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MECHANIZING RICE MAKES IT CHEAPER

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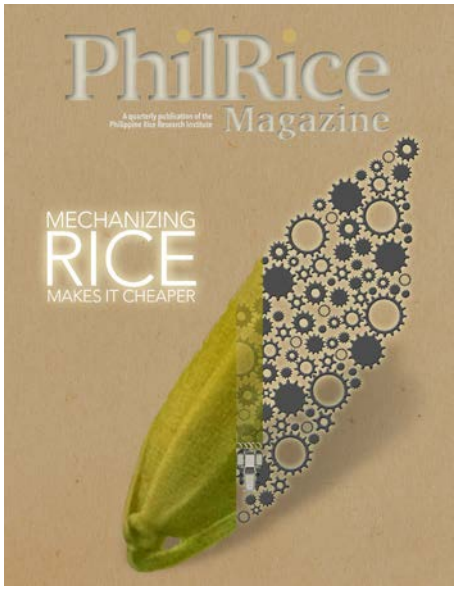

ABOUT THE COVER

Machines are farmers' allies. With machines, farmers could produce and earn more in a breeze helping them to confidently compete with rice-exporting neighboring countries. It is hoped that machines would become part of Filipinos' farming culture.

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2007 Binhi Hall of Fame Awardee
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Mechanizing rice makes it cheaper

Today's Filipino farmers have to spend P12 to produce a kilogram of paddy (unmilled) rice. Their counterparts in Vietnam spend only P7.00; only P9.00 in Thailand. Of the P12, we pay P3.60 (30%) for hired labor, specifically for manual crop establishment and harvesting services that contribute the most to our farmers' cost of production. Using machines in transplanting and harvesting our crops will markedly reduce our production expenses. Increasing our yields is another concern, though.

This predicament is being compounded by pressing issues, such as climate change that tremendously affects the dynamics of our farm operations, often wreaking havoc on our farmers' investments. The ASEAN economic integration even poses new threats to our farmers. More and cheaper imported rice will soon penetrate our market. Our government needs to help our farmers put up good competition against their ASEAN counterparts.

Our socioeconomists contend that to be competitive, our farmers have to produce quality products at a lower price than our competitors. One plausible way to help them survive under an open economy is to reduce cost, particularly in labor, through mechanization. For example, if farmers adopt the combine harvester, they will earn an additional P6,436/ha net income.

While it appears to be a sound solution, mechanization is not without major challenges and constraints. Our farm lands are generally uneven or in irregular shape, not to mention their small plot sizes. Machines could hardly maneuver in such conditions. These small plots are located in the outskirts and are usually in the inner parcels, thereby difficult to access for machine service. Economic (high price) and social (labor displacement) factors likewise make many farmers lose their appetite to adopt machinery, such as combine harvester.

Enabling policies are needed to address these challenges and make mechanization work. This issue of the magazine features stories that relate rice mechanization to competitiveness. Both science-based knowledge and field experiences are narrated here to give you a better understanding about the sensitive topic. •

NEWS

ABDULA IS OUTSTANDING RICE SCIENTIST

PhilRice Executive Director Sailila E. Abdula was recognized on August 7 in Manila as Outstanding Rice Scientist of the Philippines by the ASEAN Rice S&T Ambassadors Award Search Committee.

"As a government employee, this means that we are doing what is expected from us to help the people. Having this award is more than just an achievement, it is also a challenge for me to continue doing researches to help our farmers," Abdula says.

Abdula helped develop tungro-resistant rice varieties NSIC Rc120 and Rc226 to help manage the disease in Southern Mindanao, which were released in 2003 and 2010.

He also adds that as a breeder, he needs to continuously develop disease-resistant, high-yielding, and climate-resilient rice varieties to increase farmers' competitiveness and income.

Currently, he is developing transgressive lines that can become rice varieties, which will yield as high as hybrid rice seeds.

Abdula, 45, is a Maguindanaoan from West Patadon, Matalam, North Cotabato. In 2012, he obtained his PhD in agriculture major in plant genetics from Chungbuk National University in Korea. He also finished Master in Development Management, Development Academy of the Philippines. - **ALLAN C. BIWANG JR.**

ALLAN C. BIWANG, JR.

RESEARCH ON HEAT-TOLERANT RICE RECOGNIZED

Quantitative Trait Loci (QTL) for high-temperature tolerance in rice won the Outstanding Scientific Paper Award during the 39th National Academy of Science and Technology Annual Scientific Meeting, July 12-13.

Authors Dr. Norvie L. Manigbas and Jupiter L. Grospe from PhilRice, and Evaristo A. Abella from Central Luzon State University identified six major and three minor QTLs containing genes that can counter the ill-effects of high temperature. QTLs are sections of DNA containing the genes that control a trait.

These QTLs were found through the backcrossing of *Dular* and NSIC Rc150

GOD BLESS DR. GELIA CASTILLO

The PhilRice community deeply mourns the passing away of Dr. Gelia Tagumpay Castillo, 89, National Scientist and longest-serving trustee of the Institute. She succumbed to acute respiratory failure on August 5. Her ashes now rest at the Libingan ng mga Bayani.

Ma'am Gelia dedicated her life to the service of Filipino farmers as a rural sociologist. She was in the Board of Trustees of PhilRice since December 1986 and served as a consultant of the International Rice Research Institute.

PhilRice recognized her in 2005 as the "heart and conscience of the Institute," and the "lovable grandmother and true lover" of PhilRice.

"She mothered the Institute since its birth and as it grew, she made sure that it was in the right direction. During our Board meetings, I listened intently to her profound comments and suggestions. Indeed, she had foresight and wisdom which I valued a lot as head of PhilRice then," Dr. Leocadio Sebastian, former PhilRice executive director, wrote in his social media account.

She reviewed and celebrated the role of rice and Filipino life in her book titled *Rice in our life*. In her article in the April-June 2010 issue of PhilRice Magazine, she wrote: "Seeing is believing" may be trite but it still works. However, it is not enough. We need to add, DOING; USING; KNOWING; UNDERSTANDING; and ADAPTING is believing. All these actions are important so farmers can actually experience not only the technology's performance but also why it works."

She also published three well-known books titled *All in a Grain of Rice*, *Beyond Manila*, and *How Participatory is Participatory Development?*

In 1999, Dr. Castillo was conferred as National Scientist by then President Joseph Estrada. She was also a Professor Emeritus of UP Los Baños.

In her years of working for Philippine agricultural and rural development, she has always believed that "science must serve a human purpose. When the best of science and scientists are devoted to the problems of those who have less in life, that is ethics and equity at its best. For the millions of Filipinos who do not produce enough rice and those who cannot afford to buy enough rice to eat, what better human purpose is there for rice science?" - **MARY GRACE M. NIDOY**

(*Tubigan* 9). *Dular* is an Indian heat-tolerant rice variety that has low-yield potential. The other is a Philippine variety that averages 8.5t/ha but not resistant to high temperature.

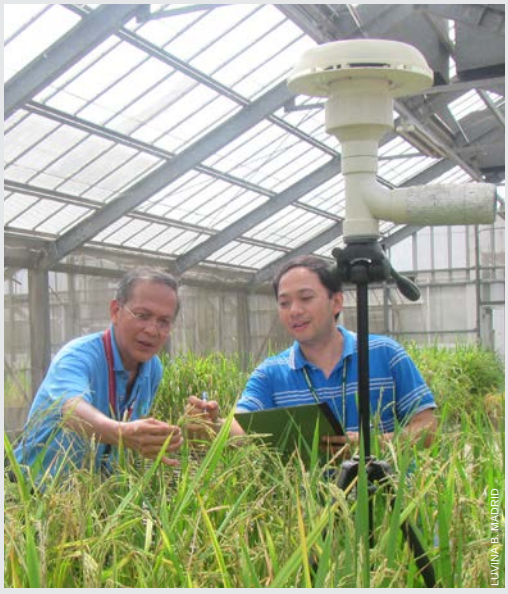
Manigbas says these QTLs will be used in mapping genes using molecular markers and in incorporating genes into high-yielding cultivars through marker-assisted breeding, which hastens the breeding process.

