

BIO LIFE

September - October 2006

Vol.2 No.5

RP hosts
10th APEC ATCWG –
Research, Development
and Extension
on Agricultural
Biotechnology Workshop



10th APEC ATCWG RDEAB
Manila, Philippines

Corn me up!

Scientists
developing
popular crop
for biofuel
production



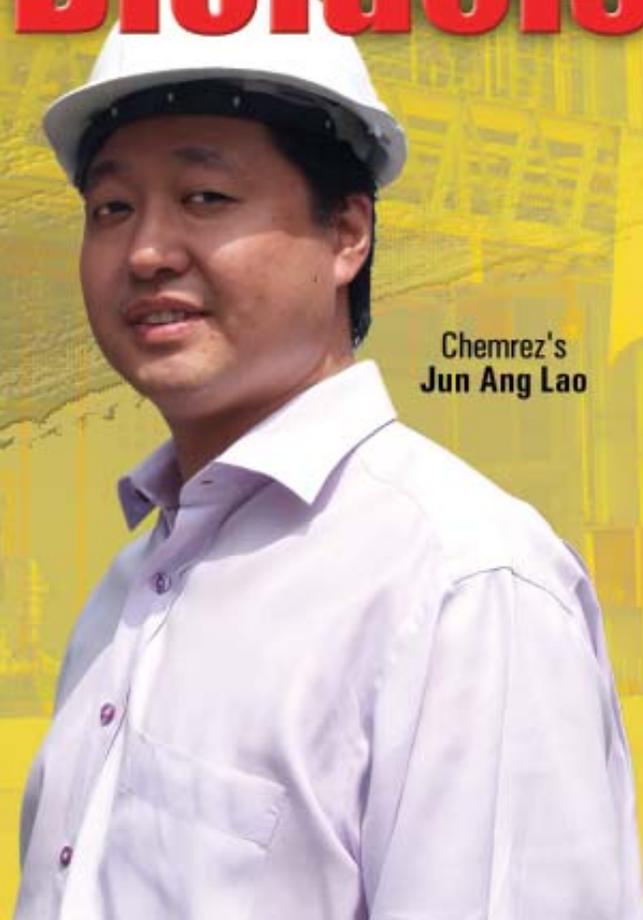
High hopes on **Biofuels**



Biotech to the rescue

Cashing in
on 'green gold'
in Caraga

Energy
from
a tree



Chemrez's
Jun Ang Lao

EDITORIAL

- 3** Biofuels to rev up our national economy

COVER STORY

- 4** High hopes on biofuels
By Joel Paredes and Jonathan Mayuga
- 8** Corn me up!
Scientists developing popular crop for biofuel production

EVENTS

- 10** It's all systems go
RP hosts 10th APEC ATCWG – Research, Development and Extension on Agricultural Biotechnology Workshop
- 12** Third Asian Biotechnology Conference kicks off in Manila

TRENDS

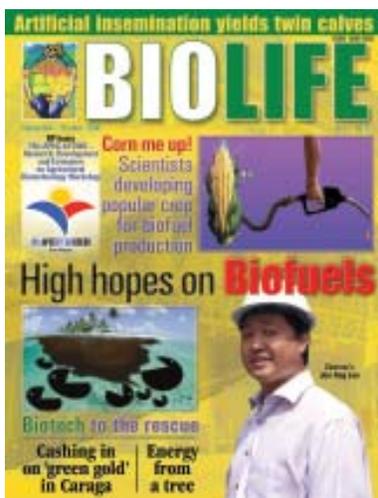
- 14** The road to building the DA Biotechnology Roadmap
Interview with Director Alicia Ilaga, DA Biotech Program
- 16** Seed company developing new hybrid corn varieties

FILIPINNOVATORS

- 17** Energy from a tree

FOCUS

- 18** *Guimaras Oil Spill*
Biotech to the rescue



In this issue

September-October 2006 • Vol. 2, No. 5



- 19** Lots of help from little friends

- 20** Waging war from a filthy jar

- 22** Vermiculture: Bright prospects from a simple technology going organic

FILIPINNOVATORS

- 23** Artificial insemination yields twin calves
By James Earl E. Ogatis

FOCUS

- 24** Cashing in on 'Green Gold' in Caraga
By Jonathan L. Mayuga

- 28** A tribe, a lake, a way of life

TRENDS

- 29** Thumbs up
Provincial, city agriculturists back biotech and its products

- 30** *Jose G. Burgos, Jr. Awards for Biotech Journalism*
In honor of a journalist, to honor journalists

VIEWPOINTS

- 12** An honor for the country
By Alicia Ilaga

- 31** Variety accreditation and biosafety guidelines: a harmony
By Dr. Vivencio Mamaril



BioLife is a bi-monthly magazine published by the Biotechnology Coalition of the Philippines in cooperation with the J. Burgos Media Services Inc. with editorial offices at 2/F The Advocacy House, 8 Sct. Chuatoco St, Quezon City, Philippines.
Telephone (632) 4137293.
Fax No. (632)3728560.

E-mail: info@biotechforlife.com.ph
Website: www.biotechforlife.com.ph

Joel C. Paredes, editorial director • Lyn Resurreccion and Roja Salvador, associate editors
Benjo Laygo, art director • Nanie Gonzales, associate art director • Jonathan Mayuga, chief of correspondents • Dr. Edita Burgos and Abe Manalo, editorial consultants • Leonilo Doloricon, art consultant • Ian Go, staff writer • Menchu Bon, Ressie Benoza and Rhoda Yumang, editorial staff

Our partner agencies are the Department of Agriculture, DA-Biotech Program Implementation Unit, and Technical Committee for Public Awareness and Education of the Philippine Agricultural and Fisheries Biotechnology Program, Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) and the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD)

Our Biotech for Life Media and Advocacy Resource Center is open to the public. It is located at 92 Road 1 corner Road 33, Project 6, Quezon City, Philippines with Telefax No. (632) 5295292.

Biofuels to rev up our national economy

With the Senate finally passing the Biofuels Bill unanimously, the stage has been set for the country to wean itself away from fossil fuels, which are being depleted quickly as large economies continue to gobble up crude oil.

The country has vast potentials for biofuels and this has been realized only after years of painstaking study and debate, taking into consideration the very large amount of foreign exchange that the country shells out for black gold.

It is a step in the right direction and is dictated by the national interest.

In a world that is slowly veering away from the use of fossil fuels, the move represents a realization that the country has renewable energy resources, from ethanol to biodiesel, which could be utilized to prop up the economy.

The country would save more than \$500 million annually from its energy bill if it could retool and use ethanol and biodiesel for vehicles and even for power generating plants.

Out of the one percent biodiesel blend to the 10 percent ethanol blend of gasoline in the market, the country could realize huge savings while freeing the country from pollutants that fossil fuels emit.

Aside from biofuels, the country also stands to gain much by working feverishly to develop biotechnology products, ensuring food security through GMOs in corn, rice, cotton and papaya and other fruits that have many applications in the pharmaceutical, medicinal and cosmetic industries.

These are multibillion-dollar global industries that have been yearning for cheap raw materials and natural ingredients, organic chemicals and a host of other substances that could only be grown and nurtured on the ground.

It is positive news that some Filipino companies have been exporting natural ingredients like papain to Belgium and biodiesel products or oleo chemicals to Japan.

It would be even better if, in the near future, the country benefits the most from its own large inventory of flora that produces safe food and clean energy for the world to enjoy.

As the country grapples to win its war to produce food for its teeming millions, it is also time for us to see the wisdom of profiting from biotechnology and its products quickly, without pain. ■





High bio

Special report by JOEL C. PAREDES

MEET Jun Ang Lao, the man who pioneered in commercializing coco-methyl ester, or simply coconut biodiesel. He may just be the key to the divide between market-led sustainable development and the environment.

Jun Ang Lao was already working in Australia's

booming information technology industry when his father asked him to return home and help in the family's growing business.

At first, the young man was surprised. "We were raised not to expect to be taken in by the family business," he says. Nevertheless, his father Dean wanted him back, re-



Science-researchers work on cocodiesel inside Chemrez's laboratory



hopes on fuels

and JONATHAN MAYUGA

alizing that the company, which he and his brother Leon owned, was growing fast. Jun was being asked to head Chemrez, one of the companies under the D & L Group, which was named after the elder Laos, both of whom were registered chemical engineers who focused on producing inorganic chemicals.

The company was practically low profile since the Angs were not really targeting the retail market then since their clientele were actually giant international and local manufacturers.

However, in 1995, they set up Chemrez, which manufactures specialty chemicals ranging from colorants

to vegetable oil and fats from coconut, Soya and even palm oil for giant food chains like Jolibee and Max's.

The Senate, beating its own self-imposed deadline voted 19-0 to pass on third reading last October 11 its version of the bio-fuel bill requiring a minimum of five percent bioethanol fuel by volume to be blended in all gasoline sold in the country within two years upon its enactment into law.

It also mandates a 10 percent blend of bio-ethanol gas sold at pump stations within four years upon its effectivity.

In passing the law, Senate minority floor leader Aquilino Pimentel Jr. said energy experts expect that a 10 percent mandated ethanol blend can reduce the country's gasoline importation by as much as 100 million liters annually, which will translate into a \$100-million savings in foreign exchange yearly or at least \$1 billion in 10 years.

The bill also promotes the importation of machinery and equipment to be used exclusively for the production of biofuels, by exempting it from import duties for a period of five years from the date the companies were accredited by the Department of Energy (DoE).

Biofuels, on the other hand, has zero specific tax.

To boost production of biofuels in the country, it mandates government financial institutions (GFIs) like the Development Bank of the Philippines (DBP), Land Bank of the Philippines (LBP), Quedancor and similar agencies shall accord high priority to financing entities engaged in the production, storage, handling and transport of biofuels, including the blending of biofuels with petroleum.

As its new operations manager, Jun Lao, managed to meet with officials of Allied Pacific Corp., a Tokyo-based firm promoting biofuels in Japan sometime in 2001. The Kyoto Protocol on clean air was just signed, and Japan had already realized that its fuel consumption was going up, along with its production.

"The Japanese came to us telling us about the potentials of biofuels," recalls Ang, whose company had been exporting products to Japan as early as 1986.

He was convinced on the prospects of biofuels, not only because it had the potentials in the international market, but also because biofuels promised to bring down carbon dioxide.

Although the Japanese company gave them the motivation, Ang says the commer-

cial venture was purely Chemrez's initiative.

Ang says oil companies have also admitted that prices will hold their level, and go even higher. "There are not enough refineries to refine what you call the sour crude oil. What we are refining now is sweet crude oil, which is low in sulfur that we get from Saudi Arabia. The sweet crude oil is basically fine, but the new source of oil is processing sour crude," he says.

Ang says that it won't be easy for oil companies in these new oil refineries.

Chemrez's chief financial officer Francis Calauag, explains that oil has become a "geopolitical commodity."

"You have so many sources of tension that can affect the supply. Just look at the United States and China. They will pull in whatever oil is in the market," he says.

Coconut oil was Ang's choice. "We al-

ready have a product for 25 years, and we just changed the specification, made it tighter for fuel use and started shipping them to Japan," he says.

He also adds that coconut, compared to soy or palm oil, has a higher value not only because it is cheaper, but also with its unique quality given its chemistry. "Coconut oil allows you to have a lot more chemical formulation possible," he says. "All these years, we are pushing farmers to plant but we have been noticing that production is getting lower. If you have a sudden demand for coconut oil, there will be a demand pull. We are not pushing the farmers this time since we know they have a reason to produce more."

Highly processed coconut biodiesel also has a cetane number of 70 and an oxygen content of 11 percent provided by nature that enhances combustion. Cetane number



Chemrez's Jun Ang Lao: Cocodiesel is a perfect diesel.



**“Today, biodiesel, particularly coco diesel in the Philippines for that matter, is emerging as a need rather than a want.”
– Calauag**

is simply a measure of combustion efficiency fuel much like octane for gasoline. The higher the level of cetane, the better combustion efficiency and acceleration response. The oxygen content, on the other hand, serves as a combustion buster.

Compared to other raw materials, coconut provides a wide distillation—or volatility – range that gives good cold startability.

Bright prospects

Today, at least six companies have also ventured in coconut biodiesel, but Chemrez continues to lead the emerging industry. Cocobiodiesel is only one of very few products –or- technology – in the Philippines that qualifies for carbon credit trading.

“If you look at it, the demand is there. The first country that would come in deserves to enjoy it,” says Ang. Chemrez has been sending their bioactive product in Japan for test marketing for the past four years now.

Since they came out in the market, Chemrez has been exporting 80 percent of Bioactive to Europe and Japan. Europe has already set a five-percent standard for biofuels, while Japan is already on its way to making it a 10-percent blend.

Ang, however, says that he would prefer maximizing their efforts for local consumption. Chemrez plans to double its daily production of 150,000 liters of coconut biodiesel, with the completion of its excellent processing plant at the company’s seven-hectare compound in Pasig.

Government is already fast pushing for a law that would require one-percent biofuel

by volume to be blended in all diesels sold in the country, as well five-percent bioethanol fuel for gasoline.

A one-percent minimum blend of cocobiodiesel was found to help restore engine efficiency while enhancing combustion efficiency. Old engines with heavy carbon deposits and clogged fuel nozzles are being cleansed and declogged to restore fuel-spray atomization efficiency.

Ang says all car manufacturers in the country have agreed that up to five per cent blend in bioconconut diesel is allowable and would not affect the warranty of the vehicles. Other countries he says are already going 10- to 20-percent blend of biodiesel.

