RESEARCH FOR DEVELOPMENT

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## How to manage onion armyworm?

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# ABOUT THE COVER

The 2016 outbreak of onion armyworm in Central Luzon led to an estimated billion-peso production loses. To prevent this from happening again, DA-BAR along with partner research instutions implemented numerous projects to identify an effective integrated pest management options. These strategies were disseminated to onion farmers in the affected areas and have helped them since. Continuous efforts are being done to disseminate this technology to more onion farmers.





**BAR R4D DIGEST** is the quarterly magazine of the Department of Agriculture-Bureau of Agricultural Research.

This magazine contains feature stories on the latest technologies and breakthroughs in agriculture and fishery research for development (R4D) based on the studies and researches conducted by the member-institutions of the National Research & Development System for Agriculture and Fisheries.

The bureau was established to lead and coordinate the agriculture and fishery R4D in the country.

The editorial board welcomes comments and suggestions from readers. Reach us via our email kmisd@bar.gov.ph and our social media accounts DABAROfficial.




Agricultural Magazine of the Year
2007 Binhi Awards

Best News Magazine
2003 Gawad Oscar Florendo

# Strengthening R4D response in sustainably managing pests and diseases

by Dr. Vivencio R. Mamaril

Prevalence of pests and diseases in crops and animals have been among the problems of our farmers and fishers—resulting to yield and income losses.

As farmers have families to support and not to mention the important role they play to enable every Filipino to have food on their tables, known factors such as these can impede improved productivity and increased profitability.

Thus, preventive measures through sustainable programs to respond quickly to this threat must be implemented to reach the full potential of the commodity, hence, enhance the level of food sufficiency and security in the country. This could only be achieved by timely application of scientific knowledge and technology as rapid response.

The amount of scientific knowledge along with new tools or approaches to combat pests and diseases is increasing. Hence, significant contributions are noted to address the yield and income losses brought by various pests and diseases.

Agriculture Secretary William Dar recognizes the value of an effective, efficient, and sustainable crop pest management system.

Secretary Dar signed the Department Order No. 9 series of 2020 that aimed to rationalize and strengthen the crop pest management of the Department of Agriculture (DA). This is attuned to DA's vision of "A food secure and resilient Philippines with empowered and prosperous farmers and fisherfolk," and its battlecry of *Masaganang Ani at Mataas na Kita*.

In response, we at the DA-Bureau of Agricultural Research (BAR), as the national coordinating agency for agriculture and fishery research for development (R4D), supported a number of research studies and established strong collaboration with the National and Regional Crop Protection Centers, DA regional field offices, DA attached agencies, state universities and colleges, other partner agencies, and stakeholders in the implementation and adoption of various technologies.

On this note, we are pleased to present the first quarter issue of BAR R4D Digest for 2021 that highlights some of the significant R4D responses to address the challenges and concerns in the agriculture and fishery sector, particularly on the management of pests and diseases.

Five feature stories on researches conducted on control and management for pests in onion, viruses in rice, insect pests and diseases in corn, *Salmonella* in meat samples, and transboundary pests and diseases in crops can be seen in these pages.

The research studies have generated technologies, techniques, and decision support tools that are considered to be effective and efficient in the early detection, prevention, and control of pests and diseases—results of which can be acquired at a faster rate.

As part of our repackaged BAR R4D Digest, also featured in this issue: a success story from a corn farmer upon adoption of the technology; efforts and initiatives on infestation monitoring of DA-Central Luzon; and infographics on the developed online monitoring system and decision support tool for rice, as well as on the management of mango pest.

Contributory to efficient conduct of researches are the establishment of research facilities and acquisition of laboratory equipment. Two research facilities, supported by the bureau under its Research Facilities Development Grant program, reflected their contribution to ensuring accurate and timely results that can aid in control and management, thus, preventing possible outbreaks.

Going beyond productivity and profitability, management of pest and diseases can also ensure safe and quality produce from our farmers and raisers, thereby warrants consumer protection.

These are just a sneak peek of what are in store in this issue. But what is also important to note—all knowledge and information generated and other significant findings can immediately assist and capacitate farmers, extension workers, industry players, and other stakeholders in understanding pests and diseases prevention, management, reduction, and/or possible eradication. ###

# LAMP assay technique proves effective, effic in detecting rice virus

by Jhon Marvin R. Surio

The use of a virus detection technique called the loop-mediated isothermal amplification (LAMP) for the detection of rice viruses in the Philippines is a revolutionary initiative for the swift diagnosis of rice plant diseases and their management.

LAMP is a simple and inexpensive detection protocol that can provide results within an hour, even faster than the polymerase chain reaction (PCR) technique.

Researchers of the Department of Agriculture-Philippine Rice Research Institute and Central Luzon State University spearheaded the use and optimization of LAMP assay to detect viruses in inoculated seedlings and field diseased rice plant isolates.

These include the rice tungro bacilliform virus (RTBV), rice tungro spherical virus, rice grassy stunt virus, rice ragged stunt virus (RRSV), and the rice dwarf virus (RDV).

In addition, RDV was detected in its green leafhopper (*Nephotettix nigropictus*) insect vector and RRSV in brown planthopper (*Nilaparvata lugens*).

With this technology, early virus detection will be enhanced to raise awareness both among extension workers and farmers in the fields, preventing viral disease epidemic in major rice production areas in the country.

At present, rice viral disease epidemic only becomes noticeable when a large area of rice fields already shows discernible symptoms, and the insect vector population is already high. Management and control of the disease when it is already widespread thereby becomes a very difficult task.

Hence, the urgency of detecting initial virus infection before symptoms manifest is deemed important to provide necessary advanced warning to stakeholders.

Some of the remarkable achievements of the research include the detection of RTBV in asymptomatic plants in just a day after inoculation. The diagnosed plant later exhibited symptoms of yellowing and stunting. It bested the detection protocol using the serological-based enzyme-linked immunosorbent assay (ELISA).

Results of LAMP trials also proved its effectiveness as it was able to detect tungro infection at an early stage while symptoms are not fully expressed by the rice plant. While, ELISA and PCR proved less reliable.

As for the detection of RRSV in rice plant and insect vector, both LAMP and ELISA proved practical in determining the presence of the virus. Same goes for RDV that is also a significant achievement because of its limited epidemiological studies in the country.

The latent period of the rice viruses in the plant and insect vector is two to three weeks. With the technology, the presence of diseased plants and viruliferous insect vectors can be known days earlier.

LAMP molecular technique offers farmers and pest control officers access to reliable and prompt virus disease diagnostic tool, so that they can immediately mobilize local disease management system and apply the appropriate management strategies. This will also allow protection of standing crops and the avoidance of crop loss and additional pesticide expenditure and misuse. ###

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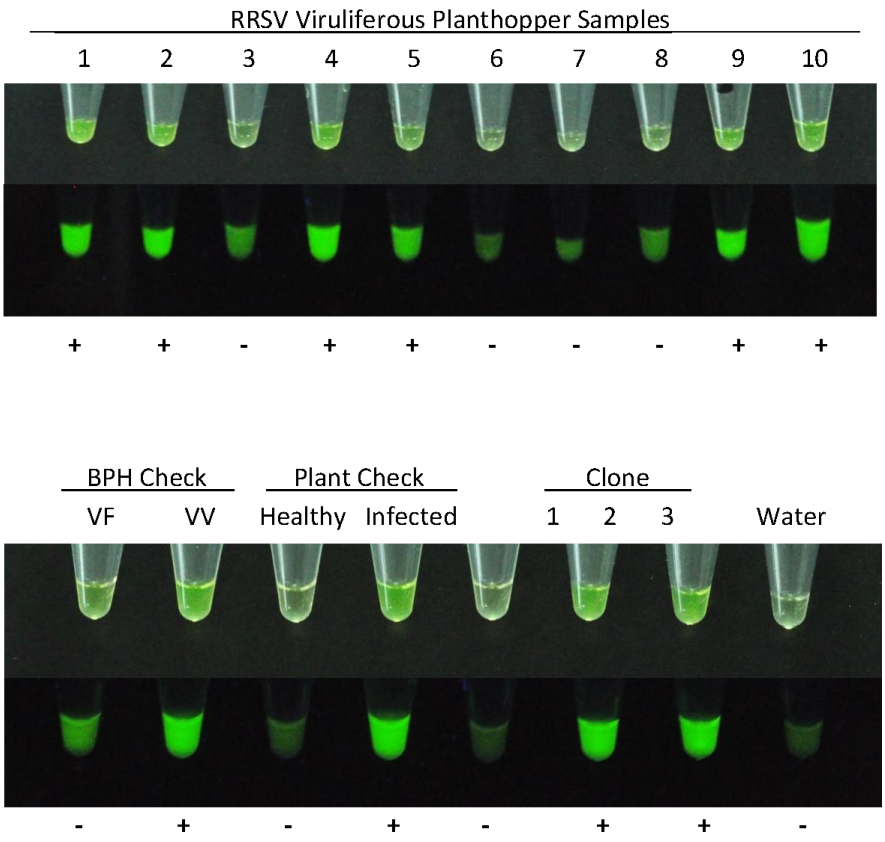
PHOTOS: DA-BIOTECH




Detection of rice ragged stunt virus (RRSV) by LAMP assay in RRSV-viruliferous brown planthopper (BPH). LAMP results were observed under white light (top row) and ultraviolet light (lower row). VF = virus-free, VV = viruliferous vector.