"As of now, we do not have local heat-tolerant rice varieties. Through this study, we've learned that the heat-tolerant trait is associated to the plants' heading days, time of flowering, fertility, and dehiscent temperature – most of which are found in the nine QTLs," Manigbas explains.

Earlier studies have confirmed that high temperature affects all growth stages of rice, particularly from the booting to flowering stage. This can cause high pollen and grain sterility that leads to serious yield loss and low grain quality and harvest index.

At present, six advanced promising lines are entered in the National Cooperative Tests under high temperature environments.

- **ANNA MARIE F. BAUTISTA**



NEWS

4PS BENEFICIARIES TRAINED ON AGRI

Beneficiaries of the *Pantawid Pamilyang Pilipino Program* (4Ps) in Mabini, Pangasinan have been trained on agriculture to build self-reliant farm households and communities through the partnership between the Department of Social Welfare and Development (DSWD), PhilRice, and the local government.

Forty DSWD partners and community educators were initially trained on rice, vegetable, and livestock production.

They then shared their learnings to 480 4Ps beneficiaries in 12 barangays in Mabini during their regular family development sessions.

"We wanted to motivate the participants to engage in entrepreneurial activities by presenting some livelihood opportunities in agriculture," says project lead Dr. Ofelia Malonzo of PhilRice.

The Mabini people were also exposed to agro-enterprising activities through a study tour at PhilRice, Philippine Carabao Center, and Central Luzon State University, including hydroponics technology, and goat and organic vegetable production.

"The establishment of a learning farm and the conduct of field tours gave them the opportunity to actually observe best farming practices, which could later improve their management decisions in their actual fields," Malonzo adds.

Also part of the program were lectures and hands-on demonstration on *PalayCheck*, an integrated rice crop management system.

ORGANIZATION-BUILDING AND VALUES FORMATION

The training program also helped organize the farmers into self-help groups such as the Villacorta Association and the Balincaguin Core Farmers Association (BCFA).

"We shouldn't be selfish. Whatever technique or information in agriculture that we learn, we should share it to the neighborhood. We should grow together as a community," says Jimmy Ragudos, president of BCFA, when asked on their significant learning from the project.

Starter kits composed of rice and vegetable seeds, basic farm tools, and other materials were also provided for the beneficiaries to sustain the initiatives of the government. The Mabini government erected the office buildings of the farmers' associations and funded the implementation of the goat-raising component of the project.

Mabini Mayor Alimar Briana says they will sustain these initiatives with the help of DSWD and the local agriculture office. DSWD personnel also continue to conduct sessions on values formation and monitor the progress of the 4Ps beneficiaries engaged in this initiative.

Strategies and impacts of this training program were presented in a poster at the 24th Federation of Crop Science Societies of the Philippines Scientific Conference held in Iloilo City in June. It won first place in the technology, extension, and development category.

- SONNY P. PASIONA

Technology Management and Services Division

PH RICE WINE LEES MAKES FOOD PRODUCTS MORE NUTRITIOUS

PhilRice's food scientists have found that lees, a residue from *tapuy,* is an alternative nutrient-rich ingredient to baked food products.

Rosaly Manaois and Amelia Morales saw that rice wine lees significantly improves the protein and dietary fiber content of brownies, a popular Filipino snack food. This finding is written in the paper, *Nutritional and sensory quality of brownies supplemented with Tapuy (Philippine Rice Wine) lees.*

"The study further supports the feasibility of lees as a nutritious ingredient for food products. Lees is an underutilized by-product of *tapuy* production, which is about 27% of the weight of raw rice," Manaois says.

The authors established that rice wine lees powder (RLP) has high levels of protein and dietary fiber. Its amino acid values are also higher than those of ordinary rice flour.

Manaois and Morales substituted wheat flour in brownies with different levels of RLP (0, 15, 30, 45, and 60%). At 30% and 45% RLP, protein content significantly improved with no considerable effect on overall sensory quality. Dietary fiber also increased from 13.85% to 19.5% when 45% of RLP was used in brownies.

Manaois reiterated that protein is important for the development, growth, and proper functioning of the body. Dietary fiber helps in maintaining a healthy digestive system, controlling weight, and minimizing the risk of certain diseases such as cardiovascular, diabetes, and certain cancers.

RICE CHEMISTRY AND FOOD SCIENCE DIVISION

The authors previously tested the lees flour on *polvoron*, a minimally processed product and another common Filipino snack food. Results revealed that up to 50% of lees can be substituted to all-purpose flour with minimal effect on its quality.

"Preparation of lees into flour will help manage waste from *tapuy* production and consequently increase its profitability, in addition to improving the nutritional quality of food products," Manaois concludes.

Manaois presented the paper on lees in the 6th International Conference on Nutrition and Food Sciences in Budapest, Hungary in May. It garnered the best oral presentation award for the session on food safety and nutrition, topping other papers from Taiwan, Poland, Turkey, Indonesia, and Hong Kong.

Manaois' participation in the said conference was funded by the Philippine Council for Industry, Energy and Emerging Technology R&D of the DOST.

- SONNY P. PASIONA

WHAT'S NEW IN RICE RESEARCH?

POLLEN BANKING TO HELP INCREASE MESTISO 19 SEED YIELD

HISXAM JASON D. BACTONG AND MARIA NECYRICA B. LARAZO

The synchronized pollination of male and female flowers of Mestiso 19 (M19) could now be artificially enhanced to increase its F1 seed yield, according to a PhilRice study.

The research conducted artificial pollination by storing sufficient amounts of viable male pollen in a container and loading it into the stigma of the female parent.

The study observed a high percentage of pollen viability from the collection during anthesis regardless of the culture medium used. The highest viability (50%) of pollen grains was only achieved after 24 hours of storage. It was also observed that amber glass was the best material for preserving pollen grains' shelf-life.

Alpha Grace S. Ferriol of PhilRice's Seed Technology Division says that the study aimed to address low seed yield owing to insufficient pollen and unsynchronized opening time of the parents' flowers during hybridization.

"Pollen is the male gametophyte of the flowering rice plant. It has an important role in F1 seed production. With adequate pollen available, additional pollen can be artificially loaded into stigmas to increase pollination and seed yield," Ferriol explains.

RIDING-TYPE RICE TRANSPLANTER PROTOTYPE NOW AVAILABLE

ANGELLI C. DOÑA AND DIONARD N. MENDOZA

PhilRice engineers have developed a prototype rice transplanter that can double efficiency while reducing cost.

"Our team started with the existing technology from Japan that requires imported spare parts. If it's locally manufactured, spare parts would be available here," explains Dr. Arnold S. Juliano, head of PhilRice's Rice Engineering and Mechanization Division.

Compared with manual transplanting that requires 20 to 25 man-days per hectare, the local riding-type rice transplanter would only need an operator and a helper to plant 2 ha/day.

Testing

The machine prototype is being pilot-tested in Nueva Ecija as two more machines are being built for testing in Negros and North Cotabato.

"We have partnered with the Metalworking Industries Association of the Philippines in San Pedro City, Laguna to manufacture the major machine components. It has signified interest to fabricate and assemble the whole unit. That's what we did to build the two other units," Juliano says.

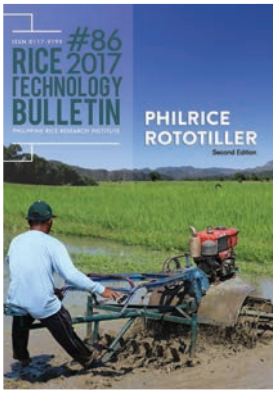
If commercialized, the machine will be available for only P750,000, compared with Japan's P1-1.3 M.

The development of the machine prototype was funded by PCAARRD-DOST.