Ang admits that a five percent blend is their target without disturbing the balance between supply and demand.

Chemrez is aware that there has been growing apprehension that coconut biodiesel had initial resistance from government simply because of the fear that it would affect the supply of coconut, which is now being developed for its food components.

Ang, however, explains that the impact is far-reaching in the promotion of alternative uses of coconut. Aside from being in demand by the food industry, coconut has been in demand not only as an alternative and renewable fuel but is also required by the petrochemical industry, particularly for making soaps and detergents.

Francis A. Calauag, who joined Chemrez barely six months ago, says biofuels are a natural outcome of the company’s business.

“We have been processing coconut into

various oleo chemicals for soap and detergent industries. As opposed to petrochemicals from crude oil, which is inorganic, we are dealing with organic chemicals from coconut oil,” he says. Processing of coconut oil uses various types of oleo chemicals, which are properly known as methyl ester and it so happens methyl esters have fuel applications.

It’s a ‘need’ not a ‘want’

Calauag, who describes himself as a “finance guy,” was at the forefront of the call center business in the Philippines after his stint in raising capital for the equity market, with the initial public offerings of Petron and Philippine National Bank (PNB) spicing his corporate track record.

He says there’s a flipside in pushing for the production of coconut biodiesel in the Philippines, aside from its being a major exporter and producer of coconut—the Clean Air Act.

“We are committed under the Kyoto Protocol to remove emissions... carbon emission in the environment,” he says. Beside, Calauag says, joining the company which has been producing oleo oil for 25 years, brings him closer to the ground.

Today, biodiesel, particularly coco diesel in the Philippines for that matter, is emerging as a need rather than a want.

As Calauag puts it, “you can save on mileage, you save dollars. It definitely has an impact on the country’s fiscal position on the international trade. By producing your own biofuels, he said you don’t have to get the dollar to buy crude oil.”

With biodiesel, he says you are not adding carbon emission. “Plant extract carbon from the atmosphere and you are just basically recycling the same amount of carbon into the atmosphere,” he says.

Beside, Calauag says producing coco diesel will not heavily affect the country’s food supply. Instead, it will only affect exports because once local companies start producing coco diesel, exports will naturally go down as local coco diesel producers have more buying power than other importing countries, considering the cost of transportation.

The Philippines, he added, produces 1.5 million metric tons of coconut oil a year. “We export two-thirds of that or one million metric tons, hence, the Philippines is consuming 500,000 metric tons for food and agro chemicals,” he said.

“If you go heavily into biodiesel production, you are not going to disturb your food

versus fuel balance. You are just converting some of the exports to the local market for fuel. You are not diverting coconut oil for food into fuel," he said.

Calauag says producing coco diesel will naturally increase farmers' income because coconut will become more valuable.

The main beneficiary of producing coco diesel is the transport sector, he says, noting that coco diesel is clearer burning fuel. "It would enhance engine efficiency, you get better mileage," he says.

While saying coconut is indeed valuable oil compared to soy or palm, he says coconut has a unique quality given its chemistry.

"Coconut allows you to have a lot more chemical formulation possible. *Isa pang nakakatuwa* all these years we are pushing farmers to plant but we have been noticing that production is getting lower," he says.

He cites the proliferation of coconut lumber and other destructive uses for what has been known as the "wonder tree."

Market-driven product

"If you have a sudden demand for coco-oil, there will be a demand pull. We are not pushing the farmers this time. We now have a reason for them to produce more," Calauag says.

A market is a lot more sustainable if it is driven by the market itself, he says. "It can survive on its own without the assistance of the government."

Oil, he says, is a geopolitical commodity. "You have so many causes of tension that can affect supply."

But produce oil from coconut rather than any other cheaper oil?

A recent study conducted by Asian Institute of Petroleum Studies, Inc. (AIPSI) describes coco-biodiesel as a "perfect natural diesel."

The study conducted by R. S. Diaz and F.C. Galindo

of the ASIAN Institute of Petroleum Studies cites the exacerbating problems in crude-oil supply arising from the conflicts in Iran, Iraq and Nigeria, which continue to cause high inflation of fuel prices in all parts of the world and necessitated a more determined effort to fast-track the development of environment-friendly alternatives and indigenous sources of energy.

After five years of extensive laboratory tests and analysis as well as field tests, the Philippines is much ahead of its neighboring countries in coconut diesel technology.

Coco diesel is better than all other diesels derived from vegetable oil because it has more features.

Coco diesel, the study noted, contains two main unique features not present in any other biodiesel.

First, it is 91 percent saturated or just nine percent short of the ideal diesel profile, giving it excellent oxidation stability.

Second, at least 62 per cent of coconut biodiesel comprises medium saturated carbon chain, giving it lower ignition temperature for cleaner combustion, higher solvency and detergency value for cleaning and declogging action, and better front and volatility for good gold startability.

The study says coco biodiesel can jumpstart the "green gold" economy in Asia, particularly in the Philippines (in lieu of black gold) as a companion to its fledging natural gas industry.

When blended with ordinary diesel, it restores fuel system and engine efficiency. Old engines with heavy carbon soot deposits and with clogged or partially clogged fuel nozzles will be cleansed and declogged in a short period of time to restore fuel-spray atomization efficiency, the study says.

Coco biodiesel or coco diesel also enhances combustion efficiency because its oxygen content, lower distillation temperatures and high octane number will enhance cold startability, accelerate response and trigger excellent power.

Ang says that coconut biodiesel is actually "bigger" than the standard commercial diesel, being biodegradable and non-toxic.

Calauag says that if a tanker using biodiesel sinks as what happened in Guimaras, there will definitely be no oil spill to clean. He then laughs and says "the worse that can happen is for the fish to have diarrhea."

Right now, there also has yet to be coconut biodiesel factories outside the country.

Ang says that cocobiodiesel is one Philippine product that has surpassed international standards. "This is one area that we can prove," he says.



Corn

Scientists

CORN is a very popular crop. Farmers love it because it is easy to grow.

Regarded as the third most important crop next to rice and wheat, corn is popular even among children.

Snacks such as the popular "Boy Bawang," "Niknok" or your ordinary crunchy corn bits called "*kornik*" are obviously byproducts of corn.

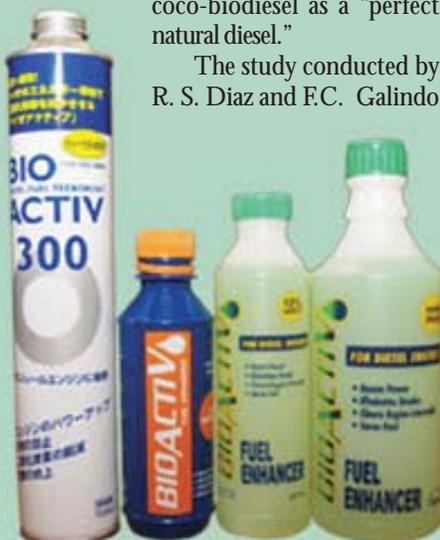
And who doesn't crave for that delicious Japanese sweet corn which can be bought at only P10 to P15 along Katipunan Ave.?

Grill it or simply steam it and spread it with butter margarine and presto, it becomes a filling *merienda*. Every morning, children wait for their favorite breakfast – the *binatog*.

Those who go to the theaters, meanwhile, always ask for a bucket of popcorn to go with their regular or extra large soft drink – the best way to enjoy watching movie.

But what makes corn more important is the fact that corn is used as a main ingredient for feeds.

Without corn, the poultry and livestock subsector will not flourish.





“A biofuels act will be a big boost. Farmers will be lured to plant more ethanol-producing crops like corn and investors will come in,”

– Parma

NEIL DOLORICON

me up!

developing popular crop for biofuel production

But do you know there's more to corn than being feed and food?

Corn is a source of ethanol and a local seed company is coming up with three new varieties, one of which can produce more ethanol!

Currently in the research pipeline of Pioneer Hi-Bred Philippines, Inc., the country's largest developer, producer and distributor of hybrid corn seeds and a subsidiary of the US-based Pioneer Hi-bred International, Inc., are hybrid-corn varieties that are drought-resistant, corn that would increase ethanol yield, and corn with nitrogen use efficiency trait.

Pioneer's Parma said his company is looking at the next seven to 10 years for the technology to be out in the market.

Studies have revealed that a hectare of corn could produce enough ethanol to run a car for some 110,550 km on E10 unleaded.

Ethanol, also known as ethyl or grain alcohol, can be used independently or added to gasoline to cut down on polluting emissions with energy comparable to that of gasoline.

The rapid depletion of fossil fuels and their fluctuating prices in the world market

has prompted the development of indigenous energy sources.

Ethanol promotes sustainable energy production.

Corn is rich in starch or carbohydrates, which means it can be used as a raw material for the production of ethanol.

Ethanol, combined with gasoline, raises octane levels and makes cleaner-burning fuel.

Corn ethanol-producing companies in the United States are interested in investing in the Philippines and the government sees this as an opportunity to increase farmers' incomes and reduce the country's dependence on fossil fuels.

Corn ethanol is a sunrise industry in the United States.

About 85 ethanol plants are now operating in the US, mostly in the Midwest, and more are being built. Half of the plants are farmer-owned.

Ethanol production in the US hit a record 3.41 billion gallons in 2004, up 109 percent from 2000 and there are some 3.5 million "flexible fuel" vehicles on America's highways that can run on up to 85 percent ethanol (E85).

Some ethanol-producing firms in the US are interested in putting up plants in the Philippines, provided there is a biofuel-friendly policy in place, and there is adequate supply of raw materials for production.

Pioneer is pushing for the development of corn ethanol and is keen on developing a market for the product.

However, to ensure that the country meets its targeted ethanol supply in the next five to 10 years, the agriculture sector must raise productivity to meet demand and have a surplus.

A hybridization rate of 15 percent per year by the end of 2008 will ensure enough corn supply to meet local demand as well as supply ethanol production, Parma said.

Corn ethanol can also help reduce the country's dependence on fossil fuels and save on foreign exchange.

With the skyrocketing price of oil in the world market, it becomes necessary to develop alternative sources of energy like biofuels. However, Parma said there is a need to create a right policy environment.

“A biofuels act will be a big boost. Farmers will be lured to plant more ethanol-producing crops like corn and investors will come in,” Parma said.

The Pioneer executive claimed that the Philippines' annual gasoline consumption is four billion liters, 96 percent of which is imported.

Corn, a major crop as 2.5 million hectares are devoted to it by a million farmers, has a lot of potentials.

The government is promoting hybrid rice and corn as they yield more.

The recent introduction of the pest-resistant *Bacillus thuringiensis* or Bt corn improved farmers' yield more, with many harvesting between four and five metric tons per hectare while others get between nine and 10 metric tons of corn per hectare. This assures them a net profit ranging from P50,000 to P60,000 per hectare.

With the production of corn for ethanol production, the price of corn specifically planted for the purpose is expected to go up, providing farmers better incomes – while keeping corn for food and feeds affordable in the market.

Parma said only 25 percent of the total corn area, or 600,000 hectares in the Philippines, is planted to hybrid corn varieties.

With 1.8 million hectares still available for hybridization, the Philippines is likely to achieve corn self sufficiency. The country may be able to produce corn solely for ethanol.

Soon, instead of telling the gas station attendant to fill me up, we might as well say corn me up! – *Jonathan L. Mayuga*

It's all systems *go*



 **RP hosts 10th APEC ATCWG – Research, Development and Extension on Agricultural Biotechnology Workshop**



THE Philippines will play host to the 10th Asia-Pacific Economic Cooperation (APEC) Agricultural Technical Cooperation Working Group (ATCWG) - Research, Development and Extension on Agricultural Biotechnology (RDEAB) Workshop to be held from November 5 to 12 at the Diamond Hotel in Manila.

Department of Agriculture (DA) Secretary Arthur Yap will deliver the keynote address on November 5 to welcome foreign and local participants who will represent APEC-member economies, including the Philippines, Canada, United States, Peru, South Korea, China, Federation of Russian Republics, New Zealand, Indonesia, Australia, Brunei Darussalam, Hongkong, Japan, Malaysia, Mexico, Papua New Guinea, Singapore, Taiwan, Thailand, Vietnam and Chile, which hosted last year's event.

Around 30 officials and scientists from the DA and its attached agencies will attend the workshop, together with at least 50 foreign delegates.

Undersecretary Segfredo Serrano, the DA undersecretary for policy and planning,

will head the Philippine delegation along with Assistant Secretary Romeo Recide and Director Alicia G. Ilaga, this year's RDEAB project overseer.

This year's APEC meet envisions the exchange of information and knowledge among member-economies on emerging research, extension, development issues and technologies on agricultural biotechnology.

Director Alicia Ilaga, head of the DA Biotechnology Program Implementation Unit, said through the workshop, APEC member-economies hope to forge commitments in capacity-building and resource sharing.

Ilaga said technical workshops and discussions on technology development and regulation towards harmonization – and the commercialization of latest technologies and products of biotechnology will be organized in view of the critical need to identify opportunities for technical cooperation.

Ilaga said a battery of dynamic and renowned experts in biotechnology and leaders will present and discuss relevant topics during the week-long event.

"We are very excited about the

upcoming workshop, because through this meeting, we hope to put into action what we have pledged during the 9th APEC RDEAB meet held in Chile," said Ilaga.

The APEC ATCWG was formed as an APEC ATC Experts Group in October 1996 to serve as a forum for member-economies to enhance the capacity of agriculture and related sectors.

The APEC Ministerial Meetings have recognized the important contribution biotechnology can make in expanding agricultural production, and affirmed the importance of transparent, science-based approaches to the introduction and use of biotechnology products.

