



ISSN 1655-3934

BAR TODAY

www.bar.gov.ph

Volume 3 No.2

April-June 2002

OFFICIAL QUARTERLY PUBLICATION OF THE BUREAU OF AGRICULTURAL RESEARCH



Technologies for today

The demand on agriculture is great, unending, and sometimes daunting given present conditions. One problem is solved and another one looms bigger. It is frustrating when the finger is pointed to agriculture as the culprit when there is not enough rice production and the country imports rice from the countries that learned from us the technologies that turned them into rice exporting nations. Of course, there are factors that hinder the country from producing enough or there is enough, but the distribution is not effective such that there are plenty in one place but nothing in another place. This is no longer the domain of agriculture if one limits its boundaries.

With the appropriate technologies, we can improve productivity and efficiency, the most pressing demand on agriculture. The Philippine Rice Research Institute (PhilRice) demonstrated this through its technology promotion efforts. While working there as fellow, I synthesized their data gathered from more than 9,000 techno demo sites throughout the country for a period of five years and we found that increasing the country's average production to five tons per hectare from the present average of three tons per hectare could make the Philippines self-sufficient in rice. Given all the support in terms of inputs, extension by the local arm of the Department of Agriculture, a responsibility now invested into the local government units, postharvest, a fair pricing scheme and the right attitude of the farmer can spell us success. There were even regions that could produce more than seven tons per hectare. A site in Region 2 could even produce more than 11 tons per hectare. Of course, these are the results of demonstration farms but what would be the difference if what has been demonstrated is transferred to the actual farm. Experiences, however, tell us that this is easier said than done.

Simply making a technology available does not mean it will be adopted. My many years of involvement in technology transfer and directly working with extension workers and

farmers allow me to conclude that technology promotion with the end goal of having it adopted is both a fulfilling and frustrating job. Fulfilling when few of the farmers adopt what is taught them, and these are just few, only the rich ones. In communication terms, they are the cosmopolites. Frustrating, when we could not go beyond encouraging the farmers to adopt because the technologies can give them a higher and better yield and they can only answer us with a smile.

Even when technologies are profitable, there are barriers that can limit their effectiveness. The users of technologies are not a selected few, therefore, these are developed with all of farmers in mind. Majority of our Filipino farmers are resource-poor farmers. Involving them in identifying and prioritizing their problems through participatory rural appraisal is one step toward developing technologies that have better chances of being adopted. We could even learn from the farmers. In one of our focused group discussions with farmers in Mindoro Oriental, we learned that they would import one ship load of 'itik' from Pampanga during rice season to take care of their golden snail problem. While this costs as much as using molluscicide, the practice is environment-friendly and the farmers do not experience discomfort such as itchiness while working in the fields if chemicals were used.

Farmers' involvement does not end in the identification and prioritization of their problems. They now participate in on-farm research. This is a system of joint data collection, verification and analysis in the identification of farmers' criteria and priorities for research planning, monitoring and evaluation. This increases farmers' acceptance of technologies since these are tested and adopted by small farmers in varied socio-economic and environmental conditions.

It is within this climate that technologies are generated and developed today. The dynamism that is science allows us to keep on finding solutions to the problems in agriculture until the other demands are answered. By then, production costs will be cut, time in developing productive technologies will be saved, and the entire agricultural enterprise will then be more efficient and accountable for a modernized agriculture. ■

In this issue

- BAR's national R&D investment is P414M from 1999 to 2001...page 3
- New policy guidelines for R&D budget proposals up...page 3
- The regional rice RDE agenda: for farmers, by farmers...page 4
- Philippine buko is cadang-cadang viroid-free, experts confirm...page 6
- A little something about abaca...page 7
- The fresh business of dried ornamentals...page 8
- Eliminating the pesky fruit flies...page 8
- PhilFruits: The vision to world-class fruits...page 10
- The Philippine aquaculture industry today...page 11
- Sustainability of aquaculture...page 13
- The tough tilapia...page 14
- Cassava foliage: Cheap alternative to carabao feeds...page 15
- Cashew and cow, anyone?...page 16
- What's up with Glory?...page 17
- Genetically modified foods: How safe are they?...page 18
- Vinegar: The effective weedkiller...page 19
- News bits: A round-up of the quarter's events...page 21

Editor

Virginia Duldulao, Ph. D.

Associate Editor

Thea Kristina Pabuayon

Writers

Maria Rowena Briones

Rita dela Cruz

Likha Cuevas

Mary Charlotte Fresco

Thea Kristina Pabuayon

Junelyn de la Rosa

Layout

Sheehan Demetillo

Thea Kristina Pabuayon

Circulation

Julia Lapitan

Vicky Ramos

Joahna Fe Umali

Adviser

Eliseo Ponce, Ph. D.

Knowledge Products and Services Division
Bureau of Agricultural Research
3rd Flr. ATI Bldg., Elliptical Rd., Diliman, Q.C.
Tel no. 920-0226 local 161-163
E-mail: kpsd@bar.gov.ph

New policy guidelines for R&D budget proposals up

The national and regional R&D agencies convened to discuss the policy guidelines for R&D budget proposals. The activity was spearheaded and coordinated by the Bureau of Agricultural Research (BAR), the agency mandated to orchestrate all research activities in agriculture and fisheries of the country.

The meeting was in accordance with the recent National Budget Memorandum No. 95, issued by the Department of Budget and Management (DBM) that all R&D agencies in agriculture and fisheries are required to seek endorsement from the Department of Agriculture (DA) for their budget proposals. Likewise, it is in line with the pronouncement of President Gloria Macapagal-Arroyo that, "all R&D programs in agriculture and fisheries must be vetted against the DA's research agenda and program."

BAR Director Eliseo R. Ponce presented the policy guidelines and procedures in the preparation, review and endorsement of the agency budget proposal in agriculture and fisheries. The R&D proposals for funding should be in accordance to the 'one system, one program' approach. There should be a common agenda and program in each sector for both national and regional levels.

At the national level, programs are either commodity- or discipline-based. At the regional level, programs include priority commodities and areas identified by the regions.

Agencies with national R&D responsibilities include all staff bureaus, attached agencies and SCUs that are members of the National R&D System for Agriculture and Fisheries (NaRDSAF). Meanwhile, agencies with regional responsibilities include Regional Field Units (RFUs), Bureau of Fisheries and Aquatic Resources (BFAR) Regional Offices, SCUs and regional agencies of the Department of Science and Technology (DOST).

At the agency level, RDE projects/activities are prioritized based on: 1) urgency of the problem, 2) magnitude of expected impact/benefit, 3) immediate utility of output, and 4) preparedness of the proponent to

systematize planning, implementation, monitoring and evaluation.

As for the funding allocation, Dr. Ponce made it clear in his presentation that: all R&D budget proposals should be within the indicative budget ceiling of the agency, allocations should be based on the economic importance of the commodity or sector, and that funding of R&D should delineate, which covers the indirect research funds (IRF) and the direct research costs (DRC). IRF includes regular

operations of the research center or institute based on its mandate while DRC covers project-based expenses.

Every year, various R&D proposals are submitted to the Bureau for funding. But because of the tight budget and the amount of money allotted, not all of these proposals are granted. The guidelines are therefore useful to the Bureau in screening those that could respond to the needs of the clientele, the industry, and the small farmers. (*Rita T. dela Cruz and the Planning, Monitoring and Evaluation Division*)

BAR's investment for national R&D programs is P414 M from 1999 to 2001

From 1999 to 2001, the Bureau of Agricultural Research (BAR) has already provided more than P414 million for the implementation of the national R&D programs implemented by the networks. Director Eliseo R. Ponce revealed this during a special meeting of the national RDE network team leaders.

According to Dr. Ponce, the amount represented 51.85% of the total BAR investment to implement R&D on agriculture and fisheries. The remaining 48.15% was allocated for Institutional Development Grants and direct research costs for the regional R&D programs.

Out of the P414M, P215M was allotted for high impact projects (HIPs), which started in 1999. HIPs are top priority projects that are of national significance and are expected to generate results within two to three years.

Dr. Ponce asked the team leaders to identify and validate all the technologies and new knowledge generated for the past three years and determine their potential impact to the country's farming and fishing communities. These include information and technologies generated from the different R&D projects and



High impact projects for rice

In rice, researchers are developing new farming technologies (resistant varieties against pests and diseases; biological control agents; field diagnostic tool for nitrogen, potassium, phosphorus and zinc; and equipment for handling wet paddy) that will improve and sustain yields of transplanted irrigated lowland rice and attain an average of 5 t/ha and 6 t/ha in on-farm national testing by 2003 and 2005, respectively. Moreover, more varieties of improved hybrid rice and cost-efficient seed production technologies that will increase average rice yield by 15% or higher are being developed. These are expected to help farmers gain an extra net income of P7,850.00/ha.

The regional rice RDE agenda: For farmers, by farmers

by Thea Kristina M. Pabuayon

In the Philippines, rice is, indeed, life. And why not? According to the Resource Center for People's Development, "rice nourishes almost 80% of Filipinos everyday and supports the livelihood of at least half the country's work force," making it one cornerstone of Philippine society.

Ironically though, the demand for rice has not been met in many years. According to experts, rice production in the Philippines is one of the highest in Asia. Sadly though, we have performed way below this potential. The International Rice Research Institute (IRRI) set the maximum attainable rice yield per hectare at 6.30 tons, while the required yield to attain food security stands at 5.30 tons per hectare. However, Philippine rice yield has not gone beyond 3.07 tons per hectare.

These facts have made it necessary for researchers to continually develop and improve this valuable commodity, both for food and business. However, researchers are finding it hard to conduct the needed researches because of lack of funds, which actually slows down the performance of the agriculture and fisheries sector. To maximize what they have, the agriculture sector has resorted to the prioritization and streamlining of researches.

In the case of the rice industry

many problems have yet to be solved through much needed researches. All in all, the country has 15 rice-producing regions, each with its own specific needs and problems pressing for solutions. To insure that no resources are put to waste and relevant researches are undertaken immediately, the Philippine Rice Research Institute in Nueva Ecija, in cooperation with the Department of Agriculture and local government units, drafted the regional rice RDE agenda.

According to PhilRice, the regional rice RDE agenda is important in guiding and steering the different agencies in the conduct of projects and development activities specific to each region.

The rice agenda were drafted and formulated after rigorous consultations with various rice stakeholders, including farmers, traders, millers, technicians and consumers. PhilRice reiterated the importance of this process, hoping to erase the notion that these stakeholders are not properly consulted and involved in identifying the problems and needs of the rice industry. Since the problems are never integrated, recurrent problems pursue the industry. Hopefully now, the consolidated input of both the stakeholders and the researchers would help the latter to streamline and focus their researches and



realign them with the actual needs of the rice industry. With this regional agenda, PhilRice expects to gather enough assistance from legislators in creating agricultural policies to increase productivity, improve farmers' conditions, and eventually, modernize the rice industry for global competitiveness.

