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WHAT'S INSIDE: NEW PHILRICE CHIEF, VAM, TRICHO, AND MORE

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PHILRICE MAGAZINE 2011

About the cover

Onion is a staple in every Filipino home. IPM CRSP is constantly looking for ways to make planting it and other vegetable crops in rice-based cropping systems easier, cheaper, and safer for the environment.

The editors encourage readers to photocopy and circulate published articles with proper acknowledgment. Everyone is also invited to contribute articles to this magazine (600-800 words plus at least four photos/illustrations with credits). You may likewise suggest topics, or refer individuals and organizations engaged in rice and rice-based activities whose stories are worth featuring. Please email philrice_magazine@gmail.com or mail to:

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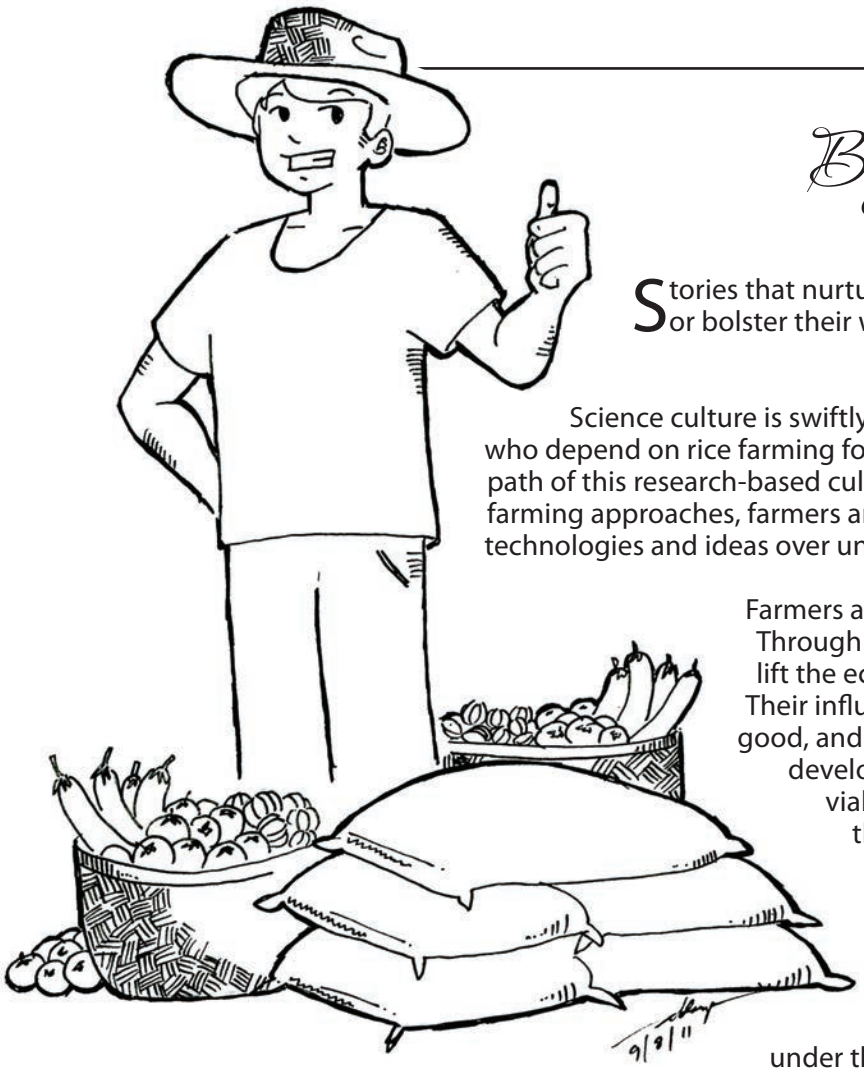
Editorial



Beyond story-telling

Stories that nurture people often help alleviate poverty or bolster their will to struggle for progress.

Science culture is swiftly changing the lives of marginal farmers who depend on rice farming for livelihood. PhilRice has followed the path of this research-based culture through the years. Because of new farming approaches, farmers are treading this path by opting for new technologies and ideas over unsustainable farming practices.

Farmers are extraordinary community leaders. Through progressive farming practices, they lift the economic standards of the countryside. Their influence is synonymous to public good, and their ability to control the levers of development is matched by their belief that viable and sustainable rice production is their greatest contribution to society. That is why PhilRice holds farmers – our valued allies – in high esteem.

Farmers in selected sites in Central and Northern Luzon, for example, are now following the approaches under the Integrated Pest Management Collaborative Research Support Program (IPM CRSP) set up by the United States Agency for International Development (USAID) as the path toward agricultural progress. The IPM CRSP has an encompassing scope; it covers agriculture, trade, environment, and gender equity. In not a few places where it works, the program promotes production options in a manner we have rarely seen before.

IPM helps reduce agricultural losses owing to pests (insects, weeds, vertebrates, diseases), damage to national ecosystems, and pollution and contamination of food and water supplies. Through IPM, crop losses and pesticide use are reduced, income is increased, and technological capabilities are improved.

PhilRice lauds these farmers whose dedication and passion to improve their lot have resulted not only in higher productivity but also accomplishments that nurture people's lives and pride.

Their efforts, not in dribs and drabs, generate compound interest that multiply through decades. Their success stories generate contributions that invite inspiration and at times awe whenever we see them.

Bacterial inoculants

Biopesticide, biofertilizer in the pipeline

Researchers of IPM CRSP are working on the development and use of a low-cost biological pesticide out of the fungus *Paecilomyces,* the bacteria *Bacillus* and *Streptomyces*, and a biological fertilizer from the bacteria *Actinomyces* for vegetable production.

Dr. Truong Hoai Xuan, study leader of whitefly management, found that *Paecilomyces* can control whitefly population. Like chemical pesticides, *Paecilomyces* has an active ingredient - the spores - that produce toxins against nymphs of whitefly, which is the most damaging insect in fruits and vegetables, specifically the silverleaf whitefly (SWF) or *Bemisia argentifolli.*

Paecilomyces can be mass-produced by growing it on cracked corn, a cheaper raw material for culturing fungi. Its spores are harvested from 2 to 4-week-old fungal culture and then sprayed like insecticide in the field infested with SWF.

Soil-borne bacterial species, on the other hand, are being discovered to be antagonistic, nitrogen-fixers, and phosphorous solubilizers. *Bacillus* and *Streptomyces* can prevent soil and water-borne diseases, respectively. *Actinomyces* can act as nitrogen-fixer and phosphorous solubilizer in the soil. These bacterial inoculants are applied with chicken manure instead of inorganic fertilizer.

The mixture of the inoculant is applied in a crop through drenching for the first 3-4 times of irrigation at the rate of 1000 L/ha.

Based on onion field trials, the bacterial inoculant can supplement 46% of the farmer's total application on NPK (157-58-0 kg/ha), but can still obtain the optimal yield of 22-24 t/ha. Production input is reduced by almost half of the total cost of using inorganic fertilizer. Moreover, anthracnose of onion is prevented.

These promising fungal and bacterial isolates are being further evaluated for different fruit and vegetable crops.// *Kristine Joy B. Panaligan*

Education for rice self-sufficiency

Officials in the rice sector stressed the need for farmers' education in attaining rice self-sufficiency during the Farmers' Field Day and Forum conducted here at the Central Experiment Station, Sept. 20.

Director Dante Delima, national coordinator for rice, said that volunteer technicians or farmers from local communities will be formed across the country to educate farmers in filling the 15-18 percent insufficiency gap in rice. "We're 82-85 % rice self-sufficient, and training technicians or farmers based in their own communities will help increase rice production. These volunteers are locals so they would know how to talk to their people and would be very familiar with the area," Delima said in Filipino.

Delima also talked about Land Bank's loan program called *Magsasakang Pinoy's Savings and Credit Card*, which was created to help farmers obtain financial aid with low interest rates.

Meanwhile, PhilRice Executive Director Eufemio T. Rasco Jr. said education is important in making farmers more adaptive to new technologies. Rasco said knowledge on aspects in rice production such as new seeds and right application of fertilizers guides farmers in increasing their yield.

"The bottom line in addressing farmers' problems is education. Here at PhilRice, we produce training materials and promote the technologies and varieties we develop through strategic ways such as this Farmers' Field Day and Forum," Rasco said.

The Field Day and Forum, a twice-a-year event of PhilRice, was participated in by about 2,000 farmers, Korean collaborators, and African trainees. Korea, a first-class agro-industrialized economy that averages 7.3 t/ha in rice yield, is sharing its technologies through the Korean Project for International Agriculture (KOPIA) Center to assist the Philippines become rice self-sufficient by 2013.

Completing in October, 25 extension workers from Mozambique, Rwanda, Tanzania, Uganda, and Kenya are learning PalayCheck – an integrated crop management system - at PhilRice since June to help increase rice production in Sub-Saharan Africa.//*Charisma Love B. Gado*

CLIMATE FORECAST BULLETIN

October-December 2011

Dr. Eduardo Jimmy P. Quilang and Elmer D. Alosnos

The October-December quarter covers the first half of the northeast monsoon a.k.a *Amihan* season. Transition from southwest monsoon to northeast monsoon is likely during October. Occurrence of tropical cyclones such as tropical depression, storms, and typhoons will be expected with tracks likely across central and southern parts of Luzon and Visayas, with secondary tracks over Northern Mindanao.