In the process, the APEC subgroup on RDEAB has been tasked to enable cooperation in relation to science-based assessment of biotechnology products, technical cooperation, transparency and information exchange, and capacity building. Such work takes into account consumers' interest in food safety and environmental quality while realizing the potential benefits of biotechnology.

The workshop consists of two parts: Part I: APEC RDEAB Workshop on

Agricultural Biotechnology Main Session at the Diamond Hotel in Manila (November 06-09)

Session A: Setting the Stage for Biotechnology Development

Session B: Global Status and Regulations of Emerging Agricultural Biotechnologies and Opportunities for Technical Cooperation

Session C: Breakthroughs on Philippine Biotechnology Information, Education and Communication Campaign and Advocacy

Part II: Science Tour at the Science City of Muñoz, Nueva Ecija (November 10) and Capability Building Session on "The Basics and Issues Involving Genetic Resources, Biotechnology and Intellectual Property Rights: A Developing Country Experience" at the Diamond Hotel in Manila (November 11)

According to Ilaga, the workshop aims to provide a forum for the exchange of scientific knowledge related to agricultural biotechnology, including risk assessment and risk management.

It aims to provide a forum for information exchange among member-economies to enable them to share experiences and hasten technical cooperation between member-economies.

Participants are expected to discuss emerging agricultural biotechnology issues, the global trends in biotechnology.

Interactions with stakeholders to encourage effective communication and enhance public awareness and understanding of agricultural biotechnology are also among the workshop's goals.

During the APEC meeting, participants will have a chance to visit the country's research centers.

The Science City of Muñoz in Nueva Ecija, 147 kilometers north of Manila, will be the first to be visited.

The Science City of Muñoz is the only of its kind in the Philippines, and second in Asia after the Tsukuba Science City of Japan.

Today, the city plays host to 16 Research and Development Centers of Excellence that have been generating breakthroughs in science and technology.

Delegates to the 10th APEC RDEAB Workshop are also scheduled to visit the Philippine Rice Research Institute (PhilRice), the Philippine Carabao Center (PCC), the National Freshwater Fishery Technology Center of the Bureau of Fisheries and Aquatic Resources (BFAR-NFFTC) and Freshwater Aquaculture Center of the Central Luzon State University (CLSU).

PhilRice, which is located in Barangay Maligaya, is developing and promoting several technologies and systems to help increase the country's rice yields and reduce the cost of rice production.

One of its major biotechnology research projects is the Vitamin A Rice, the so-called Golden Rice.

Meanwhile, the PCC, created in 1993, breeds and cross-breeds, through artificial insemination, *Murrah buffaloes*, a species of the dairy type from India, Bulgaria and some countries like North and Latin America.

This type of buffaloes can produce an average of eight liters of milk daily in 300 days. Top-performing ones can produce between 12 liters and 15 liters.

Meanwhile, the BFAR-NFFTC highlights the two best breeds of tilapia developed through rigid testing in diverse agro-climatic conditions of the country.

The participants will also have a chance to visit the 658-hectare main campus of the CLSU, a globally admired institution for higher education that has, in recent years, emerged as an agro-tourism center for Luzon. The university has also developed a technology on genetically improved tilapia.

Ilaga said strengthening existing partnerships among member-economies is a primordial concern of the participating economies.

"It is time we move on. Last year, we discussed issues and concerns on biosafety and biosafety protocols. Now, we plan to put to work our commitments for mutual cooperation to help in the development of GMOs intended to solve agricultural problems specific to each country," she says.

According to Ilaga, this year's event is a very important undertaking since the existing commercial GM crops are intended for farmers in advanced countries and developed by large multinational cooperations.

Throughout the entire meet, Ilaga said developing countries like the Philippines will present its counterperspective on emerging issues and concerns on agricultural biotechnology, including intellectual property rights.

Ilaga says this year's APEC meet hopes to trigger a faster exchange of technologies and products, and pave the way for more harmonized GMO regulation that would foster better trading relationships between member-economies based on shared technology and developed products. ■



An honor for the country

I'VE been deeply involved in biotechnology since I was tasked to head the Biotechnology Program of the Department of Agriculture.

I get more deeply involved in the program every day as I meet people who share my experiences and passion for biotechnology. And it keeps me going.

I must say that the experience of pursuing such a government program is all worth it, considering the anti-GMO sentiments, the war being waged by some sectors, the general negative perception of biotechnology as an emerging science in the Philippines, the budget constraints, the tiresome trips from one place to another.

And we are moving on. Now, we are pursuing the commercialization of biotechnology more than simply popularizing genetically modified organisms.

Indeed, biotechnology opens up a lot of opportunities. Opportunities that do not knock once, but as many times as the products and technologies that have been researched, developed and discovered in science laboratories.

My experience in Beijing, China in 2003 when I participated in the Asia-Pacific Economic Cooperation on Research, Development and Extension in Agricultural Biotechnology (APEC-RDEAB) meeting was one of the most rewarding. In that APEC meeting, I was able to forge a partnership with the Chinese developers of Bt cotton, which produces superior cotton.

We have successfully assembled the Bt cotton dossier and it is only a matter of time before the National Biosafety Committee of the Philippines approves for the testing of this superior cotton. It can produce softball-size cotton compared to the ordinary variety that produces only pingpong ball-size cotton.

In Korea, I was amazed at how Korean scientists perfected animal biotechnology and conducted their research for medicine.

It was during the APEC-RDEAB meet in Korea that the Lead Shepherd Bart Bilmer asked for the Philippines to host the next meet.

Why the Philippines? I was flattered when he said that the Philippines is consistently and actively participating in the APEC meeting and the people who represent the country have shown their commitment to forging economic cooperation.

The 9th APEC-RDEAB meeting in Chile was equally rewarding because participants were enthusiastic about working together to harmonize biosafety policies and options that would benefit participating economies like the Philippines.

The representatives were one in committing their country's support for mutual cooperation to help in the development of GMOs intended to solve agricultural problems specific to each economy.

The development of GMOs requires multi-disciplinary expertise and the Philippines is one country that can greatly contribute to the development of GMOs having our own humble accomplishments.

It is truly an honor not only for the Department of Agriculture, but for the entire country to host such an event. (Director Alice Ilaga of the Department of Agriculture - Biotechnology Program Implementation Unit can be reached at biotechpiu@yahoo.com)



Third Asian kicks off in

THE Third Asian Biotechnology Conference will kick off on November 9 and 10 at the Diamond Hotel along Roxas Boulevard, Manila with close to 200 foreign and local delegates from different Asian countries.

Thirteen experts from the United States, Europe and other Asian countries will speak at the conference to be hosted by the Philippines in coordination with the Research and Information System for the Non-Alligned and Other Developing Countries (RIS) of India.

Organizing the event is the Biotechnology Coalition of the Philippines (BCP) which is chaired by BCP President Dr. Benigno Peczon and University of the Philippines Los Baños professor Dr. Reynaldo dela Cruz.

Department of Science and Technology (DOST) Secretary Estrella Alabastro will deliver the keynote address, while Dr. Nagesh Kumar, RIS Director General will give the inaugural address, discussing the background and rationale of the series of Asian Biotechnology Conferences. Dr. William Padolina, Deputy Director General of the International Rice Research Institute (IRRI) will deliver the welcome remarks.

The Philippines, which has been an acknowledged leader in biotechnology policy and a trailblazer in governmental regulations in the region, is also hosting this year's Asia-Pacific Economic Conference (APEC) Workshop.

The conference, with the theme "Biotechnology Opportunities for Developing Countries" is intended to be a venue where major stakeholders including the government, the academe, farmers, business, church, media as well as the international community can discuss emerging issues on biotechnology and formulate strategies that would enable developing countries to use biotechnology as an engine for growth and economic development.

As this year's host, the Philippines aims to harness its potentials in biotechnology in collaboration with other countries and research institutions on specific projects.

The Third Asian Biotechnology Conference aims to achieve specific goals such as

Biotechnology Conference Manila



present updates on the current status and progress of modern biotechnology, share lessons and experiences in the fields of biotech policy and regulatory development, agricultural biotechnology, biomedical and environmental biotechnology, intellectual property rights, bioethics and commercialization of biotechnologies. Throughout the conference, the Philippines aims to identify niches in biotechnology where developing countries can play an active role.

The First Session will tackle topics such as “enabling policies” to be discussed by Dr. Gurinder Shashi, Chairman BioEnterprise Asia, “Challenges for Policymakers” to be discussed by Dr. S.R. Rao, Advisor to Indian Ministry for Science and Technology, “Developed Country Biotechnology Policy to be discussed by Dr. Sharon Weiner, Senior Biotechnology Adviser, United States Department of State (USDS), and Philippine Biotechnology Policy to be discussed by Agriculture undersecretary Segfredo Serrano and Dr. Patricio Faylon, Executive Director of the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD).

The Second Session will tackle the topics on “Biosafety” and “Bioremediation” to be discussed by Dr. Edgar da Silava, Osaka Uni-

versity; Dr. Wendy Craig, International Center for Genetic Engineering and Biotechnology (ICGEB), Dr. Hector Quemada, Program for Biosafety Systems (PBS); and Dr. Ernesto del Rosario, University of the Philippines-Los Baños.

The Third Session, which deals on the Applications of biotechnology, will be spearheaded by Dr. Jaime Montoya, Executive Director of the Philippine Council for Health Research and Development (PCHRD) with Dr. Gurinder Shashi, chair of BioEnterprise Asia, discussing the topic “Potentials and Constraints”; Dr. Nina Bargaza, Professor of Medical Microbiology, University of the Philippines discussing “Edible Vaccines”; and Dr. Filipinas Natividad, Director for Biotech Research of St. Luke’s Medical Center tackling “Diagnostics in Tropical Diseases.”

Dr. Reynaldo Ebor, Executive Director of Philippine Council for Advanced Sciences and Technology Development (PCASTRD) and Regional Coordinator for SEAsia, Program for Biosafety Systems, will lead the discussion on IPR Issues in India to be discussed by Sachin Chaturvedi, a Fellow of RIS; and Bishop Jesus Varela, member of the Board of Advisers of the Biotechnology Coalition of the Philippines, who will discuss “Bioethics.”

The fifth session which will deal on the advancement and prospects in Asian agri-biotechnology will discuss the status of GM crops to be led by Dr. Clive James, Chair of the International Service for the Acquisition of Agri-biotech Applications (ISAAA).

Among the specific topics include the Bt eggplant to be discussed by Dr. Bharat Char, Principal Scientist, Mahyco Research Center, India; Bt corn, by Dr. Jerry Flint, Asia-Pacific Lead, Technology Development of Monsanto; GM Rice to be discussed by Dr. Rhodora Aldemita, Chief Science Research Specialist of the Philippine Rice Research Institute (PhilRice); Drought Resistant Crops to be tackled by Dr. Kiran K. Sharma, Principal Scientist, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT); Virus-Resistant Papaya by Dr. Dennis Gonsalves, Center Director, Pacific Basin Agricultural Research Center; and Dr. Hubert Gijzem, Director, Regional Science Bureau for Asia and the Pacific, UNESCO discussing “Microbial Talent in Natural Systems.”

The conference is an offshoot of the 2nd Asian Biotechnology Conference held from April 7 to 8, 2004 at New Delhi, India and was organized by RIS in collaboration with the Confederation of Indian Industry (CII) and the World Conservation Union.

The World Conservation Union is India’s premier business association that exists primarily to promote an environment conducive to the growth of industry India, while IUCN is considered to be the largest international network working for environmental conservation and sustainable development.

The first Asian Biotechnology Conference was held from January 26 to 27, 2002 also at New Delhi, India. The expansion of the biotechnology industry in the Asian region during the last decade necessitates the need for a venue to discuss various aspects of biotechnology as an engine of economic growth and development.

The series of Asian Biotechnology Conferences aims to harmonize among economies development plans involving modern biotechnology through cooperation. ■

The road to building the DA



“It all started with an honest to goodness assessment of the capacities of the DA and its national network of biotechnology research and development facilities [PhilRice, PCC, SEAFDEC/BFAR, NMIS, BPI, BAI] in implementing their various biotechnology programs.”

This was how Dir. Ilaga recounts how the development of the Biotechnology Roadmap started.

With various biotech projects being developed, the DA saw the urgent need to assess the department's capacities to identify priorities and implement the right strategies, and come up with a roadmap to serve as guidepost for all its biotech projects.

The DA started the process by commissioning a group of experts, headed by Dr. Saturnina Halos, an expert on agriculture and fisheries biotechnology, with Dr. Evelyn Mae Mendoza, expert on plant-breeding technologies and Dr. Rafael Guerrero, an expert on aquaculture and fisheries development. Their task—spearhead the development of DA's integrated 10-year Biotechnology Research and Development (RAD) Program.

The process involved a) assessing DA's national network of biotechnology research and development facilities and finding ways

on how to optimize their existing capacities; b) validating the proposed priority areas in agricultural biotechnology; and, c) identifying feasible targets in the context of global trends and competitiveness.

The four-month long process also involved focused group discussions with R&D personnel, actual visits to R&D facilities and various consultation-workshops with relevant DA agencies and other stakeholders.

Stepping up

The development of the roadmap saw the need to pursue two parallel trends in the DA's biotech program. One, working on and strengthening its capacity in the area of modern biotechnology and taking advantage of our comparative advantage in pursuing projects in the area of traditional biotechnology.

The team of experts realized that modern biotechnology is more of a long-term goal, considering modern biotechnology requires substantial investment and years of research and development and a cadre of well-trained scientists.