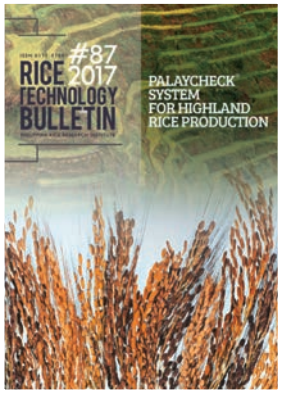
NEW KNOWLEDGE PRODUCTS

COMPILED BY HANAH HAZEL MAVI B. MANALO

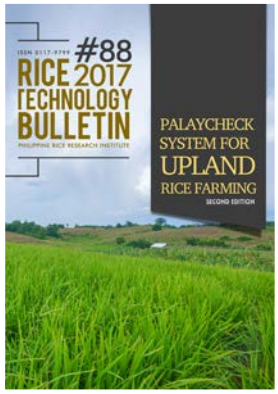
TECHNOLOGY BULLETINS



On Rototiller: introduces the modified machine including its outstanding features, performance, operating principle, cost, intended beneficiaries, and manufacturers to ease drudgery and save on cost in land preparation, and to make the farm implement more efficient.



On *PalayCheck* System for Highland Organic Rice Production: documents how the system was modified to enhance the productivity and enrich the legacy of heirloom or traditional rice.

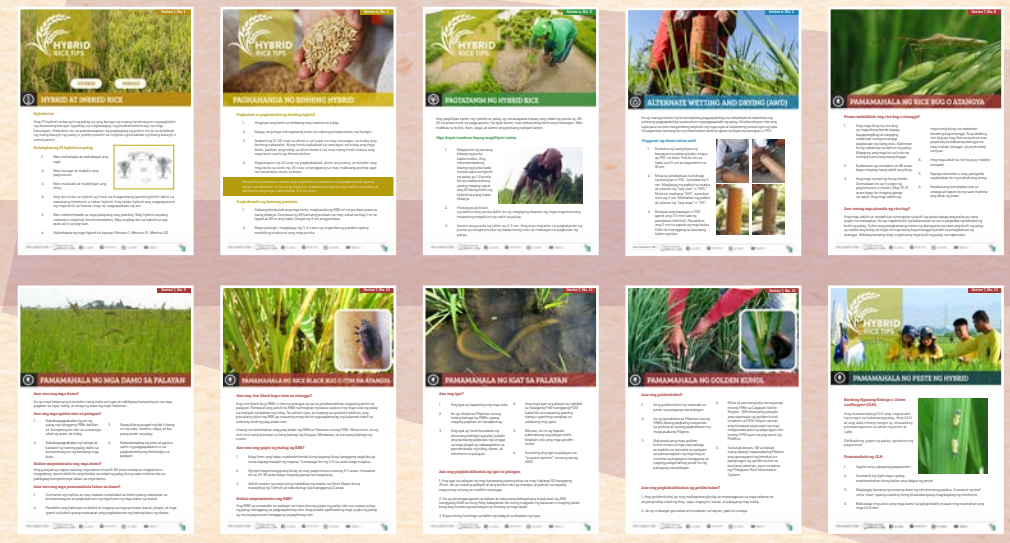


On *PalayCheck* System for Upland Rice Farming: shows the use of the system to help increase the income and household sufficiency of upland farmers.

KOMIKS

A brief introduction of a technology, process,or service through a story:

- *Komiks* on agricultural services
- *Komiks* on modified *dapog*



PILIPINO HANDOUTS

They offer short tips on rice production to farmers:

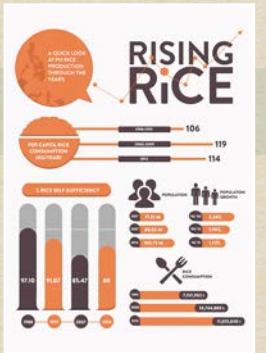
- Kaibahan ng *hybrid* at *inbred* rice
- Paghahanda ng binhing *hybrid* bago ipunla
- Pagtatanim ng *hybrid rice*
- Alternate wetting and drying
- Pamamahala ng *rice bug*
- Pamamahala ng damo
- Pamamahala ng *rice black bug*
- Pamamahala ng igat sa palayan
- Pamamahala ng kuhol
- Pamamahala ng peste ng *hybrid*

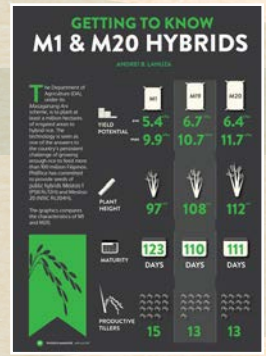
VIDEOS

"Visuarice" on rice from-farm-to-plate explains why it often takes 12 years for a new rice variety to reach the consumers' plates.

"Visuarice" on water and climate change presents water conservation and climate change adaptation technologies in rice production.

Techno-videos on mushroom production show the processes of tissue culture production, mushroom substrate production, and planting, growing, and harvesting of mushroom.





INFOGRAPHICS

Simplifying rice statistics, issues, technologies, and processes:

- Rising rice
- Getting to know M1 and M20
- Hybrid 101 and why hybrid

These knowledge products are available at www.pinoyrice.com, www.philrice.gov.ph, and PhilRice Development Communication Division.

RICE ACROSS THE COUNTRY

ALLAN C. BIWANG, JR.

BATAC COURTS AGRI GRADS INTO RICE PRODUCTION

PalayCheck, Palayamanan Plus, and other technologies were introduced to 29 agriculture graduates during the Rice Boot Camp held at PhilRice Batac, June 19-31. The graduates were from Mariano Marcos State University, Don Mariano Marcos Memorial State University, Ilocos Sur Polytechnic State College, and Abra State Institute of Sciences and Technology. They were exposed to seedbed preparation, transplanting, four-wheel-tractor driving, basic hybrid rice breeding, geo-tagging, and organic farming. "We are doing this annually to empower the youth in making choices toward pursuing careers in the rice sector with utmost dedication and commitment," Maribel Manubay of PhilRice says.

LOS BAÑOS LAUNCHES CLIMATE CHANGE RESILIENCY PROGRAM

More than 70 participants from LGUs, SUCs, and farmers' organizations attended the launching event in Mulanay, Quezon on June 16. The event made the stakeholders understand their roles in the program that will cover two rainfed farming villages serving as demonstration fields. Apart from assessing farmers' capacity to adapt to climate change-ready farming technologies, results will be used to design training modules. During the launching, seeds of three rice varieties were distributed to farmers and cooperatives for field-testing.

NEGROS TRAINS AGRI GRADS

Agriculture universities in Negros Island Region sent to PhilRice Negros 26 of their fresh graduates to be trained on the latest rice and rice-based food production technologies, May 28–June 9. Their training employed field practicum and immersion in the community to teach much about *Palayamanan* Plus and *PalayCheck* System. Jose Arnel E. Cordova of PhilRice said this year's Rice Boot Camp offered the new topics— mushroom production, vermi composting, and seed tagging, sampling, and germination. The trainees have become potential rice researchers or development workers.

BICOL HOLDS IT ROADSHOW

Some 40 participants from PhilRice, LGUs, academic institutions, and farmers' organizations joined the Information Technology (IT) Productivity Roadshow at PhilRice Bicol, June 7-9. It was part of the nationwide tour of PhilRice's Information Systems Division to encourage collaboration and sharing of information with local agencies and partners. Presentations included updates about PRiSM and Project IPaD, and the introduction of drone technology in capturing imagery in farms. Rice IT experts urged the participants to tell their communities that rice information can be readily accessed online through PhilRice's services and information portals such as the library, soil information system, rice database information portal, and Pinoy Rice Knowledge Bank.

ISABELA PUSHES DIRECT SEEDING HARDER

In support of the project *Strengthening the Promotion of Direct-Seeded Rice Culture*, PhilRice Isabela on June 27 conducted a ceremonial seeding activity to showcase direct seeding as a rice-farming strategy for climate change adaptation among farmers in San Mateo, Isabela. More than 100 farmers participated in the event jointly conducted with DA-LGU San Mateo, and NIA MARIIS and -San Mateo. Helen Pasicolan of PhilRice discussed the differences between direct seeding and transplanting, and led in the demonstration of the drumseeder. PhilRice and its partners committed to continuously support farmers to increase yields and maximize the profitability of direct seeding.

