Quality Rice. Quality Life.

2017
National Rice R&D
Highlights

SOCIOECONOMICS DIVISION

Philippine Rice Research Institute
Central Experiment Station
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Socioeconomics Division

Rhemilyn Z. Relado

Executive Summary

Over the years, the national rice research and development has produced technologies and products that are expected to be beneficial to the Philippine rice-based farm households. Socioeconomics Division (SED) is mandated to generate rice and rice-related statistics, measure the impacts of rice technologies, products, and services, and conduct policy research and advocacy activities. With these mandates, the division plays a crucial role in providing the necessary rice information to its stakeholders.

To fulfill its role as the main socio-economic research hub of PhilRice, SED implements projects on rice statistics, adoption and impact evaluation, policy research and advocacy, and research on rice-based farm households. The first project on documenting the statistical series on the rice economy ensures that rice data, whether primary or secondary, are organized into a convenient storage and retrieval system. The second project on adoption and impact evaluation provides evidence of the usefulness of R&D products and services and offers feedback to researchers and development workers. The third project on policy research and advocacy assures relevant socioeconomic information and advocates critical findings to various stakeholders. The last project involved socioeconomic papers on rice-based farm household survey of PhilRice. Through the information provided by the division, policymakers and decision-makers can ensure that development programs and policies are science-based.

In 2017, SED has produced major final outputs from its implemented projects. Notable outputs were: 1) an operational PalayStat website, which contain primary and secondary rice data; 2) information on the socioeconomic impacts of combine harvester and PhilRice-JICA TCP 5; 3) policy brief that assesses the investment worth of hybrid rice; and 4) papers profiling Filipino rice farmers, their pest problems, information sources, and social mobility.

I. Statistical Series on the Rice Economy

Rhemilyn Z. Relado

Statistics play a vital role in planning and implementing projects as well as making policies in rice research and development. With enormous thrust on government accountability, policymakers enjoined researchers and developmentalists to present project impacts quantitatively. Moreover,

statistics gathered periodically will create trends in the rice economy of the Philippines. Understanding the rice trends will have great implications on planning and implementation of rice programs that will be beneficial to the rice industry especially to the rice-based farm households in the country. Past rice statistics will also inform policymakers and researchers if government investment in agriculture is worth it. Statistics will also provide the necessary rationale to avoid the same gaffe in future programs for the rice industry.

This project addressed the need to gather, process, and update rice statistics and make available the information to primary rice stakeholders. Three studies are the project. Two were core-funded while the other one is funded by the Bureau of Agricultural Research. These were: 1) monitoring of the rice-based farm households in major rice producing provinces in the Philippines, 2) revisiting the rice-based socioeconomic information system, and 3) updating and restructuring rice and rice-related statistics.

Updating and Restructuring Rice and Rice-Related Statistics

RZRelado, RB Malasa, and RF Tabalno

With the emergent active role of local governments in the formulation of responsive and location-specific policies, implementation of local rice production programs, and PhilRice's thrusts of developing location-specific technologies, the need for location-specific rice database in indispensable. Prominent rice datasets from 2013-2016 were accessed from the Philippine Statistics Authority (PSA). Data were then tabulated and disaggregated at the provincial level. Compilation, retrieval, and organization of these data were done by PSA while validation, editing, and restructuring of output tables were performed by SED staff. Data accessed ranged from rice production to utilization to market prices.

Provincial rice statistics were then restructured following the database format needed by the PalayStat System. In 2017, 18 rice statistical tables were added to the existing database. Rice statistics from the database were then used to respond to data queries from various stakeholders: students, policymakers, scientists, and development planners.

Integration of other Rice Statistics Databases in the PalayStat System

RM Almario, MGC Lapurga, RB Malasa, RF Ibarra, MA Gacutan, and AC Arocena Jr.

