

# PHiMech

NEWSLETTER OF THE PHILIPPINE CENTER FOR POSTHARVEST DEVELOPMENT AND MECHANIZATION

KOREA  
PHILIPPINES RPC

COVER STORY

*Pro-Farmer*

Management Makes Bohol-RPC

*Efficient*

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## About the Cover

Mr. Alvin A. Mante, General Manager of the Bohol Rice Processing Complex, poses with his fellow workers in front of the RPC building.

Photo by: JMGSubaba

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## New PHilMech head is a scientist

**D**R. DIONISIO G. Alwindia, Scientist III, is the new OIC Executive Director of PHilMech. The new Secretary of Agriculture, Emmanuel "Manny" Piñol, designated Dr. Alwindia, in a special order dated July 1, 2016.

Dr. Alwindia rose from the ranks. In his journey of 30 years in research and development work, he started as a research aide but prepared himself academically to become a full-fledged scientist in the field of postharvest pathology and mycology. He is considered by his peers and colleagues in this field of specialization as "outstanding scientist" having contributed several noble discoveries and breakthroughs in recent years of his scientific work.

Highlighting his prolific scientific career are patents for two of his findings namely; bacteria (*Bacillus amyloliquefaciens*) and fungi (*Trichoderma harzianum*) that can be used to control banana crown rot. Currently, Dr. Alwindia is the principal researcher of the Biological Control Agents project which prevents postharvest diseases of tropical fruits through alternative control methods

using microorganisms and GRAS (generally regarded as safe) compounds, food additives and hot water treatments. His approach to research includes integration of these components with improvement of cultural practices.

To his credit, he has published three books, two for international circulation namely; *Postharvest Diseases of Non-Chemical Bananas: Issues and Concerns* and *Non-Chemical Approaches of Managing Crown Rot Disease of Banana*, published by Lambert Academic Publications in 2012 and 2013, respectively; and *Fungal Diversity of Non-chemical Banana and its Environs in the Philippines: A Handbook for Taxonomists and Para-taxonomists* published by PHilMech in 2011.

He has also written technical papers in both refereed and non-refereed journals. He has likewise served as referee, adviser and consultant to different international companies and an affiliate professor at the Central Luzon State University (CLSU) and De La Salle University. He graduated at CLSU with the degree of BS in Agriculture in



Dr. Dionisio G. Alwindia

1984. He took his graduate and post-graduate degrees at the prestigious Tokyo University of Agriculture in 2000 and 2003, respectively. He was conferred Scientist I position by the Department of Science and Technology (DOST) in 2011 and was promoted to higher ranks after every other two years because of his fruitful R&D work in postharvest pathology. In 2015, he was also conferred the PPS G.O Ocfemia Outstanding Plant Pathology Award in Research in recognition of his R&D work in postharvest pathology. ***RPEstigoy***



Impact Exhibition in Bangkok, Thailand

## SIMA ASEAN Thailand 2016: the new hub in agribusiness show in the Region

**T**HE SECOND edition of SIMA ASEAN, held from 8 to 10 September 2016 at the IMPACT Exhibition & Convention Center, Bangkok, Thailand, proved to be a resounding success as can be attested by the turnout of 13,000 visitors from various countries and the magnitude and scope of the event covering an exhibition space of nearly 21,000 sqm, including indoor and outdoor areas. The second SIMA ASEAN lived up to its promise as the most prominent and extensive agri-business event in Southeast Asia. The show covered a comprehensive range of products to meet all the needs of farm operations and food processing professionals.

A wide array of tractors and tractor equipment, spare parts and accessories and embedded electronics, tilling, sowing and planting technologies, agro-chemical, fertilizers, pesticides, insecticides; irrigation systems; harvesting technologies for fodder, cereals, roots, fruits and vegetables, food processing and packaging, equipment for tropical and industrial crops, handling, transportation, storage and buildings, breeding equipment and milking products was highlighted in the three-day event. The show also included services, consultancies, direct sales and demonstration of machineries.

### A strategic and dynamic platform

Considered by its exhibitors as a strategic platform to connect and develop their businesses, SIMA ASEAN Thailand 2016 attracted 300 leading brands and companies worldwide including renowned brands such as New Holland, Case (International Harvester) IH, CLAAS and Yanmar.

“SIMA ASEAN is the perfect place to get to know our customers and for them to discover our products and the New Holland and Case IH quality. We had an opportunity to launch the TT4.90 tractor at the SIMA ASEAN 2016, extending the successful TT4 Series, which now includes 5 models ranging from 55 to 88 hp. The new model fits at the top of the range, offering an even bigger performance that combines power, fuel economy and ultimate versatility. This is why the SIMA ASEAN is an important exhibition for us and it’s the reason we decided to support the show as this year’s Platinum Sponsor” These were the remarks of Mr. Mark Brinn, Managing Director CNH Industrial SEA, Japan and Pakistan.

“For us, it’s very important to provide the information about our products to our

*continued on page 17..*

## PHilMech joins DOST, DA-BAR exhibits and techno forum

**T**HE DEPARTMENT of Science and Technology (DOST) led the nation in celebrating the 2016 National Science and Technology Week (NSTW), on July 25-29, 2016. The activity, dubbed as “Juan Science, One Nation” was conducted simultaneously in all different regional offices aside from the four major science hubs in Bicutan, Taguig, Quezon City, Manila and Los Baños, Laguna. Alongside, the 2016 National Invention Contest and exhibit were conducted in SMX from July 28 to 31, 2016.

The new DOST secretary, Mr. Fortunato T. De La Peña, led the annual NSTW activities at the DOST Complex in Bicutan, Taguig City on the 25th of July. The NSTW is celebrated annually every third week of July by virtue of Proclamation No. 169 of 1993. It aims to recognize the contribution of science and technology in the development of the country and get support from the public and private institutions for its sustainable development. The 2016 NSTW features several technology open houses, symposia, scientific fora, technology fairs, film showings, scientific career talks, and technology launches, among others.