Ilaga said the prospect is very promising for agriculture and fisheries, using modern biotech through genetic engineering and the

development of genetically modified organisms (GMOs). At the moment, the Philippines, to cope with the constantly increasing costs of the technologies, need the cooperation of its neighboring countries.

Ilaga was candid enough to admit as far as facilities are concerned, even our most sophisticated research centers are still way behind that of other countries.

Meanwhile, growing global demand for natural ingredients for various applications gives a clear comparative advantage for the Philippines given the country's rich biodiversity.

“Our meager resources can actually cope with extraction and processing technologies needed to maximize our natural ingredients industry to its full potential by creating a cluster of biotech industries,” she said.

Modern biotech processes, she said can pave the way for higher value of traditional Philippine crops.

She said considering the country's available resources, the DA needs to work on its capacities in modern biotechnology, and take advantage of our substantial and sufficient resources to develop a natural ingredients industry capable of carving a niche in the world market.

Biotechnology Roadmap



According to Ilaga, there's a need to step up the program, by turning science into smart business. She emphasized that in developing the roadmap, the team was always conscious of the fact that biotech projects must be commercially viable for adoption by target beneficiaries, more importantly farmers.

While the research and experimentation phase of new biotech projects are necessary, technologies that are proven and tested in DA's R&D facilities must be offered to the public to test their viability and competitiveness. This also bolsters the need for a biotech fund to promote industry development and support government services.

Detours and Crossroads

According to Ilaga, the DA should have a strong political will to implement the roadmap.

To implement the Roadmap, excluding long-term projects, would require P1.6 billion.

So far, she said available resources can only finance the short-term needs of the roadmap.

The DA needs P400 million to undertake an accelerated and directed manpower development that will enable the Philippines

“We definitely have a lot more of work to do. But with the roadmap, we also definitely know what to do in the coming years for biotechnology.”

to compete in biotechnology, as well as foresee future developments.

“We should develop a human resource base that is creative, competitive, well-trained and imaginative, to keep up with new developments. In this item, we are targeting to train 200 scientists in 10 years,” she said.

According to Ilaga, there's also a need to set up a biotech fund amounting to P1 billion to promote industry development and support government services. She said the biotech fund would provide venture capital to technology companies involved in developing selected technologies, provide for the

establishment of technology incubators to enhance collaboration between research institution and industries, assist entrepreneurs access to the world market, and bridge biotech R & D.

Next Steps

Ilaga said that they have recently concluded the consultations with concerned DA-attached agencies and they are currently waiting for concrete proposals from their R&D facilities. They are also in the process of popularizing the roadmap to be better appreciated by other sectors and possibly open-up venues for partnership arrangements for biotech projects. Since private institutions are more financially capable in commercializing biotechnology, its applications and products, the DA is closely working with the private sector, to support its programs.

The Road Ahead

Ilaga is quite confident of the prospects facing Philippine agriculture in biotechnology with the help of the DA's Roadmap. She concluded by saying, “We definitely have a lot more of work to do. But with the roadmap, we also definitely know what to do in the coming years for biotechnology.” ■

Seed company developing new hybrid corn varieties

Planting materials ready in the Philippines within 10 years

A leading developer, producer and distributor of hybrid corn seeds is now developing three new hybrid-corn varieties to meet the demand of Filipino farmers.

Pioneer Hi-Bred Philippines, Inc. announced that new hybrid-corn varieties are now in different stages of development and will be ready in the next 10 years.

A subsidiary of the US-based Pioneer Hi-bred International, Inc., Pioneer expects to come up with drought-resistant corn, a corn variety that will increase ethanol yield, and a corn variety with nitrogen-use-efficiency trait.

Jet G. Parma, Pioneer country manager, is confident that the new hybrid-corn varieties will boost corn production and will help the country achieve corn self-sufficiency.

He is also confident of getting the approval of National Committee on Biosafety the Philippines (NCBP), which assesses the safeness of genetically modified organisms (GMOs) and their products before they are released to the environment or approved for commercial release in the market.

Parma said the hybrid-corn varieties will help increase farmers' income the way hybrid-corn farmers who planted Bt corn did since its introduction in December 2002.

In fact, Parma said most of the company's Top 30 Hybrid Corn Farmers Award winners this year are planting Bt corn.

The farmers are able to produce between eight metric tons to 10 metric tons per hectare and earned an average net income between P50,000 to P60,000 per hectare per harvest.

Parma said the three new varieties being developed by the company will make corn farming more profitable, noting that they fit farming in the Philippine setting.



According to Parma, the initiative to develop new corn varieties through the recombinant DNA technology or gene-splicing technology is part of the company's thrust to help farmers, and make the corn industry boom to make the economy grow at the macro level.

He said Filipino farmers are now growing genetically improved corn varieties, with traits that have resistance to the Asiatic corn borer, a variety tolerant to glyphosate-based

herbicide, and a variety that has both characteristics, the company further intends to produce quality seeds with such new traits, taking note of the problems besetting the agriculture sector.

Parma said a variety with drought-tolerance trait is still in the early stage of development. Corn with such trait, he said, fits the needs of farmers in areas where irrigation is poor or where there is no irrigation at all.

Pioneer is working to develop hybrid corn that uses water sources more efficiently. Such variety is expected to perform better even when water is scarce or during El Niño.

With such variety, irrigation costs will be reduced to some extent, while the risk of yield losses due to drought is minimized.

Parma said Pioneer is looking at seven to 10 years for the technology to be out in the market.

Another variety that will ensure increased ethanol yield is also in the early stage of development. This will make corn-ethanol production more efficient, supporting the government's initiative to develop renewable source of energy like biofuels.

"The increase in use of biofuels, like ethanol from corn, in the future will contribute to the government's effort to reduce air pollution," Parma said.

The third variety is expected to efficiently use nitrogen in the air.

Such corn variety will help reduce the use of imported fertilizers thereby, reducing the production cost of farmers. Health risks will be minimal as the use of chemical fertilizers will be minimized. ■

■ TRENDS

RECURRENT oil price surges have forced many countries, the Philippines included, to look at feasible alternative, environment-friendly energy sources like *Jatropha*.

The Philippine Forest Corp. (PhilForest), a corporate arm of the Department of Environment and Natural Resources (DENR), which is battling for massive production of *Jatropha curcas* L., known popularly as *tuba-tuba*, to produce biodiesel for the domestic and foreign markets has found allies in its drive.

Farmers from typhoon-devastated areas in Luzon and in Mindanao recently asked the company to help them propagate the so-called "energy tree."

An organization of agrarian reform farmer-beneficiaries in Mindanao recently met in Davao City and asked PhilForest to provide them the technical skills in establishing *Jatropha* plantations, particularly in logged-over areas and steep hillsides.

In Sorsogon, which was hit hard by Typhoon Milenyo, farmers also asked Catholic priests if they could meet with PhilForest executives and technical men to start their plantations in earnest.

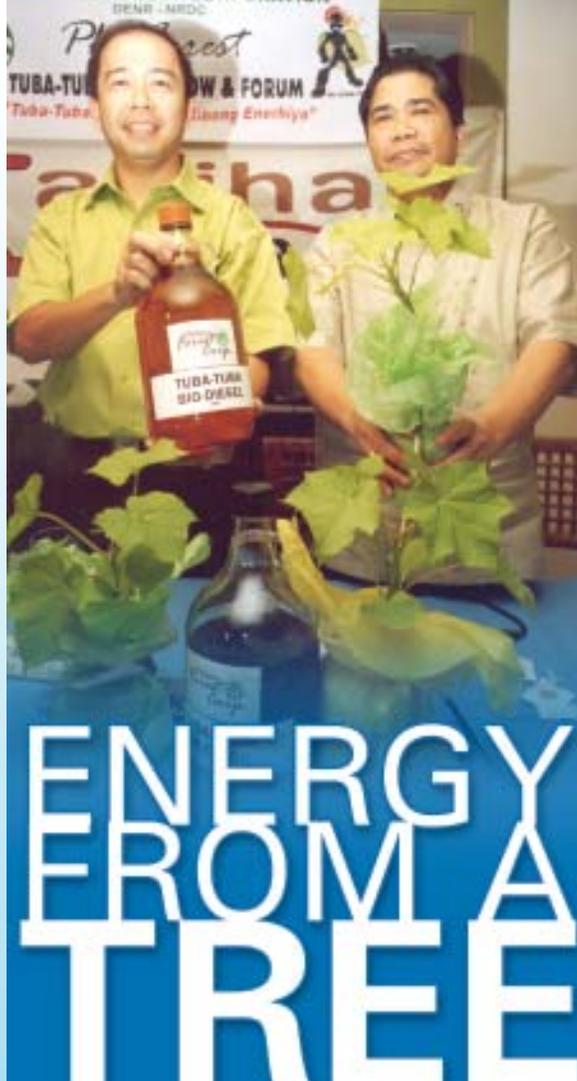
Interest in *tuba-tuba* grew, following PhilForest's announcement that it is establishing 1,800 hectares of *Jatropha* plantations nationwide.

Rice and vegetable farmers in Southern Luzon, particularly those in Albay, Sorsogon, Quezon, Laguna and Cavite, are smarting over the loss of hundreds of millions of their crops to Milenyo, which slammed into the region with winds of 230 kilometers per hour (kph).

Cultivated in the country for the last 400 years following its introduction from Latin America, *Jatropha* seeds have an oil content in excess of 28.61 percent that is comparable in quality to diesel.

Farmers said since *Jatropha* is a hardy tree that survives even in hostile, arid terrain, they are convinced it could help prevent soil erosion and protect other areas planted to high-value crops.

Moreover, PhilForest has been clothed with the authority to allow the use of barren public land by farmers eager to extract oil from *Jatropha*.



This alone, the 1.5 million-strong agrarian reform farmers from Mindanao said, is a very good incentive for them to produce *Jatropha*, which was used extensively in World War II to produce oil for lamps and diesel engines.

Encouraging test results have compelled PhilForest to develop 1,800 hectares of idle land into *tuba-tuba* plantations. Seeds produced in these plantations would then be processed into biodiesel.

Noel Lozada Jr., PhilForest president and chief executive officer (CEO), said there is a big demand for biofuel in Europe and PhilForest hopes to supply that demand through large-scale *Jatropha* oil extraction and processing.

He added that they intend to seek a P150-million loan from the National Development Corporation to finance the *Jatropha* project.

The investment in the project would have a rate of return of more than 22.5 percent and a net present value (NPV) of close to P189.5 million over 10 years, Lozada said.

The projection, according to Lozada, is based on conservative estimates, and the rate

of return on investments (ROI) could even breach 22.5 percent and an NPV of P241 million for the biodiesel aspect of the project alone.

Of the expected P150-million loan from NDC, P100 million would be devoted to the development of the plantation while the balance would be for research to improve the oil production of *Jatropha*.

Apart from crude oil, the pressed cake and oil sediments of *Jatropha* seeds can be used as basic materials for the production of organic fertilizer, laundry and beauty soaps as well as environmentally-friendly insecticide.

Lozada also said that *Jatropha* oil can also be used as fuel for lamps and stoves and even for diesel engines used in hand tractors, threshers and generators.

PhilForest claims that the project could maintain a positive NPV even if it misses its plantation and seed production targets by 20 percent as revenues in the first year of operations would still reach more than P18.5 million, rising to P166.2 million at the end of the 10th year.

Volume-wise, Lozada said, the project could produce 742,000 liters of crude oil on its first year, with output swelling to more than 5.1 million liters a year on the tenth year.

PhilForest said the NDC funding it seeks will come in the form of a straight debt, with an interest rate of eight percent per annum, payable annually with a three-year grace period on repayment on the principal, which will be amortized over the remaining period of the loan. The loan will carry a sovereign guarantee from the Department of Finance (DoF).

The corporation also pointed out that *tuba-tuba* production will lead to the commercial production of a renewable alternative energy source.

While global crude prices have shrunk to an eight-month low of \$59 per barrel as Western powers built up their reserves for the last quarter, analysts say this will only be temporary and prices may again shoot up to \$70 per barrel.

Jatropha produces abundant oil that could be used as a substitute to expensive fossil fuels like gasoline, diesel and liquified petroleum gas (LPG). ■

GUIMARAS OIL SPILL

By JONATHAN L. MAYUGA

THE RECENT oil spill in Guimaras continues to ravage Western Visayas and government is exerting its best efforts to cushion its adverse impact on the ecology and economy of three most severely affected provinces, namely, Guimaras, Iloilo and Negros.

Described as the country's worst oil spill, the Guimaras disaster nonetheless brought to fore the importance of biotechnology as an effective tool for disaster prevention and mitigation, as well as environmental protection and rehabilitation.

The magnitude of the spill, described as overwhelming, caused the government to declare a "a national disaster" and send a distress call to the world.

The government ordered a thorough investigation into the incident to determine what caused the sinking of the oil tanker and determine who should be prosecuted for the calamity.

Economic and ecological disaster

Scientists have sounded the alarm bells about the environmental effect of the disaster even as the economic impact was felt just a few weeks after it happened. Around 30,000 people have been affected so far.

At least 300 families have been relocated to safer grounds.

Some 10,000 fisherfolk were deprived of daily income ranging from P3 million to P5 million.

Biotech to the rescue

Oil-eating microbes to clean up mess

Between 150 km and 300 km of coastlines are now covered with oil sludge and more than 1,000 hectares of a marine reserve have been destroyed.

Around 1,000 mangroves have been smothered with oil, including that of a marine reserve in Taklong Island. Some sea grass and corals have reportedly died because of the spill.