The PalayStat system, an interactive web-based system, was developed to
address the need for innovation in information dissemination of rice-related

statistics to researchers, development workers, and policy makers. The idea is for the PalayStat to be the main source of information regarding the technology and social and economic status of rice-based households in 30 major rice-producing provinces around the Philippines obtained through the Rice-Based Farm Household Surveys (RBFHS).

The PalayStat system now includes the restructured datasets of the "Statistical series on the rice economy." Algorithms were also developed for the retrieval and presentation of statistical datasets. Five orientation-workshops were also conducted for PhilRice staff in PhilRice Batac, Isabela, Los Baños, Central Experiment Station, and for partner-agencies, offices, and universities. Future activities will focus on the user interface of the system.

II. Adoption and Impact Evaluation of Rice R&D Products and Development Projects

Jesusa C. Beltran

PhilRice continually generates research products to help contribute in sustaining food security, reducing poverty, and improving nutrition. This project aimed to contribute in the effective and efficient monitoring, evaluation, and quantification of the performance of rice R&D products and development programs through ex-ante, monitoring and evaluation activities, and ex-post impact evaluation studies. It aimed to provide evidence on the usefulness of R&D and related services, while providing feedbacks to researchers and development workers to ensure more efficient R&D work, research prioritization, and better management of projects and programs.

In 2017, the project covered three studies: socioeconomic impacts of combine harvester, characterization of PhilRice Mindoro satellite station, and monitoring and evaluation of PhilRice-JICA Technical Cooperation Project (TCP5) being implemented in Mindanao. The project has produced three papers.

Socioeconomic Impact of Adopting Rice Combine Harvester in the Philippines

IA Arida, JC Beltran, RZ Relado, RB Malasa, FH Bordey, MJT Antivo, and IR Tanzo

This study assessed farmers' perception and level of awareness on combine harvesters in five major rice-producing provinces. Determinants of combine adoption were identified using treatment effects-two steps model estimation. Combine harvester's adoption impact on productivity and profitability was assessed through costs and returns and partial budget analyses using DS and WS 2015 survey data.

In terms of partial budget analysis, results showed positive effects of using combine including reduction in labor costs, specifically on harvesting and threshing, land preparation, and hauling (farm to road). Fuel and oil (for harvesting and threshing, and hauling), machine custom fees (thresher and hauling), sacks and twine, and food costs during harvesting and threshing were also considered. In contrast, adverse effects include machine custom fee for combine harvester and labor cost on transplanting. Overall, results showed about P5,380.27 change in the net income favoring farmers who used the technology. Treatment effect estimation showed that under the adoption model, educational attainment, larger farm size, tenurial status, and membership in organization are significant and positively affect the likelihood of adopting combine harvester.

Baseline Characterization of PhilRice-Mindoro Satellite Station
JC Santiago, CG Yusongco, JC Beltran, and RZ Relado

As Mindoro expands its R&D activities in Region IV-B, it is crucial to determine the socioeconomic characteristics and current production practices of the farmers in designing project interventions that aimed to increase rice production and farm income in the region. Hence, the socioeconomic team conducted a baseline survey in selected municipalities of Occidental and Oriental Mindoro.

Results show that average yield level in both provinces are more than 5t/ha. High adoption of high-quality seeds (more than 70%) and combine-harvester (81%) was also observed. However, awareness of some recommended practices and technology such as seeding rate, drumseeder, Leaf Color Chart (LCC), and Minus-One Element Technique (MOET) were still moderately low at about 39%. Some pre-harvest activities were done manually resulting in high labor cost. Overall, cost of hired labor, land rent, and fertilizer contributed the largest share in the total cost.

III. Policy Research and Advocacy
Aileen C. Litonjua

Sound policy environment affects the rice sector so the government has to ensure that correct and relevant policies are being implemented. As such, timely information that serves as the government's decision guide in addressing the challenges confronting the sector should be provided.