The consultation process involved choosing three provinces each region, and three municipalities each province. These were categorized by ecosystem, namely irrigated, rainfed, and upland. Rice farmers, traders, millers, technicians, researchers and consumers participated in the study through various participatory rural appraisal approaches such as focused group discussions, survey questionnaires and on-site interviews. The researchers then identified the main problems and integrated them using the farmers' perspective of what the real concerns of the rice industry were. The researchers chose to analyze the farmers' perspectives since they considered them the most important players of the industry, and because they mostly need immediate help.

Based on the consultations with the rice stakeholders, PhilRice was able to draft a list of the priority rice problems in each region. For farmers, the leading

➡ next page



problems across all regions are the high yield loss due to seed impurity and pests and diseases in rice. Other problems are high seeding rate, labor shortage, undependability of solar dryers, lack of drought-resistant varieties, lodging of palay and zinc deficient soils. On the technicians' part, the leading problems are the limited budget given to agriculture and the impact of their devolution. Among the other problems are lack of manpower, farm to market roads, and postharvest facilities, and inactive farmers' cooperatives. Topping the list of concerns for traders and millers are stiff competition and low milling recovery. Lastly, the consumers are highly concerned in solving the proliferation of low quality rice in the market.

The Rice Agenda

Addressing low palay price

CAR, Region IV, and Region VII suffer from low palay price. In the survey by PhilRice, they found that problems related to seeds, pests and diseases, lack of capital to adopt new technologies, soil acidity, continuous cropping, high production cost, rice importation, high labor cost, low farm mechanization, lack of postharvest equipment, market constraints, and zinc deficiency are the main causes of low palay production in the three regions.

The first recommendation to improve the regions' yield is to train the farmers to use certified seeds that are resistant to known pests and diseases, and those that are well suited to their climate. Likewise, they should be trained on integrated pest management (IPM), integrated nutrient management (INM) and cultural management.

The problem in crop establishment is dictated by high labor cost which has prompted the regions' farmers to adopt the direct seeding or *dapog* method. This is quite problematic since these methods render their crops vulnerable to golden snails, rats and birds. Adopting new technologies such as PhilRice's transplanter or drumseeder and practicing proper cultural management systems will help solve

this problem.

Linked with the problem of labor is low farm mechanization, which leads to high production costs and low productivity. According to the farmers, they cannot adopt certain farm machineries since these are not suited to their areas and terrain. It is imminent, therefore, to improve the implements to encourage use and adoption.

Likewise, the regions lack postharvest facilities such as mechanical dryers that are especially needed during the wet season. Up to now, the farmers rely on the traditional methods of pavement and solar drying which are often unreliable. The consequences include being forced to sell cheaply priced freshweight palay, spoilage and low milling recovery.

In marketing, farmers asked to be protected by government by not importing rice. The importation of cheaper and heavily subsidized rice from developing and developed nations subject local farmers to unfair competition. This also means low palay prices which add to the burden of the farmers. Importation must then be monitored, preferably to be allowed only during lean months to better protect the local farmers.

All in all, cutting production costs through correct production practices, education, and strengthening of farmer groups will improve the regional rice production.

Currently, some of the RDE activities implemented in the regions include, seed networking and training of growers, field testing of new varieties, development of new cultural management practices, acceptable credit schemes, promotion of cheap but effective equipment, and use of biotechnology for crop improvement.

Addressing perceptions of low profitability

According to PhilRice's survey, rice industries of Regions I, VI, VIII,



© PhilRice Photo

IX, X, XI, XII, and ARMM are mainly weighed down by the farmers' perception that palay trading is not a profitable business. This perception comes from a number of problems, including high cost of inputs, high labor cost, marketing constraints, low palay production, and importation.

The regions' farmers must learn to use certified seeds and varieties which are resistant to various pests and diseases to improve their palay production. Likewise, this must be coupled with IPM, INM and cultural management practices to lessen postharvest losses.

A second problem that needs to be addressed is the late delivery of seeds. At the time they are delivered, the seeds have passed their seedling vigor. According to the farmers, certified seeds are often unavailable, which gets them behind their planting schedule. By the time the seeds become available, the seeds already have a low germination rate, making their crops more prone to pests and diseases.

To address high labor cost, the farmers need to learn to use new technologies like PhilRice's transplanter and drumseeder. Usually, farmers adopt the direct seeding method because of lack of labor. However, this makes their crops vulnerable to pests and weeds. Employing the new technologies will help reduce these problems.

To improve marketing, more studies should be conducted on the possible implications of putting ceiling prices to rice as opposed to having an open economy, and rice importation. Lastly, organizing, strengthening and

Philippine buko is *cadang-cadang* viroid-free, experts confirm

by Mary Charlotte O. Fresco

Around 80% of our coconut products goes to foreign market, generating US\$ 741.77 million a year. This makes us the third largest producer of coconut oil and desiccated coconut in the world. Our young coconut or *buko* even performs well in neighboring countries like Taiwan and Malaysia.

This was before export bans were imposed on our coconut products.

In 1998, Brazil was the first to set trade restrictions on our desiccated coconut. Malaysia and Taiwan followed years later by imposing a ban on our *buko* for fear that it was contaminated with the dreaded *cadang-cadang* viroid.

In 2000, experts from the Philippine Coconut Authority (PCA) in Albay did a series of rigorous viroid-detection process and declared that the meat and water of young and mature coconuts in the Philippines are free of the *cadang-cadang* viroid.

Checking the viroid

Cadang-cadang was confirmed to be a viroid disease in the late 70s. Its causal agent is the coconut *cadang-cadang* viroid or CCCVd, which is often transmitted through pollen and seed, and contaminated farm tool such as scythe. Viroids should not be mistaken with viruses because they are much smaller and have different molecular and biological properties.

The disease is common in the



Bicol region and also present in some areas in Quezon, Aurora, Biliran (particularly in Maripipi Island), Northern and Eastern Samar.

Researchers MJB Rodriguez and LP Estioko of PCA-Albay Research Center, hoping to exempt the young coconut from the ban, employed a more reliable and sensitive diagnosis for the presence of CCCVd. It is an improved molecular hybridization assay (MHA) that can be efficiently used to detect the concentration of the viroid in different parts of the nuts.

They gathered samples of young (about 6 to 9 month old) and mature nuts (a year old) from both healthy and infected palms and immediately subjected them to CCCVd analysis.

The results

The diagnosis made on fresh young coconut or *buko* was promising. Even if they were obtained from the tree infected with *cadang-cadang*, the solid (meat) and liquid (coconut water) endosperms were found free of the viroid. The same findings were obtained from the diagnosis made on the samples collected from healthy coconut trees. However, the pericarp (husk) and leaf samples from infected trees were found to have CCCVd.

The *cadang-cadang* disease, though infectious, is not as serious as it may seem. One interesting fact about this disease is that the viroid degrades through time. Experts proved this true when they observed samples of nuts contaminated with CCCVd under ambient temperature for two weeks.

Results of their observation showed that CCCVd was completely degraded in the young coconuts' husks after two weeks, while in mature nuts,



it only took one week for the CCCVd to be completely degraded in the husk.

According to the researchers, CCCVd contamination in young coconut husks is two times higher than in mature coconut husks because the latter is practically composed of dead tissues.

Furthermore, the chance for young coconut with infected husk is very small in the foreign market due to the marked inferiority in quality and appearance.

Nuts from *cadang-cadang* diseased palms are much smaller, have an unusually round shape and a scarred surface- the qualities that would not surely meet the standards set for exportable fruits. In Taiwan, for instance, the required weight for an exportable young coconut should not be less than 3 kilos. The nut surface should be smooth, while the meat soft, sweet and tender.

Also, the researchers pointed out that since there is no CCCVd contamination found in the meat and water of both young and mature coconuts, products derived from them such as desiccated coconut, coconut powder, *makapuno* jelly, *nata de coco*, vinegar and wine should be exempted from the ban.

The real score

The main reason why Taiwan and other countries imposed ban on our coconut products, is the health risks

Our own peso bill has it. The cigarette you smoke is wrapped in it. Runway shows abroad feature it. The paper you're writing on maybe is made out of it...and the Philippines is the leading producer of this versatile commodity!

Musa textiles Nee, or abaca, is indigenous to the Philippines where favorable conditions (climate and soil) are suited for its cultivation. Known as the Manila hemp worldwide, the abaca looks like the banana plant but its fruits are inedible. However, its strong leaf sheaths compensate for its being a non-food crop. Abaca is made into ropes, twines, marine cordage, tea bags, filter paper, mimeograph stencil, sausage skin, cigarette paper, file folders, x-ray negative, medical gas masks, diapers, bed sheets, stationeries, bags, hammocks, hand woven fabrics, wire insulators, wire cables, and currency paper.

In fact, the Bangko Sentral ng Pilipinas (BSP) conducted laboratory tests on the feasibility of using abaca on our bank notes. In 2001, BSP started to make 100-peso, 500-peso, and 1,000-peso bills with 20% abaca content. The 90/10-cotton/abaca blend exhibited the best physico-chemical properties and printing quality but the 80/20 blend was preferred and the resulting paper bills are stronger than the old paper offsetting the five percent increase in production cost. The abaca blend also protects the industry from the proliferation of counterfeit bills because the fiber is not readily available.



A little something about the abaca...

by Likha C. Cuevas

The plant

This plant is propagated through its suckers. It is ready for harvest when all the leaves have been formed from the stem and flower buds develop. Abaca farmers harvest 18 to 24 months after planting and conduct subsequent harvests at three to four-month intervals. The process of harvesting involves cutting down the plant at the base of the petiole and extracting the fiber from the leaf sheaths. Fibers recovered may vary from 1.5 to 2% by weight of the freshly cut stalks. The stripped fibers are dried (sun-dried or air-dried) before storage. The Fiber Industry Development Authority (FIDA) regulates the baling and grading of the fibers.

It is popular knowledge that abaca is found in the Bicol Region but it is also planted in Eastern Visayas, and Mindanao. From 1990-1999, the top 10 abaca producers were: Catanduanes, Southern Leyte, Leyte, Sorsogon, Zamboanga del Sur, Samar, Davao Oriental, Northern Samar, Camarines Sur, and Agusan del Sur.

From 1990-1999, the processing sector in the country used 67.42% of the total abaca fiber while the pulp sector accounted for 58% of the total usage.

