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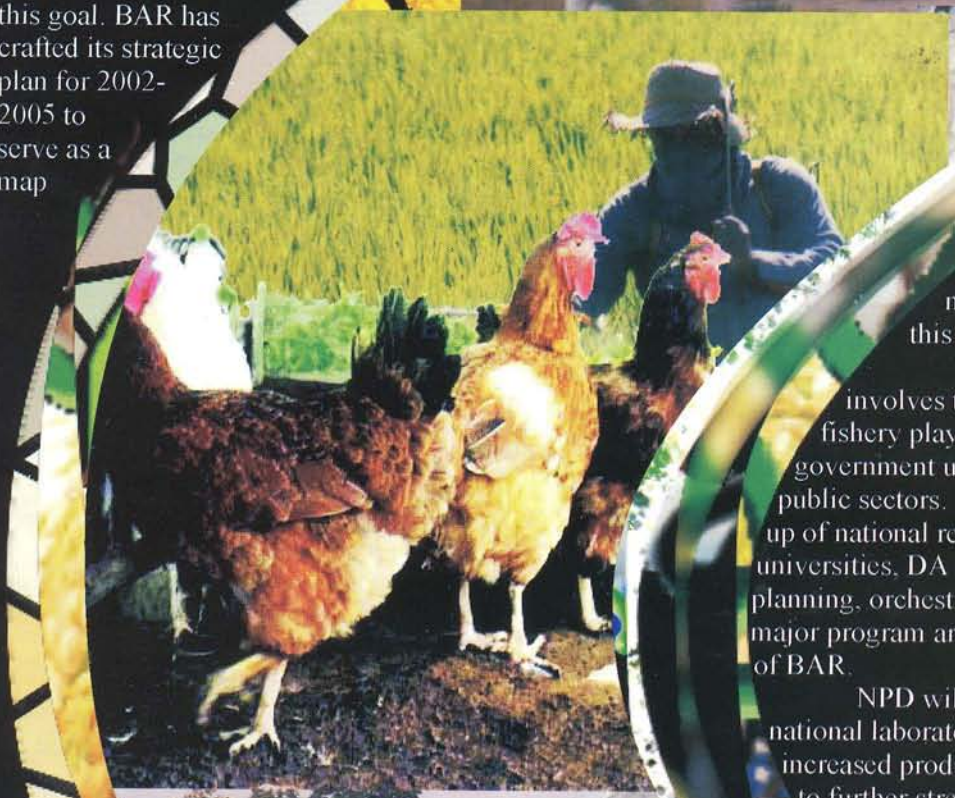
BAR gears up for 2002-2005

by Maria Rowena SA. Briones and Thea Kristina M. Pabuayon

To become a world-class research institution is the Bureau of Agricultural Research's goal. At the heart of this goal is the vision of assuring a brighter future for the Filipino people through research excellence in agriculture and fisheries.

A thousand-mile journey, one might say, but it starts with one step. BAR gingerly took initial steps and now it is ready to take assured strides towards this goal. BAR has crafted its strategic plan for 2002-2005 to serve as a map and an inspiration.



BAR will strengthen the national and regional RDE networks and the linkages with partner agencies from regional, national to international levels. The Bureau is set to unify the agricultural R&D in the country. The nine divisions of BAR will work on achieving this.

The establishment of national RDE networks involves the collective efforts of all agriculture and fishery players, including farmers, fisherfolk, the local government units, government institutions, and private and public sectors. These national RDE networks, which are made up of national research institutions, state colleges and universities, DA bureaus and agencies, provide the headship in planning, orchestrating, monitoring and evaluating the identified major program areas of the National Programs Division (NPD) of BAR.

NPD will implement the programs for establishing national laboratories, identifying benchmark information for increased productivity, and conducting collaborative activities to further strengthen network partnerships.

So far, NPD has already established 21 national RDE networks, seven sub-networks, and three special programs under the current RDE networking system. Aside from strengthening the national RDE networking system, it will continue developing, implementing, and monitoring RDE programs

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SEED OF CHANGE

Seed is life. It is continuity into the future, if sown and nurtured with the best elements to nourish it to grow, perform its mission on earth, and produce another seed, which may be better or worse than what it is. The cycle goes on.

The seed takes on many meanings. For now, the seed is a concept sown on fertile minds that soon manifests itself into a product that triggers processes to create change. This is the seed of change whose intent is for the better. We introduce change hoping that it is for the better. And like the physical seed, it soon bears fruit, an insurance of the future. But unlike the physical seed whose progeny would be like itself, the fruit of the seed of change is difficult to predict.

With this issue of **BAR Today,** we are planting the seed of change, not just for the sake of changing but we do it in response to comments and suggestions including our observations for the past years. We got feedback that **Technotrends**, one of the past publications of BAR, had been useful to readers. I got a copy to study its content. True to its name, the contents are trends in technologies which are semi-technically written. **BAR Today**, even with the old issues, contains technologies written in popular form, thus making it understandable by any kind of reader. What do we change? Should it be the format, the layout, the organization of contents, the size or all?

Sometimes, when one is so used to a thing, there is some kind of convergence and conformity of behavior so that when there is a variation, even if it is simpler or better, one cannot see the attribute of the change. This could be one reason for the obstinacy of man. This world is full of preferences and we choose, guided by our preconceived notions of what is good or bad, and what we like or not like.

BAR is at the service of its customers and clients, therefore, we are going to find out what they want, and then work out for their satisfaction. As a research and development institution, the products we offer our customers are knowledge products and services. And like the business enterprises that meticulously and attractively package their products for these to be bought, we, too, will do the same. The promotion of our products is more difficult, however, because these are intangibles and means to an end. Minus the trimmings, we promote our knowledge products (technologies and information) through simple, understandable, and straightforward language. We offer them in convenient forms for easier handling and use through better organization and layout using colors that are alive and vibrant.

You may notice that the size of this new **BAR Today** has been reduced from broadsheet to magazine size. This is for easier handling and filing.

The masthead, layout, and content organization had been changed in keeping with beauty, ease, convenience, and the times. Each quarter issue before dealt on a specific commodity. For instance, the last issue last year focused on ornamentals and so all the 12 pages were filled with articles on ornamentals, from the network to profile and status of the industry, an outstanding performer in the field of ornamentals and technologies on the production and postharvest handling of different kinds of ornamentals including the market. Whenever we prepared an issue, we felt an overwhelming satiety of the topic and it was very nauseating. There is an advantage of this kind of content organization, however, and that is the consolidation of an exhaustive write up of a subject in one issue.

The new **BAR Today** focuses on four categories: crops: livestock and poultry; marine and aquaculture; and discipline-based knowledge products. At least, all these areas are now represented so there is a variety of knowledge and information.

We want to serve you better. We have included a survey form in the past issues asking your needs and suggestions. Your feedback will be our basis of further improving our publications.

This is just one seed of change. Many more will be planted. We hope they fall on fertile soil.

113 plant species in Ilocos in danger of becoming extinct

For every second that ticks, at least five plant species are permanently wiped off the face of the earth becoming extinct forever. Scientists are alarmed at the rate that valuable genetic material is getting lost. In other parts of the country the number of plant species disappearing is not yet documented.

In the Philippines, a team of researchers from Mariano Marcos State University (MMSU) found that 113 plant species in Ilocos Norte are vanishing: 16 vegetables, 31 fruits and forest tree species, 43 ornamentals and medicinals, 7 rootcrops and 16 other plant species.

Citrus aurantifolia (dalayap)

Tagetes erecta (marigold)

This was revealed in a study that documented the province's vanishing plant species in an effort to save the region's valuable genetic resources.

Initially, the survey was conducted in four municipalities and one city in Ilocos Norte: Batac, Laoag City, San Nicolas, Pasuquin, and Dingras. These municipalities have a high diffusion rate of new varieties, widespread use of agrochemicals, and landscapes that have been altered by extensive development projects.

Vegetables in danger of becoming extinct are *balinsoek (Phaseolus sp.),* red cowpea *(Vigna sp.),* cayenne pepper *(Capsicum frutescens),* wax gourd/kundol *(Benincasa hispida),* kapas-kapas, sugod-sugod, himbabao *(Broussonetia luzonica),* and wild sponge gourd *(Luffa cylindrica).*

Both legumes, *balinsoek* and red cowpea are resistant to weevil and have good eating qualities. Aside from being a favorite spice, cayenne pepper is used to treat ringworm and rheumatic pains. *Sugod-sugod* can be used as laundry soap while wild sponge gourd can be used for scouring kitchen utensils.

For fruit and forest trees, the scientists identified the following: dalayap *(Citrus aurantifolia),* caburao *(Citrus macroptera),* darukis *(Citrus sp.),* custard apple *(Anona reticulata),* starfruit *(Averrhoa carambola),* mansanitas *(Sysyphus mauritiana),* selery, antipolo *(Artocarspus blanchoi),* balayang *(Musa errans),* pomegranate *(Punica granatum),* bignay *(Antidesma bunius),* carissa *(Carissa carandas),* zapote negro (*Diospyrus ebenaster),* and *panalayapen/apeng.*

Most of these fruit trees are medicinal, often used to treat common ailments. *Dalayap* and *caburao* leaves can be used to treat cough and headache. Custard apple leaves can be used to treat indigestion, while a decoction of its green fruits, leaves and bark can be used to treat kidney trouble, dysentery and diarrhea. Fresh leaves are also a good dewormer. The rind of the pomegranate fruit and its root-bark are anthelminthic or good dewormers. The pomegranate

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Grain borers are becoming resistant to pesticides

A lesser kind of grain borer *(Rhyzopertha dominica* Fabricius*)* is becoming resistant to phosphine - a type of fumigant or substance that is used to disinfect stored grains and protect them from pests.

Phosphine has been popularly used since the 1980s because it is easy to apply and does not leave any harmful residues in the grain.

The first signs of resistance were recorded in the early 70s but the resistance levels then were low to pose a serious problem. Today, however, there are widespread reports of higher phosphine resistance in some countries, which resulted to more researches on grain borers and phosphine resistance.

A survey in 1995 indicated that *R. dominica* strains that are phosphine-resistant are present in the Philippines. The survey used the resistance method recommended by the Food and Agriculture Organization (FAO). It involves exposing adult grain borers to a phosphine dose of 0.08 mg/ liter phosphine for 20 hours at 25 degrees centigrade and 70 percent relative humidity.