Experts at the University of the Philippines-Visayas estimated that it would take 10 to 20 years to rehabilitate the affected areas.

Overloaded tanker

The Department of Science and Tech-

nology (DOST) estimated that around 1.3 million liters of oil had already seeped from the sunken MT Solar 1 since the mishap on August 11.

The oil tanker, which was chartered by oil giant Petron Corp. was transporting oil when it sank off Guimaras Island.

Petron already claimed responsibility and asked its insurer, the International Oil Pollution Compensation (IOPC) Fund to help in assessing claims for damages.

The captain of MT Solar 1 blamed bad weather for the sinking but investigation showed the ship was not in good condition and was apparently overloaded.

Environmental activists and affected sectors like municipal fisherfolk are demanding that the government hold Petron and Sunshine Shipping Corp. liable for the disaster.

Helpless victims

The spill is already taking its toll on the poor, whose livelihood depends mainly on the rich marine life of Guimaras Strait.

Men who used to catch plenty of fish now go home empty-handed. Others stopped fishing since people refuse to buy their catch, saying fish caught in Guimaras is not safe to eat.

Women and young children who gather shells have nothing to pick up and sell anymore.

The children of the victims have stopped going to school because of financial prob-

lems.

Worst of all, the oil spill has caused residents to fall sick.

The Department of Health (DOH) had warned against risks posed by exposure to pollution. Hundreds of families had to move at least 100 meters away from the coast.

The spill had already killed wildlife, like birds, turtles and sea snakes.

Dugongs, dolphins, blue crabs, giant clams and other life forms in the Guimaras Strait and Visayan Sea are also threatened.

Racing against time

The government is exerting its best efforts, racing against time to prevent the remaining one million liters from oozing out of the oil tanker.

DOST Undersecretary for Research and Development Graciano Yumul who is privy to the ongoing effort of the National Disaster Coordinating Council (NDCC) said while it is true that the oil spill was a disaster, the government is on its toes.

Yumul recently announced that a P50 million fund was released by the government through the DOST. The amount was part of the P100 million President Gloria Arroyo earmarked for the ongoing rehabilitation of severely affected towns in Guimaras, Iloilo and Negros.

The International Oil Pollution Compensation (IOPC) Fund, Petron Corporation's insurer on oil spill incidents, is set to conduct an international bidding to siphon the oil from the sunken tanker.

Yet, the government is still faced with the dilemma of cleaning up the mess.

Science-based solution

Experts said the government is well-equipped with the technical know-how to deal with such problem, but it doesn't have the sophisticated gadget and equipment to do the trick.

Scientists are one in saying that the best way to clean up the mess is through bioremediation – the safest and most environment-friendly way.

Bioremediation is used for hazardous-waste management. Its treatment, storage and disposal are important because hazardous waste often causes irreversible damage to the environment.

Hazardous waste can be treated by chemical, thermal, biological, and physical methods.

Biological treatment of certain organic wastes, such as those from the petroleum in-



NEIL DOLORICON

Lots of help from little friends

OIL-eating microbes. Many will probably say that this piece is not worth the strain on your eyes. What more is there in oil-eating microbes? Others will then say that this is self-explanatory. Oil-eating microbes. Is there more to their kind?

There is! There is more to these organisms than meets the microscope-aided eye. In terms of being of help in cleaning up the Solar 1-induced oil spill, they dwarf this and that politician's call for inmates and citizens to donate their hair to clean the spill. In terms of being united for a good cause, they are giants.

Even if it is not regarded as a hazardous waste, crude oil cloaks and massacres marine life and causes harmful effects on beaches, rocks, trees, and the entire ecosystem.

The damage may be temporary, but in a country like ours that is perpetually plagued by natural- and man-made disasters, any damage can be regarded as a step closer to Armageddon.

As everybody probably knows, these microscopic organisms are being eyed to help in cleaning the Guimaras mess. If you know that, it's good for you. But do you know what these bacteria are? Surely, not everybody knows that they are called oleophilic bacteria that naturally use oils as food.

Oil is comprised of hydrocarbons. Basically, they are food to oil-eating microbes. They break down the oil to molecule size and increases the surface area. This increase in surface area starts the oxygenation process, reviving the dormant microbes and making them feed on hydrocarbons.

Hydrocarbons have three basic types, straight chains, branched chains, and 6-member rings. Oil-eating microbes break down all three of these into fatty acids or carboxylic acid, which are then further broken down into energy and carbon atoms, which then are used in the citric acid cycle to generate energy.

The oil that has been spilled is now broken down into basic, non-toxic elements - carbon, carbon dioxide, and water.

Oil eating microbes, like us, have requirements to survive. Air, water, and a source of nutrients, and of course, their nutrient source, oil, are necessary.

For successful bioremediation, these microbes need an environment with a temperature of -2 to 60°C, and a pH of 5.5-10. Lack of oxygen, moisture, or mineral nutrients, as well as detrimental concentrations of waste can inhibit the success of oil-eating microbes in bioremediation.

With these factors checked, the microbes can begin cleaning up oil, and hopefully someday, these tiny friends can be tapped to clean our heads, hearts and the mess we have made. ■

dustry, is highly recommended by experts knowing it is a lot cheaper, and it poses no known ill effect to the environment.

To degrade oil, scientists suggest using oil-eating microbes.

The president had asked the DOST to act as data depository apparently to arm the government with the necessary information in case of a repeat of such accident.

A major environmental problem

Oceanic oil spills became a major environmental problem in the 1960s because of the intensified petroleum exploration and the use of supertankers capable of transporting more than 450,000 metric tons (500,000 tons) of oil.

Thousands of minor and several major oil spills as well as discharges from tanker operations are reported each year.

It was estimated that oil released annually into the world's oceans exceeds 1,000,000 tons (907,000 metric tons) (Encyclopedia Britanica 2004).

Oil on ocean surfaces is harmful to aquatic life.

It prevents sunlight from penetrating and reaching microscopic plants, thereby preventing the process of photosynthesis. It also reduces the level of dissolved oxygen.

Crude oil renders feathers and gills ineffective. Birds and fish die from contact with oil.

The immediate environmental effects of oil spills have been readily identified.

Many forms of marine life die, natural habitats are destroyed, and people are eventually dislocated.

Long-term impact

The long-term impact on the ecological system is more difficult to assess.

The government had sprayed dispersants on the spill. However, they do not solve the problem but merely disperse the oil to allow sunlight to penetrate the surface of the sea.

Dr. Perry Ong, a professor at the University of the Philippines-Diliman said residues of oil are still there and it will harm microscopic plants and species. "When it happens, the food chain is broken and we are in big trouble," he said.

There has been no satisfactory method developed for cleaning major oil spills.

Skimming, a technique effective only in calm waters, involves various mechanisms that

physically separate the oil from water and place the oil into collection tanks.

Another approach is to use various absorbents to absorb the oil from the water.

Such is now being done in Guimaras.

To prevent oil from reaching the coastlines, the Coast Guard is using booms with various absorbents such as chicken feathers, rice straw, corn and coconut husks – even human hair.

The problem is how to dispose of those absorbents.

Biotech solutions

The DOST already had a plan on how to degrade oil residues.

Using an improvised bioreactor, water with oil-eating microbes will be sprayed over and over the oil-covered materials until oil is degraded or consumed by the friendly bacteria.

Yumul said the DOST is ready to construct a contained area to be used as an improvised bioreactor anytime that UP Visayas gives the go-signal.

He said most likely, indigenous oil-eating microbes will

be used because it will take several years before the National Committee on Biosafety of the Philippines approves the release of oil-eating microbes that are not indigenous to the environment where they will be released.

Engr. Romeo M. Cabacang, chief of the Microbiology and Genetics Division – Industrial Technology Development Institute said *Pseudomonas aeruginosa* is one of four locally isolated oil-eating microbes that may be used as microbial inoculants.

Pseudomonas aeruginosa, according to Cabacang, was isolated in oil contaminated esteros near the Pandacan oil depot. The microbe is ubiquitous or can be found anywhere and dies easily after consuming oil.

According to Cabacang, they can reproduce the microbe, which can multiply at a rate of 100 percent per 20 minutes.

For its part, the Department of Environment and Natural Resources (DENR) is eyeing to purchase a multi-billion-peso, state-of-the-art equipment from the United States to reproduce oil-eating microbes which it plans to use to clean up the oil slick in Guimaras.

DENR Secretary Angelo Reyes said the Natural Resource Development Corp. (NRDC), a corporate arm of the DENR,

Waging

By IAN GO

NATURE has its way of teaching us as if we were five-year-old kids. One minute we are basking under the scorching sun, building sand castles that go down once the breeze blows or the waters slam against the shore, without much thought about what comes later.

Then winds with devastating speed blows, howls like starving wolves, the landscape changes, the world that we know ceases to exist. Or we do what our nature dictates and, again, we can proudly use our being "merely" human as an excuse.

We commit errors.

A combination of the two can prove to be fatal, if not outright disastrous.

Take the case of the sunken ship MT Solar 1. The ill-fated vessel, loaded with millions of liters of bunker fuel, now lies nearly a kilometer deep in the waters south of Guimaras.

The oil of MT Solar 1 now litters our seas, wreaks havoc on 15 square kilometers of coral reefs, over 200 kilometers of coastline, 1,000 hectares of marine reserves, at least two resort islands and 50 hectares of seaweed plantations.

Chances are, the sludge also affects four birds, three hens, two turtle doves, and dozens of trees, yet Coast Guard officials, like drunks urinating on a blank wall or like pimply teenagers, are clueless on how much oil was really spilled, or is still oozing out from the deep.

As usual, those who should have been responsible are washing their hands. Maybe God had a hand in the horrible occurrence, maybe not. Maybe He will help us clean up the oil, maybe not. But we have better chances if we help ourselves.

This is where bioremediation comes in.

came up with the proposal to reproduce billions of oil-eating microbes to degrade the collected debris in severely affected towns like Nueva Valencia.

According to Reyes, NRDC will ask the oil giant Petron Corp. to help in purchasing the equipment worth \$500,000.

NRDC President Rey Francis Alcosoba said the equipment, which is available only in the United States, can produce oil-eating microbe at the rate of 100 million parts per millimeter.

"Bioremediation could really hasten the clean-up efforts in Guimaras," Alcosoba explained.

Danilo Manayaga, a chemical engineer and a renowned expert in biotechnology said spilled oil can still be salvaged as long as they haven't reached the shores.

war from a filthy jar

As you read earlier, nature has its way of teaching us like five-year-olds. If not for the Solar 1 accident, some of us might not know or care to know what bioremediation is.

Even a five-year-old, or those who already know how to read, will notice that bioremediation is a combination of two words—"bio" short for biological, and "remediation" which means to remedy.

A part of the science of the 21st century, which is biotechnology, bioremediation can be defined as any process that uses microorganisms, fungi, green plants or their enzymes to restore the dignity of the environment absorbing, destroying, neutralizing or making harmless such deadly contaminants as oil. These biological agents render pollutants harmless, reducing them to carbon dioxide and water.

Once the contaminants are degraded, the microorganisms quietly go into the night, dying after consuming contaminants.

Bioremediation depends on either microorganisms native to the site (indigenous) or those that are imported from other locations (exogenous).

Bioremediation technology that employs microorganisms was the brainchild of George M. Robinson, assistant county petroleum engineer for Santa Maria, California, who did much of his work in the 60s by experimenting with filthy jars and mixtures of microbes.

Mr. Robinson's microbe-filled jars produced wonders and from this seedy, gooey lot were born the biological agents that can be deployed

According to Manayaga, president of Secura International Corp., as oil begins to surface after oozing from MT Solar 1, it should be captured and placed in a container.

The mixed oil and salt water will then pass through the membrane filtration machine that can be availed from his company's US-based partners which, in turn, will separate oil from water by their molecular weight.

According to him, using satellite or simple air surveillance should identify area where oil is thick.

"The tanker will act as a mechanical janitor fish. It will suction the oil, then spit back the water, less the oil after undergoing filtration. The bunker fuel oil can still be used," he said.

A US-based company, Manayaga said, can supply part of the system. The machine, he

said, can process 30,000 to 50,000 liters of mixed oil and salt water per hour.

Dr. Saturnina Halos, a consultant for the Department of Agriculture Biotechnology Program said rehabilitating areas severely affected by the spill is also possible using oil-eating microbes.

Certain oil-eating microbes, she said, easily die after consuming oil, which means there is no risk that it will mutate and cause biological problem.

Against contaminants of water and soil. These bacteria actually work on chlorinated hydrocarbons, degrading them and cleaning up the mess left by the worst enemy of the planet—man himself.

Again, like five-year-olds, it may strike us as surprising that bacteria used in bioremediation should possess several beneficial characteristics. They must be able to digest organic waste quickly and completely, without causing odors or noxious gas. They must be non-pathogenic, meaning not causing any disease, and must grow in huge numbers on organic waste.

The treatment of contaminated material at the site is called in situ bioremediation. On the other hand, the ex situ bioremediation involves the removal of the contaminated material to be treated elsewhere. Examples of bioremediation technologies are bioventing, landfarming, bioreactor, composting, bioaugmentation, the introduction of a group of natural microbial strain or a genetically engineered variant, rhizofiltration, the use of plant roots to absorb toxic metals from contaminated groundwater, and biostimulation, the modification of the environment to stimulate existing bacteria capable of bioremediation.

Naturally occurring bioremediation and phytoremediation, or the use of plants to remedy environmental problems, have been used for centuries. Desalination of agricultural land by phytoextraction has a long tradition.