The Market

Would you believe that the Philippines supplied 97% of the total abaca requirement worldwide from 1994-1998 while Ecuador supplied the remaining 3%? Yes, it's true. From 1990 to 1999, the country steadily

exported abaca fiber, pulp, cordage, rope and twines, yarns and fabrics, and fiber crafts. In the United Kingdom (UK), abaca is used as replacement for asbestos while in US, Europe, Japan, India, and China, the fiber is used for tea bags, meat casing, pulp, and yarn. UK, US, and Japan were the top three major importers of abaca fiber. For that same 10-year period, the annual increase in the export of abaca fabric was recorded at 88% due to the growing awareness and interest in it for decorative, fashion and wrapping purposes in its major markets in Italy, the UK, Japan, and the Netherlands. The Philippines generated an average of US\$ 70 million over the last ten years from exporting raw fiber and processed abaca products.

Industry problems

The country's abaca industry is thriving with the availability of large area suited for abaca production, widespread ecological adaptation, wide range of potential users and applications, and available technologies for abaca cultivation and fiber production. However, there are factors that threaten our abaca production and market. First is the susceptibility of varieties to various diseases. Another problem is that most of the plantations in the country are already old and destroyed due to typhoons considering that the plantations are situated in areas often hit by this natural calamity. There is also the interest of other countries in the production of abaca fiber thus the pirating of technology (i.e. tissue culture) abroad. Ecuador also poses a threat since it produces abaca that has more consistent fiber quality than that of Philippine abaca. There is also expansion of production in Ecuador producing 1,000-1,500 kilos of abaca per hectare. Compared to Ecuador, the Philippines produces only an average of 600-650 kilos/hectare. Cheaper substitute products like rayon, kenaf (*Hibiscus cannabinus* L.), and sisal (*Agave sisalana*) pose another competition for the demand for abaca.

Programs on abaca

The National Abaca Research

The fresh business of dried ornamentals

by Mary Charlotte O. Fresco

In these modern days of plastic and metals, many people still prefer decorations and materials made from the "real thing". These include dried ornamental materials such as flowers, petals and foliage that are skillfully treated and arranged into beautiful greeting cards, wall frames, bookmarks, to table decorations and floral displays.

This concept of using dried plant materials, which are known for their long-term beauty and elegance has given hobbyist and entrepreneurs a new, exciting, and profitable ornamental business.

In other countries, the dried flowers industry is quickly developing and gathering demands among clients who prefer the natural look in their homes. Dried flowers also offer a value-added opportunity for producers who supply raw materials to floral wholesalers, retail florists and craft retailers.

Here in the Philippines, the dried flower business is still new but the possibility of developing this sector is great since our country has a vast indigenous and exotic plant resource. Recent statistics from the Bureau of Import Services of the Department of Trade and Industry show that the export share of cutflowers and flower buds used for bouquets and dried ornamentals was 16.7% in 1997. This was larger than fresh ornamental exports of 11.8%. Potential markets for our dried flowers

include Japan, Taiwan, and some European countries- the global leaders in export demand for dry materials.

Why dry?

There are many reasons for drying plant materials and one of them is the abundance of available materials. It is estimated that about 80% of flower species can be dried and preserved successfully. Plants that are best for drying are marigolds, zinnias, roses, daisies, asters, cosmos, and several ornamental grasses and foliage.

Drying is also cheap and easy to do. Sophisticated training and expensive equipment are not needed to come up with variety of designs.

Unlike fresh flowers that easily lose their marketable value and quality, dried ornamentals offer longer periods of sale if properly preserved, packaged, and handled.

Another unique characteristic of dried ornamental is their versatility. They can be arranged into different crafts according to one's preferred style, design, and use.

How to dry?

With the onset of new and varied creative designs, more advanced drying and preserving techniques were also developed. The latest approach to dried flower crafts is focused more on maintaining the color, shape, and texture to create a strong aesthetic impact.

Aside from knowing the kind of drying technique appropriate for a given plant material, also consider the quality of materials to be dried. Florists recommend that the best time to gather flowers for drying is right before they bloom, preferably during dry weather. This is to minimize the amount of moisture present in plants that may trigger early decomposition.



These are the four general methods of drying that can be used to suit the individual requirements of plant materials.

A. Air-drying

Commonly referred to as the "hand and dry" method, air-drying is the oldest and easiest drying technique. There is no special equipment needed, since the stems of flowers and foliage are just tied and hung upside down in a warm, dry, and dark place with good air circulation. Though it is the simplest, it is also one of the longest drying methods. It usually takes three to four weeks for the flowers to dry completely. Once dried, flowers are then sprayed with hair spray or clear varnish to retain their form and give them shine. With this process, however, the products tend to lose their original color.

B. Pressing

Pressing is another simple way to remove all the moisture in the plant materials. Though this is the most practical way to prevent decay in the materials, this method is not applied to multi-petalled flowers such as rose and daisies.

The common practice is to place the flowers between the pages of unglazed paper such as old newsprints and telephone books and weigh down with a heavy object. Pressed materials tend to lose their two-dimensional form



⇒ next page

yet the change in color adds to their beauty and style. Flowers with yellow tones retain their colors extremely well and the hue becomes richer, while the blue ones normally retain their color after pressing.

C. Using desiccants and silica gel

For the purpose of retaining the material's color and vibrancy, desiccants are preferred. Among the desiccants, silica gel is found to be the best medium to quickly absorb the moisture from the flowers. Flowers normally take 3-6 days to completely dry, but the materials tend to re-absorb moisture if they are not stored in sealed containers.

When using desiccants, always consider the proper procedure and application. Carefully cover the flowers with desiccants to maintain their form. To cover a flower, pour about an inch of desiccating material in the container. Cut the flower stem to about half an inch and stick this into the center of the desiccant to hold the flower. Pour remaining desiccating material along the perimeter of the container, while avoiding the flower. Gently tap the container to make the desiccating materials cover the entire flower.

Silica gel is quite expensive but it can be used repeatedly. Simply heat the used silica gel in an oven until its pink color turns to blue.

D. Using glycerin

Another way of preserving plant materials is using glycerine solution, a liquid and fatty substance used in making soap. To make the solution, mix one part glycerine to two parts of very hot water. This method is best for ornamental grasses and foliage. Simply cut the desired foliage and grasses to a length of no more than 18 inches. Remove the bark-like structure attached to the foliage before soaking. Split the bottom of the stems and put them into 4 inches glycerine solution. Another way of doing this is by laying the individual leaves into a glass or plastic container. Pour the glycerine solution over the leaves, while making sure that the surface of the leaves is completely covered. Secure the container with a plastic wrap and store them in a cool and dry place. Remove the materials from the solution when the color starts to change and the leaves become supple.

* with notes from Dr. Corazon Azucena, Ornamentals RDE Network, Los Banos, College, Laguna. Tel. No. (049) 536-2444.

Eliminating the pesky fruit flies

by Junelyn S. de la Rosa

Native to the Philippines, the oriental fruitfly (*Bactrocera philippinensis*) is a very destructive pest to edible fruits like mango, guava, breadfruit and papaya.

Eradicating the fruit fly using bait control could be done in two stages using the Male Annihilation Technique (MAT) and the Sterile Insect Technique (SIT). First, the researchers reduced the population of male oriental fruit flies to a minimum so that mating would not occur. Male oriental fruit flies were trapped using methyl eugenol- a powerful male attractant, with an insecticide such as Naled (Dibrom) or Fipronil.

Cordelitos (lengths of 6-ply cotton string about 30-45 cm) or caneite (compressed fibreboard) blocks (50 mm x 50 mm x 12.7 mm), or coconut husk blocks (50 mm x 50 mm x 10 mm) were soaked in the bait material and distributed in the field at 400 pieces per square kilometer. This treatment was repeated every eight weeks. The baits were placed on top of tree trunks or wooden poles, well out of the reach of children or animals. This technique is called the Male Annihilation Technique (MAT).

Then the residual fruitflies were eradicated using the Sterile Insect Technique (SIT) or the sterile male technique. Sterilizing insects is a new technique where insects are either treated chemically, genetically, or with radiation to be infertile. In the case of male fruit flies, they are subjected to radiation to make them sterile. The method aims to wipe out the fly population by introducing sterile males that cannot produce any offspring when they mate with the female fruit flies.

Sterile flies have been used in many countries. In the past, both male and female flies were released. Sterile female flies' eggs did not develop, however, some skin damage to the fruit did result. To counter this problem, the United States Department of Agriculture (USDA) developed a genetic technique that separates males from females in several fly species. Flies released in Hawaii were only male



Bactrocera philippinensis

sterile flies.

To ensure that SIT works, sterile insects must be present in much greater numbers than the fertile wild male flies in order to reduce production of progeny. The method is only effective after the fly population has been greatly reduced by other means, because it only takes one fertile male fly to inseminate a number of female flies.

Another biological control method against fruit flies is the establishment of parasitoids such as *Fopius arisanus* (Sonan) which is specific to the oriental fruit fly. Fruit fly parasitoids are insects that develop by laying their eggs in fruit fly eggs or larvae. The host is killed when the parasitoid's larval development is completed. Since they are fairly specific to certain fruit fly species or genera, parasitic wasps can be effective for fruit fly control.

For example, when these wasps were introduced in Hawaii, scientists documented that the Mediterranean fruit fly population was reduced to less than half.

Parasitoids do not eat or sting fruit. They lay their eggs in fruit fly larvae that are developing in fruits that have already been damaged by fruitflies. Therefore, parasitoids have no damaging effect on the fruit that is not yet infested with fruit fly eggs or larvae.

Today, only Guimaras is capable of meeting strict export standards of developing countries. Only Guimaras has successfully implemented an integrated pest management program for fruit flies. Scientists are still crossing their fingers that other regions in the country will follow suit and learn to successfully manage the fruit flies and cut the losses in our fruit industry.

Source: *Swarming, Delayed Sexual Maturation of Males and Mating Behavior of Fopius arisanus* (Sonan) by Gorgonio Quimio and Gimme H. Walter at Tel. No. (094) 536-2409 and Biological Control Against Fruit Flies in Pacific Island Countries and the Territories at www.spc.org.nc/pacifly/control/biocontrol.htm.

Abaca...continued

Center (NARC) was established to address the problems of the Philippine abaca industry and strengthen it. Through NARC, the industry is now capable of producing a large number of disease-free planting materials and improved abaca varieties through tissue culture. This involves the screening and development of high-yielding, early-maturing, pest/disease and stress-tolerant abaca varieties with high quality and easy-to-strip fibers suited to specific uses through conventional methods and biotechnology.