MIDSAYAP RECEIVES FARM MACHINE

DA-Regional Field Office 12 turned over a combine harvester to PhilRice Midsayap, June 1, through Agri-Secretary Manny Piñol and Acting Executive Director Sailila E. Abdula. The turnover highlighted Sec. Piñol's *Biyaheng Bukid* where he consults with farmers and assesses DA programs with LGUs. The machine will hasten the harvesting process and reduce the cost of production in the station. Acting branch director Ommal Abdulkadil said the station is prioritizing the promotion of cost-reducing technologies across the region.

M&M (MACHINES AND MEN)

Let's look at how we rank against other countries in Asia in terms of mechanization and labor use.

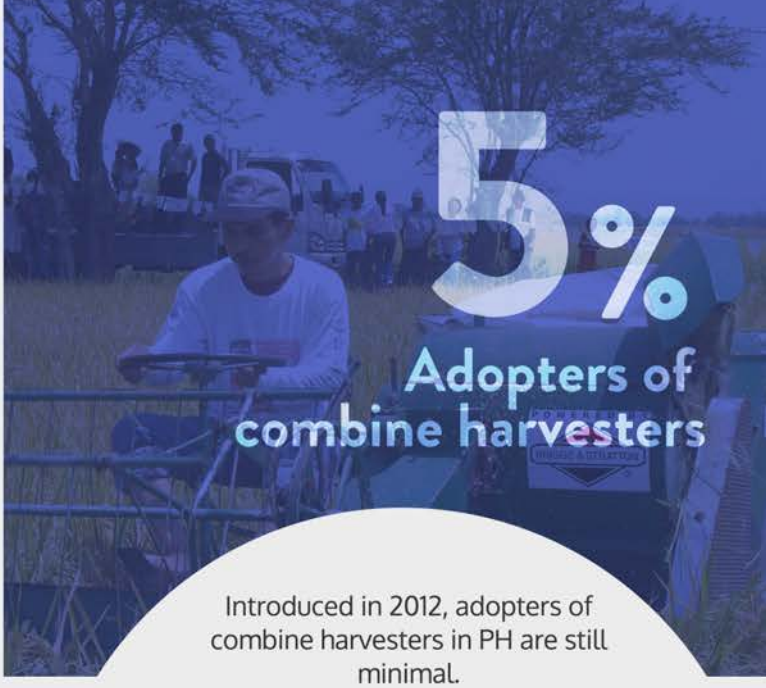
Data from the book *Competitiveness of Philippine Rice in Asia.*
Reviewed by Aileen C. Litonjua & Jesusa C. Beltran
Infographics by John Glen S. Sarol

QUICK FIGURES (CY 2013 - 2014)

The Philippines (69-71 md/ha) used less labor than India (77-78) and Indonesia (94-96) in both seasons.

	PHILIPPINES	INDONESIA
AVERAGE TOTAL LABOR USE	70 md / ha	95 md / ha
MANUAL OPERATIONS	Transplanting and harvesting	Transplanting and harvesting
ADOPTERS OF MECHANICAL TRANSPLANTERS	0%	0%
ADOPTERS OF COMBINE HARVESTERS	5%	0%
ADOPTERS OF AXIAL THRESHERS	97%	63%

The Philippines mechanized land preparation and threshing with two-wheel tractors and axial threshers.



Introduced in 2012, adopters of combine harvesters in PH are still minimal.

	INDIA	CHINA	THAILAND	VIETNAM
	78 md / ha	27 md / ha	10 md / ha	21 md / ha
	Transplanting and weeding	Crop establishment	Direct seeding	Direct seeding
	0%	10%	0%	0%
	99%	100%	100%	100%
	1%	0%	0%	0%

How To Avail of Farm Machines Through the DA's FARM MECHANIZATION PROGRAM

1. Prepare a **LETTER OF INTENT** addressed to the DA-Regional Executive Director (RED) in your region.

2. Prepare an **ORGANIZATIONAL PROFILE** of your association, including the list of farmer-members, area covered by your association, and a photocopy of the Certificate of Registration (SEC/DOLE/COA).

3. Prepare the **PROJECT PROPOSAL** (indicate what machine to avail of and a sustainability plan).

4. Seek **CERTIFICATION or ENDORSEMENT** from the Office of the Municipal Agriculturist, Agriculture and Fisheries Council, and Provincial Agriculturist (proof of legitimacy).

5. **FORWARD THE DOCUMENTS** to the Office of the DA-RED.

6. Secure a **RECEIVING COPY**.

7. **GROUND VALIDATION** of the association conducted by Rice Program Tech staff of the DA-RED along with the Provincial Postharvest Coordinator, the Agricultural Program Coordinating Officer (APCO) and the Municipal Agriculture Office staff.

8. If found legitimate and deserving upon validation, the Farmers' Organization (IA, FA, or COOP) will be included in the **SHORT LIST OF RECIPIENTS** for endorsement of the DA-RED.

9. If **APPROVED**, the association will prepare the following additional requirements: **(1)** Project proposal validation (from DA); **(2)** Board or SB resolution; **(3)** 3-Year audited financial statement; and **(4)** Memorandum of Agreement (from DA). Normally, the process takes at least 6 months to complete.

SURALLAH'S MESSIAHS

MARY GRACE M. NIDOY

Labor displacement is one of the sensitive issues in mechanizing rice production that cannot be taken for granted. In Surallah, South Cotabato, however, organized farmers remain optimistic about the undesirable repercussions of mechanization.

"We call it timing," says Jonathan D. Javelosa, chair of the Binhian ng Timog Kutabato Multi-Purpose Cooperative (BINTIKU MPC).

In the province, laborers and farm workers are scarce. South Cotabato's growing economy entices farmers to move to the city and earn their living there.

"We are running out of farm workers. But thanks to mechanization, it lightens our problem. The machines, especially the combine harvesters, are a blessing to us," Javelosa celebrates.

INCOME GENERATION

"Labor is one of the major inputs in rice production. It accounts for the major proportion of costs in the Philippines, Indonesia, and India; smaller in Thailand, Vietnam, and China. These differences are due to varying levels of mechanization," explains Dr. Flordeliza H. Bordey, a PhilRice senior economist.

"One way to reduce labor cost is through mechanization. If we want our farmers to be competitive, then we need to help their production become fully mechanized," she adds.

BINTIKU then is on the right track. In 2011-2015, the DA-RFO 12 provided the Coop a postharvest facility, thresher, handtractor, transplanters, and a combine harvester.

Since then, they have doubled their income by reducing their production costs and collecting service fees from custom-hiring.

"Members of the Coop need to give 10% of their harvest for the use of the combine harvester," Javelosa says.

He added that their machine-for-rent service would allow them to collect P1,500–P1,800 from each farmer, particularly from their handtractor.

The 75 members of the Coop own approximately 350 ha of rice land in Surallah. Due to stable income, BINTIKU has bought more machines and established facilities for its members. They now have three combine harvesters, five tractors, a solar dryer, seed cleaner, warehouse, and rice mill.

FAIRNESS AND LEADERSHIP

"As an established and registered Coop for 16 years, availing of machines is easy for us. We can easily provide the documents required," Javelosa takes pride in his organization.

Engr. Sheila Mae Arindaeng, DA-RFO 12's rice program action officer, said cooperatives are qualified if they have been established three years prior to their application for machine availment.

"One indication of BINTIKU's good track record is their expansion. Aside from the machines they acquired from our program, they bought more and put up the needed facilities. The machines that we deployed are still operational until today so it speaks so much on how they value maintenance and security," Arindaeng attests.

In BINTIKU, there is no room for favoritism and everyone follows the rules.

"We do have a system and we are strict in implementing our schedule to make sure that all members can use the machines," says John Dormitorio, BINTIKU's manager.

This distinguishes BINTIKU from other cooperatives in the country. Through DA's unannounced impact assessments, Arindaeng has seen certain cooperatives making their machines available only to a chosen few. They also discovered that some machines are no longer operational owing to poor maintenance.

