)	7-8.99 (n=10)	5-6.99 (n=29)	7-8.99 (n=11)
a. Inbred Rice						
Pedro	0	0	4	0	0	0
M3	0	10	4	20	3	0
PSB Rc10	0	0	0	0	0	18
NSIC Rc 158	17	0	0	0	14	0
NSIC Rc 160	14	0	17	20	14	9
NSIC Rc 218	0	0	4	0	0	0
NSIC Rc 222	50	40	22	20	14	36
NSIC Rc 224	6	20	0	0	14	18
NSIC Rc 226	0	0	26	10	17	18
NSIC Rc 238	8	10	22	10	3	0
NSIc Rc 308	6	10	0	0	0	0
NSIC Rc 358	0	0	0	0	14	0
NSIC Rc 420	0	0	0	0	3	0
b. Hybrid Rice						
TH82	0	0	0	10	0	0
Bigante	0	0	0	10	0	0
NSIC Rc 204H	0	10	0	0	0	0
NK5017	0	0	0	0	3	0
Total	**100**	**100**	**100**	**100**	**100**	**100**

Table 7. Percent distribution (%) of seed class used, land preparation, and crop establishment practiced by farmer-respondents that contributed 5-t/ha yield or more in three provinces of Region XII.

Farm Practice	North Cotabato		South Cotabato		Sultan Kudarat	
	5-6.99 (n=36)	7-8.99 (n=10)	5-6.99 (n=23)	7-8.99 (n=10)	5-6.99 (n=29)	7-8.99 (n=11)
A. Seed Class Used						
Good Seed	28	20	43	40	28	27
Certified Seed	61	70	48	50	69	55
Registered Seed	11	10	9	10	3	18
Total	**100**	**100**	**100**	**100**	**100**	**100**
B. Land Preparation Practiced						
a. Duration of Operation						
3 weeks	28	20	43	20	28	27
4 weeks	72	80	57	80	72	73
Total	**100**	**100**	**100**	**100**	**100**	**100**
b. Days Interval between Operation						
7 days	72	90	78	80	83	82
10 days	28	10	22	20	17	18
Total	**100**	**100**	**100**	**100**	**100**	**100**
C. Crop Establishment						
a. Mode of Planting						
Direct Seeded	72	20	78	10	83	27
Transplanted	28	80	22	90	17	73
Total	**100**	**100**	**100**	**100**	**100**	**100**
b. Operation in Transplanting	n=10	n=8	n=5	n=9	n=5	n=8
Laplap	30	13	20	11	20	38
Dapog	60	63	60	67	60	50
Wetbed	10	25	20	22	20	13
Total	**100**	**100**	**100**	**100**	**100**	**100**
c. Seeding Rate for Direct Seeded	n=26	n=2	n=18	n=1	n=24	n=3
80kg/ha	50	50	22	0	29	0
100kg/ha	31	50	56	1	54	67
120kg/ha	19	0	22	0	17	33
Total	**100**	**100**	**100**	**1**	**100**	**100**
d. Seeding Rate for Transplanting	n=10	n=8	n=5	n=9	n=5	n=8
15-20kg/ha	0	13	0	11	0	13
40kg/ha	20	63	0	22	0	38
60kg/ha	70	25	60	67	60	50
80kg/ha	10	0	40	0	40	0
Total	**100**	**100**	**100**	**100**	**100**	**100**

Table 8. Percent distribution (%) of nutrient management practices applied by farmer-respondents that contributed 5-t/ha yield or more in three provinces of Region XII.