To address the need for increasing crop yield, the Center has programs dealing with the development of appropriate abaca-based cropping systems to increase income per unit area. There are programs for the rehabilitation of pest/disease-infested abaca areas and rejuvenation of old plantations. Integrated pest management and integrated nutrient management for abaca are also practiced.

NARC has postharvest processing and utilization projects, socio-economics projects, and extension programs to help improve and sustain the abaca industry. Under the extension program, NARC facilitates the dissemination of abaca technologies to end-users and assists local government units in establishing livelihood and agricultural support services program.

Industry insiders see other potential uses of abaca, especially in the construction industry. Floor tiles, hollow blocks, fiberboard, reinforcement in concrete and asphalt can include abaca in their components. This plant can also be used as fuel and other miscellaneous items like wigs. With the combined research and development of our paper suppliers, the opportunity for abaca to be used in other countries' currency notes will be big.

Truly, this versatile crop has endless possibilities.

Sources: Arceo-Dumlao, Tina. *Old Durable Abaca Now in Peso Bills*. http://www.inq7.net/bus/2001/aug/20/text/bus_4-1-p.htm; DA-Agribusiness and Marketing Service. *The Abaca Industry Situationer Report*. <http://www.da.gov.ph/agribiz/abaca-new.html#structure>; Villordon, Arthur Q. *Arthur's Philippine Vignettes*. <http://www.mozcom.com/SCF/pv/Abaca.html>; Isarog Pulp and Paper Co., Inc. <http://www.isarogpulp.com/abaca.html>; National Abaca Research Center. <http://www.bar.gov.ph/abaca/index.htm>

PhilFruits:

The vision to world class fruits

by Likha C. Cuevas

In the next few years, we can make our durian candies and dried mangoes as regular items in grocery shelves all over the world. Our bananas, pineapples, and avocados and other processed fruits will have longer shelf life and quality that is best in the world. Our small-scale farmers' produce will have access to the world market, together with that of the commercial fruit growers.

This is how the Department of Agriculture (DA) sees the future for this industry. The Philippine Tropical Fruits Research Institute (PhilFruits), a semi autonomous unit under the Bureau of Plant Industry (BPI), will be the instrument to this vision. DA sees PhilFruits as an institution that will promote agro-industrialization in rural communities by modernizing small to medium-scale farms through provision of information, technologies, and support services in accordance with global standards. To help PhilFruits on its feet, the Bureau of Agricultural Research (BAR) in 2000 provided P10 million seed money to BPI as start-up fund to establish the PhilFruits office. In 2001, P5 million was given to the DA Regional Field Unit 11 (as support) and another P5M was given to PhilFruits for its development.

The fruit industry plays a big part in our economy. The agriculture and fisheries sector accounted for almost 20% of the country's total GNP. The average production value of crops was P230.81 billion and 19.9% (P45.9 billion) of it was contributed by the fruits industry. Statistics shows that in 1998, it generated US\$40 million in export earnings. The DA also estimates that at least 10 million people are employed by the mango, banana, papaya, pineapple, and cashew industries. There is still a lot of potential that can be tapped for these Philippine fruits.

Many government agencies have implemented programs to solve the concerns of the industry --- from access to agricultural resources and services to market information. However, the agriculture sector is in need of an institution to orchestrate all on-going R&D efforts on fruits across the country. Even though BPI has various divisions and experiment stations that have several functions and experiences in dealing with various commodities, they have difficulty in generating more research results due to inadequate funds and weak manpower capability. Fruit R&D networks in the 15 regions need better coordination and more financial and infrastructure support to meet future demands of the fruit industry. Because of this, the BPI Davao

National Crop Research and Development Center (NCRDC) was elevated to PhilFruits, under the Agriculture and Fisheries Modernization Act and Executive Order 162, to lead, guide, fund, and undertake RDE activities, generate effective technologies beneficial to farmers.



The Philippine aquaculture industry today

by Thea Kristina M. Pabuayon

Fishing is a way of life in the Philippines. The country's coastline of at least 17,460 km and 26.6 million ha of oceanic water is a haven to about one million fishers. Inland resources of at least 338,000 ha of swamplands, 253,000 ha of freshwater and brackishwater fishponds, and another 250 ha of lakes, rivers and reservoirs are evidences of the vastness of this country's fishery resource.

The Philippines is one of the world's leading fish producer. In 1995, it was 12th among the top 80 fish producing countries with a total production of 2.3 million metric tons, accounting for 2% of the world's 112.9 million metric ton fish catch. The following year, it was 13th among the 51 top fish producing countries with a total fish production of 1.8 million tons. In 2001, the country's fish yield further increased by 166,101 metric tons.

The fishing industry has three sub-sectors, namely, municipal fisheries, commercial fisheries and aquaculture. Of the three, aquaculture, which involves raising and culturing fish in fresh, brackish and marine waters, is seen as one of the most promising areas for increasing production. In 2000, aquaculture registered the highest

production and value growth of 3.07% and 8.5%, respectively.

While the aquaculture sector puts a bright spot in the country's fishing industry, there is a concern among stakeholders and fishers that we must do better. Once thought inexhaustible, our seas are yielding less fish than it used to, because of abuse and neglect. Coastal waters are overfished, while marine and inland waters are destroyed by pollution. Further aggravating the situation are reckless fishers who continuously ignore the various fishing laws and policies already in place.

The aquaculture industry in retrospect

In the 70's, the aquaculture industry experienced a lot of challenges and problems as any other emerging industry, but eventually, got a foothold and worked its way up.

Among the concerns of the industry then were low supply of fry, lack of technical support or information, lack of capital, lack of quality fingerlings and culture materials, lack of area for expansion, high production costs, difficulty in availing credit, low and fluctuating prices, and problems brought about by natural calamities and weather disturbances.

Aside from these, there were also location specific problems in the regions. Luzon, for example, lacked manpower and had high market prices due to uneven product distribution, while Western Visayas lacked the necessary

infrastructures to support the industry.

Although a number of these problems have been either solved or is in the process of being solved, our aquaculturists are still experiencing majority of these problems at present. In a 1998 study by Pahilanga, Napilan and Lumampao, they found that fishpond aquaculture in Central Luzon, Western Visayas and Western Mindanao were plagued by a number of problems, including pollution, pests, costly fry, diseases, and lack of facilities. Aside from these were social problems like poor peace and order situation and occurrence of poaching and robbery.

Doing well

Aside from aquaculture, two sectors also contribute to the country's fish production. Commercial fishing, which remains stable, accounts for 34% of the country's fish catch and is valued at US\$727 million. The other is municipal fishing that accounts for 32% of our total fish production and is valued at US\$709 million. Sadly, the latter's production has been declining since 1992 because of overfishing and environmental degradation.

And so, for the past 15 years, aquaculture has bested the two other fishing sectors in terms of performance, that is why it is seen as the best sector to develop to increase the country's fish production. Even abroad, the Philippine aquaculture industry is recognized as one of the best, ranking 9th in overall production.

From 1989 to 1998, aquaculture production grew by 4.7%, mainly through its major systems that include brackishwater fishponds, freshwater fishponds, fishpens and fishcages, marine waters, and mariculture. It made up 34.3% of the country's total fish catch, valued at US\$640 million. In 1998, the Philippines became the second biggest producer in world aquaculture



Philippine aquaculture...continued

production, supplying 7.5% of the world's total production of 8.57 million metric tons, and outclassed Japan (6.1%), Korea Rep (5.5%), Korea DPRp (4.8%) and Indonesia (1.4%). In 2000, aquaculture contributed 34% of the country's total fishery production, which has also generated employment for many Filipinos. With a projected growth of 8.7% per annum, the industry is estimated to contribute 42% to the total fishery production target by 2004.

Last year, the aquaculture sector registered the highest growth rate of 10.31% among the fishery sectors. It has performed remarkably well compared to commercial and municipal fishing that only registered a growth rate of 3.18% and 2.49%, respectively. Likewise, aquaculture production accounted for 36% of the country's total fish catch, still ahead of commercial and municipal fishing by 2%.

Likewise, the country's total fish catch grew by 5.57% from the previous year, largely due to the good performance of the aquaculture industry. According to a report by the Bureau of Agricultural Statistics, aquaculture's production increased due to the proliferation of marine fishcage operations, accessibility to better quality fingerlings, and adoption of better feeding practices by fishers.

Among the country's aquaculture activities, brackishwater aquaculture is considered the most important, with 143,197 ha devoted to it, or about 94% of aquaculture's total area. Its total production was 219,408 mt for 2000, with bangus and prawn as its major products. Freshwater aquaculture, which includes fish ponds, pens and cages registered production totals of 44,977 mt, 33,491 mt and 33,067 mt, respectively. Likewise, mariculture production, which includes oyster, mussel, and seaweed culture was 647,226 mt.

In terms of quantity, seaweed has remained the leading aquaculture product for years, registering a production of



Residents pick up bangus from the shores in a recent fish kill in Bolinao, Pangasinan.

618,038 mt or 63.2% of aquaculture products. Second is bangus with a production of 194,023 mt, tilapia at 82,601 mt, shrimps/prawns at 36,749 mt, and others at 46,758 mt.

Doing better

Although aquaculture productivity increased in the national level, regional productivity still remains low. To counter this, a lot of problems, past and present, have to be addressed by policy-makers and implementors to insure the sustainable growth of the industry.

In a paper presented during the 14th Agricultural Policy Forum on Socioeconomic and Policy Issues: The Aquaculture Sector in May 2002, Dr. Castor de Jesus, formerly of the Philippine Council for Aquatic and Marine Research and Development, discussed several issues that should be addressed to insure the sector's development.

According to Dr. De Jesus, it is important that both government and stakeholders work together to solve the industry's problems. For sustained development, the aquaculture industry should have a program that focuses, among others, on "economic ends and societal welfare goals." This would involve not only increasing productivity and equity, but also

aquaculture's sustainable management and resource conservation.

In the same forum, Rolando Platon, Chief of the Southeast Asian Fisheries Development Center (SEAFDEC)-Aquaculture Department and Danilo Israel of the Philippine Institute for Development Studies (PIDS) identified the major problems that currently beset the aquaculture industry. Resource depletion in coastal waters, environmental damage in marine waters, and environmental damage in inland waters are just some of the issues that policy makers and the government should address.

At present, there is an existing national network on aquaculture under the National Research and Development System for Agriculture and Fisheries (NaRDSAF). Organized by the Bureau of Agricultural Research, the aquaculture national RDE network is composed of member-institutions and agencies that organize, spearhead, orchestrate and coordinate aquaculture RDE activities based on a five-year national agenda and program. At present, the network is guided by its vision of a 'profitable and sustainable aquaculture production' and its mission of 'improving fisheries productivity and profitability at sustainable levels through responsible aquaculture development and management.' Its programs include the improvement of aquaculture systems, development of improved strains and new species for aquaculture, reduction of environmental impacts of aquaculture, establishment of database for aquaculture resources, formulation of appropriate regulation and policies for aquaculture, and extension.

