Quality Rice. Quality Life.

2017
National Rice R&D
Highlights

TECHNOLOGY
MANAGEMENT and
SERVICES DIVISION

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Technology Management and Services Division
Lea dR. Abaoag

Executive Summary

The Technology Management and Services Division (TMSD) promotes and disseminates high-impact rice and rice-based technologies through science-based training and technology promotion models to help increase the productivity and income of the rice farmers in the country. The division plays a crucial role in capacitating stakeholders in achieving self-sufficient, sustainable, and competitive rice economy through a responsive Rice R&D system and a strong, innovative, science and technology- based extension.

The core project, "Capacitating Rice Stakeholders to Help Achieve Rice Security" was implemented reaching around 5,000 stakeholders through its four special studies: (1) enhancing food security through delivery of specialized training courses, (2) mass-based technology promotion, (3) courseware and module development, and (4) evaluation of major training courses to were designed and conducted.

To support the rice sector of sub-saharan African countries, 35 seed specialists and extension agronomists from Africa, together with a breeder from Afghanistan and 18 agricultural extension workers from the Philippines, were trained on rice production.

The technology assessment project completed field validation activities and developed recommendation reports for the improvement of two technologies. The project under the Public Hybrid Rice Commercialization Program established demonstration sites in Central Luzon and Pangasinan to determine the performance of hybrid rice technology. Likewise, the use of public hybrid rice was massively promoted through training and technology demonstrations. There were 28 demonstration fields established, and 1,344 R&D workers, farmers, seed growers, and seed inspectors were trained.

I. Capacitating Rice Stakeholders to Help Achieve Rice Security
Anita V. Antonio

Research divisions of PhilRice have been developing new technologies resilient to climate change to increase yield and income of farmers. These high- yielding technologies coupled with strategic components and strategies are tested and promoted by TMSD. Special project such as "Capacitating Rice Stakeholders to Help Achieve Rice Security" was proposed as a strategy to capacitate farmer-leaders, extension workers, and other rice stakeholders to help them attain the required level of knowledge and skill in rice and rice-based production.

Under the project, special studies such as (1) enhancing food security through delivery of specialized training courses, (2) mass-based technology promotion, (3) courseware and module development, and (4) evaluation of major training courses were designed to capacitate rice stakeholders.

Enhancing Food Security Through Delivery of Specialized Training Courses
AV Antonio, LAI Tamani, JL De Dios, VJA Taylan, CU Sicat, DG Cargamento, RT Apuada and RF Lauriaga

Four training courses for farmer-leaders conducted under the study: Training Course on Farm Machinery Operations and Safety, cum PalayCheck System (March 6-10, 2017); Training on Rice Production for Tawi-Tawi Farmers (April 3-7, 2017); Specialized Course on Rice and Rice-based Technologies in Bulacan (November 8-9, 2017); and Specialized Course on Rice and Rice-based Technologies in Surigao del Sur (November 14-15, 2017). More than 100 farmers and farmer-leaders graduated with average GIK of 45.81%. The training courses received a Very Good (VG) to Excellent (E) training evaluation.

Four courses were also conducted for agricultural extension workers /other professionals: Rice and Rice-Related Technologies for Mang Inasal R&D Staff (April 3-4, 2017); Rice Boot Camp: Appreciating the Science of Rice Production (June 19-23, 2017); Rice Boot Camp for New Graduates of Agriculture and Other Related Courses (August 14-18, 2017); and Specialized Course on Rice and Rice-Related Technologies for AEWs of Occidental Mindoro (October 3-4, 2017). There were 124 agricultural extension workers (AEWs) and professionals who availed of the training with an average GIK of 54.55 and with VG to E overall training evaluation.

Enhancing Technology Awareness and Learning Through Mass Based Technology Promotion
CG Abadilla, FD Garcia, AV Antonio, RA Pineda, MAA Abando, and MF Launico

Three batches of S&T Updates for legislators were conducted in three municipalities of Aurora (Dilasag, Dingalan, and Dinalungan) with 30 participants. Topics included rice science and development, rice industry scenario; nutrient management, and trade liberalization. Four batches of AEWs from three municipalities in Occidental, Mindoro were given S&T Updates.

