

PHILMECH

A Quarterly Publication
of the Philippine Center for Postharvest Development and Mechanization

COVER STORY:

Hauling Made Easy for the Cacao Farmers of Barangay Tawan-Tawan, Davao City

VOL. XXIV NO. 4 | 2017
ISSN 0119-891



ABOUT THE COVER

Merlina G. delos Santos, chairperson of the Mt. Tipolog Bantay Kinaiyahan Association in Barangay Tawan-Tawan, Baguio District, Davao City stood before one of three ATS installed in their community.

Photo by: Danilo T. Esteves

CONTENTS

- 12 **COVER STORY: Cacao Hauling Made Easy at Barangay Tawan-Tawan, Davao City**
- 14 Useful Products from Cacao

NEWS

- 03 Jallorina, the new PHilMech Director
- 04 PHilMech leads Coffee Expo in Butuan City
- 05 PHilMech shows technologies at the Agrilink, Foodlink, Aqualink
- 06 Compact Corn Mill wins gold at 29th NRS
- 07 PHilMech – SAFE network collaborative meeting held
- 08 PHilMech, KAMICO launch new technology
- 09 SOA on coffee and cacao conducted in CARAGA Region
- 10 Land Bank taps PHilMech's training expertise
- 11 GAD training program features HGDG application
- 18 Jallorina speaks of harmony in Christmas lighting ceremony
- 19 Celebrating Christmas in "Denims and Diamonds"

REGULARS

- 16 POSTHARVEST DEVPLAN: Davao del Sur
- 17 RESEARCH: Utilization of Cacao Pod Husk as Fuel Briquettes
- 22 COUNTDOWN TO 40: Timeline of PHilMech Story

EDITORIAL BOARD

EDITORIAL CONSULTANT: RODOLFO P. ESTIGOY, PhD | **EDITOR-IN-CHIEF:** MILA B. GONZALEZ, PhD
ASSOCIATE EDITOR/LAYOUT ARTIST: JETT MOLECH G. SUBABA
CIRCULATION: JEMMALYNE R. AGUILAR

CONTRIBUTING WRITERS

Modesto L. Jose, Ivy V. Villanueva, Isis DC. Davalos, Benson Z. Munar, Pia Sarina M. Fukasawa, Jhoanna Keith B. Santiago, Ruben D. de Guzman, Jett Molech G. Subaba, Danica Soriano, Lovelle DS Ramos, Nicole G. Calibuso and Paolo Carl E. Soliven



Sec. Emmanuel F. Piñol of the Department of Agriculture officiates the oath taking of Dr. Baldwin G. Jallorina, the new PHilMech Director IV.

Jallorina, the new PHilMech Director

Philippine President Rodrigo R. Duterte has appointed Dr. Baldwin G. Jallorina as the new Director IV of the Philippine Center for Postharvest Development and Mechanization (PHilMech). He signed the appointment on November 27, 2017.

Dr. Jallorina worked with PHilMech since 1994 as a research analyst II. He then rose to become a science research specialist in 1995, a senior science research specialist in 1996 and a supervising science research specialist in 2002 before becoming director IV of PHilMech in 2017.

He has been given special assignments too. Among these were team engineer (postharvest component) for Regions IV

and V under the Department of Agriculture Grains Production Enhancement Program (GPEP IV) from October 1995 to February 1996, team leader for Region II and CAR under the same program from September 1995 to February 1996, technical assistant to the Assistant Secretary for Field Operations and the DA Focal Person for Mindanao from August 2001 to March 2002. He was also the zone director for Northern Luzon (postharvest component) under the Gintong-Ani Program of DA from January 2006 to March 2008.

Prior to working with the PHilMech, Jallorina was a research assistant at the Philippine Rice Research Institute (PhilRice) from 1990 to 1994 and an operations officer in Agro-Processing and Marketing

Project Office of the National Food Authority from 1988 to 1990.

This 52 year-old director is from Bagabag, Nueva Vizcaya. He graduated in Nueva Vizcaya State University with the degree Bachelor of Science in Agricultural Engineering and finished his Masters of Engineering in Agri-Chain Management in Netherlands. He finished his Doctor's degree in Agricultural Engineering at the Central Luzon State University.

He is a recipient of the Department of Science and Technology-Engineering for Research and Development for Technology (DOST-ERDT) Scholarship Program and recognized as one of the outstanding scholar-graduates with the Award of Academic Excellence in Science. » **Modesto L. Jose**

The third Annual Project Assessment and Coffee Expo showcased Arabica and Robusta coffee from the six regions in the Philippines. The event was held at the Butuan Grand Palace Hotel, Agusan del Norte on November 8-9, 2017.

This year's activity with the theme "Promoting Sustainable Community-Based Coffee Processing Enterprises for Inclusive Growth: Strengthening National, Regional, and Local Convergence" was attended by 205 participants composed of DA RFOs 4A, CAR, 6, 12 and 13, selected PLGUs and MLGUs, coffee farmers, coffee specialists, members from the media, and other stakeholders from the private industry.

Dr. Helen Martinez of the PHilMech Enterprise Development Division led the activity in collaboration with DA-RFO 13 through the High Value Crops Development Program (HVCDP).

Atty. Joselina Paula Gabriel-Visorde of the Villar SIPAG Foundation and Legal Counsel of Senator Cynthia Villar delivered the key note message. She conveyed the senator's support in incorporating research and development, technology, and training in the agriculture sector to further improve the agriculture's mechanization efforts. Senator Villar is the current Chairperson of the Senate Committee on Food and Agriculture.

"I am a staunch supporter of community-based enterprises



From left to right: Atty. Joselina Paula Visorde (Villar SIPAG Foundation), Hon. Omar Andaya (Butuan LGU), Dir. Abel James Monteagudo (RED, DA-RFO CARAGA), Engr. Raul R. Paz (Director III, PHilMech) and Dir. Jennifer Remoquillo (Asst. Director, BPI) open the coffee expo 2017

PHilMech leads Coffee Expo in Butuan City

that really help our fellow Filipinos particularly in poor communities by providing them a source of livelihood or income" said Sen. Villar in her speech during the opening program. She commended the works of the Department of Agriculture for the coffee industry.