**LAMP molecular technique offers farmers and pest control officers access to reliable and prompt virus disease diagnostic tool, so that they can immediately mobilize local disease management system and apply the appropriate management strategies.**

# R4D initiatives to effectively manage transboundary plant pests and diseases

by Salvacion M. Ritual

PHOTO COURTESY OF NCPC-UPLB

> Improving capacity is a powerful leverage to ensure effective and adaptive IPM and monitoring system at the farmers' level, while inclusive partnerships along the value chain make the whole system resilient.

Plant pests, which include insects, pathogens, and weeds continue to be one of the serious threats to food and agricultural production. In particular, the concern on transboundary pests and diseases is of importance as these can easily spread from one region to another.

The spread of transboundary plant pests and diseases has increased dramatically in recent years. Globalization, trade, and climate change, as well as reduced resilience in production systems due to decades of agricultural intensification, have all played a part, according to the Food and Agriculture of the United Nations.

Among the identified destructive transboundary pests or diseases are onion armyworm (OAW), fall armyworm (FAW), fusarium wilt (FW), downy mildew, witches broom disease, and cecid fly topping the list.

Transboundary pests and diseases substantially contribute to food and production losses. These invasive pests and diseases know no boundaries, spreading rapidly, affecting farmers who rely solely on their farms for food and livelihood.

## Addressing the threat to food security

Recognizing these, the Department of Agriculture (DA) has crafted the program on "Management of Transboundary Plant Pests and Diseases" to develop an integrated pest management options for transboundary pests and diseases and come up with science-based approach and recommendations.

The implementation of the program is in line with the instruction of Agriculture Secretary William Dar to DA-Bureau of Agricultural Research (BAR) to support and come up with R4D agenda, programs and deliverables in addressing the threat of these economically important pests.

Funded under Bayanihan 2-Recover as One Act, the program covered the verification and technology transfer of management strategies against FAW of corn, mango cecid fly, OAW and FW in banana; validation of integrated management strategies and dissemination of improved diagnostic systems for selected transboundary pests and diseases; as well as remote monitoring of transboundary plant pests and diseases; and field efficacy of three entomopathogenic fungi as biocontrol agents against FAW.

These studies are being implemented by the National Crop Protection Center (NCPC) of the University of the Philippines Los Banos (UPLB) and DA-Bureau of Plant Industry in collaboration with the DA-Regional Crop Pest Management Centers and local government units.

Among the initial results of this program include the identified five effective mode of action of insecticides Spinetoram (MoA 5), Emamectin benzoate (MoA 6), Cyantraniliprole (MoA 28), Tetraniliprole (MoA 28), Azadirachtin (UN), Matrine- (UN) which can be recommended for rotation as part of insect resistance management program against OAW. Apart from these, 10 insecticides (nine conventional and one botanical) were found effective against FAW belong to eight MoAs Emamectin benzoate (MoA 6), Spinetoram (MoA 5), Tetraniliprole (MoA 28), Cyantraniliprole (MoA 28), Chlorfluazuron (MoA 15), Chlorantaniliprole (MoA 28), Pyridalyl (MoA UN), Chlorfenapyr (MoA 13) , Indoxacarb (MoA 22A) and a botanical insecticide Matrine (MoA UN).

The project verified management strategies against major pest concerns in the Philippines. The efficacy of biological control-based strategies (earwigs, diatomaceous earth, entomopathogenic fungi *Metarhizium anisopliae* and *Beauveria bassiana*, and nucleopolyhedrovirus) were determined against FAW. Likewise, preliminary results suggest that Insecticide Resistance Management (IRM) and bagging practice are effective against mango cecid fly as recommended by the team of Dr. Celia Medina.

This research initiative also identified additional insecticides effective for OAW and provided an IRM strategy focused on alternating different modes of action aimed at delaying the development of resistance of OAW. In addition, optimization of production of entomopathogenic fungi and bioefficacy studies on the potential of biological control strategy against FW of Latundan are being documented.

Validation of existing Integrated Pest Management (IPM) strategies in selected sites is an on-going activity. The use of fungicides Tebuconazole and Trifloxystrobin + Carbendazim combination at ½ RR was initially found to be effective in inhibiting *L. theobromae* causing vascular streak die-back in cacao.

The application of low altitude remote sensing in monitoring and assessing incidences of insect pests and diseases were studied. Unmanned aerial system with multispectral camera collected series of images of corn, onion and cassava fields infested with fall armyworm, onion armyworm and Cassava Phytoplasma Disease, respectively. Through vegetation index and canopy cover analysis, prototype protocols for detecting and assessing the three transboundary pests were developed.

Other accomplishments of the program on improved diagnostic systems, remote sensing and risk analysis, and field trials of entomopathogenic pathogens, among others are still being documented.

## Ensuring adaptive strategies at the farmers' level

Improving capacity is a powerful leverage to ensure effective and adaptive IPM and monitoring system at the farmers' level, while inclusive partnerships along the value chain make the whole system resilient.

With this, capacity building of regional stakeholders including farmer-beneficiaries with the different skills and strategies to identify, diagnose, monitor, and collect transboundary pests and diseases and their alternate hosts were conducted. These include trainings on mass production of the three entomopathogenic fungi that were distributed to corn growers (members of cooperatives); and on use of unmanned aerial vehicle.

Meanwhile, public advocacy and awareness on different strategies, as well as development and distribution of relevant information materials for region-wide campaign on integrated management options were conducted.

All of these efforts are geared towards effective control and management of transboundary pests and diseases in corn, cassava, onion, banana, mango, citrus, and selected vegetables.

With UPLB-NCPC at the helm, Secretary Dar urged the agency to continue in providing training and capacitating researchers on pest management. ###

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# How to manage onion armyworm?

by Rena S. Hermoso

In 2016, Central Luzon and nearby provinces were plagued by onion armyworm (OAW) causing an estimated billion-peso production losses. In response, the Department of Agriculture-Bureau of Agricultural Research (DA-BAR) funded a program titled, Comprehensive Research and Development on Integrated Pest Management for Onion Armyworm, that will address the infestation in the affected areas.

The following year, DA-BAR in partnership with DA-High Value Crops Development Program formed an *ad hoc* committee consisting of experts from National Crop Protection Center-University of the Philippines Los Baños (NCPC-UPLB), Postharvest Horticulture Training and Research Center-UPLB, and Central Luzon State University. They undertook seven research sub-projects to develop integrated pest management options for OAW.

**Know what you're up against**

Onion armyworm (*Spodoptera exigua*) feeds on the leaves, inflorescence, and fruits of various economically important crops such as onion, tomato, corn, cabbage, bell pepper, and lettuce.

With a life cycle typically lasting between 25 to 27 days, *S. exigua* is a transboundary plant pest. It can migrate between islands and even countries. This behavior contributes to the possibility of an outbreak even in places outside its origin.

Previous studies show that a pesticide-resistant population of OAW can be developed within two to three years from the introduction of a new pesticide in the market. Resistance to pesticides is among the causes of outbreaks.

The 2017 survey conducted by NCPC-UPLB showed that farmers use more than 70 brands of pesticides. Sixty-seven of which belong to 17 modes of action. Most of the pesticides belong to pyrethroids, organophosphates, and carbamates. These are old insecticides which means OAW might have already developed resistance against it.