Sources: PAGASA, World Meteorological Organization, International Research Institute for Climate and Society

FARMERS' GUIDE ON WEATHER REQUIREMENTS FOR EACH RICE FARMING OPERATION

Farming operation	Sky condition during farm operation	Soil (moisture condition)	Leaf wetness duration	Air temperature (°C)		Wind speed (KPH) during farming operation
Land preparation	Clear or cloudy day is desirable	Moist or wet; Dry surface and moist sub-surface is desirable	Not applicable	≤ 40 desired	≥ 15 desired	≤ 50 for comfort of workers
Seeding in seedbed or field	Clear or cloudy	Moist for dry seeds; Wet for pre-germinated seeds	Not applicable	< 33 desired	≥ 15 desired	< 20 desired to minimize evaporation
Transplanting seedlings	Clear or cloudy day	Wet	Not critical	≤ 40 desired	≥ 15 desired	0-30 for comfort of workers
Hand weeding/ cultivating (upland farms)	Clear to partly cloudy day	Moist or dry	Not critical	Not critical	≥ 15 desired	≤ 59 during operation
Irrigation	Clear or cloudy day	Moist or dry	Not critical	Not critical	≥ 15 desired	Not critical
Spraying pesticide or foliar fertilizer	Clear day desired; partly cloudy day and/or night acceptable	Moist or dry desired for dry application in upland farms	Leaves should be dry at spraying time; no rain until at least 4 hours after spraying	< 33 desired	≥ 15 desired	0-18 for ground application
Threshing/sun drying/ cleaning grain	Clear to partly cloudy for threshing and cleaning grains; clear for sun drying	Dry surface for operation	Not applicable	No upper limit	≥ 15 desired	≤ 25 during grain cleaning operation

SEVERE WEATHER PROTECTIVE MEASURES

Floods and drought

Collection of runoff from rains through on-farm reservoirs provides an effective means for combating floods and drought.

Flooding in lowland rice can be prevented by draining excess water in the field through openings in the field bunds at a level corresponding to the desired depth of standing water in the field.

High winds

Windbreaks have to be erected perpendicular to prevailing wind direction.

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UP FOR THE CHALLENGE

Dr. Eufemio T. Rasco Jr. is here!

And while the wait was long, spiced with a few hits and misses, Dong Rasco is finally the executive director of PhilRice.

He could appear reticent to the acquaintance who just shook hands with him, but his flair for acerbic humor (which he delivers without rehearsal) actually relaxes, even wins people over in an instant. After mentoring 20-year-olds at UP Mindanao where he was dean and professor, he must know best how to optimize that personable side of him. As he steers the wheel of change in this research institute, Rasco is up for the challenge as the new guy in charge.

In an interview, he shares his vision for PhilRice and how to concretize it, his take on rice self-sufficiency, and even mundane matters such as pet peeves.

How prepared are you for this job?

You will have to lead me to it. But if you look at my background, I've been through a lot of assignments ranging from university, to private sector, to international research work. I was once director of UP's Institute of Plant Breeding, so I guess I have learned a few vital things about running a research institute.

What are your impressions so far of the PhilRice "flock"?

Competent. PhilRice, even before I came, already had a very good reputation.

ON INSTITUTIONAL GROWTH

Are you agreeable with an interdisciplinary track in the way the Institute plans and conducts projects? What are the gains from taking on this managerial/research track or path?

I think we can initiate a number of research thrusts. Those that have not been given enough attention before. One is energy for farming.

One Philippine government thrust is farm mechanization. For a good reason. If you look at the statistics, the cost of rice production in PH is very high compared to Vietnam and Thailand, the major exporting countries, so it's logical to ask why. Well, the statistics tell us the main reason is our very low level of mechanization. So the thrust of the government to intensify mechanization has a very good reason; it can be easily rationalized on the basis of competitiveness of rice farming. But the main cost item in terms of mechanization is not the machine; it's the fuel to run the machine. And the cost of fossil fuel has been increasing. So I guess it's important to develop a new energy system that will serve as an alternative to the present system.

In the present system: first, it's non-renewable; second, it's highly centralized; and third, it's not diversified. We're relying entirely on one source of energy, and that is fossil fuel. The exact opposite of that is what we'd like to do.

So how do we operationalize this? That means utilizing local sources of energy. Here we have used the rice hull to fuel the pump, to generate electricity for the rice mill, etc. But this can be expanded to include other sources. Before I came here, I was doing research on nipa. I see it as a source of cheap energy. The

alcohol production potential of *nipa* is probably five times that of sugarcane, which is the main source of alternative fuel in the Philippines today.

So how will this work? One possibility is it should be location-specific. *Yung lugar na may maraming nipa*, then nipa should be tapped there. For those without any *nipa*, use rice hull or some other sources. The idea is you produce the energy where it is used, so you don't have to transport it over long distances. The energy used for transport is very high and it adds to the cost of energy. But if decentralized, cost of handling and transport will be reduced. And since it is produced locally, you don't export your money. Money will remain in rural areas where it is most needed. So it is actually a good solution to the poverty problem. It will create jobs, livelihood opportunities for the rural people.

Local energy has all the elements of things that we want like environmental protection, solution to rural poverty, global competitiveness – all these buzzwords. So it will require the participation of our engineers, chemists, agronomists, economists, and devcomm specialists (to sell the idea).

THE ROAD TO SELF-SUFFICIENCY

What are your thoughts on rice self-sufficiency? Say, what should the national government prioritize in order to make that happen? What about the Institute? How can we strongly contribute to achieving sufficiency?

I've been reading the *Food Staples Self-Sufficiency Roadmap*. I think we're on the right track. The analysis is if you have to increase production, you will have to expand the productive area. And there are many ways of doing it. One is to physically widen the productive area. The problem is, the possibilities are quite limited, since we have used practically every square inch of arable land in this country, except perhaps a few places in Mindanao. So the next best thing is to increase the cropping intensity, meaning you can use the same piece of land more than once in one year. And this calls for irrigation.

The ideal scenario is you have two crops of rice and, say, one crop of vegetable or legume or rootcrops that can serve as alternate or extra staple. If you do this, you can achieve rice sufficiency. But aside from this is yield per unit area, which I think is the main concern of PhilRice. We have been doing it – improve varieties, refine crop management. Our target is moving; *matamaan man minsan,* later on you find out you have to aim again, hoping you're gonna make another hit.

But I look at the figures; the increase in productivity is steady. And in fact, I think we can claim that we have been more successful in the last ten years than during the first ten years of the so-called Green Revolution in terms of productivity growth. It's something that we can be proud of.

LESSONS AND CHALLENGES

Why have you developed this strong love for lawn tennis? Are there lessons in tennis you can also apply in your own life – as administrator, as researcher, as family man, etc.?

Like many other kinds of sports, tennis is a highly competitive game. It requires not only physical conditioning, but also a lot of mental work. You won't win if you only make use of brute force; you must also use your brain.

If you want to maintain your mental alertness, you have to practice it on a regular basis. And tennis is a good practice. Not that there is not enough challenge here in this job (*laughs*).

Discipline also: waking up early in the morning to play tennis. And in fact that's the most important. Even if you're very good, if there's no discipline, *wala ring mangyayari sayo*. I know a lot of good people who don't make it simply because they don't have the discipline.

Do you have any pet peeves? What provokes you? Or, do you tend to remain calm and composed under pressure?

Wala pa naman akong nasasapak (*laughs*). I didn't have a temper when I was a professor. *Dinadalhan ko pa nga ng unan yung natutulog (na estudyante). Sasabihin ko, kawawa ka naman* (*laughs*). Why does one have to be upset?

What do you think might be your biggest challenge as executive director?

I'm coming from an experience with 14 years of teaching. That's a completely different kind of work. It deals with young people (and a few old ones); but here it's quite different. I used to have three people working for me as subordinates, now I have1,200 people. Whenever I think of something that needs to be done, the first thing that comes to mind is to whom I will give this assignment. And to make that kind of decision, you have to know the people who are working for you. The problem is I don't know many of these people; a lot of people are completely unknown to me.

So my worst fear is I might be giving the wrong assignments to the wrong people. You need to avoid this kind of mistakes, but you need time to study the environment and the people around you. It's not only a matter of finding the right people, but also understanding the nature of the assignment so you can match it with the right person. You can have the right person but wrong assignment. So it's always a challenge, but I find it a very interesting challenge so far. //
Interviewed by Anne Marie Jennifer E. Eligio and Hanah Hazel Mavi M. Biag

Harmless gains, losses

Ella Lois T. Bestil and
Hanah Hazel Mavi M. Biag

The paper published in 2008 titled *The Vegetable Industry in Tropical Asia: The Philippines (An Overview of Production and Trade)* shows that the vegetable industry contributes about 30% to total agricultural production, and is a major component of gross domestic product.

Economic surveys show that vegetables such as onion, garlic, eggplant, and tomato are 17-35 times more profitable than rice, indicating the greater economic viability of rice-vegetable combinations than monocrop rice. Farmers can earn as much as P217, 500/ha from garlic and P165,000/ha from onion while they earn about P20,000/ha from rice. This is more-than-enough reason to keep the IPM CRSP ball rolling.

COLLABORATIVE RESEARCH

Conceived on Sept. 28, 1993 at Virginia Tech in the United States, the Integrated Pest Management Collaborative Research Support Program (IPM CRSP) aims to develop a replicable approach to IPM that transcends international dimensions to enhance global IPM knowledge-sharing through various IPM experiences in every site.

IPM CRSP is a research and development program funded by the Global Bureau of the United States Agency for International Development in Washington DC. Dr. S. K. De Datta, the program's principal investigator, emphasized that the modality of IPM CRSP is research and collaboration, not a technical assistance or a development grant. It is "collaborative research that will seek to complement both the US and the host country's IPM research programs."

The program started with four global sites in its early phase and expanded to eight sites in 1998—Philippines, Bangladesh, Guatemala, Ecuador, Mali, Uganda, Jamaica, and Albania.