Assistant Director Jennifer Remoquillo of the Bureau of Plant and Industry and PHilMech Deputy Director Engr. Raul R. Paz presented the Philippine Coffee Industry Road Map and PHilMech Coffee Postharvest and Mechanization Agenda, respectively.

Coffee specialists from the private sector were invited to serve as resource speakers during the Coffee Expo 2017. Ms. Ma. Rosario Juan, CEO and Chief Extractor of Coffee of Commune Café from Makati, delivered a lecture on Basics of Manual Coffee Brewing using third wave coffee brewing techniques. Princess Kumala "Lala" Elardo, Director of the Philippine Coffee Board Inc. and Chairperson of People's Alliance for Progress Multipurpose Cooperative based in Jolo, Sulu delivered lecture on Marketing Trends and Strategies

Continued on page 21...

PHilMech shows technologies at the Agrilink, Foodlink, Aqualink

PhilMech actively participated as a sponsor in Agrilink, Foodlink, Aqualink 2017 event; organized by the Foundation for Resource Linkages and Development (FRLD). The theme of the event was "Improved varieties and Postharvest Facilities: Essential to Profitability Industry Cooperative." The affair was held at the World Trade Center from October 5-7, 2017 with the opening ceremonies graced by President Rodrigo Roa Duterte himself in which he expressed his gratitude toward the participants and organizers alike in contributing toward the nation's progressively growing agricultural sector.



His Excellency President Rodrigo Roa Duterte delivers his keynote speech during the opening ceremonies of the Agrilink 2017 sponsored and participated by PHilMech.

The Center showcased postharvest systems for Cacao, Coconut and Soybeans. Since the emphasis was on improved varieties and postharvest facilities, practices on minimizing losses and the use of new postharvest technologies especially in cacao were offered to the public. Free information materials were also given to interested clients. Consistent with PHilMech's commitment not only to the public but with the private sector as well, the center invited its partner entities, Korea Agricultural Machinery Industry Cooperative (KAMICO) and the RU (Ramon Uy) foundry and Machine Shop, as co-exhibitors. The former demonstrated their rice mill, mechanical dryer for high value commercial crops, and vegetable

washer while the latter exhibited their organic shredder and other machinery usually used in organic farming.

Three PHilMech co-operators were also present in the retail area namely; the Alion Kapit Bisig Sea-K Farmers' Organization, Rice Processing Complex of Sta. Barbara Pangasinan, and the KKK Soya Milk company. They featured cashew nuts, different varieties of milled rice, and soya milk, respectively.

The extension strategy of inviting partners and clients is proving to be an effective way of convincing potential technology adopters. This is evident by successive purchases of both technology and food products in every exhibit events that PHilMech participated in.

A forum was also held at the Amorsolo Hall at the WTC Mezzanine during the second day of the event. The forum focused on Cacao Postharvest Technologies. The first lecture concerning the Cacao Postharvest Technologies and Processing Systems, Utilization of Cacao Pod Husks as Fuel, and Cacao Sweating Products was delivered by Engr. Andres M. Tuates. The final lecture of the symposium entitled "Environment Friendly Cacao Diseases Control with Microbial" was delivered by Mr. Elijah Z. Davalos. Both lectures generated massive interest especially on the lecture of Mr. Davalos dealing with microbial control agents as this technology is novel and showed

Continued on page 8...



Dr. Michael A. Gragas, author of the research on CCM, answers query in an interview held after the NRS event.

Compact Corn Mill wins gold at 29th NRS

The PHilMech research on Compact Corn Mill (CCM) won big in the 29th National Research Symposium (NRS) of the Bureau of Agricultural Research (BAR) held on November 23, 2017 at Luxen Hotel, Timog Avenue, Quezon City.

The paper on the “Development, Evaluation, and Commercialization of Village-Level Compact Corn Mill”, authored by Dr. Michael A. Gragas, Engr. Jayvee P. Illustrisimo and Dr. Romualdo C. Martinez won gold for the best paper on the category Applied Research TA/TV Agriculture – Agriculture Category. It also won bronze award for best R&D Poster.

PHilMech’s compact corn mill produces good quality corn grits

and can easily be transferred from one place to another. Moreover, it can simultaneously degerm, mill and sort corn grits in one operation.

Alongside this research is a qualifier paper on the “Development of a Pilot Scale Processing System for the Production of Pectin from Mango Peels (Acceptability Studies)” authored by Dr. Ma. Cristina B. Gragas, Dr. Otero A. Capariño, Engr. Aileen R. Ligisan, Don S. Ognayon, Sheryl Mae M. Villota, Alma A. de Leon, Jessica M. Rustia, Geraldine G. Gantioque and Joel G. Juvinal.

The 29th National Research Symposium gives chance to Filipino researches and scientists

to share their innovative ideas that are beneficial to the agriculture and fisheries sectors. Participants are from Department of Agriculture’s (DA) units and agencies, state universities and colleges, and other government institutions.

The said event abides with the theme: “Ensuring Food Security through Agriculture and Fisheries R&D Excellence” » **Benson Z. Munar**

PHilMech – SAFE Network collaborative meeting held

The Philippine Center for Postharvest Development and Mechanization (PHilMech) conducted a meeting together with the Sustainable Agriculture, Food and Energy (SAFE) network coordinator, Dr. Novizar Nazir. The meeting was held at the PHilMech executive lounge on October 21, 2017. It was attended by PHilMech Scientist III Dr. Dionisio G. Alvindia, technical reviewers of the Asian Journal of Postharvest and Mechanization (AJPM) including SAFE network alumni.

The meeting discussed the AJPM of PHilMech in partnership with SAFE network. The AJPM is an

international refereed journal published on-line and on-print for the science and academic community worldwide.

Dr. Nazir gave suggestions in developing the AJPM. "Be consistent when it comes to format, template and the time to publish" he said. Dr. Novi also suggested to publish the journal online to encourage people to submit papers.

The collaborative meeting also tackled the partnership of SAFE network and PHilMech in the upcoming 5th international conference of SAFE network next year to be held in Manila,

Philippines. The said conference will be hosted by PHilMech, the Central Bicol State University of Agriculture, and Pampanga State University. This will be attended by SAFE members all over the world.

Dr. Alvindia said that this event will be a good opportunity for PHilMech to promote its the postharvest and mechanization research, development and extension activities including the AJPM. » **Pia Sarina M. Fukasawa**

CALL FOR PAPERS!