To check whether these results have changed recently, a research team composed of Ms. Miriam Acda from the Bureau of Postharvest and Research Extension (BPRE) and Messrs. Mervyn Bengston and Gregory Daglish of the Queensland Department of Primary Industries (QDPI) tested three strains of grain borers for phosphine resistance.

The team found that two out of the three *R. dominica* strains are resistant to phosphine. These strains were the ones taken from Cebu and South Cotabato. On a positive note, the strain from Manila was found susceptible to phosphine. All the adult grain borers were killed at a phosphine rate of 0.03 mg/liter.

The eggs and pupae of this grain borer were found more resistant than the adults. This implies that the eggs and

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BAR gears...continued

Likewise, NPD will develop new systems and procedures on RDE planning and implementation to ensure the effective planning and execution of RDE programs.

In the regional level, the Regional Programs Division will provide financial and technical support to the regional networks. Technical advisers who are mainly from the University of the Philippines, Los Baños have been assigned to each region to give assistance to the regional agricultural research centers in managing and coordinating R&D activities.

Zonal Research Centers for Agriculture in Regions 2, 8 and 10 have also been established to promote an integrated research agenda program in the regions and yet decentralize the decision-making process in R&D planning, monitoring & evaluation, and implementation.

To ensure that BAR maintains its good relations and linkages with its partners and clients, both local and international, the Bureau created the Public and International Relations Communication Division (PIRCD).

Division head Reynaldo Comia, explains that PIRCD takes the lead in drafting BAR's communication plan within the organization as well as with other agencies and clients. "This is to systematize the Bureau's internal communication systems, build a positive image for its different policies, and develop and strengthen its linkages with local and international agricultural agencies," Dr. Comia adds. PIRCD will organize a press conference to disseminate the R&D technologies of BAR.

The Knowledge Products and Services Division (KPSD), with Dr. Hospicio Natural Jr. as the division head, will package more knowledge products in cooperation with RPD and NPD. This is part of the goal of BAR to have a greater promotion of knowledge and information generated.

KPSD will strengthen BAR's relationship with scientific societies by forming partnership with them through seminars and publication grants. The division will also start establishing Knowledge Products and Services Centers in the identified Zonal Research Centers in the country.

This year, KPSD will put in place the Bureau's Knowledge Library. This will be a repository of agricultural researches helpful to students, researchers and farmers. KPSD will also organize at least four fora to discuss and clarify burning issues on research and development in agriculture.

> The challenge is to accelerate the flow of the technologies from the scientists to the people who need them. This way, BAR can really help in alleviating poverty. - Ponce

To sustain investments in agriculture and fishery R&D, BAR needs to constantly expand and increase its external funding. The Project Development Unit (PDU) of the Bureau is mainly in charge of this task. Every year, PDU generates and packages externally funded projects by establishing linkages with both local and international funding agencies. Last year, PDU was able to implement two projects - the Grains Sector Development Program and the Pinoy Farmer Program funded by the Asian Development Bank and Winrock International, respectively.

For 2002, three projects have already been approved for funding by the Japan International Cooperation Agency and World Bank. Likewise, PDU is also developing another project proposal to be funded by the European Union.

In 2001, BAR had an initial investment of P56 M for research and development infrastructure. For the next three years, BAR will work on investing up to P250 M to upgrade R&D centers all over the country.

The R&D centers will be given funds based on their performance, development programs and capacity to manage and utilize funds. The zonal regions (Regions 2, 8 and 10) are the first priorities. Cordillera, Muslim Mindanao and CARAGA Regions will also be prioritized in consonance with the plan of the government to expedite agricultural development in these regions.

Research and development activities in these regions will be stepped up. The R&D centers will also receive sufficient funds to improve their facilities and manpower. Aside from the Philippine Rice Research Institute, the Bureau will also have a research institute for corn and fruits.

BAR had institutionalized a scholarship program to develop researchers in the different research centers. By 2005, 80 scholars will obtain their graduate degrees. BAR hopes that at least 30 percent of the workforce in the research centers has advanced training in agriculture-related courses. From the ratio of five

employees per computer-work station, the Bureau hopes to move on to only two employees sharing a computer.

Given the increased budget of R&D by virtue of the Agriculture and Fisheries Modernization Act (AFMA), BAR deems it necessary to evaluate and determine if its researches have an actual impact or is responsive to the needs of the farming and fishing communities. The Governance and Impact Evaluation Division (GIED) will evaluate the impact of major R&D programs, assess technologies and their adoption levels by maintaining a data bank of completed researches/developed technologies, and hold the annual National Research Symposium, among others. Likewise, GIED will conduct policy and system studies to provide policy makers with information that will push for the cost-effective handling and managing of research, thereby resulting to better R&D governance.

To improve dissemination of research results that are ready for use by farmers, all outputs of researches funded by BAR will be transformed into knowledge products that the agriculture and fisheries sector can easily use.

To make the exchanges of knowledge and information faster and more convenient, the current development in information technology will be utilized. Mr. Winston Tabada, head of the Information and Communication Technology Division (ICTD) avers that the Agriculture and Fisheries Research and Development Information System (AFRDIS) is one brilliant showcase of this technology. AFRDIS is a major tool for strengthening knowledge management in agriculture and fisheries R&D. "It is an information network of institutions that are engaged in research and development in agriculture and fisheries. AFRDIS aims to provide a coordinated and proactive environment for cooperation and partnership on information exchange and dissemination on a global basis."

According to Mr. Tabada, the AFRDIS was created as part of "BAR's role in setting up an effective and efficient computerized system of monitoring and evaluation of RDE staff and institutions." As such, the AFRDIS creates an R&D information network among the agriculture and fishery communities, facilitating and promoting the exchange and dissemination of information and data.

The system involves setting up local area networks and a communication backbone, with internet facilities in the member institutions at cost-affordable set-ups," Mr. Tabada explained.

At present, the AFRDIS has 11 member-institutions, namely, Mariano Marcos State University and Ilocos Integrated Agricultural Research Center in Northern Luzon; PhilRice, BPRE, Central Luzon State University and Philippine Carabao Center in Central Luzon; Luzon State University, Central Visayas Research Integrated Agricultural Research Center (RIARC) and Eastern Visayas RIARC in the Visayas; and University of Southern Mindanao and Central Mindanao Integrated Agricultural Research Center in Mindanao. This number is only a small portion of the 54 institutions that ICTD targets to be members of the AFRDIS by 2004.

Dr. Eliseo R. Ponce, director of BAR, is set on making the Bureau play a catalytic role in linking research and extension and making science and technology work for the farmers and fisherfolk. According to him, the challenge is to accelerate the flow of the technologies from the scientists who developed them to the people who need these technologies. This way, the Bureau can really help in alleviating poverty, especially in the rural areas.

"We also need to insure that our little resources can play a catalytic role in bringing in other resources from other organizations and in strengthening our partnerships with our state colleges and universities, international organizations and non-government organization," Dr. Ponce added.

Dr. Ponce hopes that BAR can meet its goals for the year and beyond. He also wishes for the continuous development of the Bureau's staff, both contractual and permanent. "I wish that we can provide our contractual staff with more permanent positions. As for the permanent employees, I hope they are given more chance to pursue graduate studies," Dr. Ponce says.

"We also need to insure that our little resources can play a catalytic role in bringing in other resources from other organizations and in strengthening our partnerships with our state colleges and universities, international organizations and non-government organizations." - Ponce

LSU experts develop new harvesting tools for sweet potato

So much for laborious and slow harvesting methods. Sweet potato farmers in the country can now look forward to a more productive enterprise with the development of a tractor-drawn harvester.

Alan Loreto and Manolo Loreto Jr., researchers of the Philippine Rootcrop Research Training Center (PRCRTC) in Leyte State University (LSU), came up with this harvester featuring a single-row vine cutter and digger after a year of research in their Bureau of Agricultural Research-funded project.

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Stakeholders propose strategies to prevent another Bolinao tragedy

by Thea Kristina M. Pabuayon

till reeling from the tragic fish kill event that hit Bolinao, Pangasinan last February, the Bureau of Agricultural Research (BAR) together with the Marine Science Institute (MSI) of UP Diliman sponsored the *National Forum on Fish Kill Events* that gathered at least 135 members of the academe, government institutions, non-governmental organizations, and the private sector for the drafting and formulation of a national strategy to monitor, manage and prevent other fish kill events in the country.

As part of the forum, speakers from MSI, Bureau of Fisheries and Aquatic Resources (BFRA), Department of Environment and Natural Resources (DENR), Department of Interior and Local Government (DILG), Department of Science and Technology (DOST), Department of Health (DOH), and the Southeast Asian Fisheries Development Center (SEAFDEC) presented various papers relating to other fish kill events in the Philippines, fish diseases, management of coastal aquaculture activities, and local government laws pertaining to the use of coastal resources.

Short-, medium- and long-term recommendations to address fish kill events in mariculture areas were made by the participants.

Quick response is needed

According to the members of the academe and research institutions, there was a need to establish a mechanism that allows government and other agencies to quickly respond to fish kill reports. To do this, there should be a fish kill 'hotline' directly linked to BFAR for anyone to report emergency fish kill situations in any part of the country. Second, is the establishment of a multi-agency Fish Kill Task Force, and a fish kill contingency plan that will, likewise, be headed by BFAR. The plan will be developed at the local, regional and national levels and should include the direct involvement and commitment of institutions regarding the operational requirement such as funding and personnel.

Likewise, an integral part of the quick response mechanism is the establishment of an effective monitoring and surveillance system that will include environmental monitoring facilities, periodic aerial photography of mariculture sites, and a database of fish kill events. This could be funded from a monitoring fund that will be taken from the Task Force members, LGUs and other external sources.

Aside from the quick response mechanism, the academe cited specific policies that need to be reviewed to prevent other fish kill occurrences. They cited the banning of the importation of new mariculture species, and the regulation of chemical use as examples. According to them, there is weak enforcement of these mariculture laws and ordinances. The government needs to realize that new species may introduce new diseases or harmful algae to our local waters, or that chemicals currently being used by fish farmers should be regulated to prevent the predominance of certain organisms over others.