A global review of all IPM CRSP activities from 1993-2001 conducted by an External Evaluation Panel lauded the Philippines for having "greatly exceeded expectations for science quality, impact, and reporting."

In the Philippines, PhilRice, which has been promoting crop diversification through its banner program *Palayamanan*, spearheads

With the support of our partners ... R&D initiatives and the promotion and dissemination of IPM strategies for rice-based cropping systems will reach more farmers and benefit the vegetable industry of the Philippines."

Trichoderma production in Bayambang, Pangasinan

FFS in San Nicolas, Ilocos Norte

the activities of IPM CRSP in its 18 years of successful research. PhilRice also promotes cost-reducing and environment-friendly technologies for vegetables grown after rice such as onions, garlic, and eggplant.

Since 2004, IPM CRSP has established 65 farmer field school sites in Nueva Ecija, Nueva Vizcaya, Pangasinan, La Union, Ilocos Sur, and Ilocos Norte with 1,917 farmer-participants.

GAIN ON YIELD, CUT ON COST

Farmers in rainfed rice areas are now benefitting from IPM CRSP breakthroughs. The use of biological controls from July 2007 to June 30, 2010 has increased marketable yield and reduced production costs of onion farmer-adopters in Nueva Ecija, Ilocos Sur, and Ilocos Norte.

In a report by the PhilRice-based IPM CRSP, the use of *Vesicular Arbuscular Mycorrizhae* (VAM) and *Trichoderma* sp. resulted in a 23% yield increase of farmer-adopters over non-adopters; and 43% and 19% cost reductions on fungicides and fertilizers, respectively.

The income per hectare of adopters at P76,029.37 is P46,850.32 more than that of non-adopters, which is equivalent to a 160.56% advantage.

'IPM CRSP FEVER'

Eager support from IPM CRSP adopters and community leaders helps spread the 'IPM CRSP fever'. Most IPM CRSP technology users are considered 'advisers' by other farmers because of their successful farms. Their community leaders, on the other hand, organize meetings on IPM and support IPM-related activities. Farmers have lessened their pesticide use as they now use *Trichoderma*, a good alternative to chemical fungicide.

The availability of *Trichoderma* and other IPM technologies, which are turn-ons to farmers, leads to their sustained adoption of the technologies. In a study from July 2008 to June 2009, among the component IPM CRSP technologies, VAM and *Trichoderma* are the most widely used as these are locally produced and proved to be effective in increasing yield level and reducing input cost of farmers without posing health and environmental risks.

"With the support of our partners from government agencies, the private sector, local government units, and international institutions, R&D initiatives and the promotion and dissemination of IPM strategies for rice-based cropping systems will reach more farmers and benefit the vegetable industry of the Philippines," Herminia R. Rapusas, IPM CRSP project coordinator, said.

Through these efforts, the Philippine vegetable industry may continue to be a boon to the many farmers who depend on it. The efforts also work at helping more people admit that sowing is much more important than harvesting.

BRIDGING THE GAP BETWEEN TECHNOLOGY AND FARMERS: THE IPM CRSP APPROACH

Maria Adrielle D. Solsoloy

> *AEWs and farmer-leaders who were given the chance to learn and experience more should take the lead in advocating IPM in their respective places.*

The success of a technology can be measured through its effective promotion and adoption. This is evident in the implementation of IPM CRSP in the Philippines.

According to Herminia Rapusas, coordinator of IPM CRSP, these technologies were developed to control losses owing to pests, and reduce costs owing to pesticides.

To optimize these technologies, it is important to have good strategies in transferring and promoting them to the Filipino farmers.

IPM CRSP IN ACTION

The program has identified several high-impact IPM strategies for onion, eggplant, and other vegetables.

According to Rapusas, these technologies have resulted in 35% reduction in inputs, 10% increase in yield, and 25% raise in net income.

The IPM packages for onions, eggplant, and other vegetables are now being promoted, disseminated, and implemented by farmers in Central and Northern Luzon.

The program was made possible with the help of local government units and the offices of the provincial agriculturists, and with the support and cooperation of farmers in Nueva Ecija, Pangasinan, Ilocos Sur, and Ilocos Norte.

Moreover, the Development Communication group of PhilRice also served as a support arm of the program in providing educational and information materials and conducting information campaign for farmers, community officials, agricultural extension workers (AEWs), and other stakeholders.

Rapusas detailed the effective strategies for technology transfer and promotion:

Farmers' and AEWs' training/ workshops

Short-term training were conducted on IPM in rice-vegetable cropping systems.

The sites were selected based on the needs and interests of the community, and its willingness to share in the expenses for the training and other logistics. After all, IPM CRSP isn't all about obsession with technology, it's making better use of those that farmers already have.

Training on the use and mass production of VAM and Trichoderma sp.

A series of hands-on training was held in several IPM CRSP sites where farmers learned to produce *Vesicular Arbuscular Mycorrizhae* (VAM) and *Trichoderma* as a management strategy for soil-borne plant diseases.

Training of trainers

Conducted to improve awareness, access, understanding, and use of pest management technologies for rice-vegetable cropping systems in Central and North Luzon, it aimed to develop skills in community organizing, facilitating discussions, producing training materials, and preparing action plans.

Farmers' Field School (FFS)

A season-long training for farmers, FFS features lectures and practicum, including agroecosystem analysis. Farmers go to the learning field to observe and record what's happening.

They return to their classrooms to process and synthesize the data they gathered. Finally, they present and discuss with the class whatever problems they observed. Then, they formulate solutions and make recommendations.

Farmers' participatory technology demonstration (PTD), field days, tours

PTD farms were established in strategic sites managed by farmers themselves with IPM CRSP and local government unit personnel guiding them. Field days were held to get feedback and critical evaluation of technologies promoted and showcased in the PTDs. Farmers from neighboring IPM CRSP sites were invited for a field tour to highlight techno-demo fields.

Information campaign and development of knowledge products

An information campaign dubbed as *Oplan Sagip Sibuyas* was held to address the pressing farm problems of onion farmers in Bayambang, Pangasinan. The campaign included massive and intensive multimedia info dissemination, technology demonstration, and FFS. Additionally, IPM training materials, FFS modules, field guides, and videos were produced. Materials for broadcasts, websites, print, and TV were prepared and produced to create more awareness on the IPM strategies.

"To ensure the sustainability of IPM adoption, AEWs and farmer-leaders who were given the chance to learn and experience more should take the lead in advocating IPM in their respective places," Rapusas said.

FFS in Piddig, Ilocos Norte

An information caravan is conducted as part of the info campaign.

Oplan Sagip Sibuyas, an info campaign on onion crop management, launched in Bayambang, Pangasinan, on Sept. 24, 2008

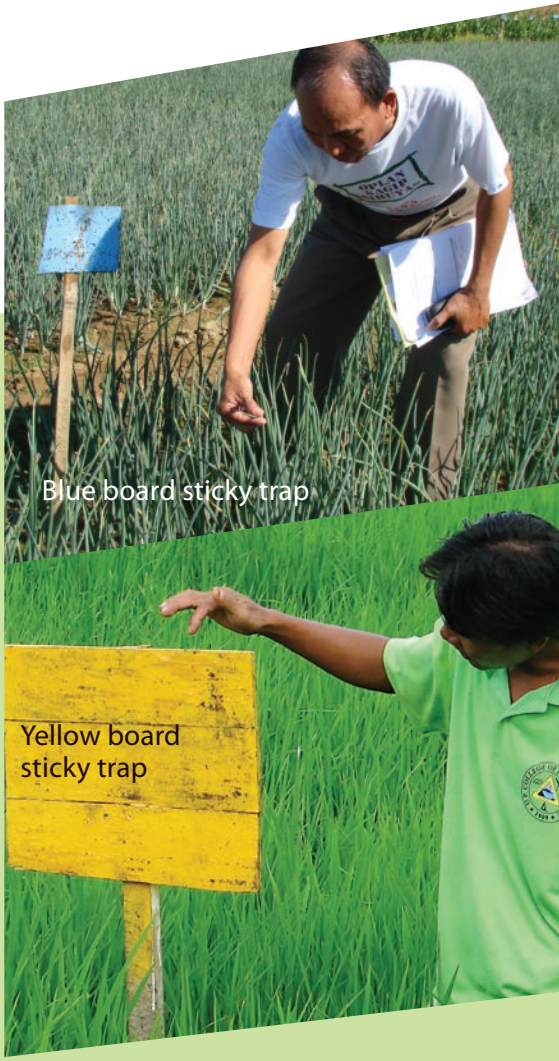
IPM : the other way out

Andrei B. Lanuza

Farmers are now venturing into rice-based cropping systems to earn more by planting other cash crops like fruits and vegetables to supplement their earnings.

Unfortunately, the transition from an all-rice production methodology to rice-based cropping systems posed new problems for some farmers, the most important of which is lack of technical knowledge (i.e. pest management) in managing crops other than rice.

To help farmers increase production and save on cost, IPM CRSP trained farmers in using alternative technologies to chemical pesticides in managing pests for crops grown after rice.



Manage pests with these practices:

INSECT, DISEASE MANAGEMENT

No insecticide spraying for the first 20 days after planting or transplanting of crops

The idea is that very few pests begin to damage crops at this stage. By foregoing insecticide spraying, friendly insects are spared and allowed to build up populations, not to mention savings for the farmer in the long run.

Using sex pheromones in traps

Sex pheromones are chemical attractants emitted by female insects, which are easily detected by male insects of the same species. This trap helps onion farmers monitor the population of male cutworms and armyworms and shoot and fruit borer moth populations in eggplant. It is used to indicate the earliest possible arrival of pests in the field. There's a reduction of 70-90% in insecticide application without reducing yield.