Much is to be done to sustain and increase our fish production. And it is up to all the fishery players to make sure that our sea resources continue to yield by taking care that these are not depleted, abused, and neglected.

Source: 1999 and 2000 Philippine Fisheries Profiles; BAS Fisheries Situation Report, January to December 2001; FAO Fisheries Department Fishery Country Profile, May 2000; The Philippine Aquaculture Industry, Trade and Investment Policy Analysis and Advocacy Support Project, PHILEXPORT, 1999.

Sustainability of aquaculture

by Maria Rowena Briones

A big fish is a big deal, especially if you can harvest thousands of them. Aquaculture is the farming and husbandry of aquatic animals and plants to earn profit. It increases the production of fish and other useful food stuffs far above the level that can be produced naturally.

Most of the world's aquaculture is in Asia. Alarming, coastal and inland resources in developing countries in the Southeast are under stress due to destructive production and harvesting practices and lack of alternative economic options for the fishers and other coastal inhabitants.

Aquaculture in the Philippines

In the Philippines, the coastal and marine ecosystem is considered an important source of livelihood for 70 percent of the country's municipalities. Being an archipelago of over 7,000 islands, mangroves are vital part of the Philippine environment. They protect the coastline from erosion, filter out silt that would have choked the coral reefs, provide spawning grounds for fish, and nesting areas for birds and animals.

Disturbingly, the number of hectares of mangroves in the Philippines has gone from 450,000 at the beginning of the century to less than 150,000 today. One of the reasons of the loss of these mangroves is their conversion for milkfish and shrimp aquaculture.

Aquaculture in the Philippines used to be dominated by brackish water fishponds with milkfish as the predominant species but today, aside from milkfish, there are at least eight species-- prawns, tilapia, mud crab, white shrimp, grouper, siganid, carp and mudfish-- that are being cultured under different farming systems in brackish water fishpond; freshwater fishpond; freshwater and marine fish pens and cages; aqua-silviculture (mud crab culture in mangrove pens) and the mariculture of oysters, mussel and seaweed.

As an economic activity, it helps us attain food security through the provision of protein sources for the population, employment and sources of income for the people especially in the rural areas. The large quantities of marine products we export give us high foreign exchange earnings.

However, its expansion had been causing pollution, disease outbreaks, destruction of mangroves and resource-use conflicts. These negative effects could have been alleviated, if not avoided, if there is proper planning, site selection and management of its long-term effects to the environment.

What research can do

The National Research, Development and Extension Network for Aquaculture, with Dr. Crispino Saclauso as the national team leader, affirms that the growth of the aquaculture industry (in freshwater, brackish water and marine) depends foremost on the sustainable and responsible management of its productive resources.

Aquaculture is not just raising fish, it is also realizing the dreams of the fisher folk. The small and medium aquaculturists need institutional and infrastructure support in their operations so that they can compete with the ones who have big capital.

The core technical team of the network adds that the socio economic context where aquaculture is introduced is oftentimes the last consideration in many development activities, thus the culture, perceptions, knowledge, experiences, economic situations and other characteristics of recipient communities are overlooked.

These and the weak linkages between research and its clients partly explain the lack of relevance and the poor quality of the technologies produced by the national research system. With the threat of environmental degradation and the issues on concessions of the local



government units for big operators, the economic and environmental impacts of existing policies, regulations, laws and practices on aquaculture need to be scrutinized.

The agenda and program of research and development activities in aquaculture for the next three years will focus on three major thrusts: improvement of aquaculture systems; expansion of aquaculture options; and reduction of the environmental impacts of aquaculture operations.

The participating institutions implementing these programs are: Institute of Aquaculture-College of Fisheries and Ocean Sciences-University of the Philippines-Visayas; Marine Science Institute-University of the Philippines-Diliman; Freshwater Aquaculture Center-Central Luzon State University; Mindanao State University at Naawan; and the Bureau of Fisheries and Aquatic Resources. This does not however preclude other institutions from implementing programs and projects that are within the identified priorities of the network.

The network claims that the program is an integrated approach with multidimensional components designed to meet the needs of the fisherfolk and address the long-term goals of sustainable development of the fisheries sector and the reduction of poverty among municipal fisherfolk.

Last 2000, the network started projects that are identified as "high impact.". Mindanao State University is

Sustainability...continued

refining the Siganid hatchery and UP Visayas is developing sustainable techniques for prawn farming in mangroves. The UP Marine Science Institute is conducting studies on seaweeds diseases, environmental quality criteria for mariculture sites and sustainable milkfish production. Results of these projects will be available next year.



Not just research, also management

Dr. Susana Siar of the Aquaculture Department of the Southeast Asian Fisheries Development Center, in her paper on resource use in aquaculture, highlights the context in which research and development activities operate. According to her, there is competition in the use of space and water resources at the local level.

"To address the needs and interests of different users and stakeholders, and to avoid resource use conflicts, aquaculture should be placed within the context of coastal resource use management," Dr. Siar pointed out.

And coastal resource management would mean empowerment of the fisherfolk themselves so they can be organized and they can participate in ensuring that the local government enforces fishery laws and regulations.

Research activities will be put to waste if resources upon which aquaculture depends, such as shore waters, fresh water bodies, mangroves, lakes, rivers, reservoirs and agricultural

The tough tilapia

by: Maria Rowena Briones

The Philippines is 9th in the over all ranking of aquaculture production in the world. Indeed, among the fisheries sector in the country, it is also the best performing sector during the last 15 years.

The aquaculture industry has grown tremendously with the onset of hatchery and culture techniques. These developments are fuelled by the need for alternative sources of marine products as our supply from natural fish stocks is nearly depleted and yet the demand is continuously increasing due to increase in human population.

Tilapia is an introduced species in our inland waters. The first strain, *Oreochromis mossambicus*, was introduced in 1950. To date, there are five additional strains *Oreochromis aureus*, *Oreochromis niloticus*, *T. zillii*, red tilapia and the genetically improved farm tilapia. They contributed in the development of a strong aquaculture industry since 1972.

At present, tilapia dominates the fish population in our fresh water areas. This is mainly because of its capacity to reproduce and grow quickly, and to survive in a low oxygen environment such as stagnant ponds and fish pens. They are also known to be disease-resistant and can

adapt to low quality inputs and varied environmental conditions.

Aside from the high growth rate and adaptability of tilapia, one of the reasons why its production is gaining momentum is the acceptability of tilapia as a source of protein in the diet of all the social classes in the local and international markets.

However, aquaculture, they say, is a double-edged sword, it solves our economic problems on one hand but exacerbates our environmental problems on the other. This is true for growing tilapia, as inputs are intensified and stocking densities are increased to maximize production and increase profit.

In some lakes, proliferation of tilapia led to the depletion of weak indigenous species. Also, the increase in the number of fish cages and pens in shallow lakes and rivers alter the natural productivity of these bodies of water. The uneaten feeds of tilapia become toxic substances, like ammonia and hydrogen sulfide, for other fish stocks. Too many cages also hinder waves and water current leading to lake eutrophication or the decrease of dissolved oxygen in the water. These conditions are rampant in the lakes of Sampaloc and Mohicop, Laguna, Taal, Batangas and Sebu.

Despite these threats, subsistence fisherfolk consider tilapia as a blessing as it increases their catch and their income.

This is also true for the middle class fish cage and fishpond operators. Because they can afford the inputs needed to increase profitability of the industry, they look forward to tapping markets abroad by venturing on big scale tilapia production.

The government is promoting increased productivity in aquaculture, as any



Cassava foliage: Cheap alternative to carabao feeds

by Rita T. dela Cruz

Cassava (*Manihot esculenta* Crantz) has been an important food source in many developing countries. It's an ideal food-security crop because of its capacity to adapt to unfavorable conditions. It grows even in poor soil and in areas where other crops fail to be productive, and is resistant to drought and pest infestation.

In the Philippines, cassava tubers are dietary staple and important source of carbohydrate for both man and livestock, and are important cash crop. The cassava tubers also have industrial purposes, particularly as cassava flour, which is now being used as substitute for commercially manufactured flour.

Unknown to many, one of the potentials of cassava farming that hasn't been fully utilized is the use of cassava foliage as animal feeds.

In a recent study conducted by the Philippine Carabao Center (PCC) and the University of the Philippines Los Baños (UPLB), scientists found that cassava foliage could be used as a potential feed for ruminants. The scientists tried to evaluate the biological and economic potentials of processed cassava leaves as feed for carabaos. Headed by Dr. Caro Salces of PCC, the study was conducted at the Center in Ubay, Bohol.

The study aims to determine effective means to detoxify the cassava foliage for animal feeding purposes, to know the effect of processed cassava foliage on the growth of the carabaos, to identify the effect of sulfur feed supplement on the growth rate of carabaos that were fed with cassava foliage, and to determine the profitability of integrating livestock in a cassava-based farming.

Detoxifying the poison in cassava

One limiting factor in using cassava as animal feed is the presence of potential toxic concentrations of cyanide or hydrocyanic acid (HCN). For human consumption, the toxicity of cassava is resolved by cooking. This is the reason why it is not recommended to eat cassava uncooked.

Cassava leaves are important source of micronutrients, protein fiber and ash, which are essential in animal feeds but along with these essential

elements is a high cyanide concentration which ranges from 189 parts per million (ppm) to about 2466 ppm depending on the variety.

Using 10 plant samples for this study, the researchers found that cassava foliage has relatively high crude protein, which indicates its potential as mainly roughage or as supplement in the animal diet. In terms of toxicity, fresh leaves have generally higher cyanide content compared to other cassava parts such as stem and petioles. The cyanide content found in the leaves ranged from 86 ppm to 186 ppm. This means that the leaves in its fresh form could cause health problems to animals.

To reduce the toxicity in cassava leaves, the scientists used three processes: wilting, drying, and ensiling. Based on the results, ensiling was the most effective method of detoxification, reducing the cyanide concentration to 80 ppm. The pH content of the ensilaged cassava ranged from 3.5-4.5, making it a good silage material. Ensiling of cassava leaves is usually done a month before the harvesting of tubers.

Effect of processed cassava leaves

A total of 24 carabaos, with age ranging from 2 to 3 years old, were used for the experiment. Included in the feeds were roughage and concentrate, which were given at 75:25 ratio. The feeds were fed dry. The roughage is composed of the ensilage cassava leaves and napier grass. To determine the feed efficiency, the inclusion of the cassava leaves to the roughage were approximated at different levels.