Accountability and compliance is key

A Coastal Development Plan has been made and a number of municipal fisheries ordinances has already been enacted, but the public is clearly unaware or completely ignore them.

For the government agencies and local government units, putting more teeth in implementing existing laws can save what is left of our mariculture resources.

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Grain borers... continued

Rhyzopertha dominica Fabricius

pupae could survive the current phosphine dosage used in warehouses and storage rooms.

The researchers said that the reason why grain borers from Cebu have become highly resistant to phosphine could be attributed to substandard or faulty fumigation procedures that are being done in private and government-owned warehouses.

At present, Cebu is the trading zone for grains in the Visayas and Mindanao hence, most of the grains that are transported and stored in Cebu are fumigated there. However, there are no gas-tight storage facilities where fumigation could be effectively carried out. Lack of proper facilities, faulty fumigation practices and no resistance monitoring could be the reason for the grain borers to have developed resistance to phosphine over time.

To sustainably manage these pests, scientists recommended more studies on the nature of phosphine resistance in borers, and the development of susceptible strains through genetic analysis. *(Junelyn S. de la Rosa)*

Source: Response to phosphine of susceptible and resistant strains of Rhyzopertha dominica (Fabricius) (Coleoptera:Bostrichidae) from the Philippines by Miriam Acda (Bureau of Postharvest and Research Extension), Mervyn Bengston and Gregory Daglish of the Queensland Department of Primary Industries (QDPI), Queensland.

Stakeholders...continued

For this, they proposed a two-stage licensing system for mariculture activities in order to provide check and balance. Under this proposed system, operators need to obtain a license to operate which is to be approved by the municipal mayor, and a license approving the appropriateness of the site which is determined by DENR or BFAR.

To insure the accountability of persons violating existing laws, LGUs will review and further strengthen existing sanctions and monitoring mechanisms.

Empowerment and education

It is often said that if you give man fish, you will nourish him for a day, but if you teach man how to fish, you will nourish him for the rest of his life. Both the literal and the figurative meaning of this adage can be applied to the tragic fish kill event in Bolinao, Pangasinan.

Reflecting on these words, one can draw the conclusion that it is only with proper education that we can truly break free from our degenerative mariculture practices that are not only harmful to the environment, but more importantly, can greatly affect the future of fishers themselves.

For the private sector and the non-government organizations, fishers and stakeholders must be aware of and apply only the proper technologies and practices in mariculture. These include the regular screening and testing of food products before they are adopted, application of feed standards, and proper feed management.

Likewise, a comprehensive national framework on sustainable aquaculture must be put in place. These would entail roundtable discussions among all mariculture players, including the academe, the government and the private sector.

Lastly, with education comes constant re-education. As another adage holds, "years of misguided teaching have resulted in the destruction of the best in our society, in our cultures and in the environment." With the rapidly changing environment and economic policies of the country, regular forums on mariculture must be conducted for the benefit of all stakeholders.

113 plant...continued

fruit is used to treat diarrhea and dysentery.

Bignay helps reduce blood pressure and cholesterol. Carissa berries can be used as astringent, antiscorbutic and for biliousness.

Vanishing ornamental species include: marigold *(Tagetes erecta)*, bachelor's button *(Gomphrena globosa)*, sampaguita *(Jasminium sambae)*, cock's comb/taptapingar *(Celosia cristata)*, cattail *(Typha angustifolia)*, kataka-taka *(Kalanchoe mata)*, Periwinkle/San Vicente *(Catharanthus roscus)*, Zinia *(Zinia sp.)*, cosmos *(Cosmos catudatus)*, native calachuchi *(Plumeria acumnata)*, rosal *(Gardenia florida)*, dama de noche *(Cestrum nocturnum)*, ilang-ilang *(Canagium odoratum)*, camia *(Hedychium coronarium)* and white kayanga *(Hibiscus sp.)*.

Marigold is used to treat convulsion and is a popular insect repellant. Kataka-taka leaves can treat dysuria (difficult discharge of urine) and is used to treat sprains, burns, eczema and other skin infections. Periwinkle has an anti-cancer property while native calachuchi is used to treat Athlete's foot.

Other plants with medicinal properties that were identified include: *disol (Kaemferia galanga)*, prayer beads *(Abrus precatorius)*, and tsa *(Ehretia microphylla)*. *Disol* is used to treat stomach ache, bloated stomach and itchiness. It is also an expectorant, diuretic and stimulant.

Samac/binonga *(Macaranga tanarius)*, anis *(Foeniculum vulgare)*, ballang, tigue, maguey *(Agave cantula)*, lipai *(Entada phaseoloides)*, arrowroot *(Maranra arundinacea)* and indigo *(Indigofera tinctorea)* are also likely to be endangered.

It is imperative that the government speed up efforts to save these species before it is too late. Saving these vanishing species today may feed and save millions of sick Filipinos in the future. *(Junelyn S. de la Rosa)*

Source: "Documentation of Vanishing Plant Species" by ME Pascua, MA Antonio, DS Bucao, EO Agustin, MLS Gabriel and SMa Pablico of Mariano Marcos State University, Batac, Ilocos Norte, Tel. No. (077) 792-3131

Hybrid rice: The future of rice farming in the Philippines

by Thea Kristina M. Pabuayon

Mang Teofilo, a rice farmer from San Miguel, Isabela has just computed his earnings for one cropping season. The amount was more than what one can win in some popular game shows on TV, a staggering P1.2 million!

Indeed, Mang Teofilo had become a millionaire in just four to six months with the help of new hybrid rice *Mestizo*. Ordinarily, his 30-hectare land would earn him P0.6 million per cropping season, but with *Mestizo,* he earned double by harvesting at least 150 cavans per hectare that he sold at P400.00/cavan.

Documented success stories of hybrid rice adoption abound in other parts of the country: Isabela, Kalinga, Davao del Sur and Davao Oriental.

According to the Philippine Rice Research Institute (PhilRice) Deputy Director Edilberto Redoña, hybrid rice can in fact give farmers an additional 1, 272 kg of palay per hectare, or at least 25% increase in yield.

Given the amazing income generating potential of hybrid rice varieties, can it be the saving grace of rice farming in the country? Can Filipino farmers have, at last, the competitive advantage they need to compete with other markets, or finally raise their standards and quality of living? What makes hybrid rice superior to inbred rice varieties?

The Philippines' 78 million people use more than 90% of the rice produced in the country as food. In the past two decades, however, the supply of rice has not been enough to sustain the rate of increase of the country's population. From 1980-1997 for example, the population grew 2.20% yearly, while the production growth of rice remained at an annual rate of 2.18%.

According to PhilRice, by the end of the first quarter of the year, rice production must at least be doubled for the rice needs of the population to be met.

However, farmers are facing a great challenge in increasing rice production since there is less land, less labor, less pesticides, and there is immense competition brought about by globalization.

With hybrid rice, the Philippines can increase its rice production by 1 ton per hectare.

A better deal, a more profitable alternative

According to agricultural experts, the farmers' best bet in meeting the challenge of increasing rice production is to "increase yield per unit area, per unit time," which means more harvests in shorter periods.

In 1998, the Department of Agriculture introduced the hybrid rice program in commercial production. PhilRice launched the hybrid rice technology as a full research and development program to support the government's current national program on rice. The hybrid rice program aims to promote productivity and competitiveness, specifically by increasing farmers' yield by 15% or higher, by developing and using hybrid rice technology.

According to studies conducted by the DA, the hybrid rice technology has been recorded to increase rice yields by at least 15%-25% compared to superior inbred varieties in the country. This ability is attributed to 'heterosis' or hybrid vigor that enables increased growth, disease resistance and fertility in hybrid species. On the average, hybrid rice yields six tons per hectare, but this can go as high as 10 to 12 tons per hectare with good environmental conditions and proper cultural management

Hybrid rice Mestizo

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Sweet potato breakthrough: SPFMV-resistant varieties

by Laarni C. Anenias

The SPFMV is known to significantly reduce growers' harvest and income yearly.

Researchers from the Leyte State University (LSU) have recently identified sweet potato varieties that are resistant to feathery mottle virus disease.

Adaptability trials under the project "Interdisciplinary management of sweet potato feathery mottle virus (SPFMV)." revealed that V27-2, V27-5, and V28-2 are the most resistant varieties to the virus under Tarlac conditions. The researchers, led by Dr. Manuel Palomar of LSU, found that these varieties have the most desirable qualities preferred by farmers and consumers. They also identified the variety *kinampay* as the most resistant to SPFMV under Bataan conditions.

Through surveys in the major sweet potato growing areas of Tarlac and Bataan, researchers learned that the virus was already in the fields even during the 1950s. However, it was not until the late 1980s and early 1990s that the disease reached epidemic levels.

The researchers likewise discovered that SPFMV practically wiped out the most popular sweet potato variety called *Bureau* in Tarlac at that time. A more resistant variety, VSP6, which the locals dubbed as *Super Bureau*, replaced the wiped out variety. However, it only took the virus 10 years to make a comeback. An outbreak again occurred in 1997-98 after the El Niño phenomenon, and even the *Super Bureau* succumbed to it.

Researchers characterized the symptoms of the SPFMV disease into two types. The first symptom, exhibits vein clearing of leaves, followed by the production of chlorotic spots. These are yellow marks on the leaves resulting from the reduced levels of chlorophyll, the green pigment in leaves of plants.

In other cultivars, the virus causes the enhanced production of anthocyanin - the pigment that produces blue, violet, and red colors in plants resulting to purple rings surrounding the chlorotic spots, then followed by vein feathering. Another symptom induces mottling, or formation of an irregular pattern of patches or spots of different colors, chlorotic spots, and reduced leaf size.

The SPFMV is known to significantly reduce growers' harvest and income yearly. Previous surveys on SPFMV-infested areas in Central Luzon confirmed this. Farmers here lamented that prior to the spread of this disease, sweet potato production was a lucrative business, especially during periods when rice could not be grown due to lack of irrigation. Farmers here plant sweet potato to about 10,000 hectares each year.

To date, all sweet potato fields in Tarlac and Bataan are SPFMV-infected, with every locality varying only in the degree of infection, the study reported. The highest SPFMV incidence was noted in Capas, Paniqui, Tarlac, Balanga, and Bagac.