Using nuclear polyhedrosis virus (NPV) against cutworms

The NPV basically zeroes in on cutworm larvae, infects it, and kills it. Since farmers don't ordinarily find NPV's lying in some place, they were instructed to collect the diseased cutworm larvae and store them in freezers for future use. There's a net incremental benefit of P136,000/ha compared with P65,000/ha from using insecticide.

Using yellow and blue board sticky traps

Studies show that leafminers are attracted to yellow color. These 16-cm x 16-cm boards covered with an adhesive material are used to trap and monitor the population of leafminer adults in onion fields. Trapped insects are then counted on a weekly basis until harvest time with the board cleaned and reapplied with sticky material after each observation. Thrips, on the other hand, are attracted to blue. They are trapped and monitored like the leafminers. This resulted in a decrease in population of larvae.

Sex pheromone

Stale-seedbed technique

Removing and destroying damaged fruits and shoots

This method is used to reduce eggplant fruit and shoot borer populations by just removing and destroying damaged fruits and shoots. Contrasted to a bank transaction, this method also teaches farmers not to deposit but to withdraw disease-causing organisms from their onion fields.

WEED MANAGEMENT

Stale-seedbed technique (SST)

Farmers are taught to perform sequential plowing and harrowing at 2-week intervals, followed by one application of a non-selective herbicide or another harrowing. This technique reduces weed population by 80% - 90%, weed control by as much as 69% and increases net income by as much as 25%.

Managing pests is not all about pesticide use. A farmer has many ways to choose from. His options are not that complicated. IPM CRSP believes it isn't too difficult to be a farmer here or elsewhere.

AEW Mario Cabinte

Herminia Rapusas talking with AEW Francine Acosta in Padu Chico

Mayor Zuriel Zaragoza of Narvacan

Sustaining the IPM CRSP chain

Alfred Franco T. Caballero

Have you ever wondered why garlic bulbs are woven into chains? The chains, tightened by the dried garlic leaves, at times look like oversized necklaces made of white gold.

Visit your local market and you might still see garlic chains on display. Aside from making it easier to transport the bulbs, the chain also helps reduce damage to the bulbs and cloves from handling and jostling.

For Herminia Rapusas, coordinator of IPM CRSP, her partners – the mayors and agricultural extension workers (AEWs) of Ilocandia, are like a chain of garlic bulbs that sustains her project's success.

THE VALUE OF PARTNERS

They say a chain is only as strong as its weakest link. Partners, like links in a chain, make sure things hold and don't unravel as they ensure continuity and sustainability. For Rapusas, partners are essential to the success of the project. "Aside from being part of the protocol, I rely on my network of local government unit (LGU) officials and AEWs to facilitate our arrival and acceptance in the community. They point us in the right direction and help us get settled."

> ***They say a chain is only as strong as its weakest link. Partners, like a link in a chain, make sure things hold fast... For Rapusas, partners are essential to the success of her project.***

But it's more than that really; the LGUs help in the positive reception of the IPM CRSP team in *barangays*. Of course, not all her contacts always deliver, but as Rapusas says, there is no need to throw the baby out with the bathwater. There are, after all, ideal partners in a rather complicated operation such as IPM CRSP.

PARTNERS IN THE GARLIC CAPITAL

Edgar Yabes had been mayor of Sinait, Ilocos Sur in 1998-2007. His centerpiece thrust then was agriculture, particularly garlic, because he says it is where the wealth of his municipality comes from. Take away garlic and the Sinait economy would screech to a standstill. A town as small as his cannot compete with other places in terms of industry and commerce,

Mayor Marlon Ines of Sinait speaking in the FFS graduation

Former Mayor Edgar Yabes of Sinait

Eliseo Aurelio, Sinait MA

Remy Inovejas

even though much of the garlic produce in Ilocos Norte is traded in bulk in Sinait.

Yabes allotted P30,000 from the municipal development fund to subsidize the purchase of seeds and provide additional support such as snacks and transport during the Farmers' Field School (FFS).

Farmers in Sinait prefer to plant only garlic or onion after rice. These high-value crops are especially prone to soil-borne diseases and fungal attacks. Fortunately, there's IPM CRSP that presented practical solutions to the problems.

IPM CRSP was a sustained success in Sinait. What started as a simple grassroots project has been welcomed and adopted by Sinait farmers. In fact, the first FFS site was established through the request of its residents. Also, the incumbent mayor, Marlon B. Ines, has continued supporting the project since 2008. The aroma of fried garlic, sometimes confused with the scent of crisp peso bills, must have bonded them together.

CONCERTED EFFORTS

Now, a total of 11 sites have been established all over Sinait where education of farmers goes on. Yabes says another key to this sustainability are the AEWs who really love the project. After all, they make sure there are farmers waiting for Rapusas and her team.

Aside from being the teachers/facilitators in the FFS, the AEWs make sure the farmers attend classes by going around their sites and reminding stragglers not to be absent. They set up the venues of the FFS, arrange snacks, and coordinate everything from securing permission from local authorities down to smallest details like finding insect samples for the lessons.

Mario Cabinte, an AEW in Narvacan, Ilocos Sur under the leadership of Mayor Zuriel Zaragoza has even decided to produce VAM so that he could supply his farmers with VAM when necessary. Remy Inovejas from Sinait, Ilocos Sur, Francine Acosta of Sto Domingo, and Cecilia Sambrano of San Nicolas, Ilocos Norte are also exemplary AEW going around their barangays looking after the effectiveness of their activities.

Municipal agriculturists like Mamerto Tacbas of Santo Domingo, Ilocos Sur and Eliseo Aurelio of Sinait are administratively responsible for the partnership with IPM CRSP. They provide the official blessing to the activities of the AEWs who are in the field. They coordinate with the office of the mayor and act as a go-between the AEWs and the highers-up. Without their support and intercession, the AEWs cannot just participate in the project.

Each and every one of these people helps make and keep the IPM CRSP a success. But most of all, it is the farmers who whisper garlic in their hearts a thousand times every season that keep the chain strong.

the bulb that 'lights' farmers' lives

Diadem B. Gonzales

As far back as 5,000 BC, one certain bulb has illuminated farmers' lives, just as it makes farmers of today tearfully joyful on their way to the bank - the ubiquitous and one of the most important vegetable crops in the Philippines and around the world - onion.

Indeed, world history would have been different without this bulb, which has 'lighted' the daily cuisines from royalties of antiquity to the ordinary denizens of modern times. Its use spans almost the "totality of the world's cultures."

In Nueva Ecija and in the Ilocos Region, some 12,000 ha are planted to onions after rice. And as farmers get quite a bit from both crops, their options for escape from unexplained poverty keep glowing.

Scores of farmers have benefited from the onion IPM technology through the IPM CRSP; among them is Renato Garcia, a mechanical engineer from Bunol, Guimba, Nueva Ecija, who practically abandoned his *talyer* (repair shop) 20 years ago in favor of the more lucrative onion farming.

"*Kasi mas may pera sa farming* (Because there is more money in farming)," says the 62-year-old seed grower and farmer-cooperator of five sites under the IPM CRSP project.

ARMING AGAINST ARMYWORMS

Known to the Department of Agriculture for his industry in managing a 13-ha farm, Garcia used to spray at night, three times a week, to destroy *harabas* (armyworm/cutworm), a pesky pest that costs him P20,000 per season for insecticides alone.

"*Matindi yun kung umatake. Halos mga 40% na lang ang matitira sa aking ani. Yung harabas, gabi lang lumalabas para kumain ng halaman* (It is devastating when it attacks. Only 40% is left from my harvest. Armyworms eat plants at night)," he said.

Added to this cost is a whopping P120,000 capital for a 1-ha onion farm, let alone labor, land preparation, and weeding.

He remains unfazed because of the excellent results of the new technologies applied by the IPM CRSP in a mother-and-baby onion farming field trial. Garcia joined the program for more knowledge. "*Kahit tapos ka na sa pag-aaral,*

> *this* **bulb**...*has* **'lighted'** *the daily* **cuisines** *from* **royalties** *of antiquity to the* **ordinary denizens** *of modern times*

Brilliant harvest. Sacks of onions of Renato, planted and treated with VAM.

kailangan lagi at patuloy pa rin ang pag-aaral. Yan ang nagpapaangat ng karunungan (Continuing education increases knowledge even after school)."

"Even if armyworm destroys 25% of the plants, I just leave it at that because a young onion is capable of recovering. I no longer spray insecticides. That's what I learned from IPM CRSP," he says. "If armyworms are too many, we spray nuclear polyhedrosis virus to kill them. I saved P80,000 from my expense on chemicals in 1 ha."

GOING BIO

"Another nice thing I learned was the use of *Vesicular Arbuscular Mycorrhizae* (VAM), a biofertilizer, for improving nutrient absorption and management of root-knot disease caused by nematodes and other diseases, and *Trichoderma*, a biofungicide, for controlling soil-borne diseases with good results ever since I used them. My yield increased by 20%," Garcia adds.

From his previous total input cost per hectare of P100,000 to P120,000, Garcia now spends only P70,000 per onion cropping season because of VAM.

VAM increases bulb weight by 23% to 54%, while *Trichoderma* reduces the need for fungicides by 80%.

VAM used to be produced in his *barangay*, but nowadays, farmers buy it from Talavera, Nueva Ecija. Ten kilograms are enough for a 1 ha onion farm.