This project mainly aimed to proactively provide relevant information and advocate critical findings of policy researches to stakeholders through advocacy materials (i.e., policy briefs) and activities (i.e., policy seminars and workshops). The former intends to provide a brief

and concise reading material for policymakers that are easy to understand. The latter are advocacy avenues where stakeholders could discuss and draft solutions to problems besetting the industry. This project then serves as a vehicle for PhilRice, specifically SED, in creating a greater influence on rice-related policy planning and formulation of the government.

Linking Rice Science for Decion-Makers
AC Litonjua, JC Beltran, RF Ibarra, and AG Andes

This study served as an active delivery vehicle of policy research results and advocacy arm of PhilRice that influences rice policy formulation. This organized activities such as seminars, forums, and workshops convene experts and policymakers to discuss policy-related issues and formulate solutions for these issues. In December 2017, a workshop was conducted to help the SPARC Program to take off in 2018.

The proceedings of the 2016 policy seminar-workshop were drafted to serve as a reference of DA officials and other relevant stakeholders in crafting their programs and projects that would create great impact to the rice industry. Dissemination of information on the current situation of the rice industry was also conducted.

Rice Science for Decision-Makers
AC Litonjua, FH Bordey, JC Beltran, MGM Nidoy, and AG Andes

This study aimed to concisely discuss rice industry issues and their related policies. It also provided recommendations on addressing issues through a policy brief.

In 2017, the study examined the impact of hybrid rice on farmers' competitiveness and local rice supply. Results showed that a farmer is competitive if he/she can sell the same quality of palay (paddy rice) at a lower price than his/her competitors. This is possible only if he/she can produce palay at lower unit cost without sacrificing its quality. Planting hybrid seeds is one way to improve competitiveness. This could increase yield and consequently reduce production cost per kilogram of palay. Although hybrid seeds are more expensive than certified inbred seeds, unit cost of the former is lesser, which can result in higher income for farmers. Due to its high yield, hybrid rice technology can increase the availability of domestic supply, which improves the country's rice security and lower the need for imports. Hybrid rice adoption can be improved by expanding irrigated areas, making hybrid rice available and accessible within farmers' locality, intensifying extension activities in irrigated areas, and expanding hybrid-seed production area.

IV. Socioeconomics Studies of Rice-Based Farm Households in the Philippines

Alice B. Mataia

Remarkable array of rice-based technologies is now available for rice-based farm households' adoption to increase their productivity, profitability and competitiveness. Despite the extensive R&D efforts and technology promotion in the rice sector, on-farm yield levels are still way below the maximum potential. The results of the 2011-2012 rice-farm households survey in 33 major rice- producing provinces in the Philippines showed that 21% of rice farmers in irrigated areas achieved yields of less than 3t/ha, 28% obtained 3.1-4t/ha, 24% got 4.1-5t/ha, while 27% harvested more than 5t/ha.

In rainfed areas, more than half (54%) obtained yields of less than 3t/ha and only 7% achieved more than 5t/ha. These yield variabilities can be attributed not only to biological and physical constraints but more on socioeconomic factors.

Farmers' Pest Problems and Management Practices: Implications to Rice Productivity

AC Litonjua, JY Siddayao, and CS Parayno

Pests and diseases remain to be major problems in rice production. This study provided updates on current pest problems, farmers' management practices, and productivity implications of pesticide use. This will enable stakeholders to align activities, programs, and policies with the different contexts and situations in the field. Majority of farmers encountered weed problems with Echinochloa colona as the most prevalent. Meanwhile, other prevalent problems per category were rice bug (insect pest), stem rot (WS 2011) and leaf blast (DS 2012) (diseases), snails (WS 2011), and rats (DS 2012) (other pests). Majority of farmers applied chemicals to manage these pests and diseases. Few used chemicals even without reported problem on pests. There were also few who used highly toxic chemicals. There could also be misuse of chemicals, especially herbicides, which could explain for high incidence of weed problems during the reference period. Cropping intensity is another factor that could have affected the level of pests and disease in the field. The level of insectide use is not economically optimal, implying overuse of the chemical. The extension system needs to continue educating farmers, especially on the possible impact of their practices. This may also include proper briefing on the widely used chemicals to ensure correct use. Non-chemical controls may be encouraged to reduce heavy reliance on chemicals, especially insecticides.