Do you have any recent Postharvest and Mechanization-related findings in Biology, Chemistry, Engineering and Socio-Economics?

Asian Journal of Postharvest and Mechanization

KEY DATES

JANUARY / JULY

Call for Papers

FEBRUARY / AUGUST

Paper Submission Deadline

MARCH / SEPTEMBER

Peer Review

APRIL / OCTOBER

Paper Revision

MAY-JUNE / NOV.-DEC.

Packaging of the AJPM

Email your paper at
od.philmech@philmech.gov.ph
For more information, visit our website
at **www.philmech.gov.ph**

PHilMech, KAMICO launch new technology

Partners, the PHilMech and KAMICO (Korean Agricultural Machinery Industry Cooperative) launched the “PTO-Driven Rotating Disc Plough (Plow)” at the PHilMech headquarters last November 23, 2017.

A techno demonstration of cultivation in three types of soil: sandy, sandy loam, and heavy clay highlighted the launching. The technology was developed for the 35 HP mini-sized tractor and suitable for any crops.

According to Mr. Philip Kim

president of Fitcorea Trading (a representative of KAMICO in the Philippines), the rotating disc plow is excellent for deep plowing since the rice straws and soil are perfectly turned over, resulting to a better quality of soil especially in the rice farm.

“Plowing is very important in farming, the new/deep soil is needed to come out. The problem is, farmers seldom do deep plowing. They only use rotavator which cuts up to 15cm deep while plowing allows deep digging up to 25-35cm”, he added.

The Wecan-Global, a member of KAMICO and based in South Korea, manufactured the technology.

In addition, based on the memorandum of understanding on technical cooperation, PHilMech and KAMICO agreed to pursue and promote agricultural mechanization through collaborative studies and research on machinery development.

» **Jhoanna Keith B. Santiago**

.....

PHilMech shows technologies ...from page 5

benefits absent from synthetic chemical pesticides. Due to limited time, Dr. Estigoy announced that queries should be forwarded to the respective resource speaker as the event was wrapped up at around 1:00pm.

The lecture-seminar of PHilMech during AGRILINK trade fair events is also an opportunity to give the public an idea on what technologies could be expected from the center.

Prominent leaders of the industry also visited the PHilMech booth. Among them were Agrilink

Chairman, Mr. Antonio Roces, KAMICO Chairman, Shin Gil Kim, Assistant Secretary of the Department of Agriculture, Hon. Leandro Gazmin, Former Undersecretary of the Department of Agriculture, Mr. Dante S. Delima, and former PHilMech Director, Engr. Ricardo L. Cachuela.

PHilMech also participated in various exhibits like the 2017 Regional Science and Technology Week in Tabuk, BFAR expo in Pampanga, Kabisig Expo in Bacolod, Cacao Congress in Butuan City, National Organic Agriculture Congress in CDO,

CocoLink in Davao City, Coffee Expo in Butuan City, Cacao Link in Pampanga, Adivay Festival and Agri Aqua Fair in Benguet, Info Caravan in Pangasinan and Cacao Link in Davao City. » **Isis DC. Davalos**



Mr. Pierre Anthony Joven, OIC City Agriculturist Butuan together with PHilMech staff congratulates the graduates of the School-on-the-Air.

SOA on coffee and cacao conducted in CARAGA Region

The Philippine Center for Postharvest Development and Mechanization (PHilMech) in collaboration with the Department of Agriculture CARAGA region conducted a School-on-the-Air (SOA) on coffee and cacao production and postharvest processing or *Kasayuran sa Kakao ug Kape sa Kahanginan (4K)*.

The course aired over four local radio stations in CARAGA namely Radyo Natin 91.1 at Bislig City; Mon Radio in Tagbina Surigao del Sur; San Franz Radio 96.1 in Agusan del Sur and Hope Radio 93.5 in Agusan del Norte. The SOA program aired on April 17- July 31, 2017 was spearheaded by the Agriculture Information Section staff of DA RFO – CARAGA in coordination with PHilMech and local government unit of all cities/ municipalities in the region.

Last November 14-16, 2017, the SOA graduation was conducted

in three different provinces of CARAGA region. The provinces of Agusan del Sur, Surigao del Sur and Agusan del Norte were the locations of the culmination activity of the SOA. Considering the graduates' residences were in remote areas from different municipalities, the team opted to travel to the provinces instead of the farmers travelling to Butuan City which is more taxing, according to Ms. Presilda. "It is the most convenient and strategical way of conducting the graduation," Ms. Emylou Presilda said (Chief AFIS DA CARAGA).

The first batch of SOA graduation was conducted on November 14, 2017 in Surigao del Sur. Farmer-graduates from Bislig City and Municipality of Tagbina attended the activity. A total of 93 graduates have satisfactorily completed the course requirement from the said province. The second batch of SOA graduation was in Agusan del Sur on November 15, 2017.

A total of 95 farmer-graduates from the Municipality of Rosario and Prosperidad satisfactorily completed the course. The last batch SOA graduation was conducted in Butuan City, Agusan del Norte. Farmer-graduates from the municipalities of Buenavista, Las Nieves, Agusan del Norte, Cabadbaran and Butuan City attended the graduation. For the province of Agusan del Norte and Butuan City, a total of 133 graduates satisfactorily completed the course.

After the four-month SOA, outstanding students from each city/municipality were recognized. A plaque of recognition was given to the outstanding farmer-graduates and a certificate of completion was given to all graduates. » **Ruben de Guzman**

Land Bank taps PHilMech's training expertise

Land Bank- Nueva Ecija tapped the expertise of Training Management and Technology Division (TMTD) of the Philippine Center for Postharvest Development and Mechanization (PHilMech) to conduct a three-day training course on mechanization and postharvest technology last December 13-15, 2017.

This training attended by 45 participants consisted of lecture-discussions and hands-on training operation of various farm machinery from land preparation to harvesting.

During the opening program, Dr. Baldwin G. Jallorina, Director IV of PHilMech assured the participants that PHilMech is open to provide assistance when they need it. He expressed his gratitude to them hoping that they would be able to grasp all the necessary knowledge they need in operating farm machinery.