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Tried and tested

According to the DENR, bioremediation and oil degradation has been tried and tested before.

Bioremediation was used in Venezuela to clean up an oil spill last year.

In November 2005, a Danish shipping

Bioremediation, with all its usefulness, is not a panacea that may smother all contaminants. Heavy metals like cadmium and lead are not readily absorbed or captured by organisms. Metals such as mercury may do more harm than good when integrated into the food chain. In these instances, phytoremediation is useful as many plants can bioaccumulate these toxins above their roots, which are then harvested for removal. The heavy metals in the harvested biomass can be further concentrated by incineration.

Genetic engineering, which is also biotechnology, can create organisms specifically designed for bioremediation and holds a lot of promise for environmental rehabilitation.

The most radio-resistant organism known, the bacterium *Deinococcus radiodurans*, has been modified to consume and digest toluene and ionic mercury from highly radioactive nuclear waste.

In areas where excavation is needed to work on cleaning up environmental mess, a number of cost and efficiency advantages come with bioremediation.

Hydrocarbon spills, specifically petrol spills or certain chlorinated solvents that could possibly contaminate groundwater, what can be done is to introduce the appropriate electron acceptor or electron donor amendment. They may significantly reduce contaminant concentrations after a lag time for acclimation.

Excavation, disposal elsewhere, incineration or other ex situ treatment strategies, are costlier and bioremediation reduces or eliminates the need for "pump and treat," a common practice in areas where hydrocarbons have contaminated groundwater. ■

vessel carrying about 550 cubic meters of fuel oil collided with a Liberian vessel near Venezuela's Lake Maracaibo shipping lane that resulted in the leaking of oil from the Danish vessel.

The microbes used are classified by the United States Food and Drugs Administration as "Class 1 food-grade, none-pathogenic microorganism," which means it poses no hazard to the marine organisms in Guimaras.

The microbes feed on oil substance and quickly die once they run out of oil to feed on.

Commercially known as "pristine sea" microbes, the technology makes use of three oil-zapping bacteria namely the *Pseudomonas azelaica*, *serratia mercescens*, and *Xanthomonas maltophilia*.

Experts believe that using oil-eating microbes will do the trick. ■



Vermiculture: Bright prospects from a simple technology going organic

By JONATHAN RONQUILLO

BEFORE 1998, Pamela Henares wanted to do something different on their 18-hectare farm in Concepcion, Bacolod City, to go 100 percent organic. Back then, neighboring farms were all into heavy chemical inputs for their farms, and she knew, from what she read and learned from attending various conferences on organic farming, that there was an environmentally and socially sustainable way of farming. She had a couple of ideas on how to go organic, but was open to learn new and proven approaches, particularly on vermiculture.

Dr. Rafael Guerrero, a friend also from Bacolod and fellow organic farming advocate, was the first to share his expertise on vermiculture. When he visited Bacolod, Pam fetched him from the airport, brought him to the farm to share her plans and picked his brains for some bright ideas. “Raffy [Dr. Guerrero] was eager to help us and even wrote some instructions on some tissue made of recycled paper, and we actually started from there,” recalls Henares.

Later on they were able to get in touch with Ms. Lina Villegas, who at that time was working with the Department of Agriculture, National Crop Protection Program. She was the one who provided them information on the different stages involved in vermicomposting and its applications. Producing biofertilizer from vermicompost got Pam’s interest most, since this was one of the simplest and yet most urgently needed input for her farm.

But Henares knew that consulting with these experts was not enough, so they commenced field testing on their farm. Pam recounts how they started their actual experiments. “*Lahat yata ng pwede naming subukan, ginawa namin, talagang* trial and error yung process. We were looking at producing fertilizers through vermicomposting that can be doable, affordable and can really be within reach of the poor farmers.”

At first they used all available farm waste materials from vegetable and plant peelings,



roots, husks, leaves and dried trunks and branches. They later found out that the best mix for their organic vegetables was pure plant peelings without any leaves or husks. This proved to be effective for vermicomposting and produced biofermented organic fertilizers that has a regenerative effect on the soil and actually increases crop yields.

Since they were also into chicken contract-growing, they also tried vermicomposting using chicken waste combined with rice hull that also proved to be effective. They have tested their self-produced biofertilizer on crops ranging from vegetables like lettuce, tomato, okra and eggplant, fruits like lanzones, santol and guyabano and even on rice.

Because of their successful field tests, the farm was able to go 100 percent organic and was self-sustaining by October 1998. Their organic vegetables, especially their lettuce are currently in demand in Bacolod, and they have also ventured into exporting worms to other countries albeit on a limited scale. She said that their farm has already gone beyond

the usual organic farm since they have also employed 50 regular employees, who derive additional income from producing biofertilizers.

They wanted to share their organic farming technology to more farmers so they decided to organize seminar-workshops that were held on their farm. They would invite farmer groups and organic farming advocates and together with fellow vermiculture and vermicomposting experts, they would conduct on-site workshops and actual demonstrations on producing bio-fermented organic fertilizers.

Henares became an active organic farming advocate and is currently a Board Member of the Negros Island Sustainable Agriculture and Rural Development Foundation (NISARDF). They will be sponsoring a National Conference on Vermiculture this coming November 16.

Problems encountered

According to Henares, there is still limited information available on vermiculture and vermicomposting and much limited

Artificial insemination yields twin calves

By JAMES EARL E. OGATIS

information back in 1998. “ We did not know where and who to ask at that time. Apart from our initial talk with Raffy and Ms. Villegas, it was all trial and error. We had to make all the mistakes,” she said.

But Henares says there is a much bigger problem for organic farming in Negros Island. The government, from the city to the provincial level seems unconvinced about organic farming and its benefits. She said that their efforts in promoting organic farming to be adopted and promoted by the government were met with skepticism. Apart from showing them the dreadful effects that chemical fertilizers do on farms, they even went as far as outlining the possible revenues that biofertilizers can provide the province. But Henares and other advocates are dumbfounded why the provincial government continues to insist on promoting chemical-heavy inputs for farming.

Prospects

While Henares said that they are content with what their organic farm has accomplished, she envisions Negros Island to go organic within 10 years since the prospects for vermi-composting and biofertilizers are bright. She said that with sufficient institutional support, the benefits of organic farming can go beyond environmental protection and can even contribute to positive social impacts.

The government can provide employment to those who will produce biofertilizers. In Negros where sugarcane farmers can hardly make ends meet even during planting season, providing regular employment can make a big difference.

According to Henares, if only the LGUs will adopt vermiculture, specifically vermi-composting to produce biofertilizers, it will: 1) significantly contribute in solving their garbage problems; 2) detoxify the soil, make them naturally fertile to increase yields and incomes of farmers; and 3) provide employment for those who will produce biofertilizers instead of spending scarce government resources on importing chemical fertilizers and high-tech equipment.

Henares and her fellow advocates proved that biofertilizers worked on their farm and can be implemented on a larger scale if only the government will support it. Why it continues to ignore the technology despite its obvious benefits, according to Pam, “is beyond comprehension.” ■

“I am grateful that the artificial insemination program of the Department of Agriculture gives me twin upgraded calves,” 74-year-old Ireneo Naparato, a resident of Barangay Mat-y, Miag-ao, Iloilo quipped after his F1 cow gave birth last March 6, 2006.

Naparato has been raising cattle and carabaos since he was a child. He used the animals in tilling his two-hectare farmland planted with rice and corn. He was very thankful that at this time of his life, he was able to have twin upgraded calves, one male and one female.

According to Cyrus Depamaylo, the Provincial AI (Artificial Insemination) technician assigned in Miag-ao, the mother of the twins was also a product of AI program from the crosses of native cow and Bulgarian Murrah Buffalo semen thus resulting to the F1 breed.

The twin was the fourth delivery of the F1 mother. The first offspring which was three years old was sold by Mr. Naparato for P30, 000.00 at the San Joaquin Livestock Oksyon Market.

“*Ako naga-kumbensir gid sa parehas ko nga mga nagasagod sang baka nga mag -angkon man sang serbisyo sang AI agud mapataas naton ang kalidad sang aton kasapatan,*” (I am encouraging my fellow livestock farmers to avail the services of artificial insemination program in order to upgrade our cattle and carabaos) *Mang Ireneo* stressed.

The twin calves were treated with iron on two to three ml dose per head while the mother was given multivitamins four days after giving birth. Today, the calves are seven months old and display upgraded qualities such as fast growth and big body structure, among others.

Mang Ireneo first knew of the AI services from Juanito Palacios and Benjamin Nuevaespa, both provincial livestock technicians, who introduced the program to the municipality of Miag-ao in the late 80s. They taught *Mang Ireneo* the signs of “heat” among cattle, in order to have proper timing for the AI services. Since then, *Mang Ireneo* constantly watched for signs of the “heating” period such as reluctance to move, raising of tail, allowing other cows to climb on her back and mucus discharge. When these signs are present he immediately informs the AI technician and avail of the program.

Naparato was able send his seven children to school out of his income in cattle raising. One of his children was able to earn a degree in education.

Manuel Porque the Regional AI coordinator said that the birth of twin calves is a breakthrough of the AI program in the region. This is concrete evidence that the AI program is effective in upgrading the native stocks and can counter apprehensions that AI services can result to the death of female cows.

“We need to upgrade our native stocks in order to have quality animals really suited for work, meat and even milking purposes,” added Mr. Porque.

Likewise, Noel Bautista, chief of the Provincial Livestock Division is grateful with the result of twin calfdrop in Miag-ao, Iloilo . He said that the province of Iloilo AI program has serviced 323 cattle and 150 carabaos and has produced 52 cattle offspring and 16 carabao offspring from January to September this year.

“The Provincial government of Iloilo is supportive of the AI program because through this program our livestock farmers can demand higher price for their upgraded animals,” said Bautista. ■



Cashing in on 'green gold' in Caraga

FARMING in the Caraga Region has never been better.

While Mindanao is blessed with favorable weather condition for farming and Caraga has huge water resources, farmers still remain poor.

Farms are not so productive and some farmers tend to merely trade crops and fruits with products brought in by merchants rather than sell them in the market.

In fact, Caraga Region, which is comprised by Agusan del Norte and del Sur and Surigao del Norte and del Sur, is one of the most impoverished regions in the country.

High poverty incidence

The region has the fourth-highest family-poverty incidence among all the regions in the country from 1997 to 2000. Among Mindanao regions, Caraga has the third-highest poverty incidence.

No wonder. The region is noted for its wood-based economy despite its vast potentials for agriculture.

Over the past decades, people depend on the benefits of the logging industry, leaving idle a vast tract of lands supposedly dedicated for food production.

With its rich mineral deposits like iron, gold, silver, nickel, chromite, manganese and copper, it is now being eyed as investors' haven by the mining sector.



Engineer Danilo Manayaga, President and Chief Executive Officer of Secura International, while Agriculture Secretary Domingo Panganiban talks to tribal leaders of the Mamanwa ingredients during a dialogue at the IP Training Center in Jabonga, Agusan del Norte.



nal discusses the economic oppoprunities in biotechnology in the Caraga Region (top) tribe about the DA's livelihood package and the prospects of farming for natural

New opportunities

However, farmers see things differently now.

In fact, investors, farmers and other stakeholders in the farm sector see better economic opportunities in biotechnology.

A recent stakeholders' forum entitled "Economic opportunities in biotechnology in the Caraga Region" has opened up a window of opportunity for farmers to increase their incomes the biotech way and make it big in the natural ingredients industry.

Agriculture Secretary Domingo Panganiban, who attended the three-day stakeholders' forum in Butuan City on September 27-29 at the Northern Mindanao Institute of Science and Technology (NORMISIST), urged the participants to take advantage of the economic opportunities offered by the biotechnology century.

Biotech century

"Biotechnology Century" is now used to describe the 21st century because of the extensive use of modern and traditional biotechnology around the globe.

Farmers, Panganiban said, can cultivate crops whose natural ingredients are in demand in the world market, the same way he urged them to plant hybrid and the more superior pest-resistant varieties of corn popularly known as Bt corn to maximize yield and cut production cost.

The DA chief said the Philippines has 300,000 hectares planted to hybrid corn and areas with Bt corn are expected to hit 100,000 by



A science-research specialist at NORMISIST shows tissue-cultured abaca disease-free plantlet produced at the institute's tissue-culture laboratory

yearend.

Alicia Ilaga, chief of the DA Biotech Program, said natural ingredients are already a multi-billion-dollar industry.

A multi-billio-dollar industry

Modern biotechnology includes pharmaceuticals which has the biggest worth among all other biotechnology industries.

The medicine industry alone is estimated to be worth \$60 billion.

The cosmetics industry is worth \$10 billion, while functional food ingredients is worth \$200 billion.

By farming for natural ingredients, she said farmers can easily increase income because the market is already there.

Food and feed

On the other hand, Panganiban noted that the requirements of the livestock industry for corn has grown because of population growth and the only way to become corn self-sufficient is through hybridization and conversion of regular corn fields into the more productive Bt corn plantations.

The poultry industry is already a P190 billion industry while swine industry is almost a P400 billion industry in the Philippines.

"The food requirement is almost 4.4 million metric tons every year for these two big activities in the livestock industry. Our production is approximately 4.9 million metric tons a year, so we have only half a million tons for the other industries that need corn for producing products that are necessary for domestic use," he said.

The Philippines still needs to supply the requirement of the corn oil industry of approximately half a million metric tons and supply the need of the corn-starch industry which is estimated at 700,000 metric tons a year.