**Monitoring the population**

Evidence shows that pesticides alone cannot mitigate and control the effects of the 2016 OAW outbreak. Taking into account the pest behavior and life cycle, research shows that monitoring and early detection of OAW spells the difference between effectively managing the population and suffering from infestation. Farmers are working on a tight three- to four-day window to control the population.

"Luring male moths is considered an effective way to keep track of OAW populations," said Melvin D. Ebuenga of NCPC-UPLB.

Before planting, farmers can set up two lures per hectare with a 50-meter distance to monitor the moth population.

"Synthetic pheromone trap was proven to be the best compared to virgin female and crude pheromone extract," Ebuenga added.

The research team from NCPC-UPLB also identified alternate hosts, and hotspot areas of OAW.

The probable hotspots are the areas continuously planted with spring onion, corn, and pepper as well as the areas with plenty of two weed species, *Trianthema portulacastrum* and *Eleusine indica*. These weeds are also considered to be the most preferred alternate hosts of OAWs in the area.

This data served as the baseline information to develop an early warning system—Farm-level *Harabas* Monitoring and Advisory System. It was designed to generate area-specific early warning advisories.

"The scheme involves trapping the male moths daily. The catch data is then inputted in a simulation model that takes into consideration the weather forecast data for the locality, basic OAW biology, historical data, presence of alternate hosts, and other pertinent information," explained Ebuenga.

The simulation run will serve as a guide as to when is the best time to spray and apply other means of managing the pest.

NCPC-UPLB and East West Seed Co. are working to migrate the OAW forecasting model to a web-based platform where stakeholders can receive population forecasts. Continuous efforts are being made to bring this system to the onion farmers.

**Be familiar with your enemies' enemy**

*Metarhizium rileyi* and *Spodoptera exigua* multiple Nucleopolyhedrosis Virus were identified as natural enemies of OAW. The former grows and encloses the pest in its spores while the latter causes the pest to disintegrate.

Using microbials and biopesticides also complement the management strategy above.

Neem, Bioflash (Zamboanga del Sur's farmer concoction), *Bacillus thuringiensis* subspecies aizawai and subspecies kurstaki (biological insecticides), *Metarhizium anisopliae* (entomopathogenic fungi), Nucleopolyhedrovirus, smoke vinegar, and chlorfenapyr accompanied with pheromone traps were found effective in managing OAW and other Lepidopterous pest such as cutworms and earworm infestations.

To prevent the growth of the population at the onset, farmers can set up 20 lures per hectare or one lure per 50 square meters. Aside from sex pheromone traps, farmers can also use white UV light.

Judiciously using the recommended rates of registered pesticides that belong to different modes of action is another way of managing OAW. ###

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PHOTO: DA-BAR ARCHIVES

# *Salmonella* detection made easier, faster through optimized PCR-base

by Jhon Marvin R. Surio

# ed protocol

PHOTO COURTESY OF UPD

A new *Salmonella*-detection method with a higher sensitivity and specificity than previous methods was recently validated for a faster means to detect *Salmonella* in meat samples.

This method uses a molecular technique called polymerase chain reaction (PCR) to spot *Salmonella* DNA in different matrices regardless of growth type.

The PCR-based method has undergone a proficiency test to validate its efficacy in detecting *Salmonella* in four matrices, namely: beef, chicken, sponge swab, and animal feed. The assessment yielded 'Satisfactory' remarks for all matrices, as rated by a proficiency test service laboratory in United Kingdom.

After demonstrating efficacy, it is imperative to know how it fares against the traditional detection method still employed in Philippine laboratories at present. This was done using parallel testing, or the side-by-side testing of samples using both methods.

Parallel testing resulted to 88 percent of samples having the same results, using the traditional culture-based protocols as performed by Department of Agriculture-National Meat Inspection Service (DA-NMIS), and the PCR-based method as performed by the University of the Philippines Diliman.

Samples that obtained different results can be attributed to the occurrence of atypical growth of *Salmonella* in culture media in the traditional detection method protocol.

Taking only three days to process, as opposed to the week-long processing for the traditional method, the new method is eyed to benefit meat analysis and other food safety laboratories in the country.

Faster detection protocols are key for more efficient prevention and control of *Salmonella*-related foodborne outbreaks.

This also permits faster processing of permits and other documentation requirements for agricultural products.

Meanwhile, after the validation of detection protocols, 11 laboratory personnel of the DA-NMIS and two from DA-Bureau of Animal Industry were capacitated through a training-workshop on concepts, workflows, rationales, and basic troubleshooting. Needs in their respective laboratories were also surfaced and discussed.

Through the developed protocol, faster monitoring of *Salmonella* in the food production chain, particularly in raw meat for domestic and foreign consumption, is expected.

These measures are eyed to positively influence the growth of jobs in the poultry and livestock production system.

Lastly, the optimized protocols should facilitate a faster and more sensitive detection of *Salmonella* in agricultural products, particularly in poultry and livestock, that can prevent or control foodborne outbreaks. ###

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# Early warning prevents possible pests and disease outbreak

by Rena S. Hermoso




PHOTOS COURTESY OF DA-BPI

The BPI Corn Collect is a mobile application designed to gather pest data.

Corn is one of the staple crops in the Philippines. The industry is separated into white and yellow varieties. White corn is processed for human consumption while yellow corn is an essential ingredient of feeds for hogs, poultry, and fish.

There is an increasing demand for corn due to the increasing requirements of the livestock and poultry industries, as well as the increasing food demand that is directly proportional to the increasing population. To keep up with the demand, production has to increase.

"But production is challenging due to the occurrence of insect pests and diseases attacking corn plants and the effect of climate change. Open pollinated corn varieties are vulnerable to the attack of insect pests especially corn borer and other Lepidopterous insects," explained Wilma R. Cuaterno, Department of Agriculture-Bureau of Plant Industry (DA-BPI) Crop Pest Management Division chief.

Pest attacks and disease occurrences significantly contribute to reduced corn yield.

To effectively manage corn pests, it is beneficial to develop an early warning system. DA-BPI implemented a project to develop an effective early warning system in the management of corn pests and diseases.

Funded by the DA-Bureau of Agricultural Research, the project will be implemented across all the regions. As of November 2020, 432 sites were established; 4,301 datasets have been uploaded in the online information system; and 3,902 datasets were validated from eight regions (i.e. Cordillera Administrative Region, Cagayan Valley, CALABARZON, Eastern Visayas, Zamboanga Peninsula, Northern Mindanao, Caraga, and Bangsamoro Autonomous Region in Muslim Mindanao).

The project team trained the Regional Crop Pest Management Center (RCPMC) staff from all the 16 regions to enhance their skills and knowledge in identifying corn insect pests and diseases, monitoring, and data gathering using digital data capturing devices with Open Data Kit (ODK) application.

The BPI Corn Collect is a mobile application designed to gather pest data. All the data inputs from the different regions were transmitted to an ODK aggregate database in the cloud to establish the regional and national pest profile. These pest profiles can be accessed through bpicpmd.info.

Regional data managers validate their respective data sets and forward it to DA-BPI, the national data manager. The bureau validates, consolidates, and analyzes the data to establish the national pest profile of corn in the forms of graphs, charts, and pest maps.

"The dashboard of the Corn Information System that automatically computes and generates tables, graphs ready for download once the dataset is active and validated by the national and regional data managers," said Cuaterno.

In case of a disturbing pest situation, "a warning notification will pop up and blink pointing to the location of farm site where alarming pest observation was observed," she added.

A pest advisory that includes the management strategies, Prevention, Avoidance, Monitoring, Suppression approach to contain and manage the pest immediately will then be forwarded to the concerned region.

For example, in February 2020, an alarming and increasing pest incidence on Corn Planthopper in CALABARZON was observed. This alerted DA-BPI to issue a pest advisory to limit the pest spread in the area.

The bureau issued a National Pest Advisory in March 2020 that was disseminated to all regions. Through this early warning, DA-BPI has monitored that there was a decline in the infestation from March to June 2020.

The mobile app is now on its 1.29 version. The RCPMC, app's users, "found it very helpful since simple analytics are already included as well as the timing of issuance of advisories. So when the advisories are issued on time, farmers can act earlier thus avoiding significant losses," shared Cuaterno.

"They like it very much compared to when they were using paper and pen while collecting data from the field," she added.