Two Rice TechnoKlinik was conducted in Occidental Mindoro and Surigao del Sur that were attended by 279 farmers. The PalayCheck System was discussed during the activity. Two field days and forum were also conducted at the Central Experiment Station, which were attended by 4,907 farmers and other rice stakeholders.

Module and Courseware Development and Utilization
Lea dR. Abaoag

The concept of the courseware on the familiarization of natural enemies and pest identification was developed and the module on seed health and quality was improved in consultation with the subject matter specialist (SMS). The module on understanding insect pests and diseases and its management was pilot-tested in collaboration with the project IPaD with 23 AgRiDOC Roll-out graduates as participants. Six short case studies on field problem identification, analysis, and management were also developed and pilot tested.

Tracer Study: Evaluation of Training Courses
RA Pineda, AV Antonio, and CB Cruz

The Rice Specialist Training Course (RSTC) on PalayCheck and Palayamanan System is one of the major training courses spearheaded by TMSD from 2008-2010. It has trained 347 Rice Sufficiency Officers (RSO) and Agricultural Extension Workers (AEW) from the different regions.

Former trainees were traced to assess the application of the acquired skills, knowledge, and attitude from the training and the extent of relevance by which the training course (the different training modules or topics) had helped them in doing extension work, get better job, or promotions. It also enabled the training management team to review the training modules. TMSD had trained or reached out to 29,211 farmers, AEWs, and other rice

stakeholders from 2008 to 2017.

Results showed that majority (87%) is at the government agriculture-sector doing research, extension work, and training. The training was very helpful (77%) in their work and it helps them in finding new job or get promoted (90%). Modules on the PalayCheck System (4.65) were the most relevant and actual field exercise in land preparation and crop establishment (4.76) were the most relevant field activities.

Clean GPS On-farm Learning Center
FD Garcia, RD Romanillos, MJ Manalang, AV Antonio, MF Launico, CB Cruz, LdR Abaoag, J Patayan, and WB Collado

In 2017, the learning center showcased technologies for high yields, and was used for practical applications and farm machineries demo area during the Lakbay Palay.

In the performance trial/demonstration of newly-released irrigated lowland rice varieties, NSIC Rc 398 yielded 9.99t/ha in the DS. During the WS, Mestiso 55 yielded 5.52t/ha. One hundred ninety-three trainees from eight training programs used the area for field activities. Training of two batches of Rice Boot Camp with 48 participants were conducting in the learning center.

II. Technology Assessment and Mature Technology Identification

LdR Abaoag, JV Pascual, and AM Jose

The project conducted an assessment process on Rice Hull Gasifier Engine Pump System (RHGEPS) of the Rice Engineering and Mechanization Division. As part of technology field validation, farmers and household users were interviewed after using the technology for at least one month. Overall performance evaluation of the technology was excellent. Few comments were focused on the technology design such as improving the durability of materials for much longer use and to ensure safety of client.

Field validation activity was conducted to assess the performance of PhilRice Weeds App, a digital-based technology that can be utilized through Android smart phones. The technology was classified both as information and partly a diagnostic tool. PR Weeds App features the major and minor weeds in irrigated and rainfed-lowland ricefields in the Philippines. The

app was developed for farmers, students, professors, researchers, extension workers, and decision-makers as a tool for effective management of weeds.

Results from field validation showed that the target users/selected respondents were satisfied with what they have experienced during technology demonstration and with their actual hands-on and familiarization with the technology. They were also satisfied with the App's usefulness and convenience; and with its function as good information source. However, the technology has yet to be improved. Respondents said it would be better if the App develops a scanning feature that solicits actual photo of weeds then it shall analyze and provide necessary information such as complete details about the weeds, management options, and active ingredients of herbicides to use during severe manifestation. These modifications were suggested so that accurate information on identification, prevention, and control management can be obtained.

The results gathered during technology validation were analyzed and submitted to technology generators and office of executive directors for their review and further refinement, and eventually for the approval of its commercialization.