Farm Practice	North Cotabato		South Cotabato		Sultan Kudarat	
	5-6.99 (n=36)	7-8.99 (n=10)	5-6.99 (n=23)	7-8.99 (n=10)	5-6.99 (n=29)	7-8.99 (n=11)
Nutrient Mgt.						
a. Mode of Application for Direct Seeded	**n=26**	**n=2**	**n=18**	**n=1**	**n=24**	**n=3**
1st Application						
7-10 DAS	19	100	22	20	21	18
12-14 DAS	31	0	28	60	54	55
21 DAS	50	0	50	20	25	27
Total	**100**	**100**	**100**	**100**	**100**	**100**
2nd Application						
12-14 DAS	50	100	22	20	21	18
28-32 DAS	50	0	78	80	79	82
Total	**100**	**100**	**100**	**100**	**100**	**100**
3rd Application						
28-32 DAS	50	100	22	20	21	18
42-48 DAS	50	0	78	80	79	82
Total	100	100	100	100	100	100
4th Application						
42-48 DAS	50	100	22	20	21	18
56-62 DAS	50	0	78	80	79	82
Total	**100**	**100**	**100**	**100**	**100**	**100**
b. Mode of Application for Transplanted	**n=10**	**n=8**	**n=5**	**n=9**	**n=5**	**n=8**
1st Application						
7-10 DAT	70	75	80	67	80	75
12-14 DAT	30	25	20	33	20	25
Total	**100**	**100**	**100**	**100**	**100**	**100**
2nd Application						
17-20 DAT	70	75	80	67	80	75
24-28 DAT	30	25	20	33	20	25
Total	**100**	**100**	**100**	**100**	**100**	**100**
3rd Application						
27-30 DAT	70	75	80	67	80	75
38-42 DAT	30	25	20	33	20	25
Total	**100**	**100**	**100**	**100**	**100**	**100**
4th Application						
37-40 DAT	70	75	80	67	80	75
52-56 DAT	30	25	20	33	20	25
Total	**100**	**100**	**100**	**100**	**100**	**100**

DAS (Days after sowing); DAT (Days after transplanting)

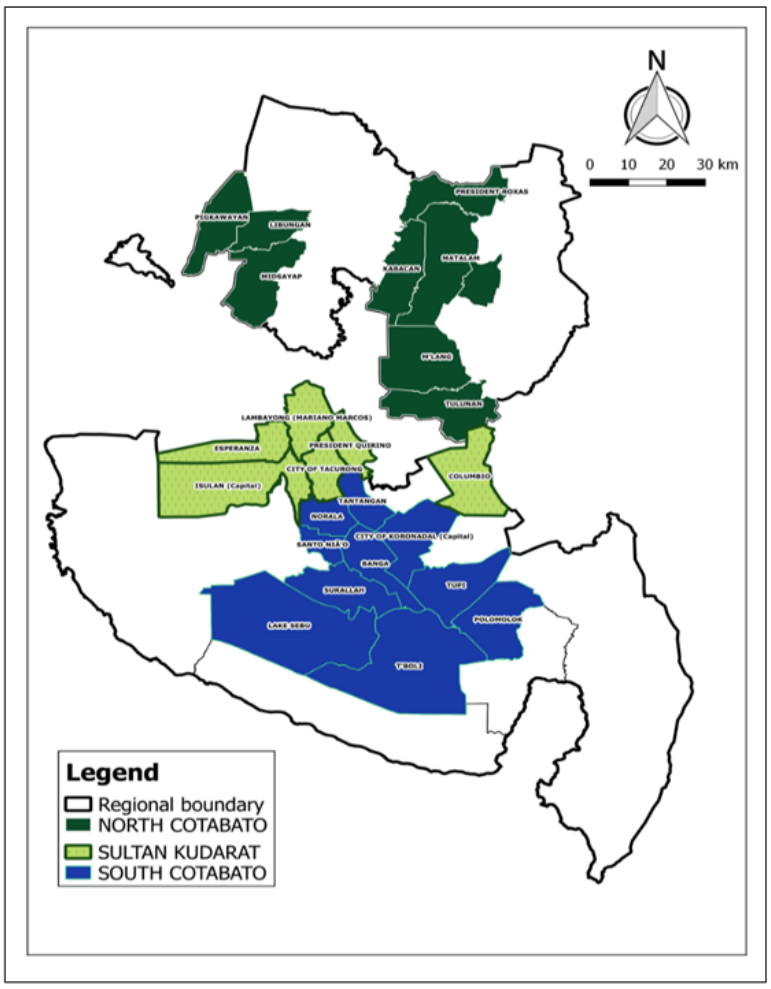

Figure 1. Surveyed municipalities in Region XII

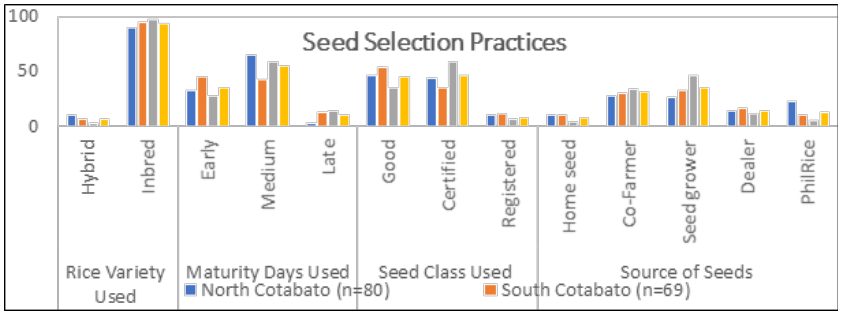

Figure 2. Percent distribution (%) of seed selection practices by rice farmer-respondents in three provinces of Region XII