A consultation meeting was conducted after the training. Participants were able to clarify their concerns regarding mechanization and other possible assistance the Department of Agriculture (DA) can provide.

Moreover, issues on the maintenance and repairs of



Deputy Director Engr. Raul Paz closes the three-day training course.



A lady trainee was assisted by a PHilMech staff during the hands-on training.

machinery were also raised during the consultation meeting. Engr. Niño Bengosta of the Agri-Infrastructure Coordinating Unit of PHilMech explained that after-sales service are provided by these manufacturers. The farmers will only need to request for assistance from them.

Account officer of Land Bank Nueva Ecija, Mr. Flor Amado

Cabatan, announced that the Land Bank Regional Office was planning to replicate the same kind training to other provinces in Central Luzon as it has been helpful in the training and enhancing the knowledge of their beneficiaries in the operation and management of rice machinery. » **Nicole G. Calibuso with reports from Sherielyn B. Banglig (TMTD)**



Project leaders who participated in the training workshop on the application of Harmonized Gender and Development Guidelines.

GAD training program features HGDG application

Twenty-three project leaders and staff participated in the three-day activity hosted by the Gender and Development Program on October 23-25, 2017 at the PHilMech Training Hall.

The training-workshop featured sessions designed to introduce the project leaders of PHilMech to the features of the Harmonized Gender and Development Guidelines (HGDG) tool and its application to GAD Planning and Budgeting to help achieve gender equality and empower women through PHilMech projects and programs.

Ms. Lorenza A. Umali, Independent GAD Consultant, served as the resource speaker. She discussed

Revised Guidelines in the Audit of Gender and Development (GAD) Funds and Activities in Government Agencies COA Circular No. 2014-001, Guidelines for the Preparation of Annual Gender and Development (GAD) Plan and Budget and Accomplishment Report to Implement the Magna Carta of Women, Overview of Harmonized GAD Guidelines and Policies, Review of GAD Concepts, Gender Analysis Tools, GAD Checklist for Project Implementation and Management and Monitoring Evaluation, GAD Checklist for Agricultural and Agrarian Reform Projects and the Gender Analysis Questions. Lectures were complemented by workshop sessions.

Simultaneous application of HGDG tool to PHilMech projects tagged in the agency GAD Plan and Budget FY 2018 were conducted. An enhanced output which determines the cost of the program budget that can be attributed to GAD was crafted by the participants at the end of the training. » **Danica Soriano**

Cover Story



Cacao Hauling Made Easy at Barangay Tawan-Tawan, Davao City

by Jett Molech G. Subaba

Three creeks. Two-kilometer trail. One sack of cacao on shoulders.

These are the challenges the cacao farmers at Barangay Tawan-Tawan Baguio District in Davao City face during the harvest season of cacao in bringing their produce to the nearest road.

According to Merlina G. delos Santos, chairperson of the Mt. Tipolog Bantay Kinaiyahan Association, this scenario has been a burden in their area for many years thus, most of the land were just abandoned and remained untilld. But when the Agricultural Tramline System (ATS) developed by the Philippine Center for Postharvest Development and

Mechanization (PHilMech) was granted and installed in their area in 2013, their lives have changed.

The ATS is an alternative transport system for farmers in areas isolated from road network because of ravines, rivers or dense vegetation. It is a hauling facility using cables, pulleys and carrier to transport agricultural produce. It is developed to improve farm productivity and save up to 20 percent hauling expenses of farmers.

This first ever tramline in Davao City was initiated by their local government and they waited for seven years before it is finally granted to the barangay. Since the barangay is not permitted to do



The Agricultural Tramline System



Dried Cacao Beans

the operations, it was transferred to Mt. Tipolog Bantay Kinaiyahan Association. They have 146 cacao farmer-members tilling 384 hectares of land at the foothills of Mt. Tipolog. Aside from cacao, they also produce durian, lanzones and corn.

Saving more with ATS

Delos Santos, 45, commends the technology for its various help to the farmers in their area. One of the major benefits the association has experienced in using the ATS is, it saves time.

"Before, when we haul our produce from the mountains, it took us five hours before we reach the nearest road. With this tramline system, we only need to bring our produce at tower B, then we can ride and travel for only five minutes towards to road. It is very easy now," said delos Santos.

Another benefit of ATS is, it saves energy. "Since we don't need to carry our produce down the ravines and through creeks and rivers for five long hours, we don't get tired anymore after hauling all our produce. We can even have spare

time to chill and rest after our activities," she added.

The ATS can also save money from hauling expenses. "Before, we pay a lot for hauling like Php6.00 per kilo for manual hauling with a capacity of 50 kilos per person. With the ATS, the farmers will only need to pay Php1.00 per kilo with no hauling burden," delos Santos emphasized.

Moreover, ATS helps increase productivity and income of farmers in Barangay Tawan-tawan. "Aside from the money we saved from lesser hauling fees, we were able to till 100 hectare more of land for cacao. Before, it was abandoned and not developed because of the drudgery of manual hauling during harvest season, but now it is tilled and it means more income for us," delos Santos happily explained.

ATS can even save the quality of their produce especially with their banana products. They can bring down newly harvested bananas and as a result, they don't have to go to traders but the buyers go straight to them. Lastly, in an unexpected situation, their ATS was even able to save a life when a

person at the foothills of Mt. Tipolog accidentally fell on the ravines. He was transported via ATS and has reached the hospital on time.

Good stewardship begets more ATS

The association has encountered problems with the ATS as its rope was accidentally cut after three people reached the tower B. Since they have profited from its operations, they were able to buy replacements for the rope and brought back the operation of the ATS.

Because of their good performance in their area, they were granted two more ATS under the name of their organization. These ATS in their area open more land to be tilled because of its promising benefit of making hauling of produce easier and better.





Cacao Roaster



Cacao Pods



Cacao beans



Sweatings from cacao



Briquettes from cacao pods

Chocolate has been the people's all-time favorite snack. The sweetness it brings makes people crave it for more.

But have we ever wondered how chocolate is made? How every bite of this favorite chocolate bar is processed?

In a small province of Talandang, Calinan in Davao City, the members of Cocoa Foundation of the Philippines (Cocoa Phil) showed and demonstrated how from a simple cacao bean, useful products like the tasteful chocolate tablea, are made. Cocoa Phil is a group of farmers and cacao processors developing different cacao products.