Garcia also applied 50% of the recommended fertilizer rate with good results. His harvests increased to 80 bags of big onions, up from 50 bags per hectare. "Lately, the price of onion in the market plummeted that's why my profit was not so big," he confides.

It doesn't matter. Farmers are happy these days with the results of IPM CRSP, without saying that they owe everything to the program. They share what they have learned, together with 70 other farmers and agricultural extension workers, by conducting training in other barangays. They have come to terms with the fact that sharing one's knowledge doesn't diminish it.

Whether it is colored yellow, red, or white, this 'bulb' will continue to light the lives of farmers both economically and in the culinary sense, let alone its possible medicinal uses and healthy effects on virility.

As for Engineer Garcia, there's no turning back to his old *talyer*.// *With reports from Ella Lois T. Bestil*

In Onion, there's Strength

Hanah Hazel Mavi M. Biag

It's onion harvest time again and many farmers are uncertain of the fate of their produce. Fortunate are the members of the Kalasag Farmers-Producers Cooperative of San Jose City, Nueva Ecija as they are at least sure of their market and support from government and the private sector.

Technical assistance and financial and marketing support flow into the cooperative as they continue to enjoy the trust and confidence of the Jollibee Foods Corporation (JFC) as one of its suppliers for 3 years now.

"Produce onions with lesser chemical residue. That's the key. Go for the biological way in managing onion crops," Wencelito Gomez, coop manager, said.

INTO MARKETING

Through the project, *Bridging Farmers for the Jollibee Supply Chain*, the cooperative of small farmers has established a link to a huge market.

Evolving from onion clusters of Barangays Kaliwanagan and San Agustin, the cooperative was organized in 2008 with 30 initial members. Now, 48 members make the cooperative more efficient and effective in satisfying the expectations of its buyer. The project has shaped the organized farmers into entrepreneurs whose partners include JFC, now one of the largest corporations in the country; Catholic Relief Services (CRS), which focuses on agricultural programs by linking small-scale farmers to more profitable markets; National Livelihood Development Corporation (NLDC) that pursues a package of livelihood and enterprise development interventions to hasten socio-economic growth in the countryside; the Integrated Pest Management Collaborative Research Support Program (IPM CRSP) of PhilRice that promotes technologies for rice-based crops; and the local government unit (LGU) of San Jose City, Nueva Ecija.

Gomez, 43, said that the project conducted a series of workshops

on marketing for the cooperative. Out of the workshops, they realized that their production planning every cropping season really puts everything in order. Also, their exposure to JFC management boosted their confidence in negotiating with other people, especially buyers.

"This strong support from various sectors is needed if we want to uplift the conditions of farmers," Wilfredo (Fred) Alfonso, agricultural extension worker of San Jose, said.

PREFERRED SUPPLIER

"We're thankful that Fred has linked us to PhilRice, his former employer, through IPM CRSP. Producing onions with lesser chemical residue without sacrificing quality is easy," Gomez said.

He also said, "We made a good impression right from the very start as our first delivery to the JFC Commissary in Canlubang, Calamba City, Laguna had only 0.017% reject." From an initial delivery of 60 metric tons (mt) in 2009, it increased to 236 mt in 2010, and 245 mt in 2011.

The technological interventions of IPM CRSP for the project ensure that the cooperative remains a reliable supplier.

Their habit of spraying insecticides for convenience is now fading out, but their determination to instead use biological fungicide *Trichoderma* and biological fertilizer *Vesicular Arbuscular Mycorrhizae* (VAM) is intensifying.

Gomez admitted that they are awed at how effective a simple sex pheromone trap is in catching male insects toward managing pest populations. Their interest in the technology went as far as suggesting to IPM CRSP that possible local suppliers of sex pheromone for insects should be encouraged. Also, they use VAM before seed sowing and transplanting and *Trichoderma* in their crops every after rain pours to prevent the outbreak of diseases.

Through IPM best practices, the cooperative has kept its good reputation as a supplier, and with it comes stable profit and support from microfinance institutions, aside from equipment grants from government.

The cooperative could now avail of production loans from the Alalay sa Kaunlaran Inc. and optimize equipment given by the Philippine Center for Postharvest Development and Mechanization (cold storage bin, 20-footer van, 1 unit reefer truck with a 3-ton capacity and 150 plastic crates); the DA-Region III (screen house, shallow tube wells, 1 unit of reefer truck with tractor head, multi-tilling machine, and motorized sprayer); the CRS (1 unit computer); Bureau of Soils and Water Management (shredder); and the Philippine Carabao Center (17 heads of purebred Murrah buffalo).

GOOD NEWS

"Our blessings should be shared to the community," Gomez exposed his preacher instinct. Hence, the birth of an organization (*KABIYAK* or *Kaagapay ng Biyaya sa Kabukiran*) of women, out-of-school youth, and elders who peel onions for the cooperative, giving them the chance to earn additional household income.

Right-sized and safe onions are the farmers' reward and their key to becoming a more reliable supplier to Jollibee Foods Corporation.

KABIYAK members are thankful to the coop as they earn additional household income from peeling onions.

Kalasag farmers share their overwhelming 'supplier' experience to a representative from the Catholic Relief Services.

The prospects for additional income for the cooperative are also inviting. JFC has encouraged them to supply not just onions but four other products: bell pepper, salad tomatoes, kalamansi, and rice. Now, they have more reasons to be thankful for their cooperative and for the knowledge they got from IPM CRSP.


Trichoderma product

Do-it-yourself IPM practices

Alfred Franco T. Caballero


To mass-produce *Trichoderma,* cracked corn is needed to grow the fungi.

PhilRice offers to a cash-strapped farmer the ultimate do-it-yourself solution in rice-based vegetable farming. The high costs of commercial fertilizers and pesticides have always been the perennial problem among farmers who are completely vulnerable to the dictates of the agricultural inputs industry. But did you know that you can make your own fertilizer in your own backyard by using materials that you can even make? Fertilizer and fungicide-saving technologies such as *Vesicular Arbuscular Mycorrhizae* (VAM) and *Trichoderma sp.* being promoted by IPM CRSP can help farmers reduce cost and increase their productivity while minimizing environmental damage.

VAM AS BIOFERTILIZER

VAM, developed by the National Institute of Molecular Biology and Biotechnology of the University of the Philippines Los Baños, is made from the symbiotic relationship between a beneficial fungus and the roots of a higher plant. The fungus attaches itself to the roots of plants like onion, garlic, and tomato and, in the process, gives it protection from soil-borne pathogens and adds nourishment.

VAM bolsters not only the plant's ability to absorb water and nutrients from the soil, but it also conditions the soil by making it more porous. VAM can potentially decrease chemical fertilizer use by 60-80%.

To make your own VAM biofertilizer, you will need a sterilized garden soil, clay pots, native corn seeds, and VAM starter inoculants. Clay pots are cooler and resistant to hot soil; starter inoculants are available from IPM CRSP at PhilRice or from the local agricultural extension worker. Follow these steps:

1. Start the production process by "cooking" the soil for 1-2 hours in a big wok or *talyasi,* or by drying under intense heat of the sun for 2-3 days (not advisable during the rainy season).
2. Place the sterilized soil in clean and dry clay pots.
3. When the soil has cooled, sprinkle a pinch of root starter inoculants; cover this with a thin layer of sterilized soil.
4. Sow 3-5 corn seeds in each pot.
5. It takes 3 months for plants to grow under normal conditions. Keep pests and diseases away.
6. Stop watering the plants after 3 months and wait for the plants to dry up.
7. Cut the plants or stalks when they are completely dried, but leave the soil in the pot to dry further.
8. Take the soil from the pot and roots. Cut the roots finely. Mix the finely cut roots with the soil from the pot to produce VAM soil inoculants. Save some root inoculants for future use.
9. Store the root and soil inoculants in sealed plastic bags in a dry and cold place.

During planting, simply broadcast VAM thinly on the seedbed, and then cover it with a thin layer of soil. The seeds are now ready to be sown. If

Leoncio Mangalili earns more than P10,000 from selling VAM, a biofertilizer.

necessary, apply fertilizer 15 days after sowing. Do not apply chemical fertilizers on the seedbed before sowing if you are going to use VAM biofertilizer.

TRICHODERMA AS BIOFUNGICIDE

Trichoderma sp. is a beneficial fungus that attacks harmful organisms by coiling its mycelia (tentacle-like structures) around them. It can further reduce farm inputs in rice-based vegetable production. Otherwise known as 'mycoparasitism', it is also highly competitive against harmful organisms for space and food released by the plants' roots. It produces antibiotics and secretes enzymes that cause the thinning of the harmful organism's mycelia, and helps enhance plant and root growth and consequently yield.

To produce your own *Trichoderma* inoculants, you will need cracked corn, polypropelene bag (5x8", 0.3 thick), rubber band, water, big cooking pot, steamer (or autoclave if possible), pail or basin, stove, fuel, screen, *Trichoderma sp.* (IPM CRSP isolate), mask, and gloves.

1. Wash the corn. Make sure it is completely clean, then boil it for 20-30 minutes or until half-cooked.
2. Rinse the boiled corn until cool. Drain on the screen.
3. Put 100 grams of boiled corn inside a plastic bag. Make sure to release the air inside, and then tie with a rubber band.
4. Put the packed corn inside the steamer or autoclave; steam for 2 hours with steamer or for 15 minutes with autoclave. Allow the corn to cool.
5. Inoculate the corn with *Trichoderma*. Cover nose and mouth and refrain from talking to avoid contamination when inoculating corn grits with *Trichoderma* sp. Incubate for 7-10 days.
6. In 3 to 5 days, whitish features on the corn are observed. These are the mycelia of the *Trichoderma* sp. After 7 days, the corn will turn green as spores of the *Trichoderma sp.* are produced.
7. Remove the corn from the plastic bag. Before spreading out the corn, put a clean Manila paper or old newspaper inside the box. Cover the box with paper or net to keep it from flies. Air-dry the corn completely.