III. Adaptation Trial cum Techno-demo: Strategy in Increasing Utilization of High-Yielding Rice Technologies in Central Luzon and Pangasinan

RD Romanillos, MJ Manalang, and FD Garcia

The project demonstrated the use of public hybrid seeds in Central Luzon and Pangasinan to determine the performance of hybrid rice technology (HRT) in terms of adoptability, profitability, and productivity under partial mechanized farming. Adaptability of the public hybrids was conducted in 20 sites. Data showed that Mestiso 73 has the highest yield among the public hybrids tested in Central Luzon and Pangasinan, followed by Mestiso 19, Mestizo 1, and Mestiso 20.

The yield of M20 was 8.19t/ha, higher by 1t/ha than inbred varieties, which attained only 7t/ha. During the DS planting, the average yield for mechanically transplanted hybrid was 8.28t/ha while inbred attained only 7.06t/ha, or equivalent to 17.28% yield difference. For partial mechanized hybrid cultivation, a reduction of transplanting cost by P3,560-P5, 560 per hectare was experienced.

The project also developed the modified method in seedling tray preparation using mud as medium soil, which resulted in savings of up to P1, 540. Fifteen farmers' field day and forum and ceremonial transplanting

were conducted in Central Luzon and Pangasinan participated in by 1,705 farmers, AEWs, and LGU partners/other stakeholders in the dry and wet seasons.

Twenty-three trainings on hybrid rice seed production, F1 cultivation focused on partial mechanization and seed production, and seed certification on TGMS/CMS/inbred were conducted. Implemented with ATI, BPI, and DA-RFOs, 763 AEWs, LFTs, farmer-leaders, AgRiDOCs, seed inspectors and seed analysts were trained. The two training of trainers on hybrid rice seed production and certification for PhilRice, ATI, BPI, DA-RFO staff gained 39% GIK and VS evaluation rating. With 64 participants, the program also helps link the farmers with DA, LGUs, and other agencies to provide them the machineries needed in their areas.

Abbreviations and acronymns

ABA – Abscicic acid
Ac – anther culture
AC – amylose content
AESA – Agro-ecosystems Analysis
AEW – agricultural extension workers
AG – anaerobic germination
AIS – Agricultural Information System
ANOVA – analysis of variance
AON – advance observation nursery
AT – agricultural technologist
AYT – advanced yield trial
BCA – biological control agent
BLB – bacterial leaf blight
BLS – bacterial leaf streak
BPH – brown planthopper
Bo - boron
BR – brown rice
BSWM – Bureau of Soils and Water
Management
Ca - Calcium
CARP – Comprehensive Agrarian Reform
Program
cav – cavan, usually 50 kg
CBFM – community-based forestry
management
CLSU – Central Luzon State University
cm – centimeter
CMS – cystoplasmic male sterile
CP – protein content
CRH – carbonized rice hull
CTRHC – continuous-type rice hull
carbonizer
CT – conventional tillage
Cu – copper
DA – Department of Agriculture
DA-RFU – Department of Agriculture-
Regional Field Units
DAE – days after emergence
DAS – days after seeding
DAT – days after transplanting
DBMS – database management system
DDTK – disease diagnostic tool kit
DENR – Department of Environment and
Natural Resources
DH L– double haploid lines
DRR – drought recovery rate
DS – dry season
DSA - diversity and stress adaptation
DSR – direct seeded rice
DUST – distinctness, uniformity and stability
trial
DWSR – direct wet-seeded rice
EGS – early generation screening
EH – early heading