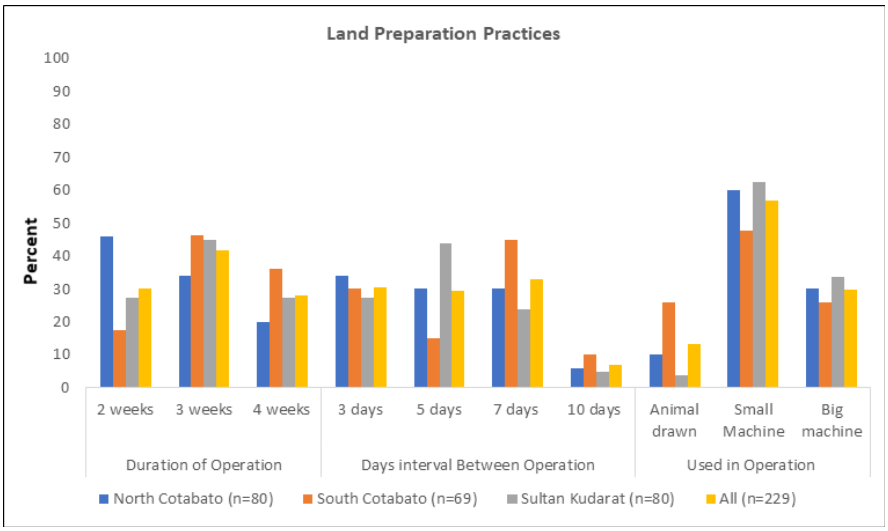

Figure 3. Percent distribution (%) of land preparation practices by rice farmer-respondents in three provinces of Region XII

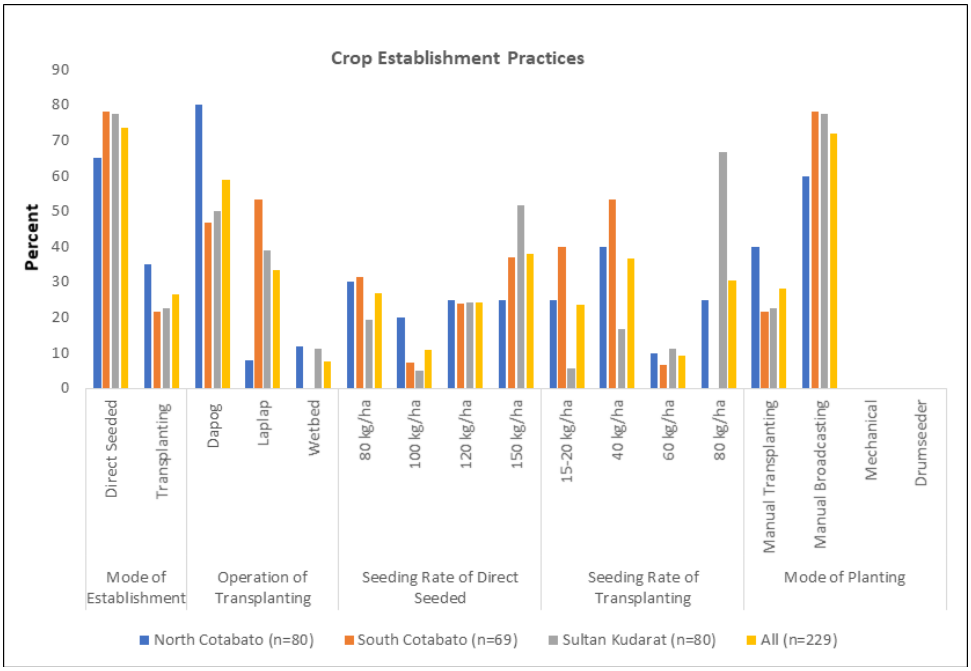

Figure 4. Percent distribution (%) of crop establishment practices by rice farmer-respondents in three provinces of Region XII