"The DA-BPI Crop Management Division will maintain the app and lead the collaboration with the regions. After the sustainability transition, we are hoping that a regular budget will be given to it together with the other major crops chosen by DA," ended Cuaterno.
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# DA-Central Luzon and its war against farm-pest and other challenges

by DA-RFO 3 Regional Agriculture and Fisheries Information Section

Agriculture is one of the fundamental industries in the Philippines. According to a study, 47 percent of our country's total land is considered as agricultural land. And, its output sustains the local and export demands and marks to be essential commodities in the country.

Growing crops for food consumption has been a lifelong activity in the Philippines. According to the latest data of the Philippine Statistics Authority, Central Luzon produced an estimated total volume of other crops at 1,439.87 thousand tons in 2018. One of the top-produced commodities of other crops in the region is the onion (mature bulb) with about 7.27 percent shares. However, compared to 2018, the production of onion decreased to an estimate of 9, 298.48 metric tons.

As reported from scientific studies, one of the reasons caused by the reduction of production of onion in Central Luzon is due to onion armyworm infestations. Onion armyworms or *Spodoptera exigua* (Hubner) lacan are pests that are most destructive at the larval stage and can decimate an entire hectare farm in one day.

According to Randy Gervacio, head of Bagong Pag-asa Farmers Association in Bongabon, Nueva Ecija, apart from the army worm, their crops were also attacked by harmful anthracnose and bulb

rot. These pests began to surface during the last quarter of 2020 causing decay of inner scales of onions. However, despite the use of pesticides available in the market, the worst part is multitudes of worms and plant pathogens are immune to any kind of pesticides.

In connection with this, the Department of Agriculture (DA) in Central Luzon, led by the Regional Crop Protection Center (RCPC), conducted a monitoring regarding the infestation of onion armyworm in the town of San Manuel, Tarlac. Due to the damage detected, the RCPC immediately notified the Municipal Agriculturist Office of Moncada and conducted monitoring in neighboring towns and set up pheromone traps to find out if there are *harabas* inhabitants. RCPC's scientists also conducted a technical briefing to farmers on the proper management of various types of diseases and pests of onion including *harabas*. Apart from the province of Tarlac, the RCPC also conducted monitoring and technical briefings on onion pests and diseases in the towns of Nueva Ecija and Pampanga.

Crops damaged by different pests and diseases are always encountered by farmers and it constrains the farm production; therefore, farmers use pesticides available in the market to combat the infestations. However, some pests are getting immune to pesticides. Some pesticides available in the market use synthetic materials that are toxic chemicals and noxious to the environment. Due to pest immunity and hazardous effects, scientists from University of the Philippines Los Baños (UPLB) are testing

PHOTO COURTESY OF DA-RFO 3

**Agricultural awareness trainings are still being conducted to improve farmers' and fisherfolk's livelihood.**

the efficacy of own-produced biopesticides and microbial against armyworms. Biopesticides is a broad array of microbial pesticides derived from microorganisms and other natural resources that confer protection against pest damage. The eco-friendly characteristics of biopesticides promote a sustainable agroecosystem and are beneficial for the environment, human life, and agricultural products.

The biopesticides research team is composed by university researchers and scientists Marcela M. Navasero, Melissa P. Montecalvo and Mario V. Navasero from the National Crop Protection Center, College of Agriculture and Food Science, UPLB. The aforementioned biopesticides project aims to help the farmers not just for Central Luzon but also for every farmer in the Philippines. Currently, the project is under evaluation of the DA-Bureau of Agricultural Research and on its mass production stage. Once research is completed, it will give farmers the option to choose safer and cheaper pesticides. The scientists are hopeful that the research may support efforts to make a meaningful contribution to food security and farm-pest alleviation.

On the other hand, as farmers adopted innovation in modern agriculture, the rise of digital agriculture and related technologies has opened a wealth of new opportunities. The DA-High Value Crops Development Program administered a drone sprayer

management and operation in Iba, Zambales. The Remotely Piloted Aircraft System or drone brought significant advancements in the agricultural system. The drones' potential provides a tremendous platform in addressing other pest management in order to achieve sustainable development.

While the DA-Central Luzon is adapting to modernization, routine training is still being conducted despite the pandemic. The Agricultural Training Institute-Central Luzon offers online training courses on Integrated Diversified Organic Farming System and financial literacy for the young farmers of the region. Online trainings like webinars are very essential in helping the agricultural sector in being competitive and being prepared for future obstacles that may emerge. At the same time, it encourages future bloodlines of farmers and fisherfolk in the country.

The challenges faced by the agriculture sector from climate change alone poses huge problems, and the need for the farming communities to adapt and become resilient is critical to meeting the Philippines' expanding food demands and population. Plant diseases and plague problems influencing plant development and productivity might be better handled by biopesticides than synthetic pesticides. The biopesticides are the best way to control plant pathogens like armyworms because of their beneficial effect—stability, sustainability, and no detrimental impact on the environment. Agricultural awareness trainings are still being conducted to improve farmers' and fisherfolk's livelihood, as well as to bridge the gap and equip them on present and future obstacles that can lead to a wide range of knowledge and higher productivity in agriculture.

Notwithstanding these challenges, the DA-Central Luzon continues to serve the interest of farmers and fisherfolk and transform the Philippine agriculture into a dynamic and resilient sector for the country to speed recovery, inclusive growth, and greater productivity gains, as well as to ensure strong food security. ###


PHOTO COURTESY OF DA-RFO 3

Like any other farmer, Danny R. Guillermo of Ilagan, Isabela who has been farming for 18 years is afraid of losing his crops to pests as it means losses.

Thus, when Piat, Cagayan in 2019 felt the incidence of one of the most destructive insect pests of corn, the Fall Armyworm (FAW), Guillermo sought proper knowledge on how to manage the said pest so as not to incur yield loss.

An open pollinated variety (OPV) white corn farmer who tends to his two-hectare farm land, Guillermo eagerly participated as one of the farmer cooperators and attended a training on corn pest surveillance, monitoring, and management conducted by the Department of Agriculture (DA)-Cagayan Valley through its Regional Crop Protection Center (RCPC).

Cagayan Valley, as reported by the Philippine Statistics Authority (PSA, 2016) remains to be the top producer of corn in the whole country. The increasing number of different corn pests has always been a challenge and threat to the region. It causes huge decrease in production to both the small- and large-scale corn growers.

In order to address this, DA-Cagayan Valley-RCPC committed its goal and advocacy to continuously strengthen pest management with different strategies to reduce and eradicate the occurrence of pests.

The DA-Cagayan Valley-RCPC established farmer cooperators which are part of the project titled, "Development of Early Warning System and Data Management of Corn Arthropod Pests and Diseases in Region 2" and funded by the DA-Bureau of Agricultural Research. The said project aimed to develop an effective early warning system in the management of pest and diseases of corn in the region.

With the advent to improve yield and increase production, one important factor is to reduce the presence of insect pest and diseases. The implementation of community-based surveillance and management to prevent their potential damage and spread is necessary.

Under the project, FAW, a new pest emerging in the country, was observed in some of the monitoring sites. Lower incidence was noted with only 0.92 percent regional average incidence on genetically modified (GM) varieties and 2.7 percent for non-GM varieties. Management on these pests was immediately applied on the identified sites which resulted to the decline in population and a lower damage, as reported by DA-RCPC 2.

Manong Danny, as he is fondly called, saw the big improvement in his farm since he became a farmer-cooperator and applied the technologies and interventions he learned. He now embraces and practices the changes for a better corn farming.

"*Halos* 50 percent *ang itinaas ng aking kita simula noong sinubukan kong gamitin ang mga* interventions *na binibigay ng proyekto ng* DA-RCPC," he said in a phone interview with DA-RCPC.

He further shared, "*Ang natutunan ko pong teknolohiya ay kung paano mas maagang puksain ang mangilan-ngilang insekto at sakit sa maisan upang 'di na dumami at makabawas sa ani*."

Manong Danny learned that pest, specifically the FAW, is a big threat to his corn crops, especially the OPV. He acquired the habit of constantly monitoring his corn and the first sign of pest infestation. Thus, he can easily eradicate the different diseases and insect pests from his farm at the onset

"*Itinuro rin sa akin ng* DA-RCPC *kung paano kilatisin ang* FAW, *kung anong itsura ng kanilang sinisirang dahon at bunga ng mais, kung ano ang inog ng kanilang buhay at lalo na ang tamang pag-*control *ng* Fall Armyworm," Manong Danny added.