The livestock industry is importing close to 335,000 metric tons of corn, which can be produced in the Philippines. Panganiban said through hybridization and planting of Bt corn, the country can be self sufficient in corn.

The biotech way

Panganiban stressed that applying modern biotechnology in ag-

riculture is the only way to increase production to ensure food security in a country like the Philippines, where food production has been reduced owing to massive land conversions, even as population continues to grow at a rate of about 2.8 percent per annum.

A consortium of biotech companies based in Belgium is eyeing Caraga as the source of its raw materials, specifically papain or enzyme of papaya which is extracted from the latex of the fruit.

Initially, the fresh supply needs of the companies in Belgium will require farmers to plant between 15,000 hectares and 16,000 hectares to papaya, providing farmers an opportunity to make use of their idle lands or maximizing their existing farms through intercropping method.

Secura International, a Filipino biotech company, also offered contracts to farmers to grow plants with and supply it with natural ingredients.

Secura president Danilo Manayaga said he is willing to offer a contract to grow papaya in 50,000 hectares of land to produce papaya latex.

BIONet Caraga

Recognizing the business opportunity of the "biotechnology revolution," participants of the seminars formed the Biotechnology Information and Organization Network (BIONet) – Caraga.

No less than a brother of Agusan del Sur governor Adolph Edgar Plaza, Rolando Plaza, who represented the private sector, was named its chairman.

Members of the BIONet Council led by Dr. Gaudencio Petaclorin Jr. and Edico Allan, representing the academe, Jesus Navarro, another private sector representative, Eduardo Blanco, representing the non-government organizations (NGOs), Ruben Bonaobra, representing farm producers, Leonardo Ocopra and Adriano Bulan representing local government units (LGUs), met the following week to discuss the growth potentials of the region through traditional and modern biotechnology in agriculture in coordination with NORMISIST, a leading biotechnology research center in Mindanao.



Agriculture Secretary Domingo Panganiban examines before signing the 'covenant' supporting and endorsing the formation of the Biotechnology Information and Organization Network (BIONet) in the Caraga Region as Alberto Guevarra of Quedancor, NORMISIST Vice President for Academic Affairs and Research & Extension Dr. Prudencio Salapudin, and Director Alicia Ilaga of the DA Biotechnology Program look on.



Secretary Panganiban with organizers and participants in the Caraga workshop

One of their initial targets is to form the BIONet-assisted papain consortium to crack open the Belgium natural ingredients market. Belgium is the biggest importer of natural ingredients which biotech companies use for various purposes, including medicines and pharmaceutical products.

Leading the way

The provincial government of Agusan del Sur is also supportive of biotechnology.

Max Legado, the provincial agriculture officer of Agusan del Sur who represented the governor, said biotechnology can lead the way in increasing production to feed the expanding population.

He said some farmers have tried to plant, for example, Bt corn, and none has died by eating it, as what some anti-GMO (Genetically Modified Organism) advocates warned before.

"I asked myself, will I die of hunger or will I eat GM products. We need food to feed our people," he said.

Legado said GM products will pass through quality and safety standards before reaching the market for consumption.

He noted that in some countries, GMO products have been commercially used. "Quality of production, and to break markets for our products, are always among the government's thrusts."

Research and Development

Biotechnology is not new in Caraga.

In fact, NORMISIST, which played host to the event has developed and is now mass-producing disease-free abaca and banana planting materials.

Dr. Prudencio C. Salapunid Jr., vice president for academic affairs, and research and extension of NORMISIST, expressed his full support on biotechnology commerce, noting that for its part, the institution is extensively conducting various research and development to come up with improved variety of planting materials like abaca and banana.

NORMISIST was able to come up with disease-free planting materials of abaca and banana through tissue-culture, and was able to develop new varieties of orchids and other ornamental plants.

According to Salapunid, they are sending two faculty members to UP to study molecular biology and biotechnology as part of the institute's research and development agenda.

Scientists and science researchers in NORMISIST are also zeroing on certain commodities endemic to the region, like tree plam or commonly known as *tagum*.

Tagum palm is rich in starch and can be used as prepared food. It can also produce hydrogel, which is essential ingredient of some pharmaceutical products.

Tagum palm is abundant in wetlands like Agusan marsh, which can no longer be devoted for rice or corn, because they are recently declared protected areas.

Through biotechnology, he said they want to make sure that *tagum* is preserved and enhanced for the production of products of high value, which include a very important renewable energy source called biofuel as alternative to fossil fuel.

Financial and technical support

Through the DA, the government is providing technical support to those willing to invest in biotechnology commerce or biocommerce, a word coined to describe the commercialization of biotechnology products.

The Quedan and Rural Credit Guarantee Corp. or Quedancor, a financing institution of the DA, vowed to provide technical, as well as financial support, to help farmers jump start the "biotech revolution" in the region, particularly those wanting to invest in the production of papaya for the supply of latex.

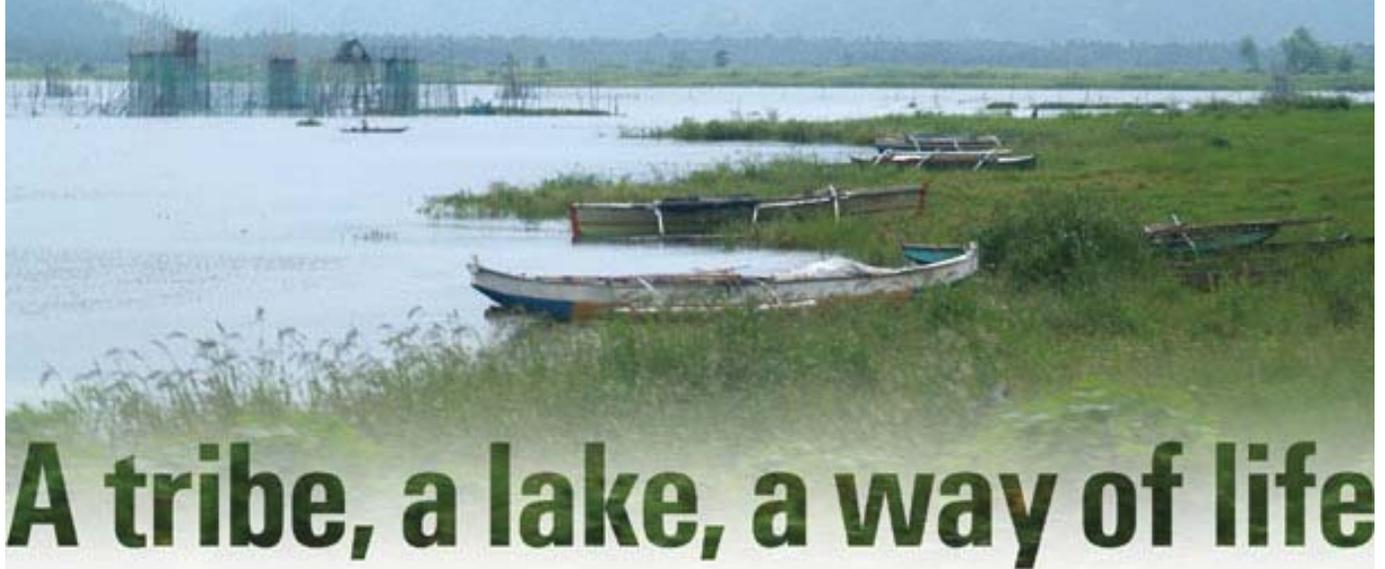
Quendancor vice president Alberto Guevarra assured that farmers will get financial support.

He invited the farmers to gain accreditation by registering their company, corporation or cooperatives with the Securities and Exchange Commission (SEC), the Department of Labor and Employment (DOLE) or the Department of Trade and Industry (DTI) to access Quendancor's funds for Small and Medium Enterprise (SME) program.

A matter of time

The DA Biotech Program is eyeing Mindanao as the center of the country's natural ingredients industry.

Having identified Caraga's potentials to produce crops and plants to supply raw materials for natural ingredients, Ilaga said it is a matter of time before farmers who have expressed their willingness and eagerness to start farming for natural ingredients will finally find a different kind of gold right in their palms. ■



A tribe, a lake, a way of life

DATU Randy Catarman describes his fellow Mamanwa as diligent. But he says food is getting harder and harder to find nowadays in Mindanao. The good news about biotechnology could not, therefore, have come at a better time for them.

Basically hunters, the Mamanwa eventually turned to farming and fishing in Lake Mainit after hunting became increasingly less productive. But to survive, they decided to do it the biotech way—albeit only recently.

Despite its abundance, the lake had been unable to sustain the needs of the increasing number of people.

“We are not lazy people. We cultivate our land and we go fishing in the lake everyday if we had to. Before, it takes us just an hour, even less, to catch a fish; now, it takes us four hours or more and yet sometimes, we go home empty-handed,” he says.

A recent visit of Agriculture Secretary Domingo Panganiban in Butuan City last month to attend a three-day stakeholders’ forum titled, “Economic opportunities in biotechnology in the Caraga Region,” an hour’s drive from the old town of Jabonga, Agusan del Norte, came at a very opportune time for the Mamanwa.

Panganiban met with some 20 tribal leaders led by Datu Randy, who appealed for government support. While saying farming has never been better, they said the food they produce is barely enough for their subsistence.

“What we produce in our farm and what we catch in the lake are just enough for our daily consumption. Although we are not experiencing hunger, our people remain poor,” he says.

They said the great Lake Mainit is no longer as abundant as before.

The Mamanwa were once considered a *Negrito* group, but now are thought to comprise an older group entirely distinct from other Filipino populations. But like all *Negritos*, they have adopted the language of a dominant nearby group. In Mindanao, they are concentrated primarily in Kitcharao and Santiago in Agusan del Norte.

They are quite mobile, and have continually relocated until recent years.

As hunting has declined in importance, the Mamanwa receive some of their subsistence from other groups with whom they have labor arrangements.

But the major economic activities of the Mamanwa are farming and fishing in the lake.

Lake Mainit, the country’s fourth largest lake, has totally become their life support system since time immemorial.

The lake, with a total inland water of 17,000 hectares and, with a depth of 180 meters and an elevation of 37 meters above sea level, the deepest

package of livelihood projects for the Mamanwa. He likewise ordered the DA’s Regional Executive Director Ricardo Regis to immediately craft a proposal on how to provide the Mamanwa with livelihood.

In response, the DA official in Caraga said that initially, 55 goats will be given to the Mamanwa. The DA Region XIII also shouldered expenses for procuring supplies such as the interlink wire for fencing, biologics and pasture grasses as planting materials.

The municipality of Jabonga will provide other needed logistics, as well as the labor requirement to build the goat house.

For its part, Director Alauya Olama of the Bureau of Fisheries and Aquatic Resources-Caraga will provide fish cages for the establishment of a mariculture park in Lake Mainit. He said BFAR’s amazing breed of freshwater tilapia will fit in the lake.

Panganiban also directed DA-Caraga to purchase one pumpboat for the Mamanwa.

More importantly, he urged them to join the biotech revolution and farm for natural ingredients. He noted the economic opportunities in biotechnology, such as supplying the world’s natural ingredients industry, with raw materials.

For instance, papaya, which is traditionally grown by the Mamanwa, can become a major source of income. He urged them to plant papaya and become a major supplier of papain.

The Agriculture chief also urged them to plant hybrid corn and the pest-resistant and high-yielding Bt corn instead of the regular corn they usually grow in their farms, and experience the wonders of agricultural biotechnology.

He promised to help provide market access to make the Mamanwa more economically strong and productive, and more important, food self-sufficient.

Datu Randy was overwhelmed by the package of support they will receive from the government.

More important, he is grateful that the economic opportunities in biotechnology have come their way and that they learned just in time that biotechnology can be a way of life. ■



Panganiban visits Lake Mainit.

lake in the Philippines, provides them food and drinkable water.

The unspoiled teardrop-shaped lake is one of the most untouched ecosystems in the region; it has unique and diverse potentials among the largest lakes in the country.

It has the most pristine waters surrounded by numerous cold and hot springs in its various tributaries. It is home to some rare and freshwater fishes.

The terrestrial ecosystems feature some of the rare and endangered species of palm, orchids, fire orchid and hardwood premium timber species. The presence of wildlife species, such as migrating birds in season, that depend on the lake is attributed largely to the shallow marshland and estuarine areas.

Panganiban, during the dialogue, promised a

Thumbs up

Provincial, city agriculturists back biotech and its products

EFFORTS to popularize biotechnology and its applications to agriculture finally got the much needed boost, with provincial and city agriculturists pledging their support in promoting biotechnology and its products to increase food production.

Participants in the 16th National Conference cum Seminar Workshop on Local and National Initiatives on Food Security and Sustainability on 10-15 October 2006 sponsored by the Philippine Association of Provincial and City Agriculturists (PAPCA) lauded government for taking the bold moves in promoting biotechnology during a symposia sponsored by the Department of Agriculture-Biotechnology Program Implementation Unit (DA-BPIU).

The provincial and city agriculturists share the view that low food production necessitates the modernization of Philippine agriculture and the application of biotechnology.

They are open to the idea of holding a stakeholders' forum in their provinces to popularize biotechnology and its products, including the genetically improved corn varieties now commercially available.

The week-long activity held at the Monte Vista Resort in Pansol, Calamba, Laguna was attended by at least 100 participants from as far as the provinces in Visayas and Mindanao, Bicol and Ilocos.

Led by Director Alicia Ilaga, director of the DA Biotech Program, the participants were updated on the latest issues and concerns on biotechnology, the trends in biotechnology, the economic opportunities and the Philippine Agri-Fisheries Biotechnology Roadmap or Biotech Roadmap now being pursued by the government.