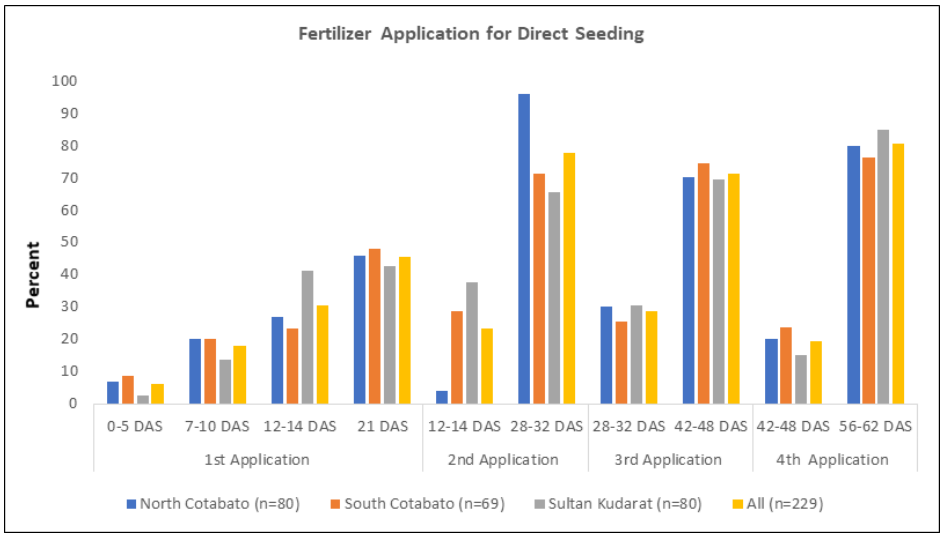

Figure 5a. Percent distribution (%) of fertilizer application practices for direct seeding by rice farmer-respondents in three provinces of Region XII

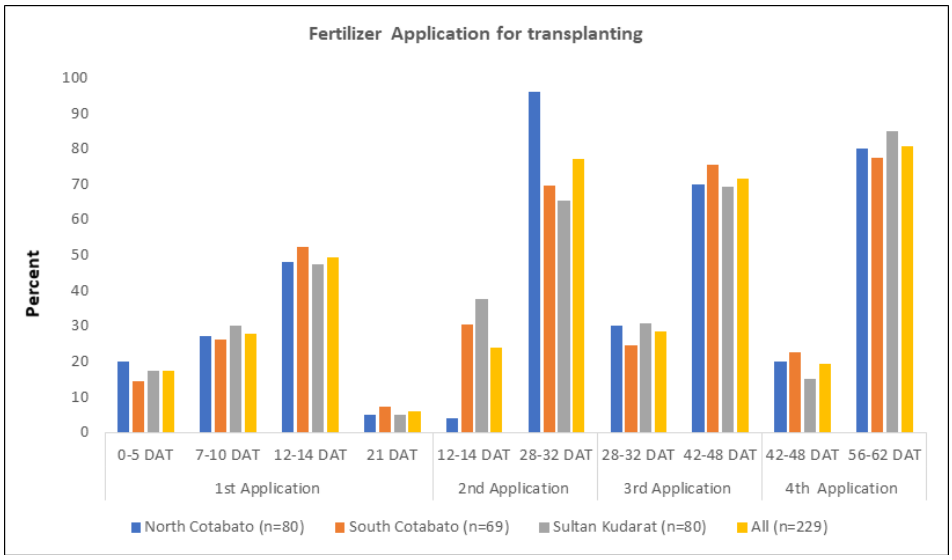

Figure 5b. Percent distribution (%) of fertilizer application practices for transplanting by rice farmer-respondents in three provinces of Region XII