Researchers are now inputting all survey data to complete a geographical information systems map to facilitate easier monitoring of these SPFMV-infested areas. They are also working on the characterization, identification of vectors or disease carriers, and epidemiological studies, the study of causes, origin, and development, of SPFMV. Further adaptability trials and evaluation of other resistant and high-yielding varieties are also being sought.

Source: "Interdisciplinary management of sweet potato feathery mottle virus disease in Central Luzon" by Dr. Manuel Palomar, LSU, Baybay, Leyte

Plant with SPFMV. (Taken from the International Photo Center at www.cipotato.org)

Trapping the potato leaf miner

by Mary Charlotte O. Fresco

armers in Buguias, Benguet could never forget that fateful November in 1999 when they lost about P 333 M in profits in four months as they were hit by the worst potato leaf miner (PLM) outbreak of the country. Because of the magnitude of loss, researchers of the Benguet State University (BSU) created the Potato LeafMiner Task Force composed of various research agencies in the DA-Cordillera Administrative Region. They developed quick response strategies in order to decrease the pest population into manageable levels. One of the technologies found effective, affordable and safe to use is the yellow sticky trap (YST).

Unhealthy tubers from potato plants infested by PLM

Sample of yellow sticky trap

How YST technology was developed?

In an effort to come out with the most effective means to control the population of the leaf miner, researchers closely examined the life cycle and behavior of the insect. Researchers found that the damage is predominantly caused by the female adult miner, which feeds and lays eggs on the leaves, resulting to numerous severe punctures. Potatoes that are severely damaged during its vegetative stage fail to produce big tubers.

By monitoring the pest population, researchers observed that adult leaf miners are attracted to yellow. This biological response of adult insect to a particular color prompted the development of the yellow sticky trap (YST).

How to use YST?

YST can be made from any material that could be painted with chrome or lemon yellow and sticky substances.

Sticky materials such as motor grease No.3 or gear oil SAE 140 were found to work best in cooler areas like Benguet and the Mountain Province. Other sticky materials for application in warm conditions are yet to be tested.

The traps are set at a distance of 5 X 5 m, 10 x 10 m or 15 X 15 m apart. The distance between traps should not be more than 10 X 20 m. As observed by the researchers, more insects are trapped in YST when they are suspended 30 cm above the ground.

During the pest outbreaks, farmers, after having underwent IPM-farmers field school and training, were able to develop their own YST. Most of them used recycled materials like water drums (22 X 225 inches), plywood, galvanized iron (15 X 8 inches), empty fungicide containers, and rice sacks.

Efficiency of YST

The researchers evaluated the efficiency of traps based on their designs, color, kind of material used, and distance of trap installation.

Based on the data collected, plywood is the most efficient trap material as it was able to trap 27 adult miners per square inch, as compared to yellow sack and plastic straw which trapped 21 and 20 adult PLMs, respectively.

Meanwhile, yellow plastic plates are the most affordable materials for the traps because they are cheaper, locally available and easier to use.

For the color of trap materials, researchers found that both lemon and chrome yellow were efficient in attracting the insects. However, researchers advised the use of chrome yellow because it does not fade easily.

Aside from being efficient, YST is also practical to use. Cleaning is easy as sticky traps can be washed with ordinary dish washing soap and water. Likewise, farmers can easily repaint the traps with sticky substances once the surface of the trap dries up.

The researchers recommended installing the sticky traps in the field from one week up to 1 1/2 months, as this is the most susceptible stage of potato to leaf miner.

Other than YST, the researchers recommended other control measures such as crop rotation, use of resistant potato variety like *Igorota*, irrigation, and fertilizer management. Farmers are also advised to follow cultural management techniques that include proper tending of soil, application of right amount and kind of fertilizer and pesticides, and using clean and healthy planting materials.

Based on the study entitled "Integrated Management of LeafMiner (Liriomyza Huidobrensis) on Potato", a research funded by DA-Bureau of Agricultural Research.For more information, please contact, Dr. Lolita Molitas-Colting, Dr. Rogelio D. Colting, Mrs. Teresita K. Mangili, BPI-Benguet National Crop Research and Development Center, Guisad, Baguio City at Tel. (074) 445-9085

Ensuring bruise-free mangoes through the *Sigpao*

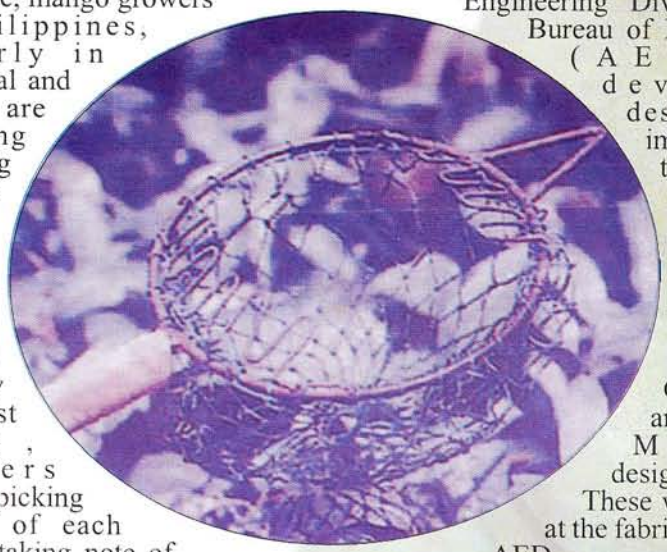
by Rita T. dela Cruz

he Philippines, Iloilo to be exact, has one of the best varieties of mango in the world. After the United States Department of Agriculture (USDA) approved the importation of our Guimaras mangoes effective June 2001, Philippine mangoes have been reaping praises from other countries for its distinct, exotic taste and excellent quality.

One of the set quality standards of importable mangoes is that it should be free from bruises and stains. The smoother the mangoes, the better. However, bruising and staining of mangoes are unavoidable especially during harvest. And since mango fruits are easily bruised, a lot of them are wasted if handling and harvesting are not done carefully.

To maintain the good quality of our Guimaras mangoes and to ensure their proper handling during harvest, a group of researchers from the Bureau of Plant Industry (BPI) of the Department of Agriculture (DA) headed by Engr. Gilda Yolanda G. Rodovia designed and developed a harvesting technique that makes use of mango pickers or *Sigpao* .

To date, mango growers in the Philippines, particularly in Batangas, Rizal and Pangasinan, are already using three existing models of the *Sigpao*. Through field trials, using the Regional Network on Agricultural Machinery (RNAM) Test Codes, researchers compared the picking performance of each *Sigpao* while taking note of the picking time and the mangoes wasted during the picking.



Through observation during the field trials, the models are effective in picking mangoes, but they are not as efficient because many mangoes are still wasted during the picking. The models are either fast in picking but many mangoes are wasted, or few are wasted but relatively takes longer picking time.

This problem was considered by the group in the development and design of a good mango picker. It should lessen the number of wasted mangoes and at the same time allows farmers to harvest in less time. The group conducted various ocular inspections and field trials and fabricated the designs of the new *Sigpao* models---BPI *Sigpao* Model I and II.

Sigpao Model I has a round bar with an aluminium adjustable handle. Its round bar is a bit larger and a lot heavier weighing 1.35 kilos.

Sigpao Model II has a round stainless steel bar handle and a hacksaw blade attached to it. This model is a lot lighter than the first model, weighing only 1.20 kilos. The net is made of nylon cord. The round bar has a three-tooth comb, which is used to clamp the fruits. The handle is adjustable to different heights during harvest period.

Engineers from the Agricultural Engineering Division of the Bureau of Plant Industry (AED-BPI) developed, designed and improved these two models. Specifically, Engr. Romansito G. Guerrero designed Model I while Engrs. Gilda Rodavia and Hilario M. Maglinao designed Model II These were designed at the fabrication shop of AED.

Results of the field tests showed that the two BPI designs are far better than the existing three mango pickers. Using field trials, the researchers compared the effectiveness of the two newly developed pickers using again the RNAM Test Codes.

With Model I, the picking time was 3.65 minutes per *kaing*. This is a lot better than the previous models, which ranged from 12-13 minutes per *kaing*. It was noted that mango wasted was only 2.67% compared to the 3% of the previous models.

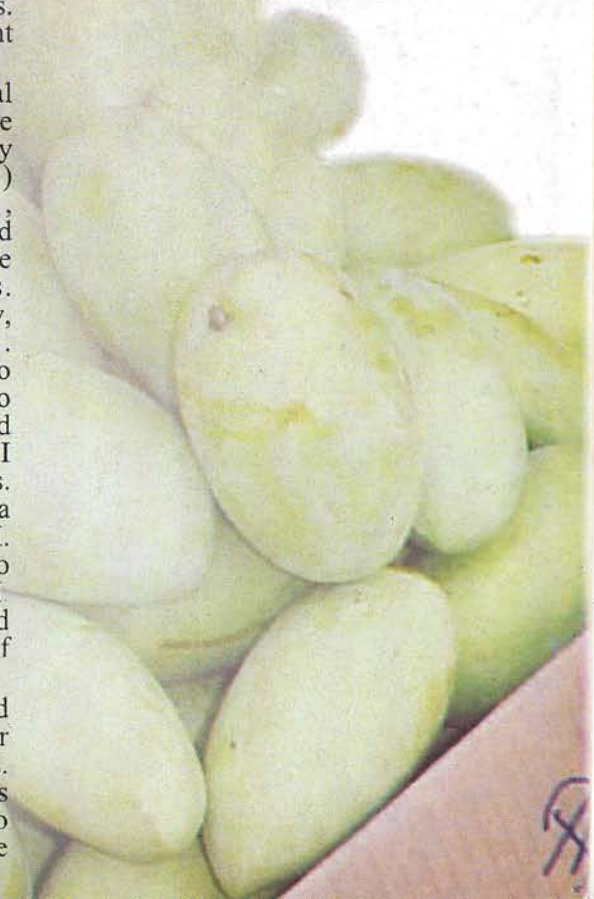
However, between these two models, Model II was found to be the more effective. Its picking time is also 3.65 minutes per *kaing* and recorded no mango losses during the field trial. This is attributed to the fact that Model II is a lot lighter than Model I so that the picking of mangoes is much easier and efficiently handled by the picker.