PHilMech joined NSTW in Bicutan, Taguig in their National Invention Contest and exhibit conducted in SMX, MOA. PHilMech featured various postharvest technologies and systems on coffee, soya, coco water and cashew. Other developed technologies such as pectin, corn mill, cassava digger, onion seeder and MCSTD. Invited cooperators displayed and sold cashew and soya products on both events.

Mr. Vicente S. Dagagon and Benjamin R. Lao, farmer scientist, both from Davao del Sur congratulated PHilMech for delivering good public service. They were grateful to PHilMech for accrediting one of their manufacturers.

Meanwhile, PHilMech participated in the 12th Agriculture and Fisheries Technology Forum and Product Exhibition from August 11-14, 2016 at the SM Mega Mall. This year’s theme was *“Pagsulong ng mga Teknolohiya sa Pamayanan Tungo sa Maunlad na Pagsasaka at Pangangisda.”* The event aimed to provide an opportunity for entrepreneurs to develop agribusiness enterprises through the R&D technologies generated by research institutions and to showcase different products from exhibitors.

*continued on page 21...*



Cong. Arthur Yap of Bohol and Mer Layson, soybean processor, show off the KKK products together with other PHilMech staff and partners.

## Technical conference starts convergence of PHilMech, industry stakeholders

**T**O STRENGTHEN partnership and collaboration of PHilMech with government agencies and other industry stakeholders, the Technology Management and Training Division (TMTD) of PHilMech conducted the Technical Conference on Agricultural Mechanization & Postharvest Technologies on September 26-30, 2016 at the PHilMech Training Center. The activity aimed to enhance the awareness of the participants on the recent developments on agricultural mechanization and postharvest technologies of the different priority commodities (Rice, Corn, HVCs).

Seventy participants composed of officials and technical staff from the Department of Science and Technology (DOST), Department of Trade and Industry (DTI), Department of Agrarian Reform (DAR), Local Government Unit (LGU)-Munoz and representatives from private organizations (Luzon-wide) attended the conference.

Subject matter specialists from PHilMech presented the agency's commercialized and emerging technologies for rice, corn, cassava, coffee, cacao, cashew, coconut, soybean, coconut and fruits and vegetables such as mango, moringa and banana. Invited



One of the participants during the question and answer at the technical conference for industry stakeholders.

Speakers from DTI-XI, Asst. Regional Director Edwin O. Banquerigo, discussed the cacao industry situationer while Engr. Romeo Vasquez of RS Vasquez Enterprise, shared their success story as farm service provider. He challenged the participants with their tagline "It's more fun in mechanized farming... and more funds." Resource persons clarified issues and concerns brought up during the open forum. Similarly, the group realized that some of their agricultural mechanization and postharvest activities can complement each other. Representatives from each agency expressed appreciation for the knowledge gained in the

conference. Majority of the participants are first time trainees of PHilMech. They rated the overall training program as very good (47.14%) to excellent (52.86%).

"The course was excellently conducted and very timely. Technologies generated by PHilMech are so relevant to DOST techno-transfer activities of the different provinces. We're so grateful to PHilMech for inviting us to attend this conference as it is very beneficial to our work. We appreciate PHilMech gathering us together as audience since convergence is a must now," said the participants. *MCajucom*

**T**HE LUZON A cluster of the Agri-Infrastructure Coordinating Unit (AICU) of PHilMech conducted a series of training courses to support the sustainable use of postharvest technologies and machinery.

Together with the Regional Field Coordinators -- Engr. Josephine Valdez (RFC Region 1), Engr. Frieda Abalos (RFC CAR), Engr. Jarrel Oting (RFC R2) and Engr. Marylou Collado (RFC R3), the group conducted four batches of training courses, namely: (1) Enhancing the Capability of Selected Farmer Organizations on the Operation and Management of Coffee Processing Facilities (in Tabuk, Kalinga on August 9-12, 2016); (2) Capability Building of Viability and Sustainable Selected Agricultural Trampoline Beneficiaries (at the PHilMech Munoz headquarters, Nueva Ecija on August 16-19, 2016); (3) Intensifying the Capability of Selected Farmer Service Provider on the Operation and Management of Agricultural Machineries (also at PHilMech headquarters on August 23-26, 2016); and (4) Enhancing the Capability of Selected Farmer Organizations on the Operation and Management of Rice Processing Centers (PHilMech headquarters on August 30-September 2, 2016).

A total of 138 participants, half of which are females, from Regions 1, 2, 3 and the Cordillera Administration Region, have been trained. Trainers included experts from PHilMech, Central Luzon State University (CLSU), Cooperative



Participants during their field visit to the agricultural tramline in Tuba, Benguet.

## Beneficiaries undergo training to sustain technology use

Development Authority (CDA) and the Philippine Carabao Center (PCC).

The content of the training courses focused on institutional and organizational management, technical management of the selected technologies, enterprise development and financial management. Field visits to different successful recipients of the technologies were also done.

As an output of the training courses, the participants submitted their action plans for implementation. These action plans will help increase the participants' level of capability and expertise in the utilization of the technologies. These will also increase patronage of mechanized services so as to increase the income of the farmer-beneficiaries.

The training courses were successfully conducted in collaboration with the Regional Field Offices, and the Provincial/Local Government Units. Specifically, the training courses aimed to: (1) determine the different factors required to enhance operation of the machinery; (2) adopt the necessary measures in the operation and management of the facilities for increased utilization and profitability; (3) enhance the capability of the end-users, technical performance of the facilities and marketing of the products; (4) provide support to the farmer - beneficiaries toward entrepreneurship and investment in agricultural machinery management, maintenance and service provision; and (5) strengthen partnership with LGUs and other collaborators in the promotion of the sustainable use of postharvest technologies and mechanization.

*RHermoso*



Dr. Michael and Dr. Ma. Cristina Gragasín, both winners in the National Invention Contest of TAPI-DOST.

## PHilMech researches win at 2016 National Invention Contest

**T**HE PHILMECH Compact Corn Mill and Pharmaceutical Grade Pectin from Mango Peels won 1st Place and 3rd Place, respectively, in the 2016 National Invention Contest and Exhibits last July 28-31, 2016 at SMX Convention Center, Mall of Asia, Pasay City.

The PHilMech Compact Corn Mill won in Most Creative Research Category. The technology addresses the lack of efficient corn mill in the country. It produces good quality corn grits and provides business opportunities to small business enterprise given its low capital requirement and high financial viability.

Dr. Michael Gragasín, Supervising Science Research

Specialist of PHilMech, headed the project. His team members include Dr. Romualdo Martinez and Engr. Jayvee Ilustrisimo.

Meanwhile, the pharmaceutical Grade Pectin from Mango Peels won in the Utility Model Category. Pectin is a high-value product used as a gelling and thickening agent and as stabilizer by cosmetic, food and pharmaceutical industries. The technology can help reduce the country's importation of pectin and help in the mango peels waste utilization.

Dr. Ma. Cristina Gragasín, also a Supervising Science Research Specialist of PHilMech and fellow researcher, Engr. Aileen

Ligisan are the proponents of the project.

The National Invention Contest and Exhibits was spearheaded by the Technology Application and Promotion Institute (TAPI) of the Department of Science and Technology (DOST). The contest was an offshoot of 2015 Regional Invention Contests.

The said event recognized the hard work and efforts of the inventors and researchers including the students. Winners received certificate of recognition, plaque and cash award. *GMZCarganilla*



## DA agencies, RDIs discuss possible RDE collaboration on mechanization

**A**LL FOR ONE purpose – a unified and comprehensive Research, Development and Extension (RDE) on agriculture and fishery mechanization.

Heads and representatives of RDE institutions and agencies of the Department of Agriculture (DA) met to discuss possible inter-agency convergence and collaboration on postharvest and mechanization. The round table discussion was held at the PHiMech Liaison Office, ATI Bldg., Quezon City on September 9, 2016.

Division chiefs of PHiMech facilitated the discussions. Participating agencies were grouped according to commodities, namely: Rice, corn and cassava (Grp 1), high value crops (Grp 2), poultry and livestock (Grp 3) and fishery (Grp 4). Included in Group 1 were the representatives from the Philippine Rice Research Institute (PhilRice), National Food Authority (NFA), National Irrigation Administration (NIA), and the Bureau of Soils and Water Management (BSWM). Group 2 included the representatives from the Bureau of Agricultural Research (BAR), Philippine



Director I Arnel Ramir M. Apaga opens the round table discussion.

Rubber Research Institute (PRRI), Bureau of Agriculture and Fishery Standards (BAFS), Philippine Fiber Industry Development Authority (PhilFIDA), Philippine Coconut Authority (PCA), and the Sugar Regulatory Administration (SRA). Group 3 included representatives from the Bureau of Animal Industry (BAI), Philippine Carabao Center, National Meat Inspection Service (NMIS), and the National Tobacco Administration (NTA). Meanwhile, representatives from the Bureau of Fisheries and Aquatic Resources (BFAR) and the Philippine Fisheries and Development Authority (PFDA) comprised Group 4.

Discussions centered on the R&D efforts done by the agencies, the technology gaps that need to be addressed and the possible areas of collaboration with PHiMech.

As mandated by the AFMech Law, PHiMech will provide leadership in the development and implementation of the Agri-Fishery Mechanization RDE Network (AFMechRDEN). Thus, there is need to build strong partnerships with agencies and RDE institutions with postharvest and mechanization concerns.  
*MBGonzalez*

# TREATS

## All About Brown, Red & Black Rice



Rice is the staple food of the country. Today, the health conscious Filipinos are shifting from the white polished rice, into brown, red or black rice that are now available in the local market.



## Tips

### Brown rice buying and storage

- Buy in smaller amounts to avoid any rice waste.
- Transfer brown rice to an airtight container (e.g. tightly lidded plastic container) after bringing it home. Exposing the oils to oxygen causes deterioration and spoilage.
- The ideal condition for brown rice is a cool, dark place. If stored in an airtight container and your pantry happens to be both cool and dark, the rice can be kept for about six months.

Source: [www.thekitchn.com](http://www.thekitchn.com)

## Equipment

### Compact Rice Mill with Impeller Huller



Hulling Mechanism: *Impeller*

Milling Recovery: 63-66%

Milling Capacity: 250 kg/hr

Input Capacity: 350 kg/hr

Head rice recovery

Brown rice: 91.1 %

White rice: 63.9 %

Coefficient of hulling: 0.998

Prime movers:

5 hp (whitener)

5 hp (huller, blower, aspirator, de-stoner)

Dimension (w/o cyclone): 1.6 m x 0.6 m x 1.5 m

## Recipe

### Coconut Black Rice Pudding

Ingredients:

2 - 2 1/2 cups water

1 cup black rice

1 cup light coconut milk

1/4 cup unsweetened coconut flakes

3 tablespoons brown sugar

1/2 teaspoon salt

Procedure:

Mix 2 cups water, rice and coconut milk. Bring to a boil. Reduce heat and simmer uncovered for 45 minutes or until rice is tender. Stir occasionally. During the last 10 minutes of cooking, to keep a close eye. Adding extra water, 1/4 cup at a time, if the rice gets too dry.

Meanwhile, toast the coconut flakes. Preheat the oven to 176°C. Place the coconut on a baking sheet and bake for 5 minutes or until golden-brown, stirring once during baking.

When the rice is tender, add the sugar and salt. Simmer for a couple more minutes, or until pudding is of desired texture. (Add a little more water for a looser pudding; let cook several more minutes for a drier pudding.) Taste and adjust seasoning. Spoon into individual bowls, top with toasted coconut flakes, and serve.

Source: [Lisa Altmiller, allrecipes.com](http://LisaAltmiller.allrecipes.com)



## Advisory

### Boost Health with Black Rice

Eating black rice provides us the following benefits: full of antioxidants, protects heart health, helps detoxify the body, good source of fiber which improves digestive health, a naturally gluten free grain, helps slow down absorption of sugar in the blood, helps prevent diabetes, and better at preventing obesity than refined grains.



## Trivia

Did you know that the red variety of rice gets its rich colour from an antioxidant called anthocyanins?

These are also found in deep purple or reddish fruits and vegetables. The compound is believed to have properties that can reduce inflammation, allergy, prevent risks of cancer and help in weight management.

Source: [food.ndtv.com](http://food.ndtv.com)



## Selection

### Brown for Good Challenge

Check out the following websites:

[www.philrice.gov.ph](http://www.philrice.gov.ph) | [www.bericepossible.com](http://www.bericepossible.com)





Mr. Romeo T. Tario  
Chairman, BOFAMCO

Mr. Dante A. Mante  
General Manager, BRPC

## Pro-Farmer Management Makes Bohol-RPC Efficient

by Jett Molech G. Subaba

THEY CARE about the facility but they care about the farmers, the most.

It has been the goal of the Bohol Farmers' Multi-Purpose Cooperative (BOFAMCO)—since they assumed the management of Bohol-Rice Processing Complex (BRPC) in 2014—to provide not just high quality milled rice but to also improve the rice farmers' quality of life.

This multi-million complex in Pilar, Bohol was built through the bilateral cooperation between the Philippines and the Korean government, through Korea International Cooperating Agency (KOICA), with the latter as the providing partner of postharvest facilities in the country.

Part of KOICA's mission is to “facilitate sustainable socio-economic development of partner countries, aiming to reduce poverty and improve the quality of life”.

The Rice Processing Complex in Bohol is equipped with the state-of-the-art facilities on postharvest and processing of rice. It has five mechanical dryers with 50 MT/batch capacity; huller for brown rice with 3.5 MT/hr capacity; length grader for white rice with 2.5 MT/hr; and a warehouse with 1,100MT capacity of rice.

With these facilities, the complex offers services like custom milling, custom drying, warehousing, hauling and trucking services.

### Managing the BRPC, handling issues

In 2014, the Department of Agriculture turned over the management and operation of BRPC to BOFAMCO, a city-based farmers' coop composed of farmers, seed growers and other professionals in the field of agriculture.

**“Yun ang main objective ng RPC e...  
Ang goal natin ay ma-increase ang  
income level ng farmer.”**

Concurrently, the board chaired by Mr. Romeo T. Tariao appointed Mr. Alvin A. Mante as the General Manager of the BRPC—in-charge of the administration of the complex. However, when the operation plant manager of BRPC died, Mante also assumed overseeing the operations.

Mante’s trainings, good relation with the farmers, experiences in the LGU and his established network of key people have provided him the edge to run the complex competently.

Before he assumed top management, Mante was a first-hand witness on how the complex was overly utilized by farmers who brought their dripping wet paddy during the wet season in 2014. Some paddy were found already germinating, thus paddy value was at stake.

As a consequence, BOFAMCO was indebted to pay the farmers who deposited their produce. Since they have issues with the remaining working capital in the RPC, they opted to loan from the bank to ensure that the operations of RPC will continue.

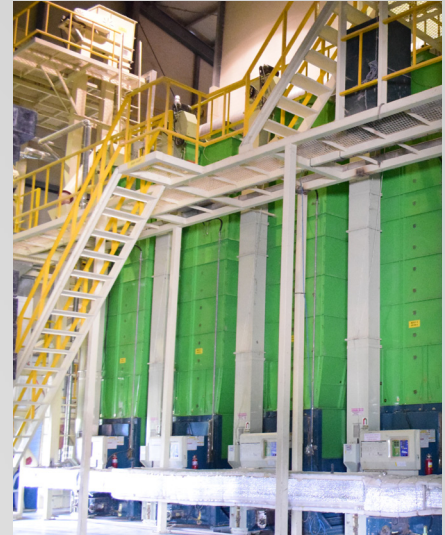
The germinating paddy also known as Yellow Rice or Yolanda Rice, they bought from the farmers were considered not good for the high-end market. But through the genius of Mr. Mante, a three-term councilor of Pilar, Bohol, he managed to release these stocks through the “cook now, pay later” program of the coop with the help of the LGU who preferred spending their calamity fund for rice supply.

The lack of working capital is a major problem in the RPC, thus they were limited on their operations. But still, with the support of the local government of Bohol and loans accessed by the coop, they were able to cope up with their financial needs.

These issues and the like were easily addressed by the 43 year old manager, because the BOFAMCO board of directors has given him authority over decision making in the BRPC.

### **Sources, market and competition**

The BRPC receives raw materials from 10 different municipalities in Bohol with Pilar, San Miguel and Ubay as the top three sources. Price varies according to the moisture content and variety



of the paddy. The coop pays up to P24/kg for hybrid varieties like Habilis with 14 moisture content and P22-23/kg for inbred varieties like NSIC Rc218 and Rc300.

According to Mr. Mante, they also engage in contract-growing with farmers. This has helped the coop to have a sure source of materials that can suit their requirements. Moreover, the coop determines when the harvest time, when and where to store, how long to store, and when to market it. Currently, they partner with black rice producers and seed growers on this project.

The BOFAMCO markets their rice (white, brown, black) to different coops, institutions,

***continued on page 22***

The following research abstracts are part of the winning R&D papers during the recently concluded PHilMech R&D Review 2016.

## Design, Testing and Evaluation of Compact Rice Mill with Impeller Huller

M.A. Gragasin, J.P. Illustrisimo and R.C. Martinez

Rice mills play a vital role in the food self-sufficiency program of the Philippine government since these could affect the supply of rice in the market. This research developed a new type of village-level rice mill with impeller huller that could provide a comparable milling recovery with traditional rice mill, with less capital investment, and subsequently operating and maintenance costs.

Test trials revealed that the coefficient of hulling, hulling efficiency and head rice recovery of the impeller huller of the newly developed rice mill were 0.990, 86.8 %, and 87.7

%, respectively. Likewise, it is capable of efficiently milling palay with moisture content of 10 to 18 % without significantly affecting its milling recovery and hulling efficiency. Its unique and innovative design has successfully made it compact yet powerful with milling capacity of 250 to 300 kg/hr and capable of producing both brown rice and white rice, a distinct feature not possible to traditional village-level compact rice mills. Cost of milling is estimated at Php 0.87/kg with internal rate of return of 82.5 %. The newly developed rice mill technology is highly favorable for barrios with no existing rice mill installed since



this can be easily connected to household or single-phase electrical line. The technology is also ideal to be used by brown rice producers and organic rice suppliers.

## Design and Development of Probe Meter for Moisture Detection of Selected Grains

A.C. Joaquin, ME.V. Ramos, R.C. Martinez and E.B. Santos

A prototype unit grain probe moisture meter was developed for quick moisture content measurement while doing grain sampling during grain procurement. The prototype unit was composed of a standard grain probe, a 100-gram capacity test chamber, a menu panel for

control and measurement and a handle for ease of sampling. Initial circuit designs were considered and calibrated during the early stage of development but failed to yield acceptable performance until the circuit design used in the prototype unit. The prototype unit probe moisture

meter was micro-controller based, with LED display and adopted a capacitive sensor oscillator circuit. Results of calibration experiments for paddy and corn showed linear relationship between frequency readings and standard oven moisture content measurements.

## Fluidized Bed Drying System for Complete Drying of Paddy

R.J. Pontawe, N.T. Asuncion, R.B. Villacorte and R.C. Martinez

Fully-automated, commercial-scale fluidized bed dryer system with 1 ton/hr output capacity was developed and installed at the NVAKMPCO-GC in Solano, Nueva Vizcaya. This was evaluated using a high moisture paddy.

The developed technology system is composed of a fluidized bed drying chamber, tempering bin assembly, biomass furnace as the heating system, conveying system, airflow system, dust collector system, automated control system and bagging bin. Complete drying of paddy with  $\geq 28\%$  (w.b.) initial moisture content was attained after 2 passes of fluidized-bed drying at 2 min exposure to 70 °C drying temperature and 3.21 m/s superficial air velocity, followed by 60 min. air tempering period (30 min without ventilation and 30 min with air ventilation) for a total drying time of 2.07 hours. Rapid drying of high moisture paddy with 31.5%

(w.b.) initial moisture content resulted to 82% reduction in drying time as compared to recirculating batch dryer at the same drying temperature of 70 °C. Specific heat energy consumption was only 3.17 MJ/kg of water removed and 19.88 kW-hr/batch of electrical consumptions of the fluidized bed drying system. Paddy dried on the system produced low Head Rice Yield Reduction Ratio (HRYSR) of 0.039 which denotes that the head rice yield recovery passed the PAES for maximum 5% Head Rice thus a clear indication that the system did not significantly affect the quality of dried paddy.

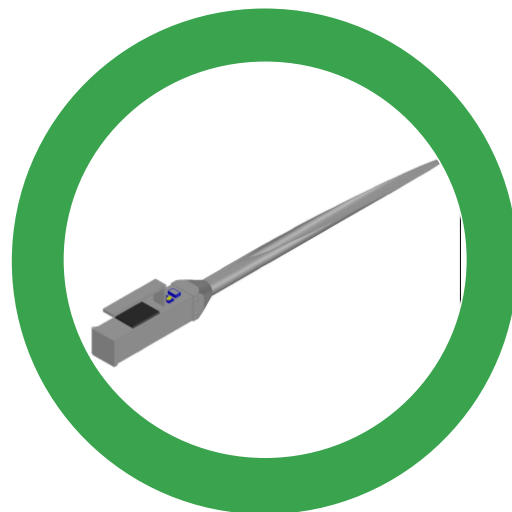
The drying cost was calculated to be Php 1.14 per kilogram of wet paddy. Net present value of Php 35,664,095.00 with BEP of 4,506.00 bag and Internal Rate of Return of 82.16% resulted for the commercial-scale fluidized bed dryer to be financially viable



at payback period of less than 2 years. Partial budget analysis of the commercial set-up vs recirculating batch type dryer gained additional income of Php 5,131,743.00 and reduced cost of Php 752,928.00. The optimum drying parameters of using fluidized bed dryer is 70 °C drying temperature at 2 min fluidization time, 3.21 m/s superficial air velocity, 4.5 in. H<sub>2</sub>O static pressure, 10 cm grain depth and 60 min ambient air tempering period.

Using linear regression technique, a calibration model for paddy was established with a relatively high correlation coefficient ( $R^2$ ) of 0.94 and a relatively low standard error of estimate (SEE) at 0.85. Model validation tests showed excellent results with residuals mean square

value of 0.68. Likewise, resulting calibration model for corn yielded a promising outcome with equally high correlation coefficient ( $R^2$ ) of 0.97 and standard error of measurement (SEE) of 0.56. Validation tests also generated a very good result with residual mean square value of 0.52.



## Agricultural Profile

Agriculture is the main livelihood of the people. Rice is the major product. In fact, the province is known as the “ Rice Granary of the Southern Tagalog”. In 2015, Occidental Mindoro has been cited as one of the top five rice producing provinces in the country.

Other major products are corn, onion, garlic, mangoes, cashew, banana (saba) and vegetables (*pinakbet*) .

## Postharvest Situationer


Based on production data and postharvest inventory, drying capacities was deficient both for rice and corn. Rice and corn milling as well as warehouse /storage capacities were also found inadequate.

## Proposed Postharvest Projects

To improve the postharvest industry of the province , the following projects were proposed for establishment:

- ▶ Integrated Postharvest Facilities Service Center
- ▶ Community –based Drying Service Center
- ▶ Small-Seed Corn Mechanization Center
- ▶ Village-Level Feed Mill
- ▶ Cold /storage Facility for Onion/Garlic
- ▶ Banana Chips Processing Center
- ▶ Mango Processing Center
- ▶ Trading Post for Vegetables
- ▶ Cold Chain for Fish
- ▶ Fish Processing Center
- ▶ Seaweeds Processing Plant
- ▶ Organic Fertilizer Plant

**Source:** *Occidental Mindoro Development Plan (2009-2018) by the Provincial Government of Occidental Mindoro, Office of the Provincial Agriculturist and the Department of Agriculture-Philippine Center for Postharvest Development and Mechanization (DA-PHilMech)*



## Occidental Mindoro

Occidental Mindoro, which is part of the MIMAROPA region, lies west of the Mindoro Island. A mountain range separates it from Oriental Mindoro. Occidental Mindoro is rich of marine resources, virgin forests and white sand beaches which lure many tourists in the place.



## **SIMA ASEAN...from page 4**

international customers, especially from the Southeast Asia region. For this purpose, we think SIMA ASEAN Thailand 2016 is a good platform to attract international visitors and also gives us the opportunity to present our high technology products in our line-up especially to serve the sugar cane residue management with our big bailer. What we really appreciate for this year, SIMA ASEAN not only has indoor exhibition but also has outdoor exhibition and demonstration area which gave us more opportunity to showcase our machinery with real working environment.” explained Mr. Benjamin S. Punyaratabandhu Bhakdi, Regional Director, CLAAS Regional Center South East Asia Ltd.

### **Added Feature, Technology Demonstration Area**

For this second edition, SIMA ASEAN conducted real-live demonstrations on two hectares of outdoor area. The exhibitors such as CNH, Yanmar, Claas, Chokchai Agricultural Machinery Co. or Echo were able to highlight their equipment and machinery in action on four major crops of the region (Rice, Cassava, Sugar Cane and Napier Grass) planted for the event at the Lakeside Mueang Thong Thani.



SIMA-ASEAN Exhibition 2016

### **Thailand, the Agribusiness Apex of Southeast Asia**

“For SIMA ASEAN Thailand, we are focusing on innovation and sustainability which are the key fundamentals to develop agricultural sectors in the region. We need to, not only show new technologies and innovations but also to apply new thinking to build up the new ideas forward for farmers. Only then, can we begin to build a sustainable, positive, and inclusive agribusiness industry not only in Thailand but also within the ASEAN Community.” said Valérie Lobry-Granger, General Manager of the Agriculture equipment, Food, Construction, and Optics (AFCO) at Comexposium,

at the opening ceremony in the presence of Mrs. Jintana Chaiwannakarn, Vice Minister of the Ministry of Agriculture and Cooperatives.

The SIMA ASEAN third edition will take place on 7 to 9 September 2017 at the IMPACT Exhibition & Convention Center, Bangkok, Thailand which expects a wider and more comprehensive agribusiness show with the integration of innovations and new lessons from the previous two editions. *RPEstigoy*

## Leyte coop finds relief in cassava *papag* dryer

**M**R. MARGARITO Costello, president of Fatima Multi-Purpose Cooperative based in Calubian, Leyte, expressed satisfaction for the cassava *papag* dryer they are now adopting. Mr. Costello is convinced that the *papag* dryer is environment friendly, cost efficient and easy to use when it comes to drying cassava.

He shared their experiences before using the *papag* dryer. *“Mahirap, marami nagrereklamo dahil mabaho, tulad ngayon bihira lang umaraw. Inaabot ng isang buwan yung drying, tapos mababa narin ang recovery kasi marami nang nadurog.”* But when the *papag* dryer came, rain or shine, the longest drying was only five to six days.

Engr. Donald Mateo of the Agriculture Mechanization Division (AMD) of the Philippine Center for Postharvest Development and Mechanization (PHilMech) recommended the use of thinner *papag* for effective aeration of the cassava. According to Mr. Castello, he often calls Engr. Mateo regarding the design of the *papag* because that time, CARE is requiring them to submit the total project cost for the *papag* dryer.

The CARE is an international humanitarian organization that helps families in poor communities improve their lives and overcome poverty. Capital is given to them to produce cassava. The United States Agency for International



Development (USAID) also supports the cassava farmers. From farm level, it is now a relief when it comes to processing.

In Calubian, Leyte there are 450 small farmers planting cassava in 650 hectares. Dried and fresh cassava tubers are being produced. *PSMFukasawa*

## Free online access to resources at SLS

**R**esearchers and other clientele of the PHilMech can now have a one year access to online resources for free. End-users can look for first-hand information on agriculture, food science, technology, environment, sustainability and on the development of emerging green technologies. Thanks to the IPaD project.

The IPAD stands for Improving Technology Promotion and

Delivery thru Capability Enhancement of the Next Generation of Rice Extension Professionals and Farmer Intermediaries. The project is being implemented by PhilRice, ATI and IRRI. Its objective is to empower the agriculture sector by promoting the use of various information and communication technologies.

Included in the free package are databases of GREENR, Gale Powerpack Agriculture

Collection, Gale Expanded Academic ASAP and EBSCO. These databases can be accessed and downloaded right away. The information supplied by these databases gives readers a review of theories, latest models, and significant research results currently published. The internet address and password is available through the PHilMech Scientific Literature Service. Free access of information is until May 2017. *JRAguilar*

## Dr. Alvindia sets PHilMech new directions

**T**HE PHILIPPINE Center for Postharvest Development and Mechanization (PHilMech) headed by its new director, Dr. Dionisio G. Alvindia, held a press conference at PHilMech Liaison Office, ATI Bldg, in Diliman, Quezon City last September 29, 2016. It was the first appearance of Dr. Alvindia to the press since he took over the leadership of PHilMech since July 1, 2016 through Special Order No. 651 issued by the Secretary of the Department of Agriculture Emmanuel Piñol.

Dr. Alvindia presented the agency plans and priorities to align with the targets and goals of the new administration.

He said, “PHilMech aims to develop and commercialize farming technologies that are appropriate for small farmers and agriculture cooperatives. Inputs from the stakeholders will be used by the agency to create an integrated Research, Development and Extension (RDE) agenda for postharvest and mechanization on farm, fisheries and food processing development. Stakeholder-driven RDE should result in more innovations by PHilMech’s highly-talented



Dr. Dionisio G. Alvindia (left) and Dr. Rodolfo P. Estigoy (right) answer queries from media during the press conference

scientists, engineers and experts”.

“We will continue the “AgrInnovation” program spearheaded by Engr. Bingabing to address the increasing needs of localized machinery and technologies in our country. We will just add something we forgot to do, immersion with our stakeholders,” he added.

He also emphasized PHilMech’s assistance to the mango, banana and other fruit growers in the country by helping them to preserve their harvest in an organic way to meet the export requirements for other countries. The agency is now working initially with Mindanao farmers to show them the benefits of

the developed technology like the Bio-Control Agents (BCA) in treating the fungal contamination in fruits like banana.

Dr. Alvindia emphasized that the PHilMech directions would be more zealous in giving value to government funds in implementing the projects of the agency.

The press conference was attended by media people from different news agencies like Noon Time Balita, Radyo Agila, Business World, Business Mirror, Philippine News Agency, Manila Star Philippine Star, Malaya, Brigada News FM, Radio Corporation of the Philippines, UNTV, Dyaryong Tagalog, among others. *RDdeGuzman*

## PHilMech conducts KOICA-RPC national mid-year seminar-workshop

**T**HE KOICA-RPC Seminar, Mid-Year Assessment and Planning Workshop was held last September 5 to 9, 2016 at PHilMech Training Hall, Science City of Muñoz, Nueva Ecija. This is part of the project “Establishment of Modern Integrated Rice Processing Complexes in the Four Provinces in the Philippines”. The Philippine Center for Postharvest Development and Mechanization (PHilMech) as the National Project Management Office organized and sponsored the event.

The seminar cum workshop aimed primarily to enhance the knowledge of the RPC Management Board and Team on leadership principles and practices, effective negotiation and selling techniques and best practices on rice trading business. The activity also aimed to assess the FO/ RPC CY 2016 mid-year accomplishments and status reports (physical and financial), plans and targets of the RPCs as well as formulate action plans on other pressing issues and concerns related to operation



Director III Raul R. Paz opens the RPC seminar-workshop and assessment

and management of the five RPC. To enhance the creativity among the professional management teams in each RPC in promoting the RPC services, a contest on designing an information material like leaflet was conducted. An educational tour was also done in nearby agencies namely Philippine Carabao Center, Central Luzon State University and PhilRice.

Sixty delegates composed of representatives from DA-PDS, DA-SPCMAD, DA-CAFED, DA-PHilMech, DA-RFO I, DA-RFO VI, DA-RFO VII, DA-RFO XI, RPC's of Pangasinan, Iloilo, Bohol and Davao del Sur, Aurora and Farmers'

Organization (FO) of Iloilo and Bohol RPC participated in the event.

Rev. Dr. Joy S. Gabasa, president of Asian Center for Leadership Education and Development; Dir. Brigida T. Pili, Provincial Director of DTI Nueva Ecija; and Engr. Edgardo Alfonso, Rice Trader/ Chairman and CEO of Agrinet Grains Corporation served as the Resource Speakers for the above mentioned topics. The delegates specifically the plant managers from the five RPCs (including Aurora RPC) presented the RPC Operations and Management updates,

***Continued to next page...***

## ***PHilMech joins..from page 5***

Exhibitors represented by BAR's R&D partner institutions included Department of Agriculture attached agencies, bureaus, regional field offices, Regional Integrated Agricultural Research Centers (RIARC), Bureau of Fisheries and Aquatic Resources-Regional Offices (BFAR-RO), Regional Fisheries Research and Development Center (RFRDC), state universities and colleges (SUC), international organizations, and private sector.

Hon. Dr. William D. Dar of the International Crops Research Institute for the Semi-Arid-Tropics and Senator Cynthia S. Villar, senate chairperson of the Committee on Agriculture and Food were guest speakers during opening program. Other key personalities were seen visiting the booths and have shown interest on the technologies on display.

Hon. William Dar, BAR Director Nicomedes P. Eleazar along with former Secretary of Department of Agriculture Arthur Yap and Assistant Director Teodoro S. Solsoloy were the prominent leaders who visited the PHilMech booth. Former Secretary Yap showed interest on the CocoWater Pasteurizer technology. He expressed his desire to adopt the technology in his congressional area in Bohol.

As lead agency on postharvest and mechanization program, PHilMech showcased the developed technologies and systems on coffee, coconut, cassava, soya, cashew, corn and rice. These technologies help Filipino farmers in producing good quality products and facilitate efficient postharvest operations of these commodities.

Among the booth visitors of PHilMech were Lovely C. Hodor from DA-Region

8, who showed interest on adlai thresher, Mr. Gil Marzo, fishery consultant from Quezon City, who inquired about the MCSTD and Ms. Maureen Mangaring, manager of Agri-partnership from Commonwealth, Quezon City, who expressed willingness to be a partner for coco-water project. The best sellers for this year's exhibit were the coco-water, soya and coffee technologies. Approximately, 100 visitors had visited the PHilMech exhibit during the four-day affair.

The Alion-Kapit Bisig Sea-K of Mariveles, Bataan which processes quality cashew nuts and the KKK Soya Milk of Paco, Manila, both PHilMech cooperators, were invited to display and sell their products. Remarkably, their respective products were sold-out during the last day of the event. Both cooperators were very grateful with the assistance provided by PHilMech. ***IDCDavalos***

## ***PHilMech conducts... from previous page***

issues and concerns including their action plans and targets. Meanwhile, the bookkeepers/plant manager presented the financial report. Discussions firming up the agreements on major issues and concerns were done. After the seminar-

workshop, the participants had an educational tour in the nearby agencies.