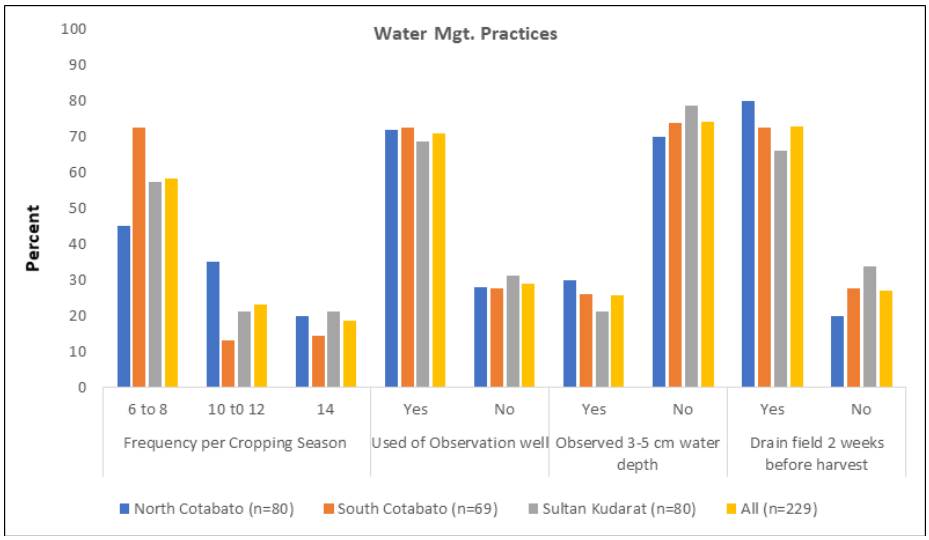

Figure 6. Percent distribution (%) of water management practices by rice farmer-respondents in three provinces of Region XII

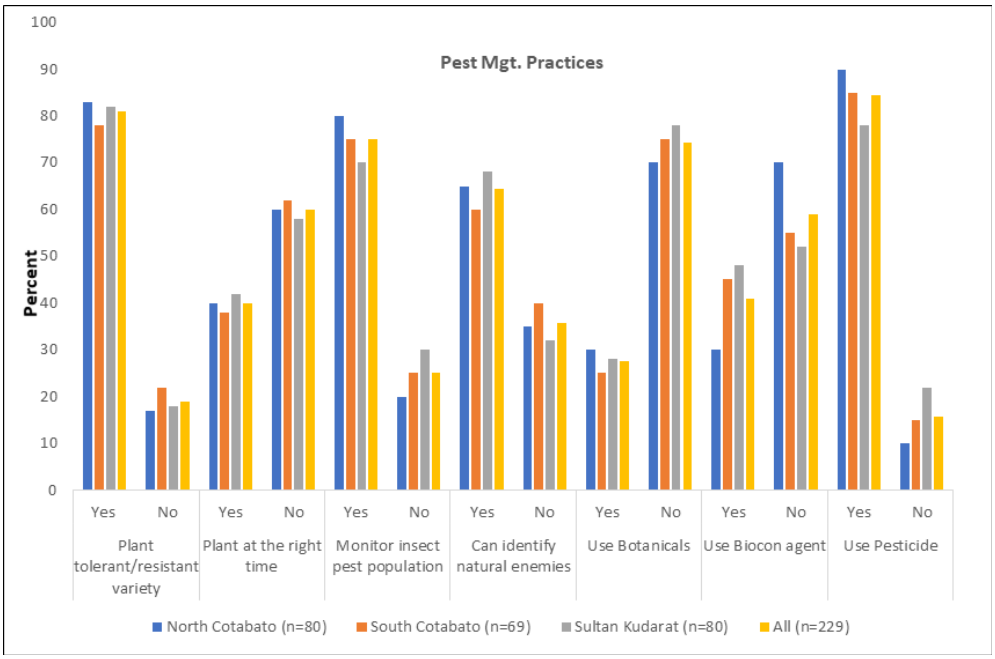

Figure 7. Percent distribution (%) of pest management practices by rice farmer-respondents in three provinces of Region XII

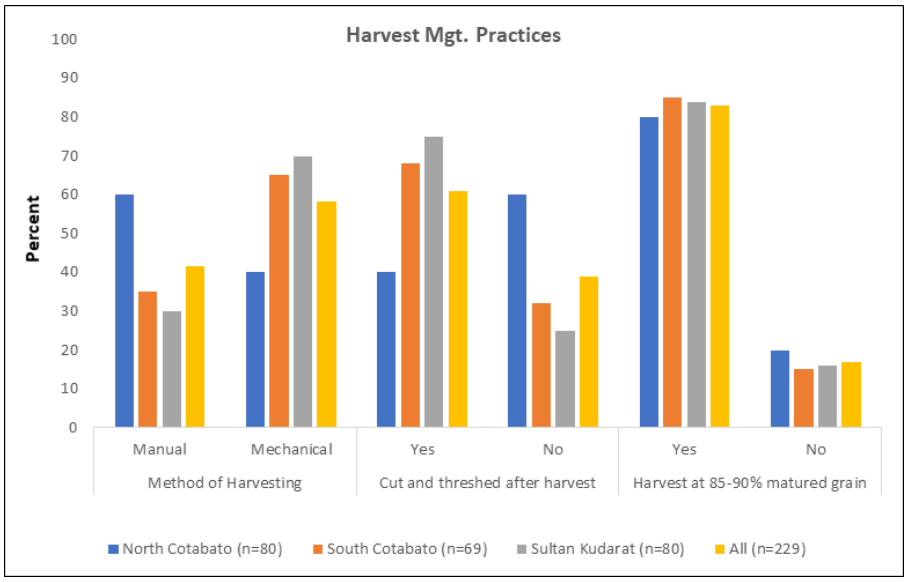

Figure 8. Percent distribution (%) of harvest management practices by rice farmer-respondents in three provinces of Region XII