With this result, Model II has big potential for commercialization. It can also be used as picker for other fruits like *chico*, *santol*, *lanzones*, *rambutan*, mandarin, *dalanghita* and other fruits wherein handpicking is not feasible.

With the higher production cost of making Model II, its estimated selling cost is about P458.40. But the service life of this picker is ensured to last for 20 years.

Source: "Design and Development of Mango Picker" by Gilda Yolanda G. Rodavia, Hilario R. Maglinao, Danton Jose B. Nilo, Romansito G. Guerero, Corazon V. Orcullo and Teresita C. Silva of the Bureau of Plant Industry

For more information, please contact the Agricultural Engineering Division of the Bureau of Plant Industry, 692 San Andres Street, Malate, Manila at telephone number (02) 524-0801 or (02) 525-3719) for fax.



Wipe out coconut rhinoceros beetle with sawdust

by Mary Charlotte O. Fresco

awdust and other wood excesses may mean waste for some. But for coconut farmers, sawdust can be a primary weapon against ruthless pests such as coconut rhinoceros beetles.

The rhinoceros beetle (*Oryctes rhinoceros*) is common in Southeast Asia and has long been one of the most serious problems among coconut growers worldwide. In fact, almost all studies conducted and published about pest management in coconut deal with this pest. The extent of damage by the rhinoceros beetle is almost incalculable. The threat starts when the beetle reaches its adult stage (two months) and feeds on the palm shoot or *ubod*. Subsequently, the new leaves that are about to open are damaged. The beetle also attacks young palms in nurseries. When not regularly monitored and no control measures are employed, damaged young plants eventually die.

What's in the sawdust?

Problems are best solved when one considers their root cause. Researchers of the study worked with this principle by considering the breeding habit of the insect. Rhinoceros beetles normally breed and lay their eggs in rotten wood, compost and other decaying organic matter. Experts preferred the use of decaying sawdust as best alternative to lure the beetles. The decaying sawdust normally emits an aroma that attracts the beetles.

In a study conducted by a group of experts from the Philippine Coconut Authority (PCA) Zamboanga Research Center led by Mr. Emmanuel Eterrado, 116 trap boxes (150cm X 150cm X 50cm) were linearly installed (50 to 75 meters apart) along the perimeters of a 300 ha experimental coconut farm. Each trap box contained approximately 10 to 15 bags of coconut sawdust. To determine if other factors such as bio-insecticides would affect the "annihilation" process, a half kilogram of *Metarhizium anisopliae was* incorporated in each sawdust trap box. *Metarhizium anisopliae,* also known as green muscardine fungus (GMF), is a beneficial fungus that attacks various insect pests. Half of the amount was spread over a three-inch sawdust lining at the bottom of the box while the remaining was thoroughly mixed with the rest of the sawdust, which served as breeding media.

The result

The efficiency of sawdust trap boxes was thoroughly observed for almost a year. Based on the data gathered, a total of 20, 402 beetles of different life stages were collected from the trap boxes.

Collected beetles and their eggs were destroyed right away to avoid any chance of escape.

The researchers also monitored the level of fungal infection using GMF. Based on the data collected, the level of GMF infection reached 1.7% during the

Enhance the vitality of roots wit

oots are said to be the life-giving part of plants. Aside from being a support structure, roots have a system of absorption responsible for water, soil minerals, and nutrients uptake. Roots do not only support plant life, they also nourish the soil by pumping carbon to feed soil organisms, thus, contributing to soil organic fertility.

However, like any other living organisms, roots are susceptible to various diseases and infections normally caused by fungi, bacteria and other soil-borne pathogens. Infected roots usually cause the plants to wilt and produce unhealthy fruits.

In addressing these 'deep-rooted' problems, Vital N ™, a technology that helps plants revitalize their root system has been introduced.

What is Vital N™?

Vital N ™ is a powder formulation that induces extensive growth in roots of crops like corn, rice, banana, onion, etc. It contains *Azospirillium*, a beneficial bacterium that enhances root development and helps the plant increase its soil nutrients uptake and more importantly, produce plant growth substances such as indole3-acetic acid (IAA). Likewise, Vital N ™ helps strengthen the roots, thus protect the roots from the invasion of soil-borne pathogens that cause diseases and infections.

With the increased root surface, more root hairs are now capable of absorbing nutrients and water from the soil. As a result, the fertility and stability of soil is sustained, allowing farmers to cut down their inorganic fertilizer application by more than one-half. Subsequently, the yield is projected to increase by 15%.

The effect of Vital N™ in crop maturity was also tested in a case study conducted among farmers in Nueva Ecija. Researchers of the study were able to determine the comparative advantage of Vital N™ application in relation to crop maturity. They found that onions infected

The rhinoceros beetle (*Oryctes rhinoceros*) is common in Southeast Asia and has long been one of the most serious problems among coconut growers worldwide.

initial stage of the insect life. According to the researchers, these results indicate that newly hatched beetles are the most susceptible to infection since their integuments (hard covering of insect's body) are still soft, and thus, can easily be penetrated by fungus.

However, at the end of the study, the level of infection increased to 4.1% in the 12th month of traps installation. Researchers attributed this to the fungi that have developed on the surface of the insects' carcass that initiated a new round of infection.

Practicality of using trap boxes

Researchers confirmed that trap boxes remain attractive to beetles and are still suitable for breeding even after 11 months of use. The level of sawdust in the boxes significantly decreases through time especially when it starts to rot. This, however, serves as additional attractant to insects. At this point, it is necessary to replenish the traps with additional sawdust to meet the required volume (50 cm thick).

The study further revealed that the application of bio-insecticides like GMF may no longer be necessary since sawdust alone is effective enough to trap the beetles. Bio-insecticides can be used to control beetle population development during its early age.

For more information, please contact, Mr. Emmanuel Aterrado, Philippine Coconut Authority Davao Research Center at Tel. No. (082) 2930016.

Vital N™

by Mary Charlotte O. Fresco

with dreaded fungal disease such as soft rot were harvested too early, resulting to irregular and small-sized bulbs. Their actual yield was estimated at only 52 tons/ha. However, onions treated with Vital N produced matured and disease-free bulbs, which in turn produced a net yield of 67 tons/ha. It was calculated that approximately the farmers earned P50,000 more with Vital N™.

How to apply Vital N™?

Vital N™ can be directly mixed with dry or moistened seeds. Rooted seedlings can also be dipped in Vital N-formulated solution before transplanting in the field.

When mixing and applying Vital N™ in seeds, it is recommended to use a stout stick. Likewise, when handling seeds treated with Vital N™, it is important to protect the hands by wrapping them with a plastic bag or wearing gloves.

Researchers added that there is no known toxicity or allergic reaction to *Azospirillum*. Likewise, it has no adverse effect on the environment since it is a naturally occurring soil organism.

Left picture: Irregular and small-sized bulbs without Vital N™

Bottom picture: Onions treated with Vital N™ produced matured and disease-free bulbs

Farmers can easily adopt Vital N™ because it is cheap and simple to use. A pack, which only costs P250, is enough to treat 80 kg of seeds of rice and corn or 2, 500 plantlets of banana. Since the application of commercial fertilizer is reduced, a farmer can save about P1,600 per hectare on fertilizer application.

Farmers can easily adopt Vital N™ because it is cheap and simple to use. A pack, which only costs P250, is enough to treat 80 kg of seeds of rice and corn or 2,500 plantlets of banana.

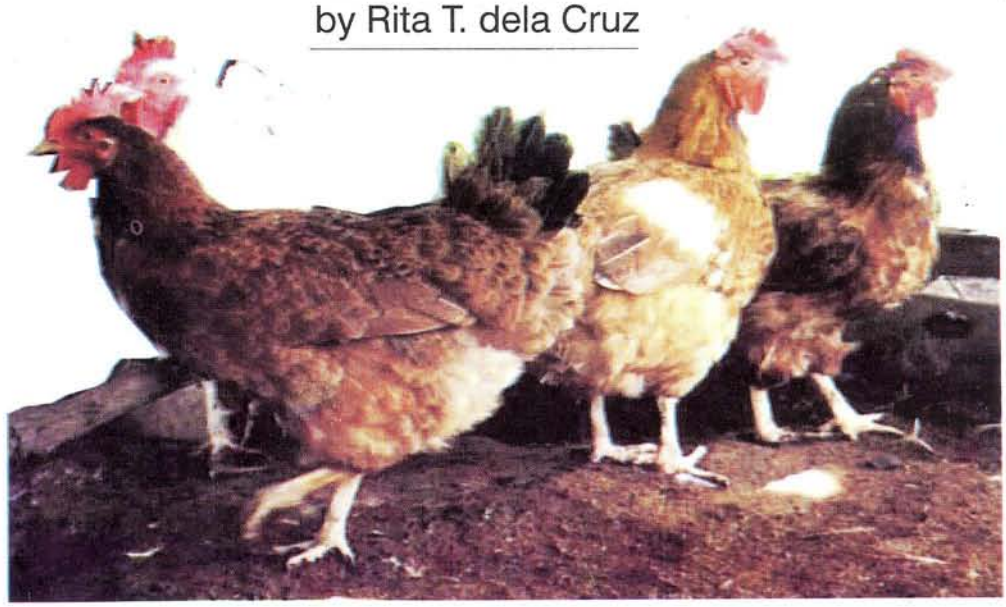
The study on Vital N™ application was developed and conducted by Dr. Saturnina Halos, senior program development specialist at the Bureau of Agricultural Research, with partial support fund from the Philippine Rice Research Institute (PhilRice)

Vital N™ was recently approved by the Fertilizer and Pesticides Authority (FPA) for nationwide testing.

For more information, please contact Dr. Saturnina Halos, ARNICHEM, 2027 Pleasant Village, College, Laguna 4031 at Tel No. (049) 536-3224.

Upgrading native chickens is beneficial for small backyard farms

by Rita T. dela Cruz



Compared to other chicken breeds, native chickens are second-rate in terms of egg and meat production. On the average, a native chicken produces 40-60 eggs in a year, while a White Leg Horn produces more than 200 eggs. In terms of meat, a six-month old Vantress weighs 2.23 kg while a native chicken weighs 1.16 kg only.