To apply the inoculant, prepare the *Trichoderma* suspension. For every 16 liters of water, mix 10-15 grams of *Trichoderma* sp. Dislodge the spores into the water.

In the seedbed, spray the suspension before or after sowing seeds. It can also be applied before or after irrigation. If some seedlings wither, spray the *Trichoderma* solution immediately to prevent the spread of disease. Repeat application at 7-14 days interval or as needed.
Before transplanting, dip the seedlings' roots into the *Trichoderma* suspension for 5 to10 minutes.
If early signs of anthracnose are observed, spray *Trichoderma* regularly to prevent the spread of disease.

FARMERS' SAY

Perlita Reyes Desisto, 55, from the Science City of Muñoz, Nueva Ecija attests to the usefulness of VAM and *Trichoderma*. She saved much from fertilizers and fungicides because of the fungi. She said with little cost, she harvested many huge, plump, and marketable onions. In her 200-m^2 field, she spends P7,000 and her harvests have even doubled. In the previous season, she said she gained P30,000 from savings and sales which, little by little, she used to build a new house.

An FFS graduate, Leoncio Mangalili Jr, 59, from Talavera, Nueva Ecija used to harvest an average of 50 bags of onions (25 kg/bag) from his 1ha field. Recently, he harvested 95 bags and sold them for P200,000. His current expenses run at P30,000. He recalls spending about P100,000 for a one-ha onion farm because he indiscriminately used fertilizers and insecticides. He used to spray everyday due to cutworm attack. Since 2008, he produces VAM and sells it to other farmers at P50/kg. One needs about 10 kg of VAM in a hectare. Because VAM works so well, ask a farmer from a faraway barangay where he gets it, and he/she would point to Mangalili. In the previous season, he said he earned P10,000 to P15,000 from selling VAM biofertilizer alone.

PhilRice's IPM CRSP hopes many more farmers will learn the benefits of VAM and *Trichoderma*. These technologies, as well as others still in the pipeline, help to attain sustainable agriculture with high yields, minimal costs, and no known damage to the environment.// *With reports from Ella Lois T. Bestil.*

Source: RTB #61: Biofertilzer Production: Vesicular Arboscular Mycorrhizae and RTB #62: Trichoderma: Biofungicide for vegetables

More than a ton of preaching

Charisma Love B. Gado

> *I first tried a kilo of VAM in my backyard garden before I facilitated the FFS on IPM in our town.*

Ilocos farmers are assured of the effectiveness of Integrated Pest Management (IPM) as extension workers themselves adopt it in their own backyards.

UP NORTH

"I first tried a kilo of VAM (*Vesicular Arbuscular Mycorrhizae*) in the tomatoes in my backyard garden before I facilitated the Farmers' Field School (FFS) on IPM in our town," Clemente Viernes, extension worker from Vintar, Ilocos Norte said. VAM is a good alternative to commercial fertilizers for vegetables, upland rice, and corn that can reduce fertilizer use by up to 80% and provide plant resistance to diseases.

Viernes, who participated in a season-long training of trainors on IPM best practices in 2009, said he found the application of VAM during the seedling stage effective. He claimed that his yield was good in spite of his one-time watering of the plants. Even in harsh conditions, his plants did not experience bacterial wilt and yellow leaf curl, he said. With initial success, he applied VAM in his 3,000 m^2 backyard vegetable garden planted with tomatoes, eggplant, and bitter gourd.

In Pasuquin, Ilocos Norte, a town that exports garlic to Taiwan, farmers led by assistant municipal agriculturist Lovelita Agustin (who herself has been using VAM for three years now on her 2,000 m^2 garlic farm), see the benefits from VAM in their farms. Their processed products are now being marketed by their Federation in the Robinson's Mall in San Nicolas.

From the FFS the extension workers facilitated, farmer Eduardo Toribio, 50, of Piddig in Ilocos Norte testified to the advantages of using VAM. He said he cut expenses on fertilizer. From applying 60 bags of fertilizer in his 3-ha farm before, he now uses 40 bags because of VAM. After applying VAM in his field, he was happy to find robust and greener vegetable seedlings, which he never experienced in his 16 years of farming.

DOWN SOUTH

Five hours from Pasuquin, extension workers in Ilocos Sur are also promoting the potentials of VAM and *Trichoderma* sp. or simply *Tricho*, a beneficial fungus that serves as a biological control agent for soil-borne pathogens.

Mario Cabinte of Narvacan, Ilocos Sur underwent a four-month training on VAM and *Tricho*, but was hesitant to disseminate the technologies at first because of the farmers' "to-see-is-to-believe" attitude. Good thing, there was FFS to showcase the technologies to skeptic farmers.

"Herminia Rapusas (coordinator of the IPM Collaborative Research Support Program) encouraged me to facilitate FFS here. If she didn't help, I wouldn't have been able to establish the sites alone," he recalled.
Two years ago, Cabinte started the FFS in Barangay Ambulogan, the town's largest area for onion production. After farmers adopted the lessons from the FFS in Ambulogan, he established another site in Barangay Parparia, where farmers tried VAM and *Tricho* on off-season tomatoes. Together, they observed that their yield was not as heavily damaged by pests and diseases. "In my own backyard garden, I observed that tomato seedlings applied with *Tricho* had 99% survival rate. The quality is also good because the National Food Corporation based in this region bought our farmers' produce," he said.

The farmers were so convinced by the advantages of using VAM and *Tricho*. Jose Ducusin, 56, a farmer in Narvacan, said that although it is hard to produce VAM inoculants, it is worth the effort. He used to apply 10 bags of fertilizer a hectare in his onion farm. Now, he starts to completely do away with commercial fertilizer and only uses VAM.

Meanwhile, Mario said a laboratory field for the production of VAM and *Tricho* would be very helpful if they are to sustain the practices.
"It would be more convenient for farmers to produce these organic inputs if we have our own supply of isolates and root starter inoculants. It is good that *Manang* Hermie

Cabinte regularly visits IPM technologies' adopters not only to monitor their progress but also to learn from them.

Mamerto Tacbas

Clemente Viernes

Eduardo Toribio

provides these materials, but it would be better if we can produce them ourselves," Cabinte said.

However, not all farmers put as much effort into organic agriculture. Remy Inovejas, extension worker in Sinait, Ilocos Sur, noted that some farmers trained in FFS-IPM have difficulty producing their own supply because they feel it requires too much effort and is time-consuming. "To encourage the farmers, I have to show them that making these environment-friendly and safe biological control agents is not as taxing as they think; and that it could be juggled with their other tasks. I make *Tricho* every Saturday, and it only takes half of my day. I wait for about 3 weeks then distribute it to the farmers for free. I also produce VAM twice a year," she said.

Inovejas, an organic farming advocate, has facilitated eight FFS. She said she incorporated the production of VAM and *Tricho* in FFS for other crops as she wants to teach more farmers about cultivating vegetables that could be safely consumed.

One of the FFS graduates, 30-year-old Rodel Corpuz of Sinait attested to the benefits of using VAM in his 0.25 ha onion farm. Corpuz said in the past he used to spend P5,000. Now, he only spends P2,000 as he reduces chemical fertilizer use.

Helping the farmers dispossess their 3S habit should also be given equal importance in promoting IPM best practices, according to Mamerto Tacbas, municipal agriculturist of Sto. Domingo, Ilocos Sur. These three deadly habits are *sadut* (not applying the practices learned from training); *sulit* (doing farm activities half-heartedly); and *saur* (not doing what they say). Teaching about 40 farmers in 4 to 5 months, their group centered farmers' values education on spiritual enrichment. As a member of the Knights of Columbus, Tacbas asked FFS facilitators to start the sessions with prayer, often led by farmers.

Tacbas, like many of his fellow extension workers, does not mind the difficulties of teaching farmers about VAM, *Tricho*, and other IPM technologies so long as the practices they introduce are heard and applied. But words are not enough. They should be practiced. Words and action penetrate the soft side of people. They even put people's doubts to rest.// *With reports from Hanah Hazel Mavi M. Biag.*

> **FARMERS IN PALINA EAST ATTEND, LISTEN, PARTICIPATE; YET, THEY GO BEYOND THE USUAL EXPECTATIONS**

Barangay Palina East is a few minutes ride from the bustling city of Urdaneta, Pangasinan. Rustic and unassuming unlike the more cosmopolitan feel of the city, it nonetheless has made its mark in mobilizing people to improve their situation especially when it comes to agriculture-related concerns. The barangay has 177 ha of rice fields, 15% of which are devoted to vegetable production during the dry season.

Farmers in Palina East are perennial favorites of the Department of Agriculture and even private sector-led trainings. But that's not the catch. They attend, listen, participate; yet, they go beyond the usual expectations.

Ramon Delos Santos, hailed Outstanding Farmer by the LGU-sponsored *Model Home* competition, is an example.

EMBRACING IPM APPROACHES

In 2004, he seriously delved into farming and has since been an ardent participant of most training that came to town. Farmer Livestock School, Farmers' Field School (FFS), Training on *Harbest-Kabalikat Sa Kabuhayan Farmers Training Program*, PalayCheck, and of course, the IPM CRSP. Name it, he joined it. When asked about what motivates him, he answers matter-of-factly: he enjoys farming a lot.