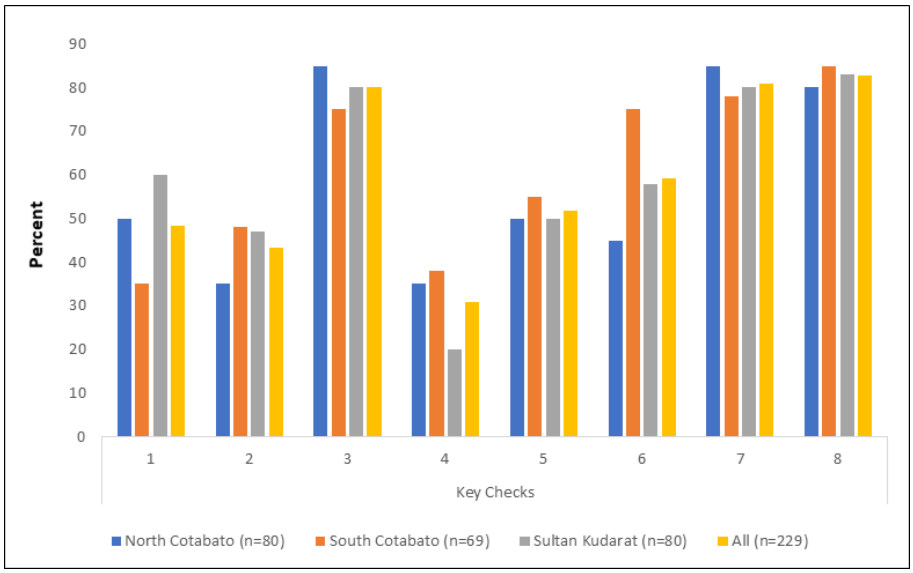

Figure 9. Percent distribution (%) of KeyCheck achieved by rice farmer-respondents in three provinces of Region XII

RISE: Relevant Innovations through Strategic Empowerment for Quality Rice

OH Abdulkadil, DAN Sumlay, STC Quiring, MB Gandawali, and IV Boholano

Capacity enhancement through training and knowledge sharing and learning (KSL) activities are fundamental components to enhance technical services of rice stakeholders with the latest rice production technologies. In 2019, series of training were conducted for local executives and the newly agriculture graduates through a two-day appreciation course and a three-day Boot Camp with emphasis on *PalayCheck* System and *Palayamanan* Plus in Region XII and Bangsamoro Autonomous Region in Muslim Mindanao (BARMM), respectively.

There were 91 rice stakeholders trained. Fifty-one (51) local executives of Datu Hoffer, Sharif Aguak, Datu Salibo, and North Upi, Maguindanao benefited from the two-day appreciation course with emphasis on *PalayCheck* System and *Palayamanan* Plus with an average gained knowledge of 54.04%. For the three-day boot camp, 40 agriculture graduates from Southern Christian College (SCC); University of Southern Mindanao (USM); Cotabato City State Polytechnic College); Mindanao State University (MSU-Dinaig Campus); and Sultan Kudarat State University (SKSU) participated with an average gained knowledge of 55.85%.

For the series of KSL activities, 780 rice stakeholders were reached. Four hundred ninety-six (496) individuals and farmers from Barangay South Manuangan Farmers Association; agricultural extension workers of DA-LGU Pigcawayan, DA-LGU Midsayap, RiceBIS; and Cotabato Special Rice (CSR) project farmer-partners participated in the activities. There were 284 students from Tupi National High School and Polonuling National High School, South Cotabato who attended the Be Riceponsible Briefing/Campaign conducted on November 18-20.

New agriculture graduates Rice Boot Camp participants

KSL activity dubbed as "Mangunguma, Kumusta Ka?

Lakbay Palay 2019 at Southern Christian College Gymnasium, Midsayap, Cotabato

Palayamanan Plus in Midsayap

IV Boholano, RP Jayme

The *Palayamanan* Plus model farm was established in PhilRice Midsayap to showcase practical, cost-saving, and yield-enhancing management practices; reduce farming risks; and enhance sustainability, productivity, and profitability. The components included rice and vegetable, mushroom, and vermicomposting production established in almost 0.75-ha area within the station.