Beginnings

Marichu Sanchez, 36, a staff of Cocoa Phil shared how cacao processing and their foundation have changed many lives. The

foundation started in 2011. Since then, PHilMech technologies like the solar dryer, piston type briquetting machine, fermentation box and splitter were being used, thus continuously supporting the foundation. Cocoa Phil is also helping the farmers in their province through programs like "Plant now, Pay later". Farmers can guarantee to continuously plant cacao and earn more income. They also train the farmers in pruning and providing fertilizers if necessary.

Ms. Sanchez clarifies that they are just guiding and helping farmers in need but not providing financial assistance.

According to her, they can't process good beans without PHilMech technologies "*Lalo na pag tag-ulan, dun kasi kami hiram magpatuyo ng beans. Kaya buti nalang meron nung dryer.*" (Especially in rainy season, that's when we find it hard to dry the beans. Good thing we have the dryer).

USEFUL Products FROM Cacao

by Pia Sarina M. Fukasawa

Cacao Processing

Ms. Sanchez discussed the step by step cacao processing. All wet cacao beans harvested from the farm drip within 16 hours before putting to the fermentation box. The beans will be mixed every hour in the fermentation box. After mixing in the fermentation box, the beans will be transferred to another box for about five to six days.

The beans will be cut, to see if it is purple already. The color purple will be the indicator to put the beans in the solar dryer. The mixing continues every hour in the solar dryer. *"Matrabaho din talaga ang pag pa-process ng cacao, pero once na masanay ka na okay na din"* (Cacao processing is really laborious but when you're used to it, it's going to be easy), she said. The drying days will depend on the variety of beans. If it's BR-clone, it will take five to six days to dry the beans but UF18 will take seven days in the drying box. The dried beans will be transferred to a jute sack for weighing. Then, small and flat beans will be separated in the sorting machine.

Tablea, briquettes and other products

One of the famous products of cacao is the tablea. A tablea is a chocolate bar refined using roasted beans. According to Marichu, tablea is the only product they sell in the market for now because it is easy to make.

In making the tablea, the dried beans will be roasted for 45 minutes. The nibs are included in the mixture and roasting of the tablea. They will grind the roasted beans for two times to refine. It

will also be mixed and molded overnight before putting it to a molder. The molded tablea will be chilled in a refrigerator within five hours for 200 grams and seven hours for one kilo. When chilled, this will be wrapped, now ready for sale in the market. Another product of cacao is the briquette. Cacao briquettes are from cacao pods that are usually left in the field after processing. Instead of leaving them unutilized, these are used as a source of alternative energy because of its high heating value.

Engr. Andres Tuates of the Bio-Processing Engineering Division of PHilMech explained how briquetting can be done. According to him, the whole cacao pod will be cut. Then the wet bean will be scooped for fermentation. The pods are dried afterwards will now be put in a shredder to be refined and to a hammer mill. According to Marichu, it is important for a cacao pod to be shredded for better quality of the product.

Briquettes are heated containing starch. When molded, it will then be placed in a dryer. The briquettes are the easiest products to make. The husks are not wasted in the farm and can be used many times. "It is really useful to us especially for farmers here who use charcoal briquettes", Marichu added.

Other products can be made from cacao sweatings. Cacao sweatings come from the unfermented cacao beans that produce less chocolate flavor. The products include wine, vinegar, juice and jam. There are also products like cacao shell, cacao tea and cacao soap. "Wala talaga nasasayang sa cacao, kasi may mga gamit kahit yung maliliit na butil na makikita mo



diyan" (There is really no waste in cacao. Because even the smallest grain scattered in the field have its use), Marichu said.

Benefits derived, problems encountered

The products prove that there are lots of ways in using cacao beans. One good benefit of cacao is that it is good for the heart. "Some people say that eating or drinking too much of cacao can cause diseases, it is not true. It has a lot of benefits actually. It has antioxidant.", said Marichu.

Aside from the health benefit of the product, processing cacao beans has its advantages. Farmers of the foundation find it easy, even if it takes hours and days of processing the beans. When asked about problems encountered in the processing, Marichu has few words to say, *"Pag tag-ulan lang talaga mahal*

Continued on page 20...



Davao del Sur

Davao del Sur is located in the southern part of the Philippines and considered the third largest province in terms of land area. It covers a total of 393, 401 hectares with 45 percent of utilized for agriculture. Most of the population in this province are Visayan migrants who speak Cebuano. The province is diversified with different ethnic groups like B’laans, Bagobos, Manobos and Tagacaolos.

Agricultural Profile

Davao del Sur is mainly agricultural. It is in a strategic position to contribute in the region’s development. Aside from mango, rice, corn, banana, sugarcane and coconut, it also produces cocoa, coffee and a variety of fruits and vegetables.

Its coastline is a long and promising industry to boost fishery production in the region.

Postharvest Situationer

The lack or the absence of postharvest facilities and inaccessible farm to market roads were the major problem confronting the province of Davao del Sur. Alongside these problems are the inadequate technical knowledge, high labor cost, high cost of transportation, pest and diseases, cold storage facilities and absence value-adding activities. and diseases incurred such losses and problems.

These problems incur postharvest losses on rice, corn and mango, while decreasing the quality of catch in the fishery sector of the province.

Proposed Postharvest Projects

During the consultation and planning workshop with the different stakeholders, the following postharvest projects were proposed:

- ▶ Establishment of Integrated Postharvest Facilities Service Center
- ▶ Establishment of Community-Based Drying Center
- ▶ Establishment of Agricultural Tramline
- ▶ Establishment of Cold Chain System for HVCC
- ▶ Establishment of Mango Packing House
- ▶ Establishment of Ice Plant and Cold Storage
- ▶ Establishment of Fish Processing Plant
- ▶ Establishment of Rice Wine Processing

Source: *Davao del Sur Postharvest Development Plan (2008-2018)*
DA-PHilMech (formerly BPRE) and the Provincial Government
of Davao del Sur

Utilization of Cacao Pod Husk as Fuel Briquettes

Andres M. Tuates Jr., PAE
Jeszel M. Suligan, PAE
Ofiero A. Capariño, Ph.D.