As part of the integrated pest management, he also learned how to use biological control agents like the *Metarhizium*, *Trichogramma ecanescence*, and earwig instead of buying and using pesticides. Because the biocontrol agents were given and provided for by the project, he was able to save enough money to buy a hand tractor for his farm, as well as seeds and fertilizers for his next cropping.

He extended his gratitude to the DA-Cagayan Valley especially to RCPC for the full support on his corn farming.

"*Taos puso akong nagpapasalamat sa mga tulong na binibigay ninyo sa amin mula sa inyong tanggapan. Napakalaki nang pagbabago mula noong nagsimula ang proyektong ito*," he said.

Manong Danny would still seek assistance from DA to learn and improve his skills on farm management. He also hopes to acquire bigger farm lands to produce more corn and perhaps other crops, "*Para mas malaki ang kita, para sa maunlad na industriya ng mais at para sa ekonomiya*," he ended with a grin. ###

# Practicing the change for a better corn farming

by Maria Elena M. Garces

PHOTO COURTESY OF DA-CAGAYAN VALLEY-RCPC

> *Itinuro rin sa akin ng* DA-RCPC *kung paano kilatisin ang* FAW, *kung anong itsura ng kanilang sinisirang dahon at bunga ng mais, kung ano ang inog ng kanilang buhay at lalo na ang tamang pag-*control *ng* Fall Armyworm.

# Detect, prevent, control: the cents of two laboratories

by Ma. Eloisa H. Aquino

With the occurrence of pests and diseases that greatly affects productivity yield and delivery of inputs of farmers, the establishment of diagnostic laboratories is parallel to ensuring accurate and timely results that can aid in early detection, prevention, and control of major pests and diseases.

"The integration of the Research for Development and Extension system and the different laboratory services are geared towards efficiency and effective systematic actions of the Department of Agriculture (DA)-Cagayan Valley. It contributes to the national goal of global competitiveness through the production of quality and safe agricultural products for the domestic and international market," thus said by Rose Mary G. Aquino, regional technical director for Research and Regulatory.

With this in mind and anchored on the Agriculture and Fisheries Modernization Act for continuous operationalization and strengthening of institutional capacities, DA-Cagayan Valley gives in to the birth of the first integrated laboratory in the country, named Cagayan Valley Integrated Agricultural Laboratory (CVIAL).

Two of the five agricultural laboratory services of CVIAL, funded under the Research Facilities Development Grant program of the DA-Bureau of Agricultural Research and the DA-High Value Crops Development Program, cater to crop, livestock, and poultry pest and disease management and serve as a venue for the provision of rapid and efficient diagnostic services for disease outbreaks.

### The Regional Animal Disease Diagnostic Laboratory (RADDL)

In response to African Swine Fever (ASF) outbreaks, RADDL conducts ASF diagnosis using Real Time-Polymerase Chain Reaction (RT-PCR) which can process 44 samples per cycle (two hours/cycle) with maximum of three cycle operations per day.

Clients can also avail Blood Chemistry Analysis and Complete Blood Count through the Automated Blood Chemistry Analyzer and Automated Hematology Analyzer,

respectively. The laboratory also uses Automated Bacterial Identification and Antibiotic Sensitivity Test Machine to identify bacteria and antibiotic sensitivity in samples while the Inverted Microscope is used for Fluorescent Antibody Test for Rabies.

Laboratory services mainly cover parasitology, pathology, serology, virology, microbiology, and molecular biology tests in support to livestock and poultry health management.

### The Regional Crop Protection Center-Plant Health Clinic (RCPC-PHC)

On the other hand, the development of Regional Plant Health Clinic has focused on accurate and fast result in plant disease diagnosis, plant pest identification, and pesticide residue analysis.

"Establishment of chemical, microbiology, and molecular biology laboratories aid in the accurate and immediate diagnosis for proper management recommendations

PHOTOS COURTESY OF DA-CAGAYAN VALLEY

to farmers to sustain sufficient, affordable, and safe food for every Filipino," Herlinda I. Tulauan, RCPC-PHC chief said.

RCPC-PHC is actively involved in the implementation of the Integrated Pest Management and Good Agricultural Practices (GAP) programs on rice, corn, high-value crops, and in applied researches geared to the development of integrated control approaches of major pests of different crops in the region.

The Center also supported the RA No. 10611, otherwise known as the "Food Safety Act of 2013," an act to strengthen the Food Safety regulatory system in the country through pesticide residue analysis using Rapid Test Kit (RTK) and Gas Chromatograph/Mass Spectrometer Machine.

"The City Local Government Unit (LGU) of Santiago, Isabela and recently the Nueva Vizcaya Agricultural Terminal Inc., in collaboration with DA-Cagayan Valley, successfully adopted the technology on the use of RTK for food safety, compliance monitoring (GAP, Pre-harvest Interval and Dosage of Chemicals), public awareness, and Biological-control Agents (BCAs) provision for the management of pests and diseases in vegetable production," Tuluan shared.

### For the stakeholders, hence, agriculture sector

Regional stations, livestock raisers, and farmers serve as the main beneficiaries of the RADDL which also provides laboratory assistance and services to students, researchers, LGUs, private organizations, and other government agencies such as the DA-Bureau of Animal Industry and the DA-National Dairy Authority. Neighboring regions particularly CAR and Ilocos region have also availed the services of the laboratories.

"Amidst the threat and challenges of the pandemic, the provision of accurate laboratory reports at the right time aids in the effective control of animal diseases thereby preventing further loss of animal stocks and protecting the income of livestock farmers, hence, establishment of animal health management protocols," Dr. Judith Z. Tattao, officer-in-charge of RADDL said.

On the other hand, RCPC-PHC resulted in the effective management of plant diseases and insect pests in the Cagayan Valley region notably on Fall Armyworm in corn.

"Proper and on time management recommendations to farmers and technology adoption contribute to the quality of products and yield through symptomatology, *in-vitro* and molecular analysis can control the infestation and or infection in their respective farm following the recommendations given to them," Tulauan said.

Further, technology awareness and adoption of BCAs for the management of pests and diseases and as an alternative for synthetic chemicals to lower the pesticide residues of their produce, hence, improve quality and reduce yield losses. ###

For more information:

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Agricultural Center Chief III
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# Establishing an animal diagnostic

by Ma. Eloisa H. Aquino

The Department of Agriculture (DA) exerted efforts and intervention for the control and management of the recent threats of viral diseases such African Swine Fever (ASF) and the avian influenza/bird flu.

Through the DA-Bureau of Animal Industry (BAI), initial vaccine trials were conducted in areas previously affected by ASF. Central Luzon State University, through funding support from the DA-Bureau of Agricultural Research (BAR), is also developing test kits that can be used as rapid screening test for ASF biosecurity, monitoring, and surveillance in the country at a much cheaper and faster rate.

For its part to provide technology and information to solve agri-fisheries problems, the Pampanga State Agricultural University (PSAU) established the PSAU's Animal Disease Diagnostics Research Facility (ADDRF). This research facility shall help in diagnosing the diseases of swine, poultry, and fisheries not only in Central Luzon, but more importantly the country in general.

ADDRF also established a Memorandum of Agreement to enter in a collaborative research and became a research facility partner of the DA-Central Luzon and its key agencies such as DA-BAI, DA-Bureau of Fisheries and Aquatic Resources, and Regional Animal Disease Diagnostics Laboratory.

"By providing accessible, fast, and accurate diagnosis of different pathogenic diseases, the laboratory provides reliable evidences that aid in accurate treatment and management interventions by veterinarians, fishery specialists, and biotechnologists," ADDRF principal investigator and veterinarian Dr. Geraldine C. Sanchez said.

"The technologies and innovations that can be derived out of the researches in ADDRF will be of advantage to swine and poultry farmers, as well as fisherfolk. In addition, this will enhance our capability in providing rapid and accurate research-based information for the DA sector, hence, towards increasing animal productivity, as well as promoting animal health," she added.

Inaugurated in 2020, ADDRF is composed of DNA Laboratory, RNA Laboratory, Cryogenic Laboratory, Autoclave Room, and Sample Preparation Room. Laboratory equipment are intended for biotechnology and molecular diagnostics testing to examine viruses and viral transmission in the food chain.

"Biotechnology applications for DNA-based viruses, such as ASF and White Spot Syndrome viruses, are done in the DNA laboratory. On the other hand, RNA-based viruses, such as New Castle Disease, Avian Influenza H5N6, and Tilapia Lake viruses, will be processed in the RNA laboratory," ADDRF Laboratory manager Jacob Anderson C. Sanchez explained.