"I think what's good about our cooperative is that our management is fair. You cannot bypass a member who has already scheduled his or her harvest time," adds Jennette Tan, BINTIKU's BOD member.

PLANS

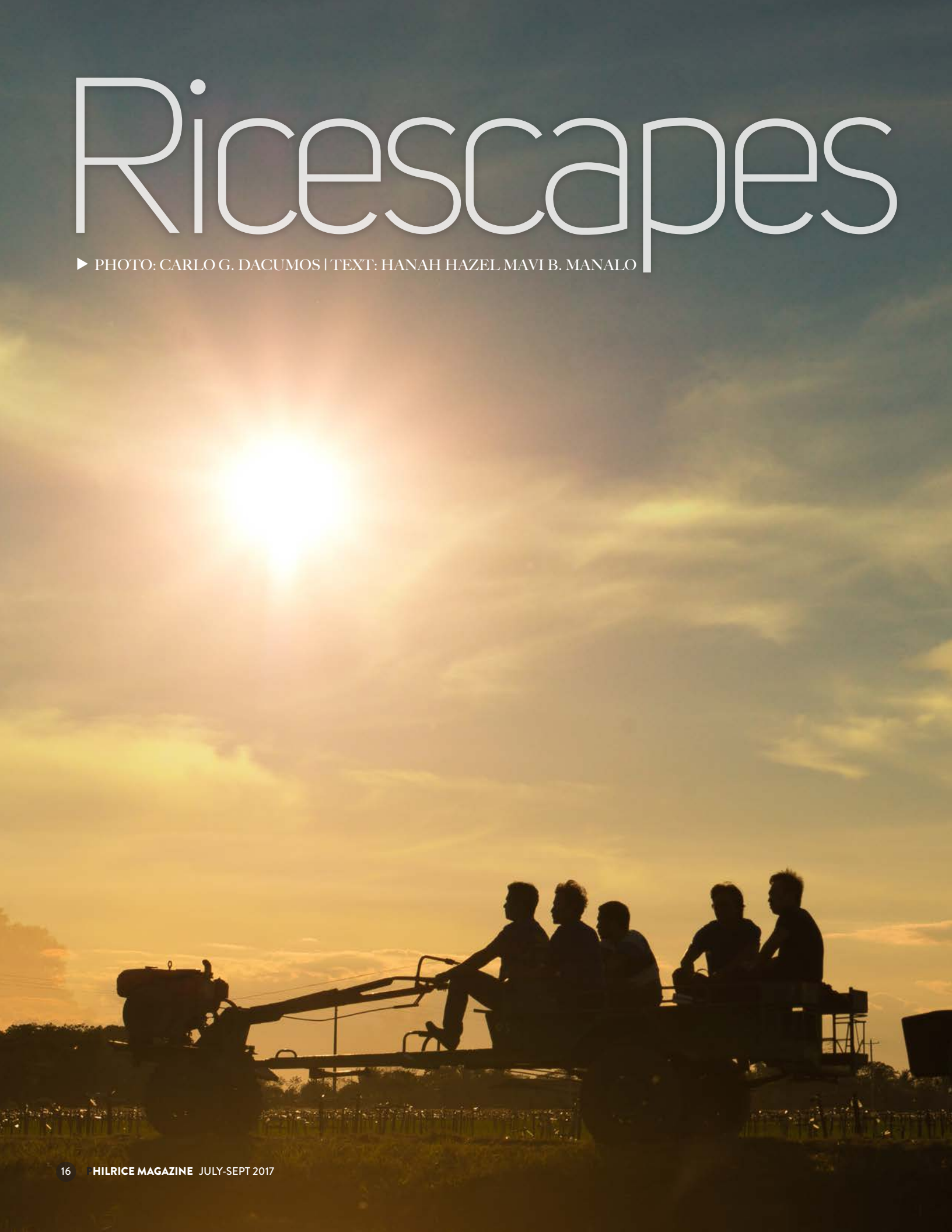
Arindaeng said the DA-RFO 12 prioritizes machines for land preparation and transplanting.

"Transplanting alone costs P8,000/ha. Farmers are now recognizing the fact that labor devours the lion's share in their production cost. Hence, many cooperatives in the province have applied to avail of our program," she explains.

BINTIKU's Javelosa advises cooperatives to maintain a good track record and strive to be stable and sustainable.•

Ricescapes

▶ PHOTO: CARLO G. DACUMOS | TEXT: HANAH HAZEL MAVI B. MANALO



PHILRICE CENTRAL EXPERIMENT STATION,
Maligaya, Science City of Muñoz, Nueva Ecija

VOX POP

COMPILED BY FREDIERICK M. SALUDEZ
CROWDSOURCED FROM PHILRICE TEXT CENTER

What will make farmers mechanize crop establishment/harvesting?

We need to see first that these machines are being actually used on the farms in our community.

-0935-448-6431, ABRA

The extension workers in our community should promote the relevance of these machines.

-BADRUDIN ANAK OF MAGUINDANAO

Labor cost is too high so we need to mechanize.

ALEXANDER BOMACHITA OF LANAO DEL NORTE AND FLORDELINO CACAYURIN OF APAYAO

If machine rental is cheap and there are no yield losses, then I would go for mechanization.

GEVAN TOLOG OF NEGROS OCCIDENTAL AND CATHERINE BASAN OF MT. PROVINCE

The lack of hired laborers during transplanting and harvesting periods in our place made us decide to mechanize.

REX SIOSON OF MAGUINDANAO AND JOSEPH OF NEGROS OCCIDENTAL

Conduct technology demonstration where it is needed for us to know how to operate machines and how these will help us make farming easier and faster.

RENATO DAGUIMOL OF MISAMIS ORIENTAL, PAGOPOK MAMALO OF MAGUINDANAO, AND MERCY VENTURA OF KALINGA

There's no need to convince me to use them. For my fellow farmers, they should learn about the technologies and the processes involved in availing of the machines through the government's promotional activities.

JOBEN TONDING OF BUKIDNON

Loans to avail of the machines should be provided to individual farmers as the machines are too expensive. I am willing to pay my loan every after harvest. I want to have a harvesting machine to maintain the quality of rice seeds that I produce.

Belen Blanza of Abra

RISE
WITH RICE

FROM MANUAL TO MECHANICAL RICE HARVESTING

SONNY P. PASIONA

One fine morning in 2014, Elizabeth Sol spotted a machine roaring through rice plants heavily laden with ripe golden grains.

"*Kanami gid ah* (It's really beautiful)," the 60-year-old Iloilo farmer recalls as her eyes sparkled to what would have been her buddy in farming— the rice combine harvester (harvester).

She curiously asked around and learned that a seed grower in the neighboring town owns it.

"I found it really clever. I saw only three people operating the machine," Sol says in awe noting that manual harvesting in Leganes town is a costly activity in rice production owing to hired labor.

Not long after, she chanced upon a harvester demonstration by DA at a time when the government was introducing its mechanization programs. Sol became much more interested to try the machine out.

REAPING RICE AND BENEFITS

The next harvest season, Sol finally decided to adopt the harvester. She approached the owner and rented it at a quite expensive P20,000 for her 2-ha farm.

As harvester became more prominent, its rental fee dipped to just P7,500/ha covering the three operators, sacks, and fuel. Since then, Sol reaped a bountiful harvest as she enjoyed the benefits of using the harvester.

"The greatest advantage of using harvester is I spend less on labor. Harvesting gets done in just half a day," she says in delight.

Sol used to employ 10-15 people to help her harvest for 2 days. Aside from feeding them, the men laborers at night consume two cases of beer with finger foods, and burn four packs of cigarettes, charged to her, just to keep them for one more day.

SPURRING COMPETITIVENESS

With harvester, Sol saved up to P6,500/ha. In manual harvesting and threshing, she paid 10 sacks for every 60 sacks harvested. Trade liberalization now necessitates that Filipino farmers be competitive with imported rice. Competitiveness is generally defined as "the ability to produce and sell the same or better-quality product at a lower price than competitor." "Farmers could either increase yields at the same production cost or maintain yields at less cost for them to offer a lower selling price," says a PhilRice policy brief.