Bio-Process Engineering Division
PHiMech

RATIONALE

Cacao beans are primarily used in chocolate processing. However, the entire processing operation generates substantial quantity of pod husk of about 77% of the whole weight of cacao pods. Traditionally in practice, the cacao processors prefer to collect the cacao beans only leaving the cacao pods in the field unutilized which generates foul odors and becomes inoculum of black pod rot, and pathogens. Cacao pod husk has a high heating value, large amount of dry matter and low ash content that can be utilized as source of alternative energy. Converting cacao pod husk into fuel briquettes will add value and at the same time address the problem of waste disposal.

OBJECTIVES

The project sought to develop environment-friendly fuel briquette product sufficient to resist the impact during handling and transport and produce the required heat for domestic and industrial applications.

METHODOLOGY



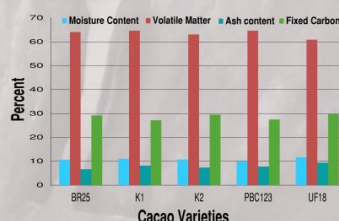
RESULTS

1. Description of cacao pods

The average weight of cacao pods and percent pod husk are 588.27g and 76.29% respectively. The initial moisture content of pod husk ranges from 89.21%±1.27 to 90.10%±0.93. With the projected production of 100,000 metric tons of fermented dried beans in year 2020 and beyond, the cacao industry can generate approximately 633 million kg of cacao pod husks.

Cacao Clones	Average Weight, g		Percent Pod Husk	Initial MC of Husk, %
	Pods	Husk		
UF18	717.20	529.40	73.69 ± 3.99	93.37 ± 3.30
BR25	499.40	379.00	75.63 ± 3.11	88.88 ± 2.49
K2	641.70	515.30	80.24 ± 1.82	89.31 ± 1.86
PBC123	558.30	431.80	77.41 ± 1.19	90.10 ± 0.93
K1	525.00	388.73	73.99 ± 2.25	89.21 ± 1.27
Average	588.27	448.44	76.29	90.17

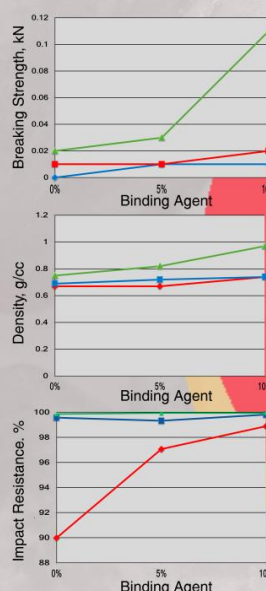
2. Chemical properties of cacao pod husk



The combustible volatile matter and fixed carbon content of pod husk obtained ranges from 60.89% to 64.69% and 27.16% to 29.69%, respectively.

3. Physical properties of cacao pod husk fuel briquettes

The briquette is cylindrical in shape with hole in the center to promote efficient combustion. The size of briquette is 50 mm in length with an outside and inside diameter of 50 mm and 16 mm. Ten percent binding agent and less than 2.2mm particle size of cacao pod husk obtained the highest bulk density, shatter resistance and break strength of fuel briquettes with a mean value of 0.75 g/cc, 99.93% and 0.114 kN, respectively.



4. Thermal properties of cacao pod husk fuel briquettes

The average energy density and thermal efficiency of the optimum formulation are 2,412.55 cal/cc and 26 percent. Likewise, the energy demand in the production of a ton of the energy contained in a ton of cacao pod husk briquettes with a value of 3,741.1 kWh.


5. Financial Profitability

Approximately 1,200 of cacao pods are needed to produce 650 pieces of fuel briquettes. From the assumption that an investor shall acquire the machine for custom services, investment analysis showed that the project is profitable with a BCR, PBP and IRR of 1.90, 1.84 years and 22.19, respectively. The breakeven selling price of cacao pod husk fuel briquettes is only P16.67/ kg.

CONCLUSION

The cacao pod husk can be utilized to produce high quality briquettes. The physical and thermal properties of the optimum formulation are sufficient to resist the impact during handling and transport and produce the required heat for domestic cooking and also for industrial application. Likewise, the energy demand in the production of a ton of briquettes is only 4.8% of the energy contained in a ton of cacao pod husk briquettes with a value of 3,741.1 kWh.



 Dr. Baldwin G. Jallorina, PHilMech Director IV, delivers his message during the tower lighting ceremony at PHilMech.

Jallorina speaks of harmony in Christmas lighting ceremony

The Philippine Center for Postharvest Development and Mechanization (PHilMech) ushers in the yuletide season with a spectacle of lights as the agency held its annual Christmas Lighting Ceremony on December 7, 2017 at the Main Gate of PHilMech Main Office in Science City of Muñoz, Nueva Ecija.

The ceremony commenced with prayers of thanks, hope and wishes offered by Dr. Ofero A. Capariño, Engr. Genaro M. Tolentino, and Dr. Normita A. Pasalo depicting the gratitude, well-wishes and aspirations of the R&D, Extension, and Support clusters of PHilMech. Christmas carols and instrumental rendition of various holiday hymns added entertainment to the festivity.

PHilMech's main entrance sparkled in blue and white as the newly appointed PHilMech Director IV, Dr. Baldwin G. Jallorina, together with the members of the PHilMech Management Committee, led the lighting ceremony. In his first ever directorial speech and Christmas message, Dr. Jallorina emphasized the importance of harmony as he leads the agency into new heights.

Deviating from the traditional tower lighting ceremony, PHilMech's 2017 Christmas Lighting program serves as a symbolism that PHilMech can go beyond the norms and shine brighter for everyone to see and marvel at. » **Lovelle ds. Ramos**

Celebrating Christmas in “Denims and Diamonds”

PhilMech defines Christmas as a time when the employees are dear to each other, festive in spirit and united in desire to celebrate the birth of our Lord Jesus Christ. This is manifested during the agency's Christmas Program held on December 21, 2017 at the PHilMech Training Hall.

With the theme-motif “Denims and Diamonds”, employees combined simplicity and elegance in their attire and presentations as they gather in this annual event.

The *Indak Anihan*, the dance troupe of PHilMech, ignited the heat of the event with their opening dance number. Special numbers from employees like singing, duo dance, saxophone playing and band presentations showcased and proved that PHilMech is the home of multi-talented employees.