Results indicated that as the content level of the processed cassava leaves were increased, the average



daily gain of the carabaos also increased. The increase ranged from 0.74 kilos to about 0.87 kilos. However, scientists also found some limiting factors in increasing the amount of ensilage cassava leaves to the feeds, one of which is the imbalance intake of essential nutrients. For instance, while the daily crude protein and calcium intake were sufficient, the digestible nutrients and the phosphorus intake were inadequate.

Sulfur as feed supplement

The scientists resolved the problem of imbalance intake of essential nutrients such as the digestible nutrients and phosphorus using sulfur as feed supplement. Sulfur amounting to two grams was added to a kilo of ensilaged cassava leaves. The feeding trial was done on 16 carabaos. Results did not indicate any relevant increase in the live weight and feed efficiency of the carabaos. The average daily gain ranged from 0.90 kilos to 1.02 kilos, which is relatively insignificant. However, the inclusion of sulfur as supplement in the cassava feeding helped decrease the toxin level of the processed cassava leaves.

Source: "Processing of Cassava (*Manihot esculenta*) Foliage as Feed for Water Buffalo" by Caro B. Salces, Bonifacio A. Hingpit, Domingo B. Roxas, Ulysses M. Lustria, Severino S. Capitan, Isabelita M. Pabuayon, and Florina E. Merca, published at the Philippine Journal of Veterinary Animal Science, 2000.

Cashew and cow, anyone?

by Likha C. Cuevas

It started out as a forested area. Then farmers slashed and burned the trees to make way for rice and corn. Later came soil Erosion. This was the situation in Barangay Luzviminda, Puerto Princesa City, Palawan where the land is slightly undulating and Hilly. In 1988, the Agrarian Reform Beneficiaries in Brgy. Luzviminda received an average of one to two hectares of land. These farmers' main crops were rice and corn and practiced one cropping per year. In 1994, the Department of Agriculture Southern Tagalog Integrated Agricultural Research Center (STIARC) conducted a Rapid Rural Appraisal (RRA) and found that there was serious soil erosion brought about by continuous cropping. Even though these farmers knew that erosion was a problem, they were not receptive to the idea of contour farming to lessen soil erosion. The farmers thought that planting permanent crops and hedges along contour lines lessened their area for crop production. Farmers were not also applying fertilizers to their crops.

To solve this problem, Ms. Librada L. Fuertes of DA-ROS Palawan headed a project that integrated crop and livestock to help increase farm productivity and profitability of hilly-land areas.

Four farmer-cooperators trained on contour farming, cattle production, compost-making, and cashew production. Each farmer devoted 0.25 ha of his farmland to this experimental cropping system. After establishing the contour lines of the hilly farmlands, they planted napier grass (*Pennisetum*

Purpureum) and ipil-ipil (*Leucaena leucocephala*) as contour vegetative barrier (used in terracing) for erosion control. Napier grass also served as fodder for the cattle that provided the farmers with extra source of income (milk production) while ipil-ipil served as a source of organic fertilizer.

The farmers planted cashew (*Anacardium occidentale*) as a permanent crop to control soil erosion while glutinous green corn and

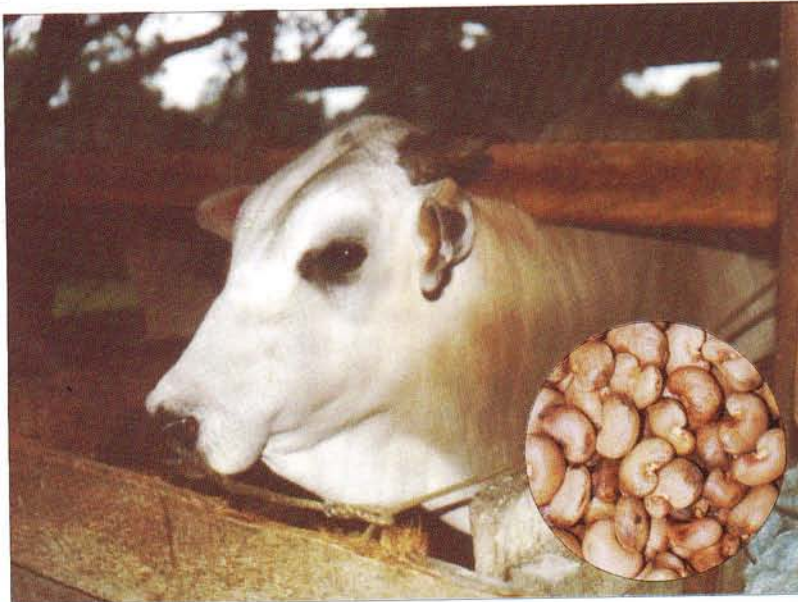
other farmers who would adopt the new farming system. The cattle served as a 'come-on' for farmers to plant the napier grass.

In 1995, the farmers earned a net of P20,708.34 from this experimental cropping system even without an income from cashew compared to a net of only P6,780 from yellow corn by using their own (old) cropping system. Napier grass (about 60%) and partial grazing supported the cattle. Two other farmers not in the program adopted the new farming system.

From 1996-1999, many farmers in the barangay adopted the crop-livestock farming system, devoting 0.25 to 1 ha of their farmlands. There were some who expanded their cashew plantation, adding 1 to 2.7 ha. The farmers earned a net of P53,959 in 1997 from cashew, mungbean-green corn, and cattle while the yellow corn only earned them P22,150. The number of cattle grew from six to 35 from 1996-2001. This increase in Brahman cattle would help upgrade the native cattle in Brgy. Luzviminda. The number of cashew trees grew

from 44 in 1994 to 1,870 in 2000. The cashew weighed 13.54 g per nut during its initial harvest in 1997 and the average production per tree was 1.63 kg, which was sold at P50.00/kg.

In 1995, the recommended fertilizers for mungbean were ammonium phosphate, super phosphate, and muriate of potash. The total cost for these fertilizers was P2,285.00. With soil analysis in 1998, soil improvement was noted. There was no more need to apply inorganic fertilizers as soil fertility improved with the application of organic fertilizer. This was good for farmers who need not spend that amount of money on fertilizers. The farmers also planned to



mungbean were planted in rotation between the contour lines known as 'strips'. Aside from providing the farmers with a source of income, mungbean enriches the soil with nitrogen-fixing bacteria and it is easily cultivated. Organic fertilizer from corn stover and hedge trimmings was applied on the corn and the mungbean.

After establishing the napier grass and ipil-ipil, the DA-Livestock Resource Center (DA-LRC) provided each farmer-cooperator with a Brahman heifer, which was more than a year old. It was stipulated in the contract between DA-LRC and the farmers that the farmers will retain the mother cow while the offspring will be returned to DA-LRC to be given to

What's up with Glory?

by Rita T. dela Cruz

This has nothing to do with Britain's best selling monthly magazine or the critically acclaimed war epic movie of Edward Zwick. *Glory* is the Philippines' first test tube carabao born on 5 April 2002, which incidentally was the 55th birthday of President Gloria Macapagal-Arroyo, hence the name.

Glory's predecessor

In the Philippines, the carabao is the farmer's best friend. Even if there are now farm machineries and other implements, the carabaos still do much of the heavy work for the farmers especially in traditional farming. In fact, carabaos are considered the Filipino symbol for industry and perseverance. The birth of Glory, a genetically superior carabao, could be one triumph for the farmers.

Before Glory came into existence, there was *Maganda*, the first test tube carabao in Southeast Asia, which was also developed by the Philippine Carabao Center (PCC). She was born on 28 October 1996. *Maganda* originated from a fresh *in vitro* embryo and then transferred using a transfer gun to a surrogate mother. *In vitro* is an

artificial environment such as a test tube rather than inside a living organism.

Unlike Glory, the process used to develop *Maganda* is far less advance since fresh embryos need to be immediately transferred to a mother carabao or it loses its viability and die. Because the embryo of Glory underwent the process of *vitrification*, it can be stored and transported from one place to another without the constraint of time and without worrying about the loss of its viability.

Conceiving Glory

Glory underwent the process called "vitrified-thawed *in vitro* produced embryo" which is a first in the field of reproductive biotechnology. This biotechnology was developed by PCC through the project, "*Production of high genetics water buffaloes through the use of reproductive biotechniques*".

The project is supported by the Department of Agriculture (DA), and the Philippine Council for Agriculture, Forestry, and Natural Resources Research and Development-Department of Science and Technology (PCARRD-DOST) in cooperation with

the National Dairy Development Board of India.

Glory was developed in the laboratory of a PCC satellite embryo biotechnology station in Aurangabad, India.

Frigorifico Allana Limited

(FAL), one of the major meat exporters in India provided the ovaries, which were taken from slaughtered female buffalos. Filipino scientists comprising the team in the India satellite station collected the eggs which were then allowed to mature in the laboratory. The matured eggs were fertilized *in vitro* with the best semen from selected bulls in India. The result of such fertilization produced a very high genetic quality of embryo, that of Glory.

Glory came from the egg of a Murrah buffalo calf and the sperm cell of superior bulls from India, which makes her genetically superior over other carabaos particularly in terms of milk and meat production.

Through a simplified method of freezing called *vitrification*, Glory's embryo was transported from the satellite station in India to the PCC national gene pool. The frozen embryo was then thawed and transferred to a surrogate mother carabao.

A glorious moment

The birth of Glory was a celebrated moment for the scientists who developed the reproductive technique that brought her to life. Glory weighed 44 kilos at birth, which is far heavier than the 33-kilo average weight of Philippine carabao babies.

The birth of Glory was also a great leap for the Philippine carabao industry. This technique is a fast way of producing quality carabaos. Compared to other techniques like natural mating and artificial insemination, the technique developed by PCC has a higher rate of success and is much cheaper.

Sources: "Science City's newest test tube carabao named after GMA" by Anselmo Roque October 5, 2001 issue of the *Philippine Daily Inquirer*; "World's 1st Buffalo Calf Born out of In-vitro Embryo" from <http://www.da.gov.ph/news2002/april/april22.html>; "Agriculture: Philippine Carabao Genome" by the Department of Science and Technology S&T Media Service at <http://www.dost.gov.ph/media/article.php?sid=131>



Photo by Philippine Carabao Center

Genetically modified foods

How safe are they?

by Mary Charlotte O. Fresco

The long-standing firestorm of debates, scientific discussions, and media coverage over genetically modified foods obviously revolve around a common issue - *safety*.

It was the same issue that public and various sectors raised when the first genetically modified plant (a tomato with a delayed ripening trait) made its appearance in 1994.