A 2015 PhilRice-IRRI study found that 30% of the cost of local rice production goes to hired labor, particularly for manual harvesting and crop establishment. Mechanizing these activities could help reduce the cost. In the case of Sol, she maintained her 120 sacks/ha at reduced cost.

> THE GREATEST ADVANTAGE OF USING THE HARVESTER IS I SPEND LESS ON LABOR. HARVESTING GETS DONE IN JUST HALF A DAY.
>
> - ELIZABETH SOL

WHY AND WHY NOT COMBINE HARVESTERS?

Land size and labor cost push farmers into mechanizing harvesting. Those with bigger lands are more likely to use harvester. "Manual harvesting becomes more laborious and costly as area increases," Aileen Litonjua of PhilRice asserts.

Yet other farmers would not adopt the machine that surely displaces laborers. Serle Deysolong, municipal agriculturist of Leganes, attests to the farmers' perception that harvester threatens the livelihood of laborers who help farmers from crop establishment to harvesting.

"Yes, there are some trade-offs for mechanizing. This is why many farmers in our town are still not in favor of it," Deysolong says.

Of course, the harvester can hardly maneuver on small plots and irregularly shaped fields. Many farmers find the machine unaffordable as well.

"At present, only one irrigators' association (IA) in Leganes has been provided by DA with a combine harvester. Other farmers' organizations got a four-wheel tractor and a mechanical flatbed dryer," Deysolong reports.

The Lapayon Farmers' Association (FA), of which Elizabeth Sol is a member, has already requested for a combine harvester from DA. More associations will in due time have more machines, Deysolong is optimistic.

"If we get one, our members can rent a harvester for less. We can also generate income from renting it out to non-members," Sol hopes.

LOUDER CALL FOR SUPPORT

The senior citizen Sol finds ease and efficiency in the use of the combine harvester. With aging farmers and the waning interest of young people to farm, there comes a louder call for support to farm mechanization.

"Senior farmers like me could not sustain our vigor in farming forever. Even our laborers now find it hard to haul sacks of rice," Sol says gloomily.

Litonjua maintains that farmers in areas with large farms and high labor price, which implies labor scarcity, are more receptive to mechanization. Hence, these areas should be prioritized by related projects and government initiatives.

"For efficient machine operations and easier field access, we essentially need land reconfiguration such as modification of field layout and shape," she adds.

Farm mechanization is a nagging battlecry to enhance the farmers' competitiveness. Surely, grand plans and proposals abound but farmers like Elizabeth Sol have yet to see them materialize sooner than soon. •

CARLO G. DACUMOS

Farming Made Easy

PhilRice machines you definitely need!

Andrei B. Lanuza

Rice farming can be a very tedious, and often back-breaking work. Long hours in the rice fields under sweltering heat can weaken the body. Or maybe, you're a farmer who just wants to harvest your crops much quicker before a big typhoon hits?

There's a machine for almost every work in the rice field. Need to prepare the field? There's a machine for that. Need to transplant seedlings on a large area and you need to do it as fast as possible? There's one for that, too. How about one for harvesting rice efficiently with as little spillage as possible? Well, you guessed it, there's a machine that does that job as well. Let us help you cook your food, too.

Machines simplify work and increase speed and efficiency for rice farmers. But owning farm machines isn't cheap. Others have gotten resourceful by pooling their money to purchase machines through cooperatives. Regardless, farmers have begun realizing that mechanization is needed to compete in rice production and the market.

PhilRice understands the need for cost-effective but efficient farm machines that are easy on farmers' wallets. We take a look at some of them.

Microtiller

The PhilRice Microtiller, also called Super Curyat, is a portable power tiller developed for the terraced rice fields of Cordillera, which could no longer be serviced by the conventional handtractors in the lowland owing to weight and accessibility limitations.

Specifications:

Field Capacity:	0.5ha/day
Labor requirement:	1 person
Width of cut:	0.6m
Power requirement:	6hp gasoline engine
Weight:	60kg
Dimension (LxWxH):	1.5x0.7x0.7m

HT Attachment

The ride-on handtractor attachment reduces the drudgery of land preparation by allowing the operator to sit instead of walking behind the machine. It can be used for plowing, harrowing, and leveling.

Specifications:

Field Capacity:	2ha/day
Labor requirement:	1 person
Effective width, Harrowing -level:	2.2m
Weight:	60kg
Dimension (LxWxH):	1.5x0.7x0.8m

Laboy tiller

"Laboy" areas have soft and low bulk density soils that float on waist-deep water and mud. This tiller eases the drudgery of farmers tilling these areas – a buoyant machine used for land preparation .

Specifications:

Field Capacity:	1ha/day (1st pass) 2ha/day (2nd pass)
Labor requirement:	1 person
Width of cut:	1.1m
Power requirement:	7.5hp gasoline engine
Weight:	100kg
Dimension (LxWxH):	1.75x1.2x0.8m

Source: PhilRice Machine Catalog 2017

Reversible Dryer

This machine eases the mixing of *palay* grains during the drying process by blowing air at the side duct of the drying bin so that the bed height level remains low. As the direction of the drying front is reversed at some point during drying, mixing of grains in the drying bin is eliminated. It is available in 4, 8, and 10-ton capacities.

Specifications:

Dry Bin:	60-100, 120-180, and 180-220cav/batch
Drying Temp.:	43 to 60 °C
Power requirement:	10, 22-24hp and 24-26hp diesel engine
Fuel consumption (fan):	0.8, 1.5, and 1.7L/h
Rice husk consumption (furnace):	25, 50, 60kg/h
Furnace:	Direct fire, rice husk-fuelled

Seed Cleaner

The use of special cleaning equipment to separate impurities helps assure the certification of high-quality inbred and hybrid seeds. Hybrid seeds require such equipment owing to their sensitive nature.

Specifications:

Output capacity:	250cav/day
Paddy purity:	90-99% depending on paddy moisture content
Cleaning losses:	<1%
Labor requirement:	1 to 2 persons
Power requirement:	1.5hp electric motor or 6hp gas engine
Dimension (LxWxH):	1.2x0.6x1.0m

Micromill

Made specifically for remote farming areas, this machine can mill rice, corn, soybean, mungbean, and coffee. It is available in two variants: "household model" and a bigger "village model".

Specifications:

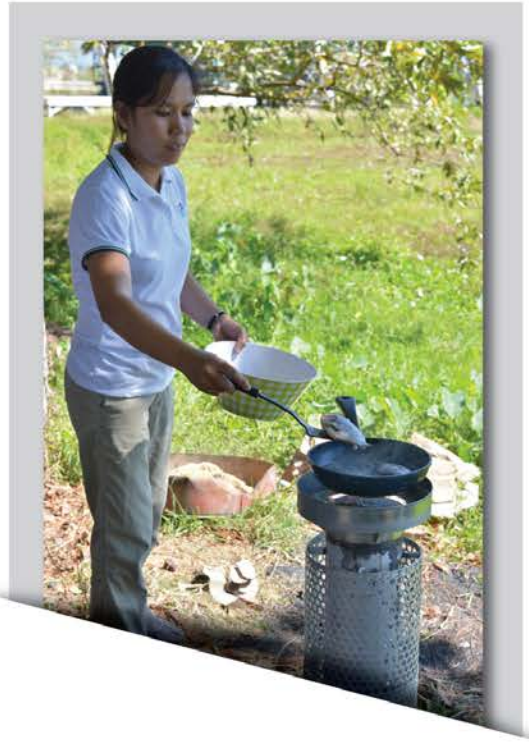
Input capacities:	50-75kg/hr and 200-250kg/hr
Milling recovery:	65% for both variants
Labor requirements:	1 to 2 persons
Power requirements:	6hp gas engine or 2hp electic motor, and 7.5 gas engine or 3hp electric motor
Weights:	50kg and 60kg

Brown Rice (BR) Mill

Designed to replace using mortar and pestle where appropriate. Brown rice milled with this machine has 99.5% purity.