One of the highlights of the event was the introduction of the newly appointed Director IV of PHilMech, the bubbly and friendly, Dr. Baldwin G. Jallorina. Through the event, the PHilMech achievers or those who has received an award or won a contest outside the agency, were also recognized and awarded. Mr. Reynaldo F. Ramos, one of the drivers of the agency was awarded a plaque of appreciation as he retires from public service this year.

To appreciate and encourage the employees to wear the theme of the celebration, best in costumes were awarded, one for male and another for female. The annual raffle draws consisting of gifts from allies and the administration, was the most anticipated part as cash, fruit baskets, rice, goods and appliances were given away to lucky winners.

Christmas is the best time of the year for all employees when they are only required to sit down, watch, eat, laugh, enjoy and savor the fruits of their whole year hard work in one festive celebration while recognizing the reason for the season. » **Jett Molech G. Subaba**



PHilMech Band sings Christmas carols



PHilMech Indak Anihan during the opening salvo

Useful products from cacao...*from page 15*

*ang kuryente. Kasi sa pagpapatuyo mas matagal pag ganung panahon** (When rainy season, we have a higher electricity consumption because drying of beans can be lengthy during those times) We also asked if they encountered problems from using the machine, Marichu said that sometimes they encounter technical problems but this can be fixed.

Mr. Rolando Suico, farmer from Malagos Cacao and Coconut Farmers' Association also shared that the main problem in cacao is the pod rot especially during rainy days. Insects can easily rot the beans before harvest. So it cannot be used anymore. But with the help of PHilMech Scientist III, Dr. Dionisio G. Alvindia and Engr. Andy Tuates, the pod rot problem was solved and prevented with the insecticide they formulated.

The Cocoa Phil is really thankful to PHilMech. *"Sobrang laki talaga ng pasasalamat namin sa PHilMech for providing these machines and equipment para mas lalong dumali ang processing namin ng Cacao."* (We are really thankful to PHilMech for providing these machines and equipment for faster cacao processing), said Marichu.

She is also thankful how cacao changed the lives of the farmers and her co-workers. Before, they really find it hard to seek



Cocoa Phil's processing lab



Cacao Plant

job especially in farming. But then when the foundation was established, a lot of them were given opportunities to earn money and help their families. Not only that, they also gained knowledge in the processing of cacao beans and other products.

From a small cacao bean, there are lots of cacao products that

can be made. Aside from the income derived from the products, the benefits of using cacao technologies have been really felt by farmers and consumers alike.

PHilMech leads Coffee ...from page 4

and inspired the participants with the story of the Sulu Royal Coffee. Ms. Jennifer Rimando, a Certified Q Grader from Sagada, Mt. Province led the Coffee Cupping and Profiling with hands-on coffee cupping activities and quality assessment.

This year's project assessment was participated by seven enterprises assisted by the PHilMech-funded and DA BAR-funded coffee projects.

Mr. Vincent Andawi of Sagada Arabica Coffee Growers and Producers Organization, Mr. Emmanuel Albano of Kalamansig LGU, and Mr. Nilo Calipayan of Km.7 Farmer Producers Cooperative were awarded as Best Presenter for the start-up stage and incubation stage (municipality and enterprise led) respectively. Dr. Normita Pasalo of PHilMech PMITD served as the head judge during the said assessment.

Other enterprises present were the Tuba Benguet Coffee Growers Association and Bocod Arabica Coffee Producers Association Inc. from CAR, Casile Guinting Upland Marketing Cooperative from Region 4A, Cabcungan Integrated Social Forestry Farmers Association from Region 6, and other coffee farmers from the CARAGA region.

The participants had the chance to visit and learn from the Mabuhay Kahayagan Coffee Growers Cooperative in Tagbina, Surigao del Sur where farmer-to-farmer encounter and sharing of ideas took place.

The co-host for the next Annual Project Assessment and Coffee Expo will be the DA-RFO CAR and is expected to convene in Sagada, Mt. Province in November 2018.

» **Ivy V. Villanueva**



Visitors buy coffee products during the coffee expo.