Delos Santos' house stands in his 2-ha mango orchard, which also serves as his area to shepherd his so-called "flock": native pigs, goats, geese, fish. Although he tends an additional 13 ha (mostly planted to *palay*), the orchard already testifies to his versatility and farming prowess. Fruit-bearing trees, such as mangoes, *santol*, and *suha* (grapefruit) are like his prized exhibits labeled with their scientific names. But most interestingly, Delos Santos doesn't waste opportunities: vegetables surround his house. Eggplant, okra (lady fingers), *upo* (bottle gourd), *sitaw* (string beans) are either lined up in neat rows or show off their wing-like leaves on sacks and small freezers now recycled as vegetable pots. Along the pathwalk to his front door are newly planted tomatoes.

In 2009, Delos Santos joined the FFS on IPM CRSP to learn how to grow vegetables using environment-friendly technologies. In two years then, he can recite by heart the procedures involved in producing biological fertilizer *Vesicular Arbuscular Mycorrhizae* (VAM) and biological fungicide *Trichoderma*. He presents one of his finished products, digs his hand into the fine brown material (VAM), and explains with understated confidence how he painstakingly went through the whole process (sterilizing, cooling, sowing, 3-month waiting, cutting, storing, and all the meticulous steps) that had to be done. He even offers advice: Just put one spoon of *Trichoderma sp.* in the knapsack when spraying.

Delos Santos likes the technical part of things and is quite private when it comes to his income. Incomes can be easily computed, but Delos Santos makes his point clear: he has found a vocation that he never imagined pursuing. Thanks to training programs, seminars, and friendly competitions, he would never have found himself excelling in farming.

BONDING MOMENT

Orlando Campued and Marylin Villarin, who have formed a bond with Delos Santos as they pitch resources to produce VAM and *Trichoderma*, also attest to how IPM-based learning led them to gain more with less input. In fact, when asked how much they spend to produce, for instance, a 9-kg stack of VAM, they implicitly say that there is no fixed share. "Only corn and the energy to sterilize the soil are needed."

These three farmers have gone through the training in 2009; they are allowed to participate again given that there are newer commodities involved (*sili*, *talong*, *at* okra).

Campued, who's 54 and could only depend on his wife for other farm-related activities (his children have shown less interest), hopes that his participation would still be worth the effort. He prays it would improve the quality and yield of his 6,000 m^2 farm which he devotes to raising *sili*. During peak times, the *sili* could fetch P180/kilo. He estimates that he could target 500 kilos during off-season; this should be more than enough to keep farm work going.

PANGASINAN FARMERS: VAM AND TRICHO FANATICS

Anne Marie Jennifer E. Eligio

Marylin Villarin

Orlando Campued

Ramon Delos Santos

Villarin, on the other hand, is the active farmhand instead of her husband, who chooses to take on jobs as construction worker. She grows ampalaya after rice in a 7,000 m^2 field.

Agricultural extension worker (AEW) Emely Lucero said that farmers have become aware and more cautious of the pests that affect specific crops such as webworm and fruitfly (for *ampalaya*) and fruit and shoot borers (for eggplant), and have been active in promoting and using the introduced technologies.

As second-time trainees, the three farmers look ahead to focus on lessons related to this new set of crops.

According to Felix O. Vitales II, also an AEW, the farmers are excited in partnering with the city's 4-H Club in advocating for the community to produce its own inoculants. Anticipation is rife that PhilRice will help share and teach the technology, and pave the way again for farmers to appreciate and imbibe another innovative, cost- and environment-friendly method to apply IPM. And as Delos Santos would say it in his admirable, self-effacing way: let's enjoy the toils of farming.

Usapang Magsasaka

Maria Adrielle D. Solsoloy

Palay-alamin!

Ano ang *Saclob*?

Nagmula ito sa salitang Filipino na "saklob" (takip).

Ang teknolohiyang *Saclob* ay isang paraan ng pag-iimbak ng binhing palay na magpapanatili ng mataas na kalidad ng binhi. Ito ay imbakang di napapasukan ng hangin.

Bakit ginawa ang *Saclob*?

Mahalagang mapangalagaan ang kalidad ng binhi bago ito itanim. Ngunit dahil sa di maayos at maling pamamaraan ng pag-iimbak madalas ay nasisira ang mga binhi. Sa Pilipinas, mataas ang halumigmig ng hangin na di makabubuti sa kalidad ng binhi. Madalas iniimbak ang mga binhi sa malalamig (may air-con) na bodega. Magastos ito kaya naisipang gumawa ng mga eksperto ng mas praktikal at murang imbakan.

Sa pag-iimbak ng binhi, laging isaisip na:

Ang binhi ay buhay na buto:

- Ito ay humihinga. Kumukunsumo ito ng *oxygen* at naglalabas ng *carbon dioxide*, tubig, at init.
- Ito ay maaaring mabilis mamatay. Ang haba ng buhay ng isang binhi ay nakasalalay sa kung paano ito pinarami, prinoseso, at inimbak.

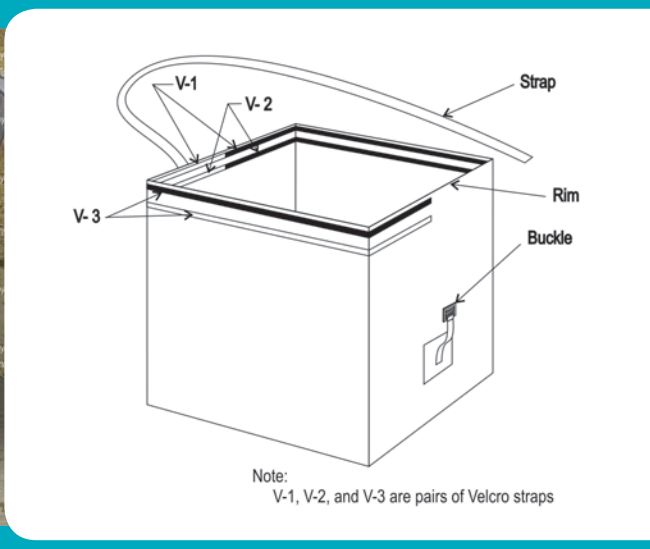
Ang binhi ay *hygroscopic*:

- Ito ay sumisipsip ng halumigmig (moisture) sa paligid nito.

Palaytandaan

Ano nga ba ang mga dapat tandaan sa paggawa at paggamit ng teknolohiyang *Saclob*?

Materyal	Tarpaulin, 0.8 mm ang kapal
Pagsara	Nakatuping gilid na may *velcro strip fasteners*
Sukat Kapag walang laman Kapag may laman	 1.35 m x 1.35 m x 2.05 m 1.35 m x 1.35 m x 1.4 m
Pagbuo	Gamitan ng mainit na pang-welding



BAHAGI NG *SACLOB*

Ang *Saclob* ay gagamitin lang dapat sa loob ng isang bahay o gusali.

- Ipwesto ang *Saclob* nang malayo sa matutulis na bagay tulad ng maliliit na bato at metal o nakausling pako o turnilyo, upang hindi mabutasan ang ilalim nito.
- Mahalagang tuyo ang nakasakong binhi na ilalagay sa loob ng *Saclob* o may lulang-tubig (moisture content) na 12% o mas mababa.
- Bago ito lagyan ng binhi, siguraduhing walang butas ang mga gilid.
- Maganda kung may magagamit na *oxygen meter* upang malaman ang dami ng *oxygen* sa loob ng *Saclob*.
- Kung walang *oxygen meter*, laging tiyakin na walang sira o butas ang *Saclob.*

Palay-isipan

Hanapin ang mga sumusunod na salita:

Peste
VAM
Trichoderma
Inoculants
IPM CRSP
Kulisap
Daga
Sakit
Tungro
Aksip
Blast
Putakti
Kuhol
Ibon

A	L	F	R	E	D	A	B	I	T	K	A	T	U	P
K	C	D	I	A	D	E	M	D	E	I	D	R	I	V
S	F	N	M	L	V	Z	Y	L	K	U	H	O	L	E
I	T	J	E	S	A	K	I	T	U	J	I	D	O	F
P	I	C	L	K	M	A	X	K	L	A	H	E	V	G
H	C	O	L	J	A	R	V	G	I	N	O	V	E	C
A	B	L	A	S	T	E	V	O	S	D	R	C	I	A
N	R	A	S	C	O	N	U	D	A	R	G	O	B	R
A	P	I	H	I	E	T	S	E	P	E	N	M	O	L
H	E	P	H	A	Z	E	L	T	M	I	U	N	N	O
P	A	M	R	E	D	O	H	C	I	R	T	A	O	P
J	C	C	G	R	A	A	W	S	B	O	L	C	A	S
O	E	R	F	I	G	N	B	R	E	N	D	A	Q	R
Y	E	S	D	K	A	I	B	C	R	A	M	T	M	S
H	O	P	E	C	S	T	N	A	L	U	C	O	N	I

Magtanong sa Eksperto

Inihanda ni Christina Abadilla- Frediles


Harabas

TANONG

Magandang araw po. Aking napag-alaman na ang PhilRice ay tumutugon din sa ibang problema bukod sa pagpapalayan. Ano po ba ang mainam kong gawin sa mga harabas at hanip na madalas pumipinsala sa aking mga sibuyas?

ABAD TINDUGAN, 45
Lupi, Camarines Sur

SAGOT

HARABAS

Ang maliit na uod ay pinapasok at kinakain ang dahon na kalaunan ay natutuyo. Habang tumatagal, ang lumaki nang uod ay kumukutkot sa ilalim ng lupa at lumalabas lamang sa gabi para kumain ng halaman. Tandaan lang po natin na ang sibuyas ay may kakayahang makabawi sa pinsala ng harabas kung ito ay bata pa (hanggang 30 araw pagkatanim). Kahit may pinsala ang sibuyas hanggang 25% bawat dahon ay hindi makababawas sa magiging sukat at bigat ng laman nito.