Specifications:

Dehulling unit:	Sb10d rubber roller
Capacity:	300kg/hr
Brown rice recovery:	74%
Labor requirement:	2-3 persons
Power requirement:	10hp electric motor or 16hp diesel engine
Dimensions (LxWxH):	2.8x1.79x3.8m



Gasifier Stove

An economical and environment-safe way of cooking using rice hull. There is a growing interest in this technology among households and small cottage-industries.

Specifications:

Ignition time:	1 min (after dropping burning pieces of paper)
Fuel requirement:	0.8kg rice husk/load
Operating time:	30 min. per load
Fan:	9 watts, 12 volts DC
Boiling time:	11 min per 2L of water

CtRH Carbonizer

The use of biochar (carbonized rice hull) is becoming popular among diversified and integrated Filipino rice farmers.

Specifications:

Ignition time:	<2 min
Input capacity:	20-26kg/hr rice husk
Operation:	Continuous mode
Charcoal yield:	35-42%
Heat output:	Allows recovery of heat for various applications
Emission:	Generally smokeless

PARTNERS IN THE FIELD

MAKING MECHANIZATION WORK FOR PH RICE

ANNA MARIE F. BAUTISTA

Experts maintain that Filipino rice farmers can be competitive if their production cost is reduced and their income improved. For the Philippine Center for Postharvest Development and Mechanization (PHilMech), the key to unlocking this goal is mechanization.

As PHilMech Director for Planning and Technical Operations, Arnel Ramir M. Apaga says, "Raising the level of rice mechanization can help reduce production cost, enhance farm operations, and improve farmers' income to be at par with other rice-growing countries in Southeast Asia." PHilMech commits to generate, extend, and commercialize appropriate agriculture and fishery postharvest and mechanization technologies to help make things happen.

While the solution is identified, the road to full mechanization has a long way to go.

CASE PRESENTED

According to the book *Competitiveness of Philippine Rice in Asia,* the most labor-intensive field operations are crop establishment owing to manual transplanting, and harvesting.

"Both are known as critical and costly farm operations. If we can mechanize these operations by using the mechanical transplanter and combine harvester, we can reduce labor cost by P4.00 to P5.00 per kilo of *palay*," Apaga explains.

Farmers hesitate to adopt the transplanter because it creates missing hills owing to poor seedling preparation. Combine harvester, on the other hand, is gaining popularity in Regions 2 and 3.

Many farmers cling to issues on the machines' suitability to farmers' practices, agronomic environments, and appropriate policies to motivate farmers' adoption. Apaga notes many farmers are aware of the existing machines but labor displacement concerns hound them.

> Raising the level of rice mechanization can help reduce production cost, enhance farm operations, and improve farmers' income to be at par with other rice-growing countries in Southeast Asia.
>
> - Arnel Ramir M. Apaga

SOLUTIONS SET OUT

PHilMech, PhilRice, and other R&D centers are promoting the handtractor-mounted transplanter, mini-combine harvester, improved attachments for handtractors, mechanical drying systems, and small rice mills.

PHilMech also works on the grain probe moisture meter, commercial-scale fluidized bed dryer, mini combine harvester: riding and walk-behind type, mechanical rice transplanter: riding and handtractor-attached type, and retrofitted compact and impeller-type rice mills, both for brown rice production.

PHilMech ties up with international manufacturers in supporting local manufacturers. It also helps capacitate farmers' organizations as farm service providers and on-farm management systems. Apaga says this will ensure that machines are used viably, profitably, and sustainably.

In partnership with the Technical Education and Skills Development Authority (TESDA), PHilMech also implements the *Magsasakang Mekaniko* Program to train individual farmers to ably operate and repair agri-machines.

Arnold Valido, 45, of Subic, Zambales, a TESDA- accredited farmer-technician, said the training favors the Pamatawan Farmers' Association in sustaining their small farm engines such as the shredder, thresher, hand tractor, and water pumps.

"Through the training, I've learned the necessary troubleshooting skills needed to maintain our farm investments. Now, I can already check on the machines, immediately fix them, and teach the techniques to my fellow members in the association," Valido declares.

With the Agricultural and Fisheries Mechanization Law in operation, PHilMech takes the lead in ensuring that all efforts of R&D institutions, including PhilRice, are well-coordinated and unified toward the improvement of rice mechanization in the Philippines. •

PARTNERS IN THE FIELD

KOREAN TRANSPLANTER MAKES PINOY FARMERS SMILE

CHRISTINA A. FREDILES

Filipinos and Koreans cherish many common aspirations. Their friendship is time-tested and honored. Today, Korean songs in English blend effortlessly with pop music over the local radio; their fashion is often adopted; their movies and telenovelas seize high ratings and downloads. Lately, their mechanical rice transplanter has stirred the interest of more Filipino farmers.

Since its inception in 2010, the Korea Project on International Agriculture (KOPIA) now led by Dr. Jeong Taek Lee has continuously lived up to its commitment in enhancing the lives of Filipino farmers through capacity enhancement that results in sustainable income.

The Korean walk-behind machine eases the drudgery and back-breaking burden of manual transplanting and generates savings for farmers. Thanks to KOPIA in the Philippines for bringing in the machine.

To make more rice seeds available in rainfed communities that highly depend on farming for subsistence and livelihood, KOPIA helps multiply and disseminate seeds of released cultivars, develop and improve varieties, not to mention provide machines. Many farmers in Iloilo, Bohol, Nueva Ecija, Kalinga, and Isabela have benefitted from the project.

PERFECT MATCH

The Bohol Farmers Multipurpose Cooperative (BOFAMCO) in Pilar is one of the recipients of the walk-behind transplanter that mechanically transplants rice seedlings with convenience of operation at a lower cost.

Romeo T. Tariao, chair of the 1,000-member BOFAMCO, is very grateful for the KOPIA technical support and farm machines.

Member Bernardo Sembrano Jumo, 60, gestures a thumbs-up for the transplanter as it fits the size of his rice paddy. He told us rice fields in Bohol are divided into small paddies for which the existing ride-on mechanical transplanter is too big.

"High cost of production is a problem, lack of farm laborers is another. Nowadays, laborers are hard to find as most of them are no longer interested in farming," Jumo laments. In Bohol, 15-20 laborers are needed to transplant a hectare of rice field in 2 days.

Only 1-2 persons are needed to operate the Korean machine. "The transplanter can finish a hectare in 4 hours," he exclaims.

From P6,000 for labor cost in seedling preparation and transplanting, the expense has now shrunk to only P4,000/ha.

OPERATING THE MACHINE

A farmer for 35 years, Jumo has been using the walk-behind transplanter for 4 years in his 5-ha property and is satisfied with its performance. He also admits to making some unsolicited modifications in operating the transplanter.

"We were taught to sow seeds in trays under the shade for 4-5 days, then transfer them to a seedbed for 12-15 days. After which, the seedlings can be transplanted using the machine," he tells it all.

But Jumo finds the Korean practice too tedious so he decided to sow seeds in trays straight in the seedbed. After 12 days, his seedlings are ready for transplanting using the walk-behind transplanter. Jumo swears that his seedlings are still healthy and vigorous despite the modifications.

With the transplanter, depth of planting, hill plant spacing, and number of seedlings planted per hill are even. His modification reduced seeding from 60kg to 40kg/ha and seedling pulling cost. He can also transplant 12-15 days after sowing resulting in less transplanting shock and more tillers. From 60 sacks/ha, he now harvests 80-100 sacks/ha.