Results showed that rice production gave the highest income followed by vermicompost, mushroom, and vegetable production. It was also found that vegetables along with other components in the *Palayamanan* plus model farm can yield additional income. Knowledge on market scanning and status of demand and supply of each commodity in the community should also be enhanced so that farmers can easily make market forecast and dictate higher price of the product.

Table 9. Annual gross income of identified crops/livestock that contributed additional income in rice-based production in the station.

Crops/Livestock	Cropping Season 2019					
	Dry Season			Wet Season		
	No. of hills	Yield (kg)	Gross Income (P/)	No. of hills	Yield (kg)	Gross Income (P/)
A. Vegetable production						
Ampalaya	5	10.35	490.40	6.00	1.63	83.00
Banana	2	2	192.00	4.00	48.00	495.00
Cucumber	0	0	-	12.00	33.00	465.00
Eggplant	12	37	674.80	22.00	46.00	822.00
Okra	0	0	-	10.00	11.00	120.00
String Beans	0	0	-	12.00	10.00	90.00
Squash	0	0	-	4.00	17.00	252.00
Tomato	0	0	-	50.00	95.00	1,756.00
Upo	0	0	-	4.00	73.00	358.00
Sub-total			**1,357.20**			**4,441.00**
B. Mushroom Production						
Oyster Mushroom		1.2	192.00		26.00	4,093.00
Paddy Mushroom		3	300.00		-	-
Sub-total			**492.00**			**4,093.00**
C. Livestock Production						
Tilapia		20	2,000.00		-	-
Duck (heads)*		10	1,200.00		20.00	2,000.00
Sub-total			**3,200.00**			**2,000.00**
D. Vermicompost Production						
Vermicompost*		800	3,680.00		2,300.00	10,580.00
Vermiworm*		12	3,600.00		50.00	15,000.00
Sub-total			**7,280.00**			**25,580.00**
E. Rice Production						
Paddy Rice (0.5 ha)		2,000	30,000.00		2,650.00	42,400.00
Sub-total			**42,329.20**			**78,514.00**
Grand Total						**120,843.20**

*Note: * - product not yet marketed*

Rice production component

Vegetable production component

Mushroom production component

Training on mushroom production

Vermicomposting production and its utilization for urban gardening as soil media for potted tomato plants

Rice Education through Advocacies and Communication Hosts for Quality Rice

DAN Sumlay, STC Quiring, and MB Gandawali

Rice research, development, and extension employ suitable communication strategies to disseminate and promote rice production technologies to the target or intended beneficiaries in order to accelerate technology dissemination and adoption. One way of reaching more audience is through local radio communication. This study disseminated and promoted latest rice production technologies and reached farmers in far-flung rice farming communities.

The *PalayCheck* System (KeyChecks 1-8) and integrated pest management technological tips were aired weekly through a 1-minute radio plugs via local radio station in Midsayap, KISS 103.3 FM ANG RADIO NI JUAN.

Results of the listenership survey showed that 88% of the farmer-respondents (76, male; 24, female) listened on radio plugs within a day between 6am-8am and 11am, while the 12% among the listeners did not make it due to the absence of radio in their respective homes. Listeners find integrated pest management as the most relevant topic due to high incidence of pest and disease in their rice field. KeyChecks 1,2,3,5, and 7 and IPM were useful during field preparation, seeds preparation, and pest management. Majority of the farmers shared their knowledge to their co-farmers and planted high-quality seeds at 20-40kg/ha. They also learned and practiced synchronous planting, proper timing of irrigating their field, and pest monitoring at early tillering to hard dough stage of the rice crop.

IEC materials such as PhilRice Magazine, techno bulletins, and pamphlets totaling 2,568 copies were distributed to rice farmers.