With the hope of improving the traits of native chickens for egg and meat production, researchers from the Western Visayas Integrated Agricultural Research Center (WESVIARC) packaged a technology to upgrade the native chickens. This project was funded by the Department of Agriculture (DA) through the Bureau of Agricultural Research.

Five research sites were identified to participate in the breeding process, four barangays in Iloilo and one in Capiz. Each site has five farmer cooperators. Each farmer has 5 to 10 female native chickens ready for upgrading.

Traditionally, raising native chickens is very easy. The native chickens are let loose on free range and fed only twice a day. But with this technology, farmers need to adopt a simple, minimum intervention technology.

The first intervention is the natural brooding and feeding process. During the natural brooding process, the upgraded hen and the newly hatched chicks are confined in a brooding pen. They can be released on the yard from time to time but the hen should be placed inside a large basket (or tied with a three-meter rope) to contain the chicks in the yard while being trained to scratch and scavenge on the ground. The chicks are fed with chick starter mash for six weeks. After that, the chicks are let loose on free range like the native chickens.

The second intervention is the hardening period. Before upgrading the native chickens, dual-purpose cocks must be hardened first. Dual-purpose cocks are the breeders with the characteristics of both egg and meat type. Hardening is done to condition the dual-purpose breeders to the rugged feeding condition of the native chickens and to acquire vigor for the offsprings. During this period, the cocks are let loose on free range from 4 to 6 months. Their feeds are gradually changed from commercial concentrates to farm by-products like unmilled rice, half-filled rice, rice bran, *binlid* and crack corn. It is also important that all chickens are vaccinated with La Sota NCD once every three months to safeguard them from avian pests.

The third intervention is the upgrading process. A total of 215 hardened dual-purpose breeders are distributed to the farmer cooperators to upgrade their native chickens. Each farmer with 5-10 female native chickens is provided with one hardened dual-purpose cock to upgrade the native chickens. The breeding ratio is 1:5-10.

The technology is easy for the farmers to adopt. Aside from the aforementioned interventions, the farmers do not need to deviate from their usual practice such as feeding, housing, disease prevention and other types of management.

According to Mr. Daniel F. Tirol, head of this project and chief of the Livestock Section of WESVIARC, adopting this technology is beneficial for small backyard farmers since it increases their income. The technology promises a one-year payback period and more than 50% return of investment.

Source: "Upgraded Native Chicken Production for Small Backyard Farms" by Daniel F. Tirol, Romeo G. Peñaflorida, Henry F. Molas and Anelyn A. Hapitan of the Western Visayas Integrated Agricultural Research Center. This paper was an official entry to the 13th National Research Symposium last 2-5 October 2001 held at BSWM, Visayas Ave., QC

For more information, please contact the WESVIARC, DA Regional Field Unit 6, Hamungaya, Jaro, Iloilo City or call at telephone number (033) 329-6210 or fax number (033) 329-0956.

Traditionally, raising native chickens is easy. The native chickens are let loose on free range and fed only twice a day. But with this technology, farmers need to adopt a simple, minimum intervention technology.

Breeding superior cattle the fast way

by Rita T. dela Cruz and Virginia A. Duldulao

A cattle produces one calf every two years. With conventional breeding, it would take several decades to breed livestock with improved genetic traits. This long period can be shortened through biotechnology, specifically, the multiple ovulation and embryo transfer (MOET) technique. This makes the production of animals with superior traits easier and to multiply these animals more rapidly.

Multiple ovulation, also known as superovulation, is the production of a large number of ova by a dam of superior genetic traits. Through this technique, more embryos are generated, therefore, more calves are produced from one superior cow. Embryo transfer is the removal of the fertilized eggs and embryos from the donor cow then transferred to the uterus of dams undergoing the estrus cycle for gestation. Gestation is the process of carrying the embryo in the womb for growth and development. The MOET technique is used to conserve superior breeding stock or to improve the rate of genetic gain of selected herds. This process is effective for livestock with low prolificacy such as cattle.

A group of scientists from the Institute of Animal Science (IAS), University of the Philippines Los Baños (UPLB) tried the technique in collaboration with the Philippine Carabao Center (PCC) and ANSA Genetics, Incorporated. They wanted to determine the number of embryo produced, quality and stage at the time of recovery, and cost of production using the MOET technique under Philippine condition.

Normally, a dam or a female cow produces only one ovum in an estrus cycle but by injecting it with a hormone or superovulatory drug, multiple ovulation occurs or more ova are produced. Using the MOET technique, the donor cows were injected with the superovulatory hormones during ovulation. They were artificially inseminated (AI) with semen from a bull.

Six to seven days after AI, the embryos were taken out non-surgically by using a catheter, a thin, flexible tube inserted into the uterus. Four to seven embryos were collected from each treated cow. One embryo was then implanted into each recipient cow undergoing the estrus cycle.

The researchers found that the cost of producing one embryo was lowest with a Holstein sire breed and an AFS dam breed and using p-FSH (porcine stimulating hormone).

Genetically superior animals are still the basis of livestock breeding. With biotechnology, the best female animals are being used as a source of genetic materials rather than a source of direct offspring. And MOET means that a single cow may be used to breed many cows each year.

Source: "Local success rates and costs of multiple ovulation and embryo recovery in cattle" by Orville L. Bondoc, IAS-CA, UPLB. This paper was an official entry to the 13th National Research Symposium last 2-5 October 2001 at BSWM, Visayas Ave., Q.C.

For more information, please contact the Institute of Animal Science-College of Agriculture, UPLB at tel. no. (049)536-3450 or fax at (049)536-2547, or e-mail Orville Bondoc at olb@mudspring.uplb.edu.ph.

Multiple ovulation, also known as the superovulation, is the production of a large number of ova by a dam of superior genetic traits. Through this technique more embryos are generated and, therefore, more calves are produced from one superior cow.

Saline tilapia: A beneficial partner in prawn rearing

by Thea Kristina M. Pabuayon

t was more than a decade ago when Northern Mindanao's prawn industry was almost crippled by *Vibriosis,* a luminous bacterial disease that caused sudden drops in the region's shrimp production. The destruction caused by this event greatly affected the region's shrimp producers prompting some intensive farms to close down, while extensive farms which contribute 88% of the region's shrimps also suffered huge monetary losses.

In Region 10, Misamis Occidental alone has devoted 1,790 hectares of its total brackishwater fishpond area to prawn farming. Of this area, 95% are comprised of extensive farms which are characterized by low stocking densities of about 5 pcs./sq.m and below. These extensive farms are greatly preferred in this region since it is relatively cheaper to maintain but almost always produces high quality shrimp products because of less disease occurrences and problems. Likewise, extensive farming is more environment-friendly since it utilizes naturally available food organisms, thus, limiting the input of feeds and chemical supplements.

At present, prawn growers are using tilapia to increase the bloom of microalgae in greenwater ponds, which in turn, enhances the growth and survival of the cultured species. Several instances have shown that tilapia-treated ponds have more stable algal population, low luminous bacteria count, and had lesser bacterial attacks.

These findings prompted the Bureau of Fisheries and Aquatic Resources in Region 10 to conduct a comprehensive study that will ultimately establish the role of tilapia in prawn culture as an agent for greenwater enhancement and in controlling *Vibriosis.*

Beneficial tilapia

Gigi Albor and Perlito Vallejos of BFAR Region 10 conducted their study in Bonifacio, Misamis Occidental. The researchers stocked three ponds with 5 pc shrimp/sqm without tilapia while another three ponds were stocked with the same density but with 5,000 pieces of tilapia in net cages. Prior to stocking, the researchers prepared the ponds by drying, liming and pest eradication. Likewise, the researchers fertilized the pond water with 2 bags/hectare of urea to ensure high plankton bloom. Growth, survival rates and profitability were computed and analysed at the end of the study.

Results showed that tilapia indeed contributes greatly to the survival of prawns. The survival rates of prawns in the three ponds with tilapia were relatively higher at 23.63%, 38.12% and 51.02% than those without at 5.7%, 11.05% and 7.97%. With these rates, the tilapia-treated ponds also had higher return of investment (ROI) rates at 126%, 181% and 251%, respectively, as compared to the three ponds treated without tilapia that had ROIs of less than 50%.

Likewise, researchers found that the water transparencies in ponds treated with tilapia are more stable than the untreated ponds, demonstrating that tilapia culture improved the growth and stability of certain microalgae which then inhibited the growth of pathogenic microbes that would otherwise have been fatal to the prawns.

Source: "Greenwater treatment in enhancing the production of tiger prawn (Penaeus monodon Fabricus) in Extensive Ponds" by Gigi Albor and Perlito Vallejos, BFAR Region 10, Cagayan de Oro City. 2001 NRS Best Paper Winner, Unpublished Category

Low mechanization in agriculture and fisheries

by Junelyn S. de la Rosa

Batangas, one of the major corn-producers in the country, is still poorly mechanized in agriculture and fisheries. This was revealed in a survey by the Institute of Agricultural Engineering of the University of the Philippines, Los Baños (UPLB) and supported by the Bureau of Agricultural Research of the Department of Agriculture (DA-BAR).

This survey showed how far behind Filipino farmers are from their more progressive Asian counterparts. While farmers from developed countries are aided by a set of modern machinery, our farmers still depend on the hoe and plow. The scientists said that the government should exert more efforts to bring new farm technologies to make our farmers globally competitive in the 21st century. The survey identified machines or implements that are used in the production and post-production of rice, corn, vegetables, livestock, and fisheries.

The levels of mechanization were classified into: low, intermediate, high and full mechanization. Low mechanization is defined as any operation that uses non-mechanical power source (i.e. man or animal).

Intermediate mechanization is any operation done using mechanical power source operated by man (i.e. in plowing: 95 percent is plowed using a hand tractor and five percent is done with an animal-drawn plow). High mechanization is any operation done solely with the use of a mechanical power source operated by a person (ie. four-wheel tractor).

Full mechanization involves the use of a mechanical power source with limited power intervention by man such as computerized drying of crops.

In rice and corn production, mechanization involves hiring a four-wheel tractor for plowing during land preparation. However, most Filipino corn farmers do not use a tractor since the average landholding is very small.

For livestock, Batangas utilizes minimal machinery. For every four backyard farms, there is only one commercial farm. This explains why mechanization is very low in the livestock sector. Even commercial farms are only partially-mechanized. Custom hiring of machines or facilities is not commonly practiced in the province because it costs more.