On the other hand, the Cryogenic laboratory houses sets of vertical freezers, ultra low freezer of up to negative 86 degrees Celcius, and liquid nitrogen tanks for specimen preservation.

To date, the animal disease diagnostics R4D project funded is being conducted in the laboratory. Funded by DA-BAR, the study examines what different genotypes of the aforementioned viruses are present in Central Luzon. This will be key in knowing the true-to-type viruses that are present and, more importantly, in understanding transmission of virus which will provide sound judgment for the DA sector in fine tuning and implementing existing policies.

"Farmers and fishers who notice symptoms of disease related to ASFV, New Castle Disease Virus, Avian Influenza, White Spot Syndrome Virus, [and] Tilapia Lake Virus may contact us through (0977) 266 3215 or our Facebook page, Animal Disease Diagnostics Research Facility. At present, the laboratory caters to the aforementioned five different viruses," Sanchez shared.

PSAU has also established coordination with Quarantine Office, DA-Central Luzon Integrated Laboratories, and Provincial Veterinary and Agriculture Offices, including Municipal Agricultural Offices in identifying farmer cooperators whose areas became sites of sampling collection.

## Future Plans

"PSAU, being strategically positioned in what used to be the highest swine and poultry density in the country, aspires to bring back Region 3 as Rank 1 in food animals production and ultimately become a strong research facility partner of the Department of Agriculture and its key agencies. In doing so, we can provide immediate support

# c laboratory

to the swine, poultry, and fisheries industries in addressing re-emerging or new disease outbreaks in the Region," study leader for the Fisheries Diagnostics component Walter L. Pacunana said.

Aside from providing research services, PSAU-ADDRF's future plan is to develop low-cost vaccines, drugs, and natural products that can prevent, cure, mitigate, and eradicate highly pathogenic infectious diseases. Further to this is by conducting extension services for small- and large-holder farmers in the region.

As PSAU faculty and researchers are committed in research utilizing molecular biology and biotechnology-based experiments, they put credit to the government support in providing facilities and modern equipment that help them reach their full potentials.

"We are very thankful for the support of the government and DA-BAR for their generosity and full assistance in the implementation of project. We would see to it that our laboratory is able to harmonize fully with DA-Central Luzon animal disease diagnostics laboratory so that our combined efforts will help solve our present problems in the animal industry," Dr. Sanchez said.
###

For more information:
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PHOTO COURTESY OF PSAU

# Pest Risk Identification and Management

PRIME

Aims to reduce yield losses caused by major pest outbreaks through appropriate management strategies and tactics, as well as better targeting of risk areas— contributing to a stable rice production, improved food security, and increased farmers' income, among others in the Philippines.

## Work Packages

WP0: Project management and coordination

WP1: User requirements and evaluation

WP2: Field survey and experiments

WP3: Remote-sensing-based crop mapping and monitoring

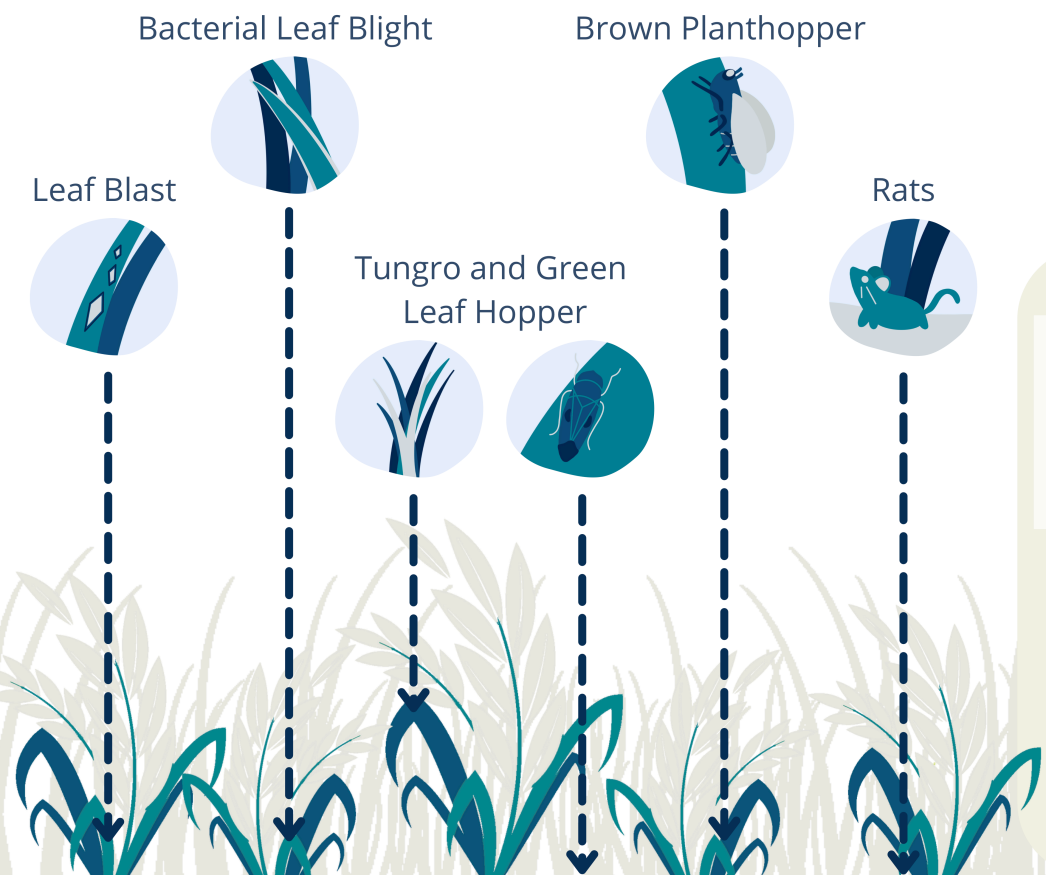
WP4: Risk factor analysis for pest outbreaks

WP5: Pest and disease risk intelligence

WP6: Capacity building

WP7: Sustainability plan

## PRIME pests and diseases




## Benefits for Farmers:

- Better pest advisories
- Targeted programs
- More efficient pest management strategies
- Higher yields and higher income

## Implementing Agencies

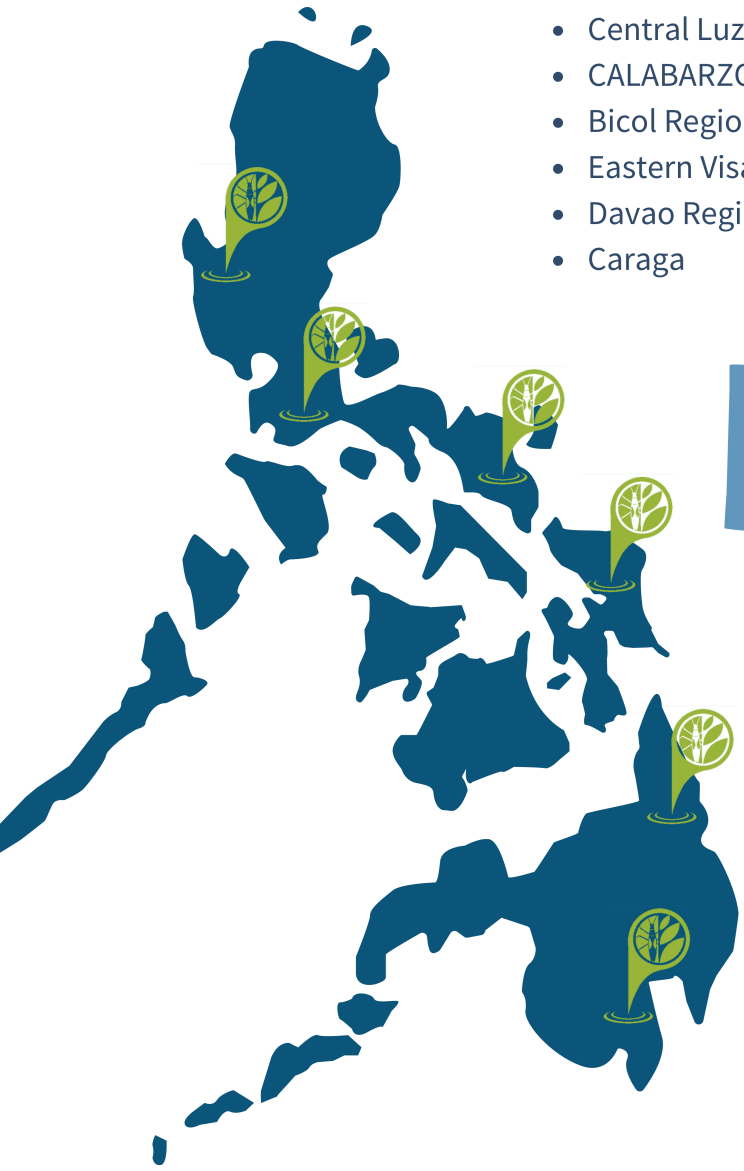
» DA-Regional Field Offices «

## Collaborating Agencies

University of Twente (ITC) in Netherlands, and National Crop Protection Center

## Funding Agency

Regions where field studies and experiments on risk factors for pest and disease outbreaks were conducted:



- Central Luzon
- CALABARZON
- Bicol Region
- Eastern Visayas
- Davao Region
- Caraga

Monitoring over **3,605** rice fields

## 1 Field Data Collection

## 2 PRIME Collect

- Field Profile
- Cultural Practices
- Pest Survey
- Pest Management
- Nutrient Management
- Yield

Photos from PRIME Facebook page

# Philippine Rice Information System

PRISM is an operational system for rice monitoring that integrates data from ICT, remote sensing, and crop health to deliver actionable information. A modern rice information system in the country, PRISM helps the DA in making informed decisions for action planning and policy formulation towards achieving food security.

## Core Activities:

1. Field monitoring
2. Rice area mapping and yield estimation
3. Capacity Building
4. Assessment of rice areas affected by flood or drought

## PRISM Official Website:

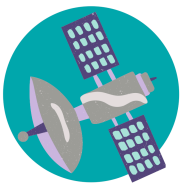
*All data and outputs are systematically stored, uploaded, and accessed here:*
*prism.philrice.gov.ph*

## Where do the data come from?

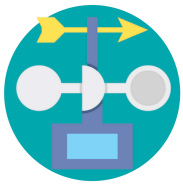

Smartphone


Field Surveys


Farmer Interviews

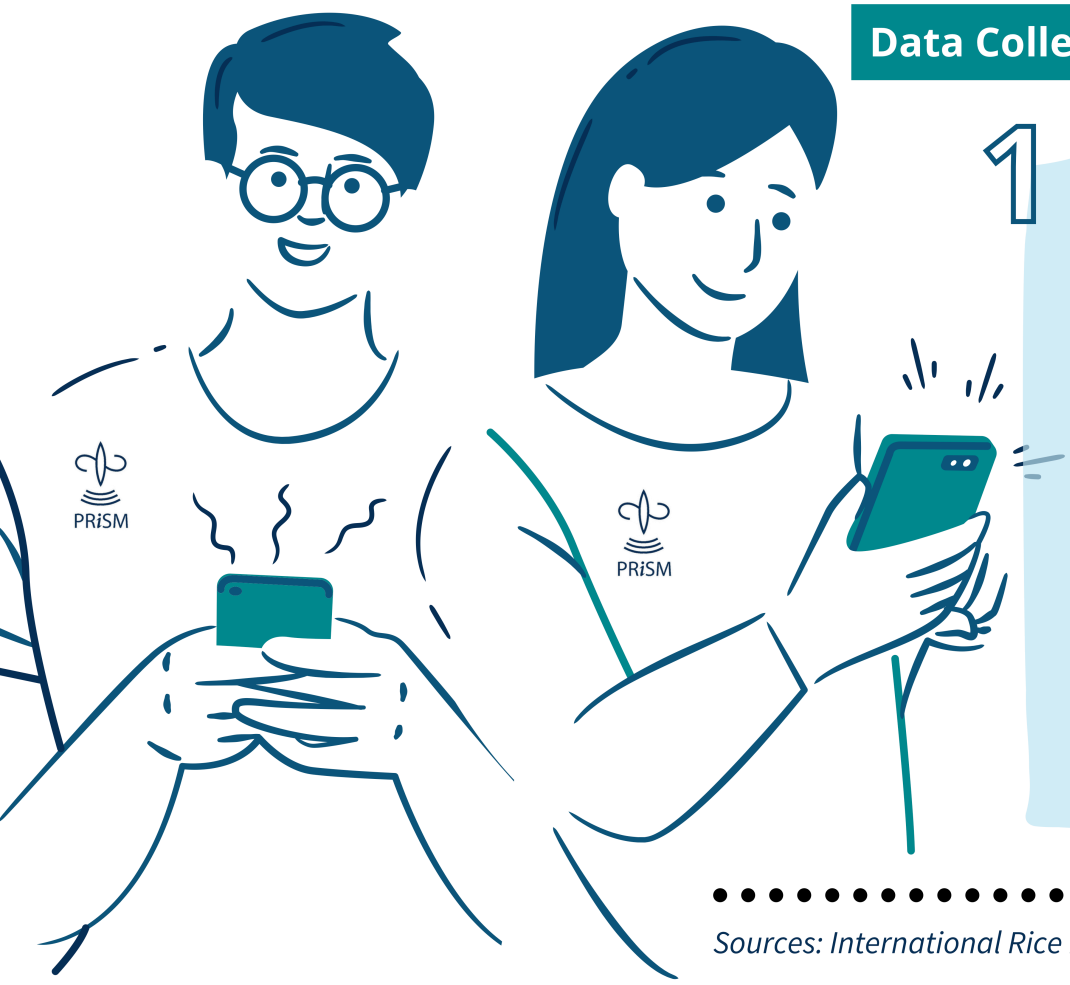

Satellites


Existing Statistical Data


Weather Stations


Existing Statistical Maps

## Data Collection Process and Analysis:




1

PRISM data collectors gather the following, among others:

- Data on rice crop or production situation
- Field observations
- Crop health assessments
- Pest management prescriptions
- Farmer interviews
- Incidence of pest injuries

*Sources: International Rice Research Institute (IRRI) and Department of*

## Implementing Agencies

## Collaborating Agencies

» DA-Regional Field Offices «

## Funding Agency

**5** Information can then be accessed or downloaded by various agencies or stakeholders using any internet connected device:

- Graphs and tables vis-à-vis occurrence of pest injuries and diseases
- Pesticides and rice varieties used
- Maps of rice area seasonality
- Reports on pest injury and disease observations
- Yield fertilizers

**4** Verified data are packaged into an information for decision-support.

**3** PRISM data managers check the accuracy of regional data, while information managers ensure that all published information are within the standards set by the DA.

**2** Field data are submitted to a centralized database for filtering and validation, and then transferred to the main database.

## Salient Accomplishments:

**Estimated rice areas on:**

- Yields *(From 2015 to present)*
- Production Losses *(Four (4) assessment reports)*

**Improved capacities on:**

- Crop Monitoring *(A total of 62 training courses)*
- Pest Surveillance

**Improved system through:**

- Modeling and Remote Sensing Approaches
- Web-based Platfom
- Integrated Databases
- Quantified Production Risks and Situations

*f Agriculture-Philippine Rice Research Institute (DA-PhilRice)*

UPANG MASUGPO ANG *CECID FLY*, TANDAAN ANG

# MANGGA


**Markahan ang kalendaryo.**
*Ang pag-atake ng peste ay nagsisimula makalipas ang 32 araw matapos mamulaklak ang puno ng mangga.*

**Alamin ang tamang paggamit ng insecticide.**
*Mayroon itong rekomendadong uri, dami, at dalas ng paggamit. Huwag ulitin ang isang uri ng insecticide sa panahon ng pagpapabunga.*


**Nararapat na gumamit ng sticker-spreader kasama ng insecticide.**
*Gumamit lamang ng rehistradong sticker-spreader upang kumapit at mabalot ng insecticide ang mga bunga ng mangga.*

**Gamitin ang Insecticide Resistance Management.**
*Gumamit ng insecticide na mayroong iba't ibang epekto sa peste tuwing mag-iispray mula 32-60 araw mula sa pamumulak ng puno upang maiwasan ang immunity ng peste.*

A GUIDE ON IRM INSECTICIDE RESISTANCE MANAGEMENT FOR MANGO


**Gawing kaugalian ang pagbabaon ng mga nahulog na bunga ng mangga.**
*Ibaon sa lupa na may lalim na 50 cm ang mga nalaglag na bunga. Ang amoy mula sa nabubulok na bunga ay nakaaakit sa mga peste.*

**Alagaan ang mga bunga sa pamamagitan ng paggamit ng fruit bags.**
*Balutin ang mga bunga makaraan ang 40 araw matapos mamulaklak ang puno ng mga mangga bilang karagdagang proteksyon sa mga peste.*

*Para sa karagdagang impormasyon, bumisita sa* ***www.mango-irm.com*** *or makipag-ugnayan kay* ***Dr. Celia dR. Medina*** *sa numerong (+6349) 536 2351 o sa email na cdmedina@up.edu.ph*

Isinulat at iginuhit nina Chantale T. Francisco, Jireh Alodia R. Laxamana, at Jhon Marvin R. Surio

# #MangoGrowerAsks

Tuwing anong oras umaatake at aktibo ang cecid fly?