Farming with the Korean machine has enabled Bernardo Jumo to acquire a pump, tractors, and a motorcycle. May KOPIA continue to put smiles on our farmers' faces. •

Rice Ble

STIR-FRIED BROWN RICE SPROUTS

By: Ma. Jophine C. Ablaza

INGREDIENTS:

1 tbsp vegetable oil
1 tbsp garlic, minced
2 tbsp onion, minced
2 tbsp oyster sauce
3 cup sprouted brown rice, boiled
½ cup squid ball, sliced and fried
½ cup kikiam, sliced and fried
½ cup Baguio beans, julienned
¼ cup celery, minced
½ cup carrots, julienned
½ cup chayote, julienned
½ cup yam bean (singkamas), julienned
1/8 tsp iodized salt
1/8 tsp pepper

Sprouting brown rice

1. Soak brown rice in water overnight.
2. Drain, spread in cheesecloth, and allow to sprout for 24-36 hr.
3. Rinse and cook at 1:2 rice:water ratio or boil for 15 min at 1:4 rice:water ratio.
4. Sprouted brown rice can be stored in refrigerator for 1-2 days or in freezer for longer shelf-life.

PROCEDURE:

1. Heat oil and sauté garlic and onion.
2. Add oyster sauce, sprouted rice, squid balls, and kikiam.
3. Stir in Baguio beans, celery, carrots, chayote, and yam bean.
4. Season with salt and pepper.
5. Mix until cooked.

Makes 5 servings

nds

CARLO G. DACUMOS

TOFU MUSHROOM STEAK WITH SALSA ALA ILOKANO

By: Jefferson Melegrito and Paulin Tabios

INGREDIENTS:

2 slice tofu
6-10 pc oyster mushroom, for grill
2 tbsp Worcestershire sauce
2 tbsp kalamansi juice
2 pc eggplant, sliced
¼ c oyster mushroom, cubed
5 pc chili pepper, sliced
1 pinch iodized salt
1 pinch pepper
1 pc tomato, sliced
2 tsp onion, minced
1 tbsp rice wine
1 tsp fish sauce
½ cup brown rice, cooked

PROCEDURE:

1. Marinate tofu and mushroom with Worcestershire sauce and kalamansi juice.
2. Pan-grill the tofu, mushroom, and eggplant. Set aside.
3. Sauté mushroom and add chili pepper, salt, and pepper.
4. Do the salsa ala Ilokano by mixing the sautéed mushroom and chili, tomato, onion, rice wine, and fish sauce. Marinate.
5. Top the marinated mixture on grilled eggplant.
6. Serve with grilled tofu and mushroom, and one-half cup brown rice.

Makes 1 serving

Recipes are taken from the PhilRice Food Planner of the Rice Chemistry and Food Science Division.

STAFF EXTRAORDINAIRE

GETTING TO KNOW OTHER PHILRICE R&D BRAINS

COMPILED BY: ALLAN C. BIWANG JR.

GERARDO F. ESTOY JR.

Birthplace:
Baybay City, Leyte

ACADEMIC PROFILE:

- PhD in Agriculture, major in Entomology (Gifu University, Japan)
- Master in Development Management (DAP)
- MS in Agriculture, major in Entomology, minor in Environmental Science (UPLB)
- BS in Agriculture, major in Plant Protection (ViSCA, now VSU)

For some 3 decades, Estoy has worked mostly on insect ecology, biological control, and integrated pest management. His study on the emerging pest rice grain bug characterized and identified its damage to the rice plant.

He has received 19 major regional and national awards. His study on fungal microbial agents for the control of major rice insect pests in Caraga Region was recognized as best paper by the Philippine Society of Mycology in 2013. Currently, he is a Chief SRS and the R&D coordinator of PhilRice Agusan.

ARNOLD S. JULIANO

Birthplace:
Science City of Muñoz, Nueva Ecija

ACADEMIC PROFILE:

- PhD in Agricultural Engineering (CLSU)
- MS in Agricultural Engineering (UPLB)
- BS in Agricultural Engineering (CLSU)

His postgraduate work on the development of a rice hull gasifier-engine pump system for optimum irrigation application in rainfed lowland farms was recognized as best study in CLSU.

Juliano now leads the team that develops and pilot-tests the mechanical rice transplanter funded by DOST-PCAARRD.

Currently, Juliano heads the Rice Engineering and Mechanization Division, and is the incoming lead of a project in collaboration with the Korea International Cooperation Agency.

VICTORIA C. LAPITAN

Birthplace:
Los Baños, Laguna

ACADEMIC PROFILE:

- PhD in Agricultural Science (Iwate University, Japan)
- Master in Development Management (DAP)
- MS in Agronomy, major in Crop Physiology (UPLB)
- BS in Agriculture, major in Agronomy (UPLB)

Lapitan has vast knowledge on microtechniques-handling, and conventional and molecular rice breeding techniques.

She has led Korea-funded projects on tissue culture of garlic, and genetic improvement for upland rice marker-assisted selection for tolerance to phosphorus deficiency. As R&D coordinator for 7 years, she supervised and executed successfully the major projects/studies of PhilRice Los Baños.

She received the Most Outstanding Principal Investigator award for the implementation of the Asian Food and Agriculture Cooperation Initiative project on the development of rice production techniques. Currently, Lapitan is the acting branch director of PhilRice Bicol.

ALBERT CHRISTIAN S. SUÑER

Birthplace:
Calumpit, Bulacan

ACADEMIC PROFILE:

- Master in Development Management (DAP)
- Master in Agronomy, major in Crop Physiology (UPLB)
- BS in Agriculture, major in Plant Breeding (UPLB)

He is involved in PhilRice Negros' major studies on the utilization of locally available organic materials for improving rice production and seedling growth of hybrid and inbred rices.

His interests include crop physiology, plant breeding, training, extension, and promotion of rice production techniques.

Suñer has for 4 years served as R&D coordinator of PhilRice Negros. He is responsible for the implementation of projects/studies that help the Institute develop technologies.

Suñer also leads the One-Stop Information and Sales Shop in the branch station, and helps carry out the Be RICEponsible campaign.

PALAY DRYING ON ROADS CONTRIBUTES 3.8% TO YIELD LOSSES.

Investments on the development and accessibility of drying facilities should be increased.

PhilRice Central Experiment Station; Maligaya, Science City of Muñoz, 3119 Nueva Ecija;
Tel: (44) 456-0277 • Direct line/Telefax: (44) 456-0112

BRANCH STATIONS:

PhilRice Agusan, Basilisa, RTRomualdez, 8611 Agusan del Norte • Telefax: (85) 343-0768 • Tel: 343-0534; 343-0778 • Email: agusan.station@philrice.gov.ph
PhilRice Batac, MMSU Campus, Batac City, 2906 Ilocos Norte • Telefax: (77) 772- 0654; 670-1867 • Tel: 677-1508 • Email: batac.station@philrice.gov.ph
PhilRice Bicol, Batang, Ligao City, 4504 Albay • Tel: (52) 284-4860; -4859 • Mobile: 0918-946-7439 • Email: bicol.station@philrice.gov.ph
PhilRice Isabela, Malasin, San Mateo, 3318 Isabela • Mobile: 0908-895-7796; 0915-765-2105 • Email: isabela.station@philrice.gov.ph
PhilRice Los Baños, UPLB Campus, Los Baños, 4030 Laguna • Tel: (49) 536-8620; 501-1917 • Mobile: 0920-911-1420 • Email: losbanos@philrice.gov.ph
PhilRice Midsayap, Bual Norte, Midsayap, 9410 North Cotabato • Tel: (64) 229-8178; 229-7241 to 43 • Email: midsayap.station@philrice.gov.ph
PhilRice Negros, Cansilayan, Murcia, 6129 Negros Occidental • Mobile: 0932-850-1531; 0915-349-0142 • Email: negros.station@philrice.gov.ph
PhilRice Field Office, CMU Campus, Maramag, 8714 Bukidnon • Mobile: 0916-367-6086; 0909-822-9813
Liaison Office, 3rd Floor, ATI Bldg, Elliptical Road, Diliman, Quezon City • Tel: (02) 920-5129

SATELLITE STATIONS:

Mindoro Satellite Station, Alacaak, Sta. Cruz, 5105 Occidental Mindoro • Mobile: 0908-104-0855
Samar Satellite Station, UEP Campus, Catarman, 6400 Northern Samar • Mobile: 0948-800-5284; 0909-370-1332

www.philrice.gov.ph
www.pinoyrice.com
(0920) 911-1398
rice.matters
prri.mail@philrice.gov.ph