In vegetable production, mechanization is still low. Human and animal power is still widely used in the various farm operations involved in vegetable production. Some of the reasons why farmers do not use farm machines in vegetable production are: small farm size, lack of machinery for rent, low income, high cost of production inputs i.e. pesticides and fertilizers, pests and diseases and farmers' low regard for post-processing of vegetables.

Finally, in the fishery sector, mechanization consists of the motorboats used by the fishermen. The researchers said that there is potential for village-level fish processing. However, that would only be possible if there is a ready and growing market for processed fish and other seafood products.

Source: "Agricultural and Fisheries Mechanization Profile (Corn, Livestock, Vegetable and Fisheries) Province of Batangas" by Dr. Danielito Franco, Institute of Agricultural Engineering, College of Engineering and Agro-Industrial Technology, UP Los Baños, Tel. No. (049)536-6728

Lessons from the coast

by Maria Rowena SA. Briones

he Philippines is not Pearl of the Orient Sea for nothing. This country is 12th among the top fish-producing countries in the world. Its 17,640 kilometers coastline and 220 million hectares of territorial waters boast of 450 corals and 2,300 fish species.

But, alarmingly, fish catch declines at about 4.3 percent annually despite efforts to increase fish production. Fisherfolks remain impoverished despite the bounty of their aquamarine resources.

These problems are not without causes. At the bottom are unscrupulous practices of those who extract resources from the sea. There is water pollution, water siltation and trawl, blast, fine mesh and cyanide fishing. Although there are fishing regulations, the implementation done by local government units is weak and ineffective.

These situations caused a paradigm shift in the orientation of coastal researches and projects. From focusing on increasing fish production, programs are now geared on empowering the people by involving them in the management, rehabilitation and conservation of coastal resources.

Initiatives are not anymore about how many tons of fish can be caught, but how many community members are able to upgrade their skills and share their knowledge and increase their participation.

Hence, there is a need for researches on socio-economic characteristics of coastal communities, how they manage their resources and what aspects need improvement and assistance from local government units and concerned civil sectors. Somehow, poverty, policy failure and fishery resource degradation are intimately related. It is hoped that an effective and efficient resource management system that is integrative and participatory can end the vicious cycle of abuse and destitution in the coastal zones.

The paper of Dr. Pepito Fernandez, Rodelio Subade and Yusaka Matsuda discussed the complex problems in Philippine coastal areas and the processes involved in establishing a system for coastal area management as shown in case studies in Banate Bay in Western Visayas and Batan Bay in Aklan. It hopes to give lessons drawn from the experiences of these coastal communities.

Somehow, poverty, policy failure and fishery resource degradation are intimately related. It is hoped that an effective and efficient resource management system that is integrative and participatory can end the vicious cycle of abuse and destitution in the coastal zones.

The resource management system in Banate Bay is more stable because of the participation of community members. They participated through their fishers' organizations and barangay and management councils. The community members also received administrative, technical and financial support from government units, international organizations and the academe. However, the participation of the traders and other stakeholders which was still lacking would also help a lot since market scenarios also have to be considered.

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Community succeeds in alley cropping

by Laarni C. Anenias

In a recent study, senior agriculturist Gavina M.. Huelgas of the Southern Tagalog Integrated Agricultural Research Center (STIARC) detailed how community mobilization worked towards the improvement of the lives of most residents of Barangay Maria Paz in Tanauan, Batangas through the adoption of alley cropping system.

Alley cropping is an effective method in managing erosion in the sloping areas. It involves cultivation of food, forage, or other specialty crops between rows of trees. Previous studies revealed that sloping areas devoted to alley cropping achieved minimal erosion, thus, enhancing soil sustainability.

The community-based approach, as Ms. Huelgas stated in her study, "allowed members of the community representing different sectors to actively participate in the development of the community. The evaluation of Barangay Maria Paz into a conservation farming village (CFV) facilitated the transfer of technology among farmers within and outside the community."

To enhance the technology's adoption, the authorities made sure that other support services are available such as a training center, trainings and fora, and farmers' cross visits. Researchers and extension workers were also trained to facilitate the adoption process.

At the end of the project, Brgy. Maria Paz farmers expressed their satisfaction in the alley cropping system in enhancing the soil's sustainability. Soil erosion in the farms, according to them, was reduced. The farmers likewise perceived the system as economically viable and socially acceptable.

Ultimately, what convinced the farmers of the effectivity of the system was that it helped increase their crop yield, consequently, their income. They also noted the ease of planting and cultivation in alley cropping, thus, giving them more time for other ventures like selling *balut* and bread.

As testimony to the success of the adoption program, Brgy. Maria Paz was declared as the first conservation farming village in 1999, the first to be declared as such. This became the turning point, according to Ms. Huelgas, wherein the different sectors began pouring, or even strengthened their support for the village. Now, neighboring barangays and foreigners frequently visit the once unknown village that gave new perspective in the meaning of 'people power'.

Source: "Community-based approach in the promotion of sloping land management technology in Batangas" by Ms. Gavina M. Huelgas, STIARC, Marawoy, Lipa City

Understanding a total production system

by Virginia A. Duldulao

he paper I presented during the National Research Symposium is very simple. It is the synthesis of a series of experiments we had been conducting since 1993 to 1999. We characterized the nitrogen dynamics of different cropping patterns such as the seasonal distribution of nitrate and ammonium in farmers' fields before and after each crop. Then we tried to find out what can be done to prevent the downward movement of nitrate. Remember that nitrate can contaminate our groundwater. We also found cases of infantile *methemoglobinemia* in the test site where the farmers applied fertilizers weekly. This is impaired respiratory system among infants or simply 'blue babies'. One cause of this is too much fertilizers being applied by our farmers that leach down to the groundwater. Finally, we tried to determine the most efficient fertilizer rate so the farmers do not spend unnecessarily."

Dr. Epifiana O. Agustin of the Mariano Marcos State University (MMSU), Batac, Ilocos Norte, talks of her winning paper, "Rainfed lowland rice-based cropping system of Ilocos Norte: Show window for future diversified and cropping systems." This won for her and her co-authors, who are from the International Rice Research Institute (IRRI) and MMSU, the AFMA Outstanding R&D Paper Award (Unpublished) Crop Science Midstream/Downstream category. This is a project of the Rainfed Lowland Rice Consortium of the Philippine Rice Research Institute (PhilRice), IRRI, and MMSU.

The study seems simple but the knowledge product generated has great applications to our rice-based production systems especially in areas where diversified farming is practiced. Moreover, the farmers can control the leaching of nitrate into their groundwater which is also their source of drinking water.

The researcher assumes that if the biophysical environment is conducive to intensification, rainfed rice production systems in other parts of Asia may also change overtime and acquire the essential features of the production systems of Ilocos Norte where the experiments were conducted. Moreover, production systems will be commercialized and diversified as access to market improves. Thus, this production system can be a model for other areas and countries that have similar characteristics with that of the province where the experiments were conducted.

Characteristics of the area

Ilocos Norte has four major ecosystems but most of the agricultural activities are concentrated in the central lowlands. Rice is the most common crop during the rainy season and planted in about 60,000 ha. The province practices a highly diversified cropping system during the dry season. The farmers grow various food and cash crops such as tobacco, garlic, mungbean, onion, sweet pepper and tomato. Melon, vegetables and corn are sometimes planted as monocrop or intercrop. All these are watered from groundwater irrigation. The farmers intensify their production system by applying greater amounts of inorganic fertilizer, irrigation and

pesticides to the cash crops.

The cropping patterns practiced include: rice-tomato-corn; rice-garlic-mungbean; rice-mungbean-corn; rice-sweet pepper-corn; rice-tobacco; rice-garlic-corn; rice-tomato; rice-pepper; and rice-garlic. This sytem intensifies the use of the land and may not be sustainable if the farmers do not understand what happens after each crop.

What's in the cropping system?

"At the start, we characterized the nitrogen dynamics of the different cropping systems and found that there is too much nitrate left after each crop. While this nitrogen can also be lost in the atmosphere, most of it is leached down," Dr. Agustin explained.

"Our problem, therefore, is to prevent the downward movement of nitrate so that it does not contaminate our groundwater. There is one barangay that is planting pepper after rice and the farmers fertilize their plants weekly, so you just imagine how much fertilizer that is. In the next study, we planted nitrate catch crops that would use the nitrogen left after rice or during the dry to wet transition period (DWTP). We tried corn, indigo, and mungbean. We found that corn efficiently used the fertilizer at the upper layer of the soil at 15 to 30 days after planting and indigo at the lower layer beyond 30 days after planting. Indigo, however, can not give the farmers any income so they may not like to plant it. But if we can only convince them that this is a good source of nitrogen for their rice and can enhance soil texture then this can help in sustaining agriculture," Dr. Agustin relates.

Dr. Agustin recommends the planting of both corn and indigo to reduce the leaching of nitrate during the entire DWTP.

"Finally, we wanted to reduce the nitrogen input for pepper because we are bothered by our observation of 'blue babies' in the test area for pepper, thus, our third study. And truly, we found that the farmers were applying too much fertilizer uselessly. Their fertilizer rates ranged from 133 kg to 366 kg per hectare. There is no reduction in the pepper yield even if the farmers only applied 266 kg per hectare," Dr. Agustin concludes. "We wish that the Department of Health will also get into the picture and find out the culprit in the 'blue baby' phenomenon in one of our test sites," she added. ■

Hybrid rice...continued

practices. PhilRice adds that, compared to inbred rice, the hybrid rice varieties have more vigorous root systems and canopies, are more responsive to oxygen, and have at least 200 spikelets per panicle.

Naturally, higher yields translate to higher income.

In a cost analysis of hybrid rice commercial production conducted by PhilRice, it was revealed that hybrid rice farmers can earn P6,000 more over inbred varieties. However, it is estimated that a farmer may need to shell out at least P22,000 per hectare for hybrid rice production, compared to inbred rice production which costs P21,700 per hectare.

Despite the higher cost, however, hybrid rice still guarantees bigger earnings for the farmers. PhilRice computed that for every 5.5 tons or 110 cavans (at 50 kilos per cavan) of hybrid rice harvested per hectare, a farmer can earn as much as P24,700. This amount is higher than the average yield of five tons per hectare of inbred rice, which can only give an earning of P18,600. At this rate, the amount may even go higher since studies have shown that the average yield of hybrid rice may go as high as 240 cavans per hectare.