Abbreviations and acronyms

AYT - Advanced Yield Trial
ABE - Agricultural and Biosystems Engineering
AEW - Agricultural Extension Worker
ATI – Agriculture Training Institute
AESA - Agro-ecosystem Analysis
AC - Amylose Content
BLB - Bacterial Leaf Blight
BLS -Bacterial Leaf Streak
BCA - Biological Control Agent
BS - Breeder Seeds
BPH -Brown Planthopper
BPI - Bureau of Plant Industry
CGMS - Cytoplasmic Genic Male Sterility
COF - Commercial Organic Fertilizer
CDA - Cooperative Development Authority
DAS - Days After Sowing
DAT - Days After Transplanting
DF - Days to Flowering
DM- Days to Maturity
DAR - Department of Agrarian Reform
DA-RFOs - Department of Agriculture-Regional Field Offices
DoF - Department of Finance
DOLE - Department of Labor and Employment
DTI - Department of Trade and Industry
DSR - Direct-seeded Rice
DS - Dry Season
FBS – Farmers' Business School
FC - Farmers' Cooperative
FSM - Farming Systems Models
FAA - Fish Amino Acid
FGD - Focused Group Discussion
FSP - Foundation Seed Production
FRK - Farm Record Keeping
GABA - Gamma-aminobutyric Acid
GT - Gelatinization Temperature
GAD - Gender and Development
GYT - General Yield Trial
GCA - Genetic Combining Ability
GIS - Geographic information system
GEMS - Germplasm Management System
GAS - Golden Apple Snail
GL - Grain Length
GQ - Grain Quality
GW - Grain Weight
GY - Grain Yield
GLH - Green Leafhopper
GOT - Grow Out Test
HR - Head Rice
HRA - Heat Recovery Attachment
HIPS – Highly-intensified Production System
HQS - High-quality Rice Seeds
HON - Hybrid Observational Nursery
HPYT - Hybrid Preliminary Yield Trial
ICT - Information and Communication Technology
IEC - Information Education Communication
IBNM - Inorganic-based Nutrient Management
ICM - Integrated Crop Management
IPM - Integrated Pest Management
JICA - Japan International Cooperation Agency
IRRI - International Rice Research Institute
IA - Irrigators' Association
KP - Knowledge Product
KSL - Knowledge Sharing and Learning
LCC - Leaf Color Chart
LFT - Local Farmer Technicians
LGU - Local Government Units
LPS - Low Pressure Steam-operated
LE-CYPRO - Lowland ecotype Cyperus rotundus
MFE - Male Fertile Environment
MSE - Male Sterile Environment
MAS - Marker-assisted Selection
MRL - Maximum Root Length
MR - Milled Rice
MER - Minimum Enclosing Rectangle
MOET - Minus-One Element Technique
MC - Moisture Content
MAT - Multi-Adaptation Trials

MCRTP - Multi-crop Reduced Till Planter
MET - Multi-environment Trial
MYT - Multi-location Yield Trial
NAAP - National Azolla Action Program
NCT - National Cooperative Test
NFA - National Food Authority
NRAM - National Rice Awareness Month
NSIC - National Seed Industry Council
NSQCS - National Seed Quality Control Services
N - Nitrogen
NBSP - Nucleus and Breeder Seed Production Project
NFGP - Number of Filled Grains Panicle
ON - Observation Nursery
OSIS - One-Stop Information Shop
OBNM - Organic-based Nutrient Management
PL - Panicle Length
PW - Panicle Weight
PVS - Participatory Varietal Selection
PWD - Person with Disabilities
PHilMech - Philippine Center for Postharvest Development and Mechanization
PRISM - Philippine Rice Information System
PhilRice - Philippine Rice Research Institute
PSA - Philippine Statistics Authority
PTC - PhilRice Text Center
P - Phosphorus
PVS - Plant Variety Selection
K - Potassium
QTL - Quantitative Trait Loci
RCBD - Randomized Complete Block Design
RSP - Registered Seed Production
RBB - Rice Black Bug
RCEF - Rice Competitiveness Enhancement Fund
RCEP - Rice Competitiveness Enhancement Program
RCM - Rice Crop Manager
RHGEPS - Rice Hull Gasifier Engine Pump System
RPH - Rice Planthopper
RSTC - Rice Specialists' Training Course
RTV - Rice Tungro Virus
RBFHS - Rice-based Farming Household Survey
KQ - Kernel Quality
SV - Seedling Vigor
ShB - Sheath Blight
ShR - Sheath Rot
SMS - Short Messaging Service
SNP - Single Nucleotide Polymorphism
SWRIP- Small Water Reservoir Irrigation Project
SRB - Stabilized Rice Bran
SUCs - State Universities and Colleges
SB - Stem Borer
TESDA - Technical Education and Skills Development Authority
TDF - Technology Demonstration Farm
TRV - Traditional Rice Varieties
TOT - Training of Trainers
TPR - Transplanted Rice
URBFS - Upland Rice-Based Farming
WS - Wet Season
WCV - Wide Compatibility Variety
YSB - Yellow Stem Borer

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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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