Since then a growing number of biotech crops has been introduced in developed countries and consumed by millions of people all over the world. Reports say that more than 40 varieties of GM crops have been approved for use in the US in the past years.

Why are there questions now on the safety of GM products?

How are GM crops developed?

Genetically modified crops are developed using the tools of modern biotechnology through a process known as genetic engineering. Just like conventional plant breeding, modern biotechnology works on a common goal of producing superior plant varieties with improved characteristics that make them better and more accessible to people. The difference lies in how this is achieved.

In traditional plant breeding, thousands of genes are mixed between two plants. With modern biotechnology, a specific feature or characteristic of the plant is chosen and added to a certain plant. That is why there is Vitamin A enriched rice, a potato with higher starch content, and soybean varieties resistant to chemical herbicides.

There are two primary methods used for transferring genes into another plant genome or genetic make-up. The DNA to be introduced into the recipient plant is coated with tiny particles. Once

coated, the particles are physically shot on to plant cells using a "gene gun". The second method is the transfer of gene from a beneficial bacterium into the DNA of the recipient plant.

Since transferring of genes is involved at all times, some potential risks may also cross the GM foods product line.

Allergens

The issues of allergenicity and toxicity seem to be the public's biggest concern whenever there is a new biotech crop. People fear the possibility that GM crops could contain an allergen that could be accidentally introduced into a food product. Food allergies are adverse reactions to a certain food component that results to an abnormal response of the body's immune system to a specific protein or allergen in foods.

Food experts and scientists deal with this issue by determining which foods and food components could trigger allergic reactions in both children and adults.

In a joint consultation of the Food and Agriculture Organization (FAO) of the United Nations and World Health Organization (WHO) conducted last year in Rome, the safety and nutritional aspects of GM foods were evaluated based on allergenicity.

The experts used an approach called "decision-tree" formulated by the International Food Biotechnology Council and the Allergy and Immunology Institute of the International Life Sciences Institute (IFBC/ILSI) in 1996 when the issue of allergenicity of GM foods was



Bt corn

specifically addressed for the first time.

Using the "decision-tree" approach and some newly-formulated strategies, they carefully assessed the GM foods based on the following criteria: source of the transferred genetic material, molecular weight, products' stability when heated or processed, sequence homology (the similar characteristics in two animals or plants), effect of pH and/or digestive juices, and prevalence in foods.

After a series of rigorous evaluation and testing, they concluded that foods derived from GM crops are considered safe if the source of the transferred genes has passed the evaluation criteria stated above. They also stressed that GM foods must undergo a pre-market allergenicity assessment. This, according to them, gives consumers an acceptable safety assurance.

The International Service for the Acquisition of Agri-biotech Applications (ISAAA) further supported these results by stating that foods and food components known to have allergens are well characterized and documented, so it is unlikely that they would ever be introduced into a GM food. Also, if there are allergenic properties present in GM

⇒ next page

Vinegar is part of every household's kitchen but did you know that this sour-tasting liquid is an effective herbicide for organic farming?

To conform to organic farming standards, the scientists used vinegar derived from fruits (grapes and apples) or grains (malt). Naturally processed vinegar is produced by rotting the fruits or the grains under an anaerobic or "no-oxygen condition". Through fermentation, the sugars from these plant sources are converted to alcohol and carbon dioxide. Through oxidation, the alcohol reacts with air to form vinegar. Vinegar that is prepared from



⇒ page 23

Sources: International Service for the Acquisition of Agri-biotech Application's fact sheet (Are foods derived from GM crops safe?); Evaluation of Allergenicity of Genetically Modified Foods, a report paper of a Joint FAO/WHO Expert Consultation at <http://www.colostate.edu/programs/lifesciences/TransgenicCrops/evaluation.html>

Tilapia...continued

increase in fish production on our part could only come from this sector. Included in the program for the aquaculture sector is increasing the productivity of brackish water and freshwater fishponds, sustainable development of swamp and marshland fisheries and marine sea cages.

Since research in fisheries is a crucial element in the development, management, conservation, and protection of our fisheries and aquatic resource, the National Fisheries Research and Development Institute was created under the Philippine Fisheries Code of 1998 (RA 8550).

Dr. Ruben Sevilleja, director of the Freshwater Aquaculture Center in Central Luzon State University, in his paper on small scale aquaculture and adoption of genetics-based tilapia technology, that he presented in the Agri-Policy Forum disclosed that there are only few research on the structure and characteristics of the aquaculture industry thus they can only surmise who are the main beneficiaries of the growth of the industry are. He emphasized the need for further research on the role of subsistence aquaculture in the Philippines and how farmers can benefit from the latest aquaculture technologies.

This forum was sponsored by the Bureau of Agricultural Research (BAR) and the Philippine Institute for Development Studies. BAR plays a pivotal role in the over all monitoring of research activities of DA agencies involved in fisheries. Monitoring is especially necessary in the trade offs that we do to meet the demands for fish and the limitations of our environment where we draw the resources that make us live.

Sources: Fishery Country Profile of the Philippines. Food and Agriculture Organization Fisheries Department (<http://www.fao.org>); Tilapia and the Environment. (<http://www.american.edu>); Small scale aquaculture and adoption of genetics-based tilapia technology. Paper presented in the 14th Agri-Policy Forum on Socio-Economic and Policy Issues in the Aquaculture sector held last May 6, 2002 by Dr. Ruben Sevilleja; The impact of tilapia fishery and culture in the Philippines: Report on rapid rural appraisal of DEGITA project. Paper presented in the 14th Agri-Policy Forum on Socio-Economic and Policy Issues in the Aquaculture sector held last May 6, 2002 by Dr. Melchor Tayanem.

Regional...continued

educating farmers and farmer groups will give them more control over prices, thereby lowering the price of rice.

Since large portions of some of the regions' fields are considered rainfed areas, water scarcity is another problem that needs attention. Irrigation facilities must be rehabilitated and constructed to insure proper water distribution across fields. Likewise, farmers must be trained on rice-based farming systems so that they are encouraged to plant even during dry seasons. For scientists, they must continue to develop drought-resistant varieties, which can also be resistant to numerous pests and diseases.

In terms of RDE activities, there is a need to intensify promotion and training on the use of new seeds, breed new varieties, develop credit services, and train farmers in handling new technologies.

Addressing farmers' inability to pay loans

For Regions II, III, V and XIII, the main problem is the inability of farmers to pay their loans punctually, which results from the seemingly low profit from rice farming and problems in marketing. Low profit, in turn, is caused by many problems, including seed problems, zinc deficiency in soils, pests and diseases, crop establishment-related problems, low level of adoption of farm and postharvest equipment, and the influx of imported rice.

One cause is the farmers' failure to cope with government protocol on prompt seed delivery and seedling vigor. Oftentimes, farmers are unable to use certified seeds because it is not delivered on time. Another problem is high labor cost due to lack of workers. The region, which still depends mainly on manual labor, also has a problem with

farmers' skepticism towards new technologies. Water scarcity also contributes to low production, which necessitates the immediate rehabilitation and establishment of irrigation facilities. Aside from these, farmers also need postharvest facilities like mechanical drying equipment, and the people should be trained to operate it. Another problem is the region's weak extension, which often hinders the transfer of new technologies to farmers. To make the transfer of technology easier, the regions need to strengthen their farmer groups, and give more market control to farmers. Lastly, the influx of imported rice in the region should also be monitored to give farmers the edge on rice prices. Likewise, instead of promoting IR varieties, the region must promote PSB varieties instead.

Improving the region's rice production would entail re-educating the farmers on the principles behind farming activities so that incorrect production practices would be controlled, if not stopped. Likewise, importation must be regularized and monitored to insure that local farmers are protected.

Some of the RDE activities that can address these needs are promotion of dry seeding and water management practices, strengthening cooperatives and farmer groups, promotion of credit services, and further studying importation policies.

Source: Terminal Report on "A Participatory Approach in Developing the Regional Rice RDE Agenda", Philippine Rice Research Institute, Muñoz, Nueva Ecija



© PhilRice Photo

A round-up of the quarter's events

APRIL

1st national confab on capture fisheries; call for papers

The National Capture Fisheries RDE Network called on all fishery scientists and researchers from government agencies, NGOs, SUCs, students, and locally based institutions to submit papers for presentation in the First National Conference of Capture Fisheries in December 2002 to be held at the UP Visayas, Miag-ao, Iloilo. This event co-sponsored by BAR will showcase the advances made in capture fisheries research for the past seven years. Deadline for submission of abstracts and regular registration was on September 30, 2002.

Region VII researchers' capability strengthened

The Central Visayas Integrated Agricultural Research Center (CENVIARC), in collaboration with BAR, Region VII RDE Network, and Institute for Strategic Research and Development Studies of LSU, conducted the training course on, "Strengthening the Socio-economic Research Capability of Region VII Research, Development, and Extension," at the Bohol Agricultural Promotion Center, Tagbilaran City. Twenty researchers from various institutions from Region VII participated in the two-week training. Participants discussed various aspects and approaches, and actual field practices in conducting RDE and presented their research outputs for critiquing and evaluation.

Project gets nod from external review team

The Bureau of Agricultural Research (BAR) initiated the Rural Intensification and Diversification Project wherein the main goals are the various production systems and expansion of farmers' options for income resources. BAR commissioned the Multi-Sectoral Consultants Multi-Purpose Cooperative (MSCmpc) to conduct a

feasibility study. The External Review Team rated the feasibility study results based on a criteria that considered food security, productivity and income, poverty eradication, empowerment, and global competitiveness. The project earned an average rating of 69.8% and will be endorsed by Dr. Eliseo R. Ponce to the DA Clearinghouse.

New R&D budget scheme rationalized

The Department of Budget and Management (DBM) met with all DA R&D agencies on April 23, 2002 and discussed the rationale for the budget reform proposal by BAR. The proposed budget reform that follows a new version of budget allocation, which is a functional scheme instead of the commodity-based scheme presently implemented. In the functional scheme, allocation of budget is itemized according to R&D functions, regulatory functions, and programs.

ITDI gets BAR's institutional support

The Bureau of Agricultural Research (BAR) pledged an institutional development grant of P670, 000 to the DOST Industrial Technology Development Institute (ITDI). ITDI will use the support fund for the procurement of an E-VAL Potentiometer Validation and Monitoring System unit that maintains and monitors quality standards for processing canned and bottled sardines and milkfish.

MAY

CVIARC opens its new information center

The Cagayan Valley Integrated Agriculture Research Center (CVIARC) opened its new technology advance and agribusiness information center in Iligan, Isabela. The information center exhibits new technologies and researches on different upland crops and provides

brochures, booklets, pamphlets that can help farmers. It also has a mini special viewing room that features technology demonstration and clips of various agricultural shows like 'Ating Alamin'.