For hybrid rice seed production, the average cost is P33,500 per hectare. This is considerably high when compared to inbred seed production that only costs P22,300 per hectare. However, a hybrid rice seed grower is still guaranteed to earn more than inbred seed growers. On the average, a farmer can earn P15,000 more at 6.0 tons per hectare compared to only 4.7 tons per hectare for inbred seed varieties. Likewise, hybrid rice seed production also boosts employment since it uses a different system of seed production.

At present, three hybrid rice varieties have already been developed. These are *Magat* (PSB Rc26), *Mestizo* (PSB Rc72H), and *Panay* (PSB Rc76h). *Mestizo,* which is the only commercially available hybrid variety, was released in 1997. It has an average yield of 6.3 tons per hectare or 1,272 kg (25%) higher than the best inbreds. Aside from its added profitability, *Mestizo* has, "good eating quality, and is aromatic". However, it is late maturing and is quite prone to bacterial leaf blight.

Magat was first released in 1993 and is recommended for planting in Cagayan Valley. It averages 5.8 tons per hectare, which translates to 779 kg (15%) more than the best inbreds. *Panay* was released in 1999 for planting in Mindanao and in some parts of Luzon.

Because of these benefits, the hybrid rice technology has gained ground not only in the Philippines but also in other Asian rice-producing countries like India and Vietnam. In China, the first country to develop the hybrid rice technology, rice production increased to 188 million tons in the 90s from only 140 million tons in 1978 with hybrid rice. Likewise, hybrid rice farming allowed them to save 2 million hectares of their land, including forests and swamps, from being converted to agricultural lands.

In the Philippines, the government is seriously advancing hybrid rice technology because of its potential to eliminate the country's dependence on rice imports to sustain its rice needs. With hybrid rice, the Philippines can potentially increase its rice production by one ton per hectare. If this is achieved in even half of the country's 2.7 million hectares of irrigated rice lands, the Philippines could produce an additional 1.35 million metric tons of rice worth $264 million.

DA's Hybrid Rice Program under the *Ginintuang Masaganang Ani* Rice Program is at the helm of hybrid rice promotion through research and development, training, and technology promotion. By 2004, the government aims to plant 10% of the country's total rice lands with hybrid rice. ■

January

BPI in its 72nd year recognizes BAR's role in R&D

The Bureau of Plant Industry marked its 72nd anniversary last January 14 at its headquarters in San Andres, Malate. As part of the celebration, BPI awarded plaques of recognition to various DA offices and officials for contributing to the goals of BPI and the development of agriculture and fisheries. Among the winners was BAR, who was recognized for its "invaluable and meritorious contribution to BPI, and as a tribute to Dir. Eliseo Ponce for his benevolence, dynamic leadership and active support to BPI." Other winners were the National Agriculture and Fisheries Council of the DA, PhilRice, National Institute of Molecular Biology and Biotechnology, Institute of Plant Breeding, and the Japan International Cooperation Agency.

AICAF, BAR discuss research collaborations

Officials from Japan's Association for International Cooperation for Agriculture and Forestry visited BAR last January 14 to discuss possible areas in research and collaboration, particularly in the areas of agriculture, forestry and fisheries.

According to AICAF Technical Advisor Chukichi Kaneda, they will draft and examine new cooperation policies for agriculture, forestry and fisheries so that they can respond to new issues and needs of other countries, particularly their Southeast Asian neighbors. BAR officials and the AICAF contingents discussed the latest R&D researches being done in the country, particularly those dealing with the effects of El Niño and La Niña.

BAR grants P5M to SMIARC

BAR awarded a P5-million institutional development grant to the Southern Mindanao Integrated Agricultural Research Center, Region XI's nerve center for R&D that actively undertakes on-farm and mid-stream research.

The grant is used to upgrade and renovate the Center's existing facilities, and construct an administration building in the 50-hectare Manambulan Station of the DA-RFU XI in Tugbok District, Davao City.

February

Planning Workshop 2002: Renewed mission for BAR

The Bureau of Agricultural Research held its annual planning workshop to review its mission and vision given the country's situation and the impact of recent global events. The workshop evaluated the performance measure of the different divisions for 2002.

Participants agreed to retain the Bureau's current vision of "an assured future for the Filipino people through research excellence in agriculture and fisheries." The Bureau's mission statement incorporated the goals of consolidating and strengthening the R&D system, managing funds, strengthening capacity towards a more responsive R&D system, increasing access to R&D knowledge, and formulating and implementing an integrated agriculture and fisheries agenda and program at both the national and regional levels.

BAR, ICLARM explore new fishery projects

Director General Meryl Williams of the International Center for Living and Aquatic Resources and Management (ICLARM) discussed with BAR the possibilities of joint fishery projects that focus on technology development and saving biodiversity.

BAR Director Eliseo Ponce, in turn, proposed that BAR and ICLARM start a small fishery project in support to this year's R&D theme, "New Science for Food and Poverty Alleviation", adding that the role of ICLARM is crucial in providing technical support and expertise in terms of project formulation and identification of priority areas.

BAR has new organizational set-up for 2002

This year, BAR has redefined and realigned its functional organization with the employment of additional personnel from the country's premier state colleges and universities, and has renamed some of its existing units in keeping with additional functions and responsibilities. This is part of the Bureau's on-going reorganization to make its service more efficient and relevant to farmers, fishers and researchers in the country.

According to Administrative Head Hamlet Dala, the organizational restructuring was a result of a rigorous process of analyzing the current set-up. "This was supposed to be implemented last year but because of certain developments and the intent to really ge the best people to handle the (BAR's) units, it really took time for the management to finalize the assignments

BAR focuses on on-farm research

With BAR's focus on on-farm research, the farmers will soon have more access to modern agriculture and fisheries technologies and other benefits of research.

Ultimately, the OFR program is expected to hasten the total farm productivity and income of farmers in the 15 regions, thus, accelerating the promotion of technology to farming and fishing communities. It will showcase the generated technologies in cooperation with the local government units.

All regions have started the first and most critical activity of the OFR program which is the Participatory Rural Appraisal to assess the actual technological needs and priorities of the regions.

March

NTLs hold 1st quarter meeting for 2002

Team leaders of BAR's 21 national RDE networks held their 1st quarter meeting to facilitate proper coordination and management of national R&D programs and networking activities.

The event is the first in a series of meetings sponsored by BAR every year as part of the regular and continuous consultation activities held with the different commodity- and discipline-based networks, DA agencies and staff

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A round-up...continued

bureaus, and state colleges and universities.

This year, the NTLs will include in their agenda new policy recommendations on the assessment of network performances, resource allocation and research prioritization of networks. Specifically, BAR will propose a set of minimum requirements that need to be met to ensure that the networks perform according to their terms of references. Criteria for evaluating the networks performances and guidelines on the termination of RDE projects were proposed.

BAR initiates new policies for R&D networks

Following the 1st quarter National Team Leaders Meeting this March, BAR and the team leaders have proposed new initiatives to improve the current project implementation and monitoring scheme of BAR and the networks, and increase their efficiency and effectivity.

These are: a one-billion endowment fund for sustained human resource development to support the continuous training of R&D scientists, or at least P2.5 million for small research grants and P0.5 million for joint researches; a proposal to integrate national RDE networks into fewer ones; and new criteria and minimum requirements for judging network performance.

Luzon R&D managers revitalize OFR program

BAR's on-farm research program has been revitalized and is now dubbed the "Community-based Participatory Action Research: The OFR Program of the DA." This developed during the Luzon regional R&D managers meeting last March.

The new program imbibes the following concepts: total farm, total technology, total family, and total community. According to BAR Director Eliseo Ponce, this new perspective provides a holistic approach in facilitating effective research-extension interface.

LSU experts...continued

Initial on-station trials revealed that at 1,300 rpm, the vine cutter could effectively eliminate unwanted vines, leaving only the stalk close to the sweet potato roots to facilitate easier digging. The researchers computed the vine cutter capacity at 1.33 hectares per day at a speed of 2 km per hour.

Moreover, the single-row sweet potato digger, another feature of this tractor-drawn harvester, could harvest 1.08 hectares per day, at 2 km per hour. The researchers likewise noted that this digger could harvest sweet potato roots with minimal damage on them.

Researchers estimated that this harvester could effectively reduce harvesting cost, which is about 13-25 percent of the total production cost.

This technology is for further research and trials until its expected date of completion in March 2003. Once completed, this technology will benefit emerging sweet potato commercial farms, mostly in Central Luzon, Pangasinan, and Eastern Visayas. Growers in Cagayan and Bukidnon could also benefit from this technology with the foreseen demand increase once a factory that manufactures biodegradable plastics using sweet potato starch is established. Cotabato and Davao del Norte farmers supplying an aqua feeds processing plant in Marvel, Cotabato are also potential end users of this technology. *(Laarni C. Anenias)*

Source: "Development of a tractor-drawn sweet potato harvester" by Alan B. Loreto and Manolo B. Loreto, Jr., PRCRTC, LSU, Baybay, Leyte

Lessons from...continued

The people residing in Banate Bay know the physical boundaries of their community. They have a sense of ownership, thus, a sense of responsibility and stewardship in the resources found in the area. Coordination among community members and avenues for dialogue are crucial factors in this process.

In the case of Batan Bay, there is cooperation and leadership at the community level that make the delegation of authority and the responsibilities fair and empowering for everybody. However, they have weak private sector participation and coordination among community members.

The participation of community members, especially the poor and marginalized, is important. Economic benefits and supplementary livelihood opportunities should also be provided to those adversely affected by conservation and management efforts to sustain genuine people's participation. Linkages with various organizations, whether private or public, make the improvement of the system and rehabilitation of the area easier than doing away with these partners.

These lessons can greatly help in improving the natural resource management in the Philippines in terms of focus, cohesion and strength. Well-managed fishery resources through co-management schemes among public and private stakeholders lead to economic progress and biodiversity conservation and protection.

Source: Fernandez, Pepito. "Coastal Area Governance System in the Philippines." Journal of Environment and Development. Vol. 9, No. 4. Dec. 2000