EMBI – effective microorganism-based
inoculant
EPI – early panicle initiation
ET – early tillering
FAO – Food and Agriculture Organization
Fe – Iron
FFA – free fatty acid
FFP – farmer's fertilizer practice
FFS – farmers' field school
FGD – focus group discussion
FI – farmer innovator
FSSP – Food Staples Self-sufficiency Plan
g – gram
GAS – golden apple snail
GC – gel consistency
GIS – geographic information system
GHG – greenhouse gas
GLH – green leafhopper
GPS – global positioning system
GQ – grain quality
GUI – graphical user interface
GWS – genomwide selection
GYT – general yield trial
h – hour
ha – hectare
HIP - high inorganic phosphate
HPL – hybrid parental line
I - intermediate
ICIS – International Crop Information
System
ICT – information and communication
technology
IMO – indigenous microorganism
IF – inorganic fertilizer
INGER - International Network for Genetic
Evaluation of Rice
IP – insect pest
IPDTK – insect pest diagnostic tool kit
IPM – Integrated Pest Management
IRRI – International Rice Research Institute
IVC – in vitro culture
IVM – in vitro mutagenesis
IWM – integrated weed management
JICA – Japan International Cooperation
Agency
K – potassium
kg – kilogram
KP – knowledge product
KSL – knowledge sharing and learning
LCC – leaf color chart
LDIS – low-cost drip irrigation system
LeD – leaf drying
LeR – leaf rolling
lpa – low phytic acid
LGU – local government unit

LSTD – location specific technology
development
m – meter
MAS – marker-assisted selection
MAT – Multi-Adaption Trial
MC – moisture content
MDDST – modified dry direct seeding
technique
MET – multi-environment trial
MFE – male fertile environment
MLM – mixed-effects linear model
Mg – magnesium
Mn – Manganese
MDDST – Modified Dry Direct Seeding
Technique
MOET – minus one element technique
MR – moderately resistant
MRT – Mobile Rice TeknoKlinik
MSE – male-sterile environment
MT – minimum tillage
mtha^{-1} - metric ton per hectare
MYT – multi-location yield trials
N – nitrogen
NAFC – National Agricultural and Fishery
Council
NBS – narrow brown spot
NCT – National Cooperative Testing
NFA – National Food Authority
NGO – non-government organization
NE – natural enemies
NIL – near isogenic line
NM – Nutrient Manager
NOPT – Nutrient Omission Plot Technique
NR – new reagent
NSIC – National Seed Industry Council
NSQCS – National Seed Quality Control
Services
OF – organic fertilizer
OFT – on-farm trial
OM – organic matter
ON – observational nursery
OPAg – Office of Provincial Agriculturist
OpAPA – Open Academy for Philippine
Agriculture
P – phosphorus
PA – phytic acid
PCR – Polymerase chain reaction
PDW – plant dry weight
PF – participating farmer
PFS – PalayCheck field school
PhilRice – Philippine Rice Research Institute
PhilSCAT – Philippine-Sino Center for
Agricultural Technology
PHilMech – Philippine Center
for Postharvest Development and
Mechanization
PCA – principal component analysis

PI – panicle initiation
PN – pedigree nursery
PRKB – Pinoy Rice Knowledge Bank
PTD – participatory technology
development
PYT – preliminary yield trial
QTL – quantitative trait loci
R - resistant
RBB – rice black bug
RCBD – randomized complete block design
RDI – regulated deficit irrigation
RF – rainfed
RP – resource person
RPM – revolution per minute
RQCS – Rice Quality Classification Software
RS4D – Rice Science for Development
RSO – rice sufficiency officer
RFL – Rainfed lowland
RTV – rice tungro virus
RTWG – Rice Technical Working Group
S – sulfur
SACLOB – Sealed Storage Enclosure for Rice
Seeds
SALT – Sloping Agricultural Land Technology
SB – sheath blight
SFR – small farm reservoir
SME – small-medium enterprise
SMS – short message service
SN – source nursery
SSNM – site-specific nutrient management
SSR – simple sequence repeat
STK – soil test kit
STR – sequence tandem repeat
SV – seedling vigor
t – ton
TCN – testcross nursery
TCP – technical cooperation project
TGMS – thermo-sensitive genetic male
sterile
TN – testcross nursery
TOT – training of trainers
TPR – transplanted rice
TRV – traditional variety
TSS – total soluble solid
UEM – ultra-early maturing
UPLB – University of the Philippines Los
Baños
VSU – Visayas State University
WBPH – white-backed planthopper
WEPP – water erosion prediction project
WHC – water holding capacity
WHO – World Health Organization
WS – wet season
WT – weed tolerance
YA – yield advantage
Zn – zinc
ZT – zero tillage

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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).