BAR aids CLSU modernize irrigation facilities

The Bureau of Agricultural Research pledged P300,000 as institutional development grant for the Central Luzon State University (CLSU). The support grant will be used to establish five models of pressure irrigation systems within the campus and these include dippers, micro-sprinklers, and misters that are beneficial to growing plantation crops, fruit and forest trees, vegetables, ornamentals, and lawn grasses. These irrigation facilities will help improve high-value crops grown in greenhouses and the farmers in combating drought.

Regions train on IT needs assessment

The Information and Communication Technology Division (ICTD) conducted an ICT Assessment Training Workshop at the Philippine Rice Research Institute (PhilRice) in Muñoz, Nueva Ecija on April 30 to May 3, 2002. The training workshop, participated in by 14 R&D institutions from Luzon, Visayas, and Mindanao, provided the theoretical framework for conducting IT needs assessment and helped formulate an IT plan. The training aimed to identify the performance levels of the participating institutions in terms of the delivery of mandated services with the existing infrastructure and personnel. It also identified the problems confronting and affecting institutional performance and solutions.

21 from NaRDSAF avail of BAR scholarship grant

The DA-BAR National R&D System for Agriculture and Fisheries (NaRDSAF) Scholarship Committee granted scholarships to 21 research

A round-up...continued

personnel from NaRDSAF institutions all over the country. Eleven of these are for PhD and 10 for masters degree. The grant entitles the scholars to a monthly stipend, matriculation and other school fees, thesis or dissertation support, book allowance, full salary, and other benefits from their mother agencies. The grantees started their graduate programs in the first semester of 2002.

BAR releases P5M for national livestock and poultry R&D center

The Bureau of Agricultural Research (BAR) allocated P5M institutional development support to the Bureau Animal Industry (BAI) to revive its National Livestock and Poultry Research and Development Center (NLPRDC). This counterpart fund will aid the development of four R&D centers that will specialize in small ruminants, cattle, swine, and poultry research. The center is envisioned to serve as the central coordinating body of all the BAI R&D activities in the country. It is located at the 10-hectare BAI land in Tiaong, Quezon and is within the range of the Strategic Agriculture and Fisheries Development Zone. (SAFDZ).

JUNE

NPD has a new head

Dr. Eliseo R. Ponce appointed Dr. Juanito B. Sangalang as the new National Programs Division Chief (NPD) of the Bureau of Agricultural Research (BAR) on June 15, 2002. Dr. Sangalang is an associate professor at the Department of Horticulture, College of Agriculture UP Los Baños. He was detailed at BAR on October 1, 2002 as the acting chief of the Public and International Relations Division (PIRD) and then as the Assistant to the Director for Programs and later as acting head of the Governance and Impact Evaluation and Policy Division.

Barangay nutrition and household food security

The Postharvest, Food Science

and Nutrition RDE Network and the Bureau of Agricultural Research (BAR) conducted the "Barangay-based Approaches to Nutrition Improvement and Ensuring Household Food Security," seminar on June 5, 2002 at the ATI Building, Diliman, Quezon City. The seminar featured presentations from the Nutrition Center of the Philippine (NNC) and Food Always in the Home (FAITH) Program that highlighted community-based approaches addressing the sustainability and political viability of nutrition programs that are also applicable to RDE programs.

BAR sets tone for fisheries research discussions

BAR Director Eliseo R. Ponce delivered the welcome remarks during the International Center for Living Aquatic Resources Management (ICLARM) or the World Fish Center discussion on June 25, 2002 at the Sulo Hotel, Quezon City. Dr. Ponce's welcoming remarks set the tone for the discussion by challenging ICLARM and the Filipino experts to play a catalytic and pivotal role in strengthening the country's fisheries and aquaculture sector. The activity was sponsored by BAR, ICLARM and the Philippine Council for Aquatic Research and Development (PCAMRD).

IPB introduces 11 new hybrid crops

The Institute of Plant Breeding (IPB) introduced 11 new crop varieties they have developed: two corn varieties (IPB 2004 and IPB 2006), four improved tomato varieties (Rosanna, Rica, Assunta, and Ara), an eggplant variety (Tisay), two mungbean varieties (Pag-asa 19 and Pag-asa 21), a cassava variety (Sultan 5) and a sweet potato variety (UPL Sp 16). The new hybrid crops produce higher yield, are pest- and disease-resistant, are easier to cultivate, and have good shelf life. The IPB Germplasm Registration and Release Office approved these crop varieties.



Erratum

BAR Today apologizes for the wrong picture in the article, "Ensuring bruise-free mangoes through the Sigpao," in the January-March 2002 issue. This picture of the sigpao (Model II) is the right one.

Phil. Buko...continued

posed by CCCVd contamination.

According to the researchers, there is no known recorded case of health risks or illness resulting from consumption of products contaminated with CCCVd. The restriction made on our coconut products is mainly due to the marked inferiorities in the quality and appearance of the nuts.

Taiwan promised to lift the ban on our coconut products when the Philippines is certified free of *cadang-cadang*. But researchers admitted that it is not reasonably possible since *cadang-cadang* has not been totally eradicated in the country.

The battle for *cadang-cadang* in the Philippines is far from over. There are studies on *cadang-cadang* disease containment program underway to selectively accredit disease-free areas as sources of coconut exports products (for immediate lifting of the ban) and to trace the spread of the disease and eventually formulate ways to completely eliminate it.

Source: Determination of CCCVd contamination in unprocessed/processed coconut export products (1999-2000), a study conducted by MJB Rodriguez and LP Estioko, Philippine Coconut Authority-Albay Research Center, Banao, Guinobatan 4503, Albay, Philippines. For inquiries contact them at Tel. No. (052) 4846615.

PhilFruits...continued

Plans for laboratory construction for biotechnology, soils, plant physiology, germplasm, seed processing plant and storage, and database/biometrics/statistics are underway. Improvement and expansion of the existing laboratories for crop protection and seed and seedling production are also needed. These are essential for PhilFruits to ensure global competitiveness of fruits in the country.

These initial activities would pave way for PhilFruits' operation in establishing and maintaining Philippine fruit germplasm and seed production; pest surveillance and early warning system; technology generation; and technology promotion. The institution is viewed as an R&D network composed of central experiment station in PhilFruits main office as the nucleus, with commodity-specific and strategically located key research centers in different parts of the country.

With a modernized R&D institution where scientists, researchers, and extension workers convene, the dream of having Philippine fruits around the world seems not far-fetched. ■

BAR's...continued

researches for the past three years. The impact assessment allows BAR to check the return on research investment and, therefore, objectively terminate or refocus projects that are not useful to the stakeholders and the country.

To date, BAR has in place 21 commodity- and discipline-based national RDE networks. Each network has a national RDE agenda and program, which serves as a guide in determining which projects and researches are to be implemented. Specifically, the networks conduct upstream research on the identified needs and problems of their assigned commodity/discipline. Likewise, each network has a lead institution that spearheads its activities and program implementation.

For 2002, BAR aims to provide more than P23 million to the networks to keep them on course. (Thea Kristina M. Pabuayon)

Vinegar...continued

Acetic acid is commonly known as ethanoic acid.

The potency of this vinegar was tested on five major weeds, namely: *common lamb's quarters*, *giant foxtail*, *velvet leaf*, *smooth pigweed* and *Canada thistle*. Using the spot spraying method, the scientists hand-sprayed and uniformly coated the leaves of the weeds with different solutions of vinegar.

According to Dr. Jaay Radhakrishnan, lead researcher of this study, the vinegar was able to "kill several important weed species at several growth stages." He added that, vinegar with 10-20% acetic acid concentration killed 80-100% of selected annual weeds particularly, the 3-inch giant foxtail, 5-inch common lamb's quarters, 6-inch smooth pigweed, and 9-inch velvetleaf.

Results further showed that the 5% acetic acid concentration had different effects on the weeds. However, the Canada thistle, one of the most stubborn weeds in the world, was found to be the most receptive with 100% kill by 5% solution.

These weeds grow along with crops so it is important that the scientists also determine the effects of spraying vinegar to these major crops. The scientists spot sprayed the base of the corn rows and found that the vinegar was able to control 90-100% of the weeds while the corn plants remained unaffected. The scientists informed the farmers that they could also use the broadcast application (applying by scattering) of vinegar to their crops but the process is more expensive compared to band application (applying to a certain portion only).

Aside from being economical, using vinegar as herbicide is also environmentally safe. Farmers can now do away with synthetically processed herbicide that could affect their health.

Source: Press release at ARS News and Information, "Spray Weeds With Vinegar?" by Don Comis of the Agricultural Research Service, USDA, Beltsville, MD. <http://www.ars.usda.gov/is/pr/2002/020515.htm>. For more information you may contact the lead researcher of this study through his e-mail, radhakrj@ba.ars.usda.gov.

Cashew...continued

generate income by making organic fertilizer from napier grass to sell.

Terraces were formed to control the erosion with the help of the hedges, however, there was no technical verification done on the site to measure the amount of soil erosion. According to a study on the management and rehabilitation of degraded hilly land areas conducted in Mabini, Batangas, 19 tons of soil per hectare annually can be lost without preventive measures, like contour farming.

Due to the social acceptability and success of the introduced farming system, the project is intended to be replicated in different communities. The farmers involved in the study formed an association and they are now producing seeds for cashew expansion in Region X.

"This is one of the successful dispersal programs of the DA," said the assistant agriculturist from the Office of the City Agriculturist, Puerto Princesa. Truly, adoption of this crop-livestock system proved to be beneficial to the farmers and to the environment.

Just imagine what cashew, green corn, mungbean, and a couple of cows can do.

Reference: Fuytes, L.L. *Hillyland Farming with Cashew + (Green Corn Mungbean) + Cattle in Luzviminda, Puerto Princesa City, Palawan. 2001. For more information, contact the Palawan Agricultural Experiment Station, Sta. Monica, Puerto Princesa City, Palawan.*

Sustainability...continued

land, are already degraded and therefore, useless.

Ultimately, the sustainability of aquaculture depends on the capability of national and local government agencies and the cooperation of resource users to regulate the use of land and water resources.

Sources: "Whose Water? Whose Space?: Issues on Resource Use in Aquaculture" Paper presented in the 14th Agri- Policy Forum on Socio- Economic and Policy Issues in the Aquaculture sector held last May 6, 2002 at National Economic Development Authority, Makati City Philippines by Dr. Susana Siar; National Integrated Research Development and Extension Agenda and Program for Aquaculture (1999-2004); Collier's Encyclopedia Vol. 2 Mac Millan Education Co. NY USA 1991.