Umaatake ang cecid fly tuwing magtatakip-silim at kapag makulimlim o maulap ang panahon.

May season ba ang pag-atake ng cecid fly?

Mararanasan ang matinding pag-atake ng cecid fly sa mga buwan ng Nobyembre hanggang Pebrero sa Luzon.

Anong mabisang sticker-spreader ang maaaring bilhin?

Maraming iba't ibang klase ng sticker-spreader na maaaring mabili. Sumangguni sa listahan ng DA-Fertilizer and Pesticide Authority o DA-FPA.

Makokontrol ba ng pagpapausok ang cecid fly?

Hindi ito inirerekomenda sapagkat hindi ito epektibo. Bukod dito, may masama rin itong epekto sa kalusugan ng mga makalalanghap.

Kailan dapat balutin ang mga bunga ng mangga?

Balutin ang mga bunga makaraan ang 50 araw matapos mamulaklak ang puno kung walang cecid fly. Maaari ring mas maaga subalit asahan na ang 40-50 porsyento ng binalot ay mahuhulog pa.

Ligtas bang kainin ang bungang naatake ng cecid fly?

Ang mga bakas ng pag-atake ng cecid fly ay aabot sa maturity ng prutas subalit hindi ito nakasasama sa kalusugan kaya ligtas pa rin kainin.

Saan maaaring makakuha ng kopya ng IRM guide?

Maaaring bumisita at mag-sign up sa website na www.mango-irm.com para sa komprehensibong rekomendasyon at karagdagan pang mga impormasyon.

Aa

# WHAT'S NEW AT DA-BAR?

by Rena S. Hermoso

Effective 4 January 2021, the Department of Agriculture-Bureau of Agricultural Research started operating under three divisions: Research Program Development, Research Coordination, and Knowledge Management and Information Systems.

The Administrative Support Services is now under the authority of the Office of the Assistant Director.

The bureau is led by **Dr. Vivencio R. Mamaril** and **Joell H. Lales** as the bureau's new director and OIC-assistant director, respectively.

Assisting them are: **Raymond Patrick L. Cabrera** and **Cynthia Remedios V. De Guia** as Research Program Development Division (RPDD) OIC-head and OIC-assistant head, respectively;

**Anthony B. Obligado** and **Julia A. Lapitan** as Research Coordination Division (RCD) head and assistant head, respectively; and

**Salvacion M. Ritual** and **Evelyn H. Juanillo** as Knowledge Management and Information Systems Division (KMISD) head and assistant head, respectively.

RPDD is in charge of planning, formulation, and updating of national and regional research, development, and extension (RDE) agenda and program as well as facilitating the review, evaluation, and funding of project proposals.

RCD coordinates, monitors, and evaluates the implementation of agriculture and fishery RDE projects.

While, KMISD is responsible for translating RDE outputs into useful knowledge products and services, as well as enhancing access to scientific literature and information exchange through information and communications technology.

DA-BAR also welcomed its new permanent staff, Nell S. Chy (Administrative Assistant III), as well as the Contract of Service personnel: Sheam Japhet C. Mahaguay (Information Systems Analyst II), Jendhel J. Serrano (Programmer), and Jimzon P. Samoy (Programmer). ###

**Dr. Vivencio R. Mamaril**
Director

**Joell H. Lales**
OIC-Assistant Director

*Sowing seeds of hope...from page 32*

Here is a glimpse of some of the insights and expectations shared by MAYA interns during the program's simultaneous ceremonial launching on the second week of March 2021:

## Why did you join the program?

"We joined the MAYA program because we were attracted to its goal to prepare us, as young professionals, to become competent individuals in terms of agribusiness and government work. We also joined this program because we believe that our skills in agriculture and biosystems coincide with the goal of this program, as well as to explore our capabilities, expand our knowledge, and gain new experiences and technical skills.

This program is the best training ground for us to start our chosen career and a good opportunity for us to land a better job that is related to our passion in farming."

**–Jennibeth Crampatana, Hazel Muñez, Khrise Angelika Ricablanca, and Samirah Batig (DA-SOCCSKSARGEN)**

## What are your expectations before joining the program and what do you hope to achieve once you finish the program?

"What I expected upon joining the program was that I am going to enjoy every step of the internship. I want to know about the different government programs that can possibly support our dream of establishing our own farm, as well as available loans for agriculture and some marketing strategies."

**–Vienna Dela Cerna (DA-Central Visayas)**

"After this program, I would like to passionately share my knowledge and skills to the farmers in the goal of achieving a food-secure and sustainable agriculture. At the same time, I plan to venture into agribusiness by applying the knowledge and technical skills acquired during my internship."

**–Ana Mae Ebero (DA-Eastern Visayas)**

## In an agricultural lens, what is your message to your fellow youth?

"The only thing I wanted to inculcate in the minds of my fellow youth is that at a young age, we should already be responsible in investing and securing our own future. Especially in these trying times, we should widen our perspectives and engage into different opportunities like this one. Moreover, I can say that despite the many challenges in our agriculture sector— we, the youth, should not lose hope but rather lead the way to amplify and improve our sector. We must take initiative and find innovative solutions for our future and our children's future."

**–Julie Mark Gamiao (DA-Ilocos Region)**

In retrospect, since farmers and fisherfolk are the backbones of the economy, the country needs more "young blood" to continually develop innovative technologies. Given these MAYA interns' agricultural dreams and perspectives, the legacy and goals of food security and sustainability can safely rest in these young hands.

With the DA and BAR, together with handling offices, providing opportunities in agri-fishery enterprises, the youth are starting to sow the seeds of hope in reshaping the future of agriculture and fishery. Given the right opportunities and resources for these young people to shine, not only does the MAYA Program empower them with competencies, but rather give them the power to make a social change and impact—either to their respective communities or to the lives of farmers and fisherfolk in the country. ###

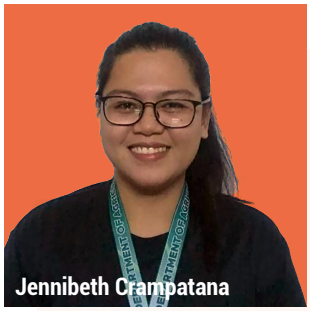
# Sowing seeds of hope:
# Reshaping agriculture's future through youth engagement

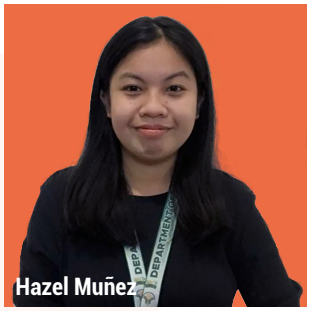
by Jireh Alodia R. Laxamana and Chantale T. Francisco

With the increasing growth of ageing farmers in the country, revival of agriculture through young hands is needed more than ever. However, contrary to the belief that youth participation in agriculture is insufficient for the demand, the engagement of today's youth proves otherwise.

Just a few hours after the Department of Agriculture (DA), through the Bureau of Agricultural Research (BAR), launched its call for youth interns for the Mentoring and Attracting Youth in Agribusiness (MAYA) Program on 9 February 2021, thousands of interested individuals flocked both agencies' social media for inquiries. With ages between 20 to 30 years old, 808 applicants were accepted out of the thousand young Filipinos who have expressed their interest in agribusiness to better serve the agriculture and fishery sectors.

*Read full story on page 31*


Jennibeth Crampatana


Hazel Muñez


Khrise Angelika Ricablanca

#MAYAProgram


Samirah Batig


Julie Mark Gamiao


Ana Mae Ebero


Vienna Dela Cerna

BAR DIGEST
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