Dr. Vivencio Mamaril, a member of the Bureau of Plant Industry (BPI) Biotechnology Core Team; Dr. Saturnina Halos, chairwoman of the Biotechnology Advisory Team (BAT) of the Department of Agriculture (DA); and Engr. Danilo Manayaga, president and chief executive officer of the biotech firms Secura International, Secura Plant Genetics Corp. and Servac Philippines Corp. talked about biotechnology and its relevance to the current problem of producing more food for the growing population, which is estimated to grow at 2.36 percent per annum. The fact that less hectareage is now devoted to agriculture has compounded the problem.

Held under the theme, "Rationalizing Local Governance and Grassroots Development as a Key to National Food Security and Sustainability," the forum also included the "Food Safety with Biotechnology Symposium" as requested by PAPCA President and Pangasinan provincial agriculture officer Jose Almendares.

Norma Lagmay, the provincial agriculture officer of Ilocos Norte who recently went to Gulin, China to attend the International Food Expo was excited about the amazing trends in biotechnology, particularly the "Pinoy Biotek" crops which are currently on the pipeline of the University of the Philippines Los Baños-Institute of Plant Breeding (IPB).

The trip last August, she said, enlightened her about the benefits of GM crops to farmers.

"In China, farmers there are already harvesting 15 tons of corn per hectare," she said.

Some farmers, she said, are also harvesting four to five tons of soya per hectare.

"When will these products be commercially available?" Lagmay asked.

Lagmay said the commercialization of the first genetically modified crop in the Philippines has improved corn production in many areas and she expects that genetically improved fruits and vegetables with superior traits will be a hit among farmers.

She called on the national government, particularly the Department of Agriculture (DA) to fast-track the development of genetically improved crops and animals that will guarantee increased farm production.

"I am calling on the national government to put more or increase the budget for biotechnology particularly research and development to come up with these products and cope up with other countries," she said.

Delano Tefora, the provincial agriculture officer of Aklan, likewise sees biotechnology as a way of feeding Aklan's poor.

Governor Carlito Marquez, he said, supports agricultural biotechnology, noting of its benefits to farmers and other stakeholders in the agriculture sector.

Aklan, which is basically a coastal province, has 11 coastal towns and five inland towns.

Despite the opposition by some anti-GMO advocates in the province, he said the provincial officials of Aklan believe that products like Bt corn and the others that will soon be made commercially available are safe to eat and environment-friendly.

"Even though some groups oppose GMOs, I stand firm that GMOs are safe and it is the only way to increase food production and generate more income for the farmers," he said. — *Jonathan Mayuga*

Stakeholders learn risk communication in biotechnology

FOR four days, policymakers, scientists, academe, information officers, industry, media and community leaders learned and practiced the science and art of risk communication.

Communication principles and skills were taught. Of particular importance was the need to pay attention to non-verbal communication cues.

The 44 participants who come from Indonesia, Kenya, Malaysia, Philippines, Thailand, United States, and Vietnam shared

their country experiences in biotechnology communication.

The Biotech Issues and Communication Workshop: Enhancing Communication Skills on Biotechnology was held from September 4-7, 2006 in Makati City, Philippines.

It was organized by the International Service for the Acquisition of Agribiotech Applications (ISAAA) and SEARCA Biotechnology Information Center with support from the U.S. Grains Council.

— *Sonny Tababa, SEARCA BIC*

Jose G. Burgos, Jr. Awards for Biotech Journalism

In honor of a journalist, to honor journalists

SOON after the restoration of democracy in the Philippines 20 years ago, press freedom fighter Jose G. Burgos Jr. and his wife, Dr. Edita Burgos who shared his aspirations, realized that their crusade against the Marcos dictatorship was also over.

Soon enough, they decided to pack up and leave the city—choosing to live a simpler life as farmers over a rather knotty city lifestyle in Metro Manila.

Burgos Jr.—Joe to his friends and colleagues in *WEForum* and *Malaya*, the national daily he published to expose the evils of the dictatorship—left the paper in the hands of close friends to lead a life that was seemingly different, but also similar, because it entailed constant inquiry and search for the truth: this time, as a farmer in search of the truth to fight food insecurity and poverty. Edita eventually gave up teaching at the University of the Philippines (UP), opting for early retirement in 1995.

“We just decided to take the big step—from publishing to farming,” Edita, or Edith to friends, recounts. “We felt that we’re so blessed by the Lord and the only way to give some of these blessings back is to be one with nature. *Mula sa hangin, hanggang sa lupa, pati sa tubig.*” Edith explains.

The decision to leave the city and live in the farm, Edith says, was also driven by a purpose—to help improve the lives of their

fellow farmers in Bulacan.

“As Joe put it then, what better way to understand and help farmers than to live as farmers ourselves?” says Edith.

Needless to say, Joe and Edith had their share of woes in farming.

The devastation caused by natural calamities, such as typhoons and flood if not

Joe, who wanted to steer clear of the often harmful chemical inputs, learned through trial and error that natural ways can substitute for chemical fertilizers and pesticides.

He zealously jotted down notes and often experimented, apparently trying to increase yield and improve farm production.

“Our neighbors were laughing at us because we were not using fertilizers and pesticides,” she says.

Joe’s instinct as an award-winning investigative reporter (for which he won the TOYM) for many years worked for them. He attended seminars and workshops for farmers and learned that there are many ways to improve crop production without chemicals—mainly through modern biotechnology.

Impressed by the potential benefits of modern biotechnology, Joe started what was to

become a major advocacy to popularize it in the last few years of his life.

Joe would write about it in his columns and discuss it in his radio program with Edith (over DZMM and Radio Veritas), in a way that farmers can relate and understand his experiences.

He realized there was a problem: most farmers themselves lacked knowledge about farming itself. Often, farmers did not know how to manage their farms and refused to try different approaches out of habit and fear that their yields will decrease. Worse, they



Joe and Edith Burgos

drought, the enormous losses from pests and disease infestation, were too much to bear for ordinary farmers.

Even though sometimes farmers experienced a bountiful harvest, it bothered Joe that their income remained low because of the cost of farm inputs, such as fertilizers and pesticides.

Edith recalled that in 1988, as they tried to make a fresh start, they had to start from scratch as they knew nothing about farming, besides the fact that their land was cracked and dry after many years of being idle.

had a general negative perception about modern technologies like biotech, apparently because they were totally unaware of its benefits.

Farmers tended to believe that all GMOs (genetically modified organisms) are poisonous crops and pictured modern biotech as a failed technology that could produce freaks and monsters like three-headed goats, or something to that effect.

Who could blame them? For a long time, they were exposed to the negative write-ups about biotechnology and GMOs that are mostly a result of anti-GMO propaganda waged by some sectors. Apparently, the reports are bereft of truth, and failure on the part of the scientists to communicate with the writers is partly to be blamed.

“There must be a way to improve the incomes of farmers and ultimately, improve their lives, by showing them that other approaches like organic farming and biotechnology work,” Edith recalls her husband saying.

For a start, Joe and some colleagues in print and broadcast journalism and academe wrote a book titled “Communication Guidelines for Biotechnology,” a product of various consultations with different biotech practitioners in the country, to help journalists and scientists communicate better to come up with a balanced and accurate reporting of news in modern biotechnology.

The guidelines have since been used by hundreds of media practitioners and scientists, and even information officers of relevant state and private agencies, as a useful reference.

Unfortunately, Joe did not live long to finish his crusade, having been cut down by cancer at the relatively young age of 62.

But thanks to the fact that his tireless campaigning had reached many people and strategic institutions and groups, his advocacy lives on and many others have taken up the torch.

Today, his wife is actively taking part and leading the Biotechnology for Life Media and Advocacy Resource Center (BMARC) in promoting the safe use and application of modern biotechnology not only in agriculture, but in every way it can harness the power of life.

It is in his honor that the Gawad Galing for Biotech Journalism, now named Jose G. Burgos Jr. Award for Biotech Journalism, was set up to recognize journalists who excel in their quest for truth and help push the frontiers of scientific inquiry, with particular focus on biotechnology. ■

Variety accreditation and biosafety guidelines: a harmony

MY previous viewpoints zeroed in on the technical aspects of biosafety. It specifically tackled risk assessment of transformation events applied for propagation. In simple words, risk assessment of genetically modified crops. My first column introduced us to corn varieties conferring resistance to Asiatic corn borer, and these varieties are registered as accredited varieties of the National Seed Industry Council (NSIC).



Variety Registration

Under Philippine laws, plant breeders can register their new varieties and such varieties are automatically accredited by the National Seed Industry Council. This framework is regulatory in nature and it is provided for by Republic Act 7308 otherwise known as the Seed Industry Act of 1992. This law paved the way for plant breeders- private and public to commercialize their new crop varieties getting a government seal of accreditation.

Question, what do we mean variety registration? It works like this, for example, a private seed company develops a new corn variety, can he market his new variety? The answer is yes. However, such variety is not accredited by the government. Does the government require that new varieties be registered before they are introduced in the market? No. Then, why do public and private seed companies register their new varieties? It is because if the Department of Agriculture would procure seeds, those that have been accredited by the NSIC would be prioritized to be bought. Also, farmers can avail cropping loans from government lending agencies if the variety they are going to plant is accredited by NSIC and crop insurance only covers NSIC-accredited varieties.

As a standard rule, before new varieties are accredited, such varieties are entered in the National Cooperative Test or commonly known as NCT. This NCT is a variety performance test in two wet and two dry season trials. Therefore, only those varieties that are as good as or better than check varieties shall be registered and accredited.

Rice and Corn

At present, rice and corn are the crops that have the most number of registered and accredited varieties. Although, other crops had been registered in the council, among others, these are rootcrops, plantation, fruit, vegetable, fiber, sugarcane, and others had been given government accreditation.

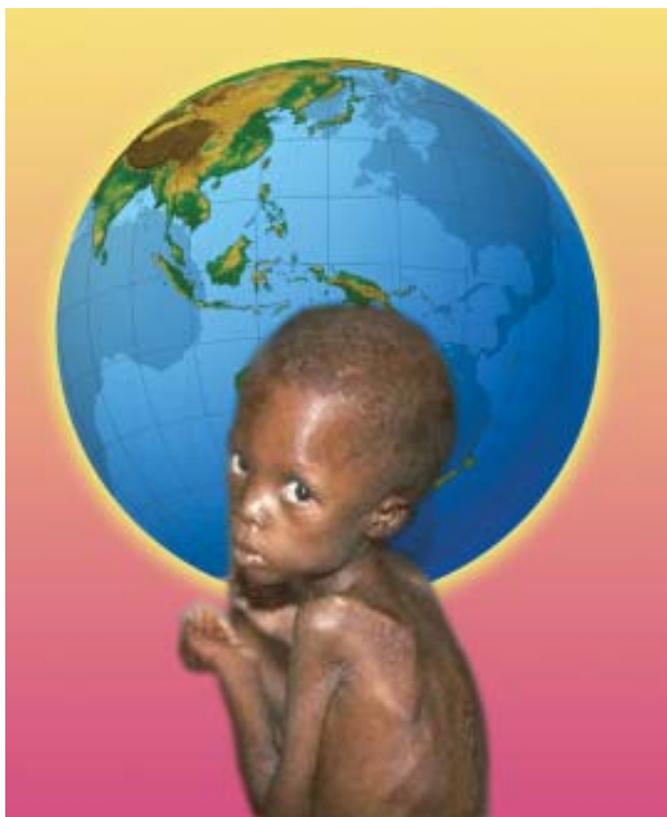
Biosafety Guidelines

There are two government issuances that regulate the development and propagation of transgenic crops. It is required that before transgenic crops are made available to the public, the crops have to undergo three biosafety protocols, and these are greenhouse, field, and propagation. These protocols are to be undertaken phase by phase, meaning a genetically modified crop has to be tested first under a controlled or greenhouse, field, and then evaluated for propagation.

Possible Harmony

Given the three successive biosafety protocols, we can see that there is the possibility of harmonizing the biosafety and variety registration guidelines. However, such harmony may only be applied to the field test of a genetically modified crop. Why do we have this opinion, an NCT and field test are both conducted in an open field, and it is only a matter of adding check varieties, the isoline or the untransformed variety, and replicate plants during the field tests.

Turn to page 34



FOOD SHORTAGES THREATEN 40 COUNTRIES SAYS FAO REPORT

The Food and Agriculture Organization (FAO) report *Crop Prospects and Food Situation* says that 40 countries face a food crisis with Darfur in Sudan in a precarious food supply situation that may worsen with security problems.

The world cereal harvest in 2006, the FAO report warns, has deteriorated due to exceptionally hot and dry weather in countries like Australia, Argentina, and Brazil. South Asia is also experiencing drier-than-normal weathers that may affect second paddy crops. FAO's forecast for cereal production is about 1.6 percent less than that of the 2005 level. A global concern will thus be the declining stock of food and inadequacy of supplies to meet demand amidst surging world prices, the report noted.

MORE INVESTMENT NEEDED IN AGRICULTURE, SAYS FAO

Although agriculture plays a central role in combating poverty and malnutrition in developing countries, the Food and Agriculture Organization (FAO) warns that foreign investment in this sector continues to decline. From a total of over US\$9 billion per year in the early 1980s, it fell to less than US\$5 billion in the late 1990s. Meanwhile, more than 850 million people around the world remain undernourished. For this reason, the theme selected for 2006 World Food Day, celebrated on October 16, is **INVESTING IN AGRICULTURE FOR FOOD