Paraan ng pamamahala:

- Ihandang mabuti ang lupang pagtatamnan sa pamamagitan ng paulit-ulit na pag-araro upang mamatay ang mga itlog, uod at pupa ng harabas.
- Kolektahin at patayin sa bukid ang mga uod habang nagpapatubig. Ang mga uod ay lumalabas sa lupa kapag nagpapatubig kaya mas madali silang ipunin sa ganitong pagkakataon.
- Iwasan ang sobrang paggamit ng insektisidyo upang mapanatili ang dami ng mga kaibigang organismo.
- Gumamit ng *sex pheromone traps* sa bukid upang mahuli at malaman ang tamang panahon at epektibong paraan ng pagpuksa ng mga lalaking paru-paro ng harabas.
- Magtanim sa paligid ng bukid ng *trap crop* o halamang magsisilbing ibang kainan ng harabas tulad ng castor o kamote upang di nila ubusin ang inyong sibuyas.

HANIP

Umaatake itong kulisap na ito sa maraming klase ng halaman ngunit paborito nitong kainin at itlugan ang dahon ng sibuyas. Ang dahon ng sibuyas na inatake ng hanip ay may maliliit na itim na tulduk-tuldok. Tinutusok ng hanip ang dahon ng sibuyas kaya ito ay nagkakaroon ng puti o silver na patse. Sinisipsip din ng hanip ang katas ng dahon ng sibuyas kaya ito ay nalalanta at natutuyo.

Paraan ng pamamahala:

- Panatilihing mamasa-masa ang lupa habang naglalaman ang sibuyas upang mahirapang dumami ang mga hanip.
- Gumamit ng *blue board sticky traps* sa bukid upang mahuli at malipol ang mga hanip at maiwasan ang pagdami nito.
- Iwasan ang sobrang paggamit ng insektisidyo upang mapanatili ang dami ng mga insektong sadyang pumapatay sa mga hanip.

HERMINIA R. RAPUSAS
Project Coordinator, IPM CRSP

Rice on TOP

The Perfect Grain
(First of three parts)

Joy Bartolome A. Duldulao

Over time, Filipinos have selected varieties of rice that appeal to them visually and instinctively. In the process, they have defined how the perfect rice grain should look, smell, taste, and feel in both its raw and cooked forms.

Bigas, as the raw form is called, looks best without insects and pests, foreign matter, and tiny broken grains. While the absence of the first two is easy to ensure, the so-called "brokens" are not easy to do away with. Tiny fissures in the grain resulting from improper drying and postharvest handling are the culprits in broken grains.

Filipinos prefer *bigas* that is glossy, translucent, and white. Regional differences, however, point to long and slender grains as the choice in most areas other than the uplands where short and bold grains are loved.

Cooked rice, locally called *kanin*, is perfect when it is aromatic, tender, cohesive, plus, of course, piping hot. Almost perfect is tolerated as rice is a food Filipinos cannot do without no matter how hard they pretend.

METRICS OF GQ

Physical techniques have provided means of determining grain quality (GQ), thus defining the metrics of a perfect grain.

With a grading machine, the brokens are easily separated from whole grains, and by weight percentage, rice with fewer than 25% broken grains is the perfect milled rice. A caliper, on the other hand, is a device that checks if a grain conforms to the ideals of perfect size and shape. Long and slender grains have at least 6.4 mm length and a length to width ratio of at least 3.

Translucency is a much-desired quality, with the exception of glutinous rices that are entirely opaque yet form a distinctly different class of beauty of their own. Translucent rice is ideally free of chalk or powdery grains, but allowances can be remedied. Thus, as measured by manual separation of chalky from translucent grains, chalkiness of at most 5% still makes for decently beautiful grains.

Beauty also intensifies with age in rice. Ageing is required to meet the perfect moisture content for the grain. Too moist is not good as too dry is also not. A 12-14% strikes the right balance of moisture in the grain. Ageing also stabilizes other grain quality properties.

For cooked rice, metrics still rely on a panel of tasters to rate the rice served before them as to tenderness, tastiness, aroma, and smoothness. However, less subjective methods are already in use such as an Instron machine to measure hardness and a gas chromatograph or a PCR machine to confirm aroma and scent. Other metrics require chemical tests. Two chemical metrics dictate if a rice variety will have good eating, cooking, and processing quality. These are amylose content (AC) and gelatinization temperature (GT).

Amylose, the linear fraction of starch, binds with iodine forming a blue color. The intensity of the blue color indicates the proportion of amylose in the starch. Rice eaters have selectively chosen rice with an intermediate amylose content of 18-25%. Low amylose content makes it soft and sticky while high content makes it hard.

Gelatinization is related to the temperature needed to cook the rice. Examining the swelling of rice grains in an alkali solution indirectly determines the gelatinization metrics. Completely swollen or fluffy grains are classified as low-GT type, partially swollen are intermediate type, and unaffected grains are high-GT type.

A scientist at PhilRice's laboratories performs a rice grain quality test on a sample batch of grains.

Rice of either the intermediate AC-low GT or high AC-intermediate GT combinations will make a perfect table rice. An added bonus is the protein in rice of 7% on average. However, higher protein content tends to make the cooked grain hard.

All rice lines in the PhilRice breeding pipeline must measure up to all these metrics. Those that pass are released as varieties, hoping to be embraced by rice eaters. And those that fail are proofs that grains could be good, better, or best.

Next issue: The Perfect Grain (Part II): The GQ Men and Women

Market forces and IPM

Chona Suner-Narvadez

The *2010 IBM Global Location Trends Annual Report* says the Philippines has overtaken India as the world leader in business support functions such as shares services and business process outsourcing.

According to XMG Global from Canada, the Philippines is third in the global outsourcing market. This is very good news for the 38 million working Filipinos, 52% of whom are employed in the services sector.

While this is a bright spot for that sector, the next largest labor force by occupation is in agriculture, where 33% are employed. The Philippines is mainly an agricultural country, and yet a cursory glance at the latest trade information on the Top 10 Philippine Exports for all countries shows that the only agricultural product in this list is coconut oil, which is not even in the Top 5 bracket.

Why are the figures like this? Maybe we don't produce enough, our produce is not up to standards, low information of producers on the lucrative export market, or perhaps agriculture is not really a lucrative industry.

Much can still be done for our agriculture industry. One source of possible sustainable competitive and comparative advantage might well be USAID's Integrated Pest Management Collaborative Research Support Program (IPM CRSP).

GAP AND IPM CRSP

Bureau of Export Trade and Promotion data show that onions/shallots is the largest category of vegetables exported from 2006 to 2010 with a total value of US$13.6 million. Good agricultural practices (GAP) as defined by the UN Conference on Trade and Development is an opportunity to integrate technical advice to farmers to include good agronomy plus food safety and quality added with business skills.

Essentially, it's about producers targeting their desired market and other objectives first, and then knowing what they need to comply with to sell in those markets.

Onion producers in the Philippines enrolled in the Farmers' Field Schools of IPM CRSP are trained to use technologies such as *Vesicular Arbuscular Mycorrhizae* (VAM), a fungus, as a biological fertilizer to reduce chemical fertilizer use by 60 - 80 %.

If the knowledge, attitude, and practices of all onion farmers in managing common insect pests and diseases in rice-onion farming systems can be improved using the IPM approach, we shall surely further increase yields and expand our penetration of the export market.

Thus, GAP, combined with IPM CRSP, can take us to our dream destination – increased income for our farmers, and a boosted economy for our country.

IPM CRSP AND TRADE AROUND THE WORLD

Elsewhere in the world, countries applying the IPM CRSP learning enjoy an advantage in selling crops to North America and Europe. Guatemala and Costa Rica derive 66% and 52%, respectively, of their gross incomes from export earnings in the agriculture sector, where a large number of their populations are gainfully employed. The US and European markets are important, and both have strict food safety standards that producers must meet. Agricultural products are outrightly rejected at ports of entry if found to have overused chemicals during production.

This is where the importance of IPM CRSP can really be felt. A study by Sullivan et al of Purdue University found that producers who adopted performance-proven IPM practices had significantly fewer sanitary and phytosanitary compliance problems. Further, these producers achieved higher marketable yields at lower production costs, resulting in greater economic and socioeconomic sustainability.

NOT JUST A STRATEGY BUT A WAY TO ECONOMIC SECURITY

Thus, partners of IPM CRSP need to see the bigger picture. As they follow technology recommendations and adopt proven IPM approaches, they will use lesser chemicals to control crop pests.

In the age of food safety and traceability, and the market trends leaning toward organic and natural products, IPM is the logical way to go. With several years of collaborative research with international agencies, it's time for the Filipino farmer to bring this knowledge to a bigger application. While farmers were encouraged before to apply IPM to save from less use of inputs, now they have a better incentive to continuously practice IPM – the strategy will enable them to have better products that are more attractive to consumers, not just in the Philippines, but around the world.

The only question now is how the produce can be consolidated for the export market. This is where the public-private partnership will come into play. Let's cross our fingers on this.

Sources:
National Statistics Office, Bureau of Export Trade and Promotion, CIA World Factbook, Philippine Exporters Confederation, Inc., International Trade Centre

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Herminia Rapusas (left) has been working with rice-based vegetable farmers in Northern Luzon. Through IPM CRSP, cost-saving technologies have helped reduce inputs and increase yield and income in many rural areas. Her dedication and connection with these farmers are a model for agricultural extension and communication: an inspiring tapestry of hardwork, setbacks, successes, and friendships that will last a lifetime.

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