Rice-Based Farm Households' Access to and Sources of Information

RZ Relado and MGC Lapurga

Documenting the rice farmers' information sources is a significant primary step in facilitating changes in farming practices from inefficient and effective techniques to profitable and scientifically proven rice management practices. This study determined the sources of information of the rice-based farm households (RBFH) in the Philippines. In particular, the study aimed to: 1) analyze farmers' sources of rice information, 2) document ICT-mediated rice promotional strategies, and 3) recommend policy and technology dissemination directions for the Philippine rice industry.

Preliminary results showed that farmers' top and most effective source of information are their co-farmers. With this, development planners should consider and assess the quality of information they receive. This is a challenge of identifying key farmers to serve as tipping points in diffusing the right information at the right time.

Another highlight of the study is the apparent preference of rice-based farm households for personal contact and proximity in accessing information sources. This is evident in their choices for co-farmers and local government units as top sources. Hence, capacity-enhancement activities for key farmer leaders and agricultural extension agents who serve as interpersonal sources of information for RBFH should be done.

Quo Vadis, Rice-Based Farm Households: A Social Mobility Study

RB Malasa, RF Ibarra, and IR Tanzo

The Philippines had been lagging in addressing the issues of poverty particularly in the rural areas. Majority of the rural areas engage in agriculture, specifically rice farming. Thus, there is a need to study the social mobility of rice farmers to better understand how they might escape poverty. Generally, the study aimed to assess social mobility of rice-based farm households. Specifically, the study aimed to assess the intergenerational and intragenerational status of education, income, and occupation of the rice farm operators; identify the strata (or emerging sub-strata) of farmers and its relationship in relation to education, income, and occupation; determine the extent of rice-based farm households that are chronic poor or borderline poor; and identify factors to influencing the social mobility of rice farm operators.

The study used panel data from the Rice-Based Farm Household Survey of the Socioeconomics Division from 1996-1997 to 2011-2012. There is also a comparison between new samples and replacement sample

households with the panel data to determine the improvement in farmers' status.

Results showed that 12% of panel farmers have college education. New farmers in the 2011 and 2012 round showed that 24% of new sample farmers have college education and 28% among replacement under the same households. In terms of training participation, 43% have attended training among the panel farmers while 37% among new samples and 36% among replacement under the same households. In terms of poverty, 20% of the panel respondents were never poor and 41% who were poor at the start of the survey in 1996-1997 had improved their status in 2011-2012 round. Only 9% remained in chronic poverty and 3% became poor in 2011-2012 from being non-poor in 1996-1997.

The Face of the Filipino Farmer
IR Tanzo and MGC Lapurga

This study described farmers' socioeconomic features, the farm resources that they own, their extension-related characteristics, the quality of life that they have, and the needs of their household. The study contributed to issues on what further interventions should be in place to fit the Filipino farmer or what policies need to be designed, so as to improve rice production in the country; thereby, meet the elusive rice self-sufficiency target. Data from the Regular Monitoring of Rice-based Farm Households of PhilRice SED was used for this study covering the harvest periods of WS 2011 and DS 2012 with 2,566 farmer-respondents.

Results showed that the current state of our Filipino farmer is not a happy one. They are aging, with low educational attainment, only half are members of farm organization and owned their land. Ownership of farm assets are dominated by basic tools and equipment, and are continually beset with same problems they have experienced years ago. However, the farmers' quality of life seems to have improved if based on their household assets. However, is this change enough for the farmer who had work almost all his/her life to ensure that the 100M Filipinos will have rice to eat?

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).

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