One of the highlight of the event was the KOICA-RPC Leaflet Competition. The four KOICA-RPCs submitted one entry for the competition.

Entries were evaluated and judged based on the given criteria. First place winner was the Iloilo RPC while the Davao del Sur RPC got the second place. Pangasinan RPC and Bohol RPC got the consolation prizes. Cash awards were given to the winners.

***AMGalvez***

## Pro-farmer... from page 13

government agencies and private companies in Bohol. They also extend their market in Cebu, Siquijor, Dumaguete and Negros.

The competition in the market is tight especially in Bohol because of the big traders in the area. They can bid a higher price just to get the farmers' produce. But Mr. Mante, firm on his stand, said, *"Kasi ganito yun, kapag hinahabol natin yun (presyo), magsasara na tayo. Kasi kapag nalugi sila (competitors) sa trading ng palay, meron pa naman silang ibang business, bawi na 'yun. Tayo, ito lang business natin, RPC... kaya hindi tayo makikipagsabayan."*

He added, *"Dapat hindi natin tinitingnan yung ngayon lang, dapat yung nuon, lumingon kayo, atsaka yung hinaharap pa, ano kayo pag wala ang RPC."*

### Pro-farmer Goals

It is RPC's ultimate goal to increase the income of rice farmers in Bohol to improve their quality of life.

The management of BOFAMCO always sees to it that farmers' welfare is over the self-interest of a few opportunists. They are no respecter of the powerful politician or a high profile person nor the rich trader,



when it comes to using the RPC.

*"Dito (sa RPC), magsabi ka muna bago ka magdala (ng palay), kahit sino ka pa.. Alangan namang tanggapin ko yung sa'yo dahil opisyal ka, yung farmer hindi,"* Mante emphasized.

They do not allow big traders to use custom milling because they protect the edge of RPC and their rice farmers. *"Regular mill lang sa mga traders na nagpapa-mill. Hindi namin pinagkakakitan ang custom milling dito. Worn-out na yung machine, hindi pa naseserve yung purpose namin na i-increase ang income ng farmers. Trader's income maiincrease mo pag ganun, magiging competition pa sa RPC yung bigas nila."*

Moreover, the coop has amended their price computation table on rice

paddies for five times now because they want to serve the welfare of the farmers.


*"We want to make sure na hindi lugi yung farmers... Sa ngayon, yung price computation, break even na talaga,"* Mante said.

### The Major Benefits of RPC

The RPC provided numerous benefits not only to the farmers but to the whole postharvest industry. It has stabilized price of paddy, increased income of farmers and reduced postharvest losses and improved quality of milled rice.

**Controller of paddy price in Bohol.** The RPC has gained control of the price in paddy over the traders and increased it from P15 to P24.

*"Itong RPC ang nagiging controller ng price dito, para hindi na bababa. Noon kasi,*



*masyado talagang mura ang bili ng mga traders dito ng palay. Ngayon hindi na, kasi umaabot kami sa punto na ang basehan, dito na. Dati P15/kilo dati ang presyo, nung nandito na yung RPC, nasa P20-24 per kilo na.,"* said Mante.

**Reduced postharvest losses.** Through RPC, fresh paddy can now be marketed in Bohol, thus saving the farmer from tedious work of drying and from the high risk of paddy losses.

*"Noon, maraming nasasayang na palay dahil walang mapagtuyuan. Ngayon dito, mayroon na. Sa Bohol kasi walang namimili ng fresh, hindi uso na bumibili ng fresh hindi gaya sa Luzon at Mindanao. Kaya nung mayroon ng RPC, bumibili tayo ng fresh harvest paddy at nagiging advantage sa farmers 'yun. Nagagamit nila agad yung kita ng palay nila. Hindi na kailangang ibilad pa,"* the proud manager said.

**High quality milled rice.** The edge of farmers patronizing RPC is its capability to produce high quality milled rice, making them competent in the market.

The RPC has machines that are not available in regular millers in the area, thus the quality of their milled rice has an edge in the market.

RPC has high brilliance, color sorter and length grader machines that the management use for their brown rice, special premium rice and black rice.

**Increased income of farmers.** Finally, the ultimate purpose of the RPC was achieved by the increase of the income of Bohol farmers.

*"Yun ang main objective ng RPC e. Sa purpose, wala duon yung 'tayo ang pinakamataas ang buying price'. Ang goal natin ay ma-increase ang income level ng farmer,"* said Mante.

Before, the price of the paddy rice of the farmers were fixed to P15, thus the traders benefit more. Now, it has increased to P24 and not getting lower than P17 per kilo.

### **PHilMech Interventions**

PHilMech serves as the project management of the RPC in the country. It has provided trainings to the management and technical staff of RPC. These include operations and management of RPC, and the procurement, processing and marketing of their produce. Dr. Rodolfo P. Estigoy of PHilMech was designated to sit in the board of directors and he spearheaded the crafting of

RPC's strategic plan.

Moreover, PHilMech consolidates their reports and monitors their performance through annual and semi-annual assessment workshop conducted in the agency. The needs of the management are being identified and addressed through consultations and seminars.

Currently, a post-management assistance from KOICA was granted to all RPCs in the country, through the initiative of PHilMech. They will receive \$600,000 worth of spare parts and supply for the next three years, about \$120,000 of these will go to the BRPC. Inclusive of the assistance is the training of the technical staff of RPC by the Korean experts.

### **Well done BRPC**

The BRPC today is one of the most efficient RPCs in the country. It is not just equipped with the modern technologies, but blessed with efficient management who always put the rice farmers' welfare on top of its priority.

The BRPC management is like the faithful servant in the Bible with whom the master commends with words, "Well done, my good and faithful servants. You have been faithful in managing small amounts, so I will put you in charge of large amounts." (Matthew 25:21)



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## **RPC Bohol Milling Facility**

The KOICA Rice Processing Complex in the country is equipped with the state-of-the-art milling facilities that are not available in regular rice mills. This has been the edge of farmers who patronize RPC.