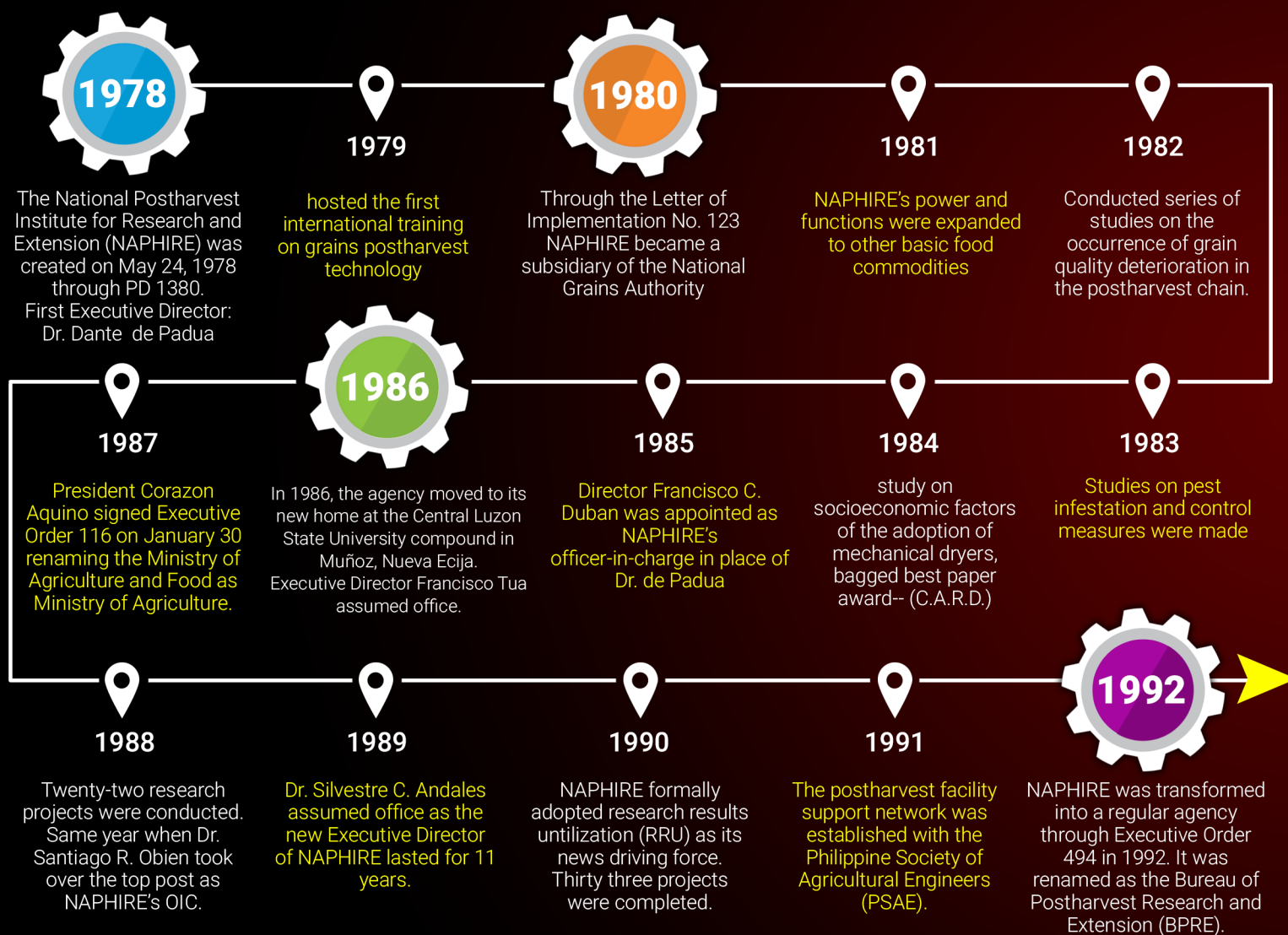


The participants to the 2017 coffee expo.

COUNTDOWN TO

40

PHilMech Stories (Part 4) : TIMELINE OF PHILMECH STORY



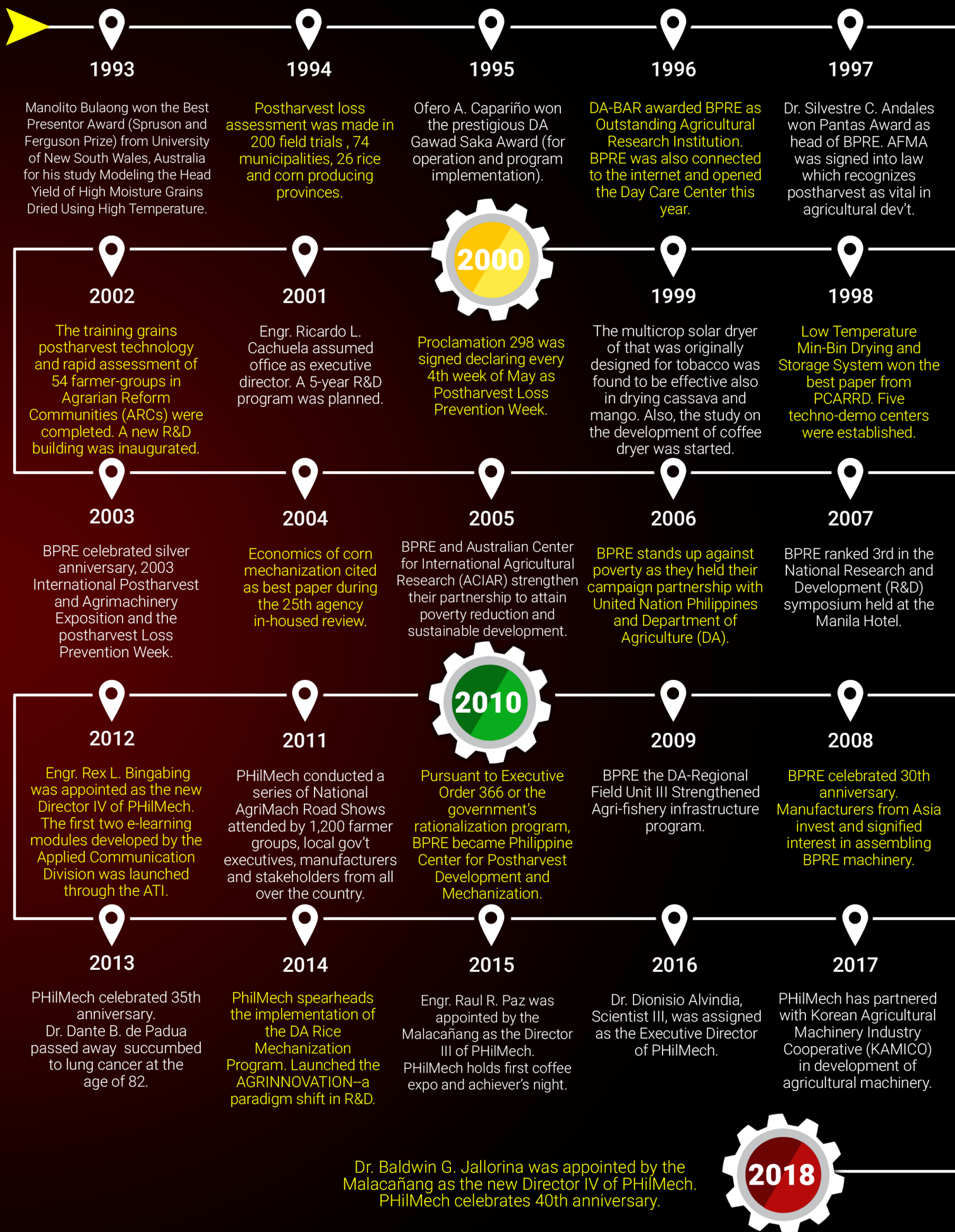
Sources:

- "BPRES@25" Silver Anniversary Magazine of BPRES, 2003. (Edited by: Jerry James dela Torre)
- PHilMech Newsletters from 2004-2017.

Researched/Compiled by:

Benson Z. Munar, Nicole G. Calibuso and Paolo Carl E. Soliven







Woman Cacao Processor



CLSU Cmpd., Science City
of Muñoz, Nueva Ecija, 3120



(044) 456-0213
(044) 456-0110



www.philmech.com



facebook.com/philmech



[@philmech](https://twitter.com/philmech)

A woman processor from the
CocoaPhil in Davao City.
Photo by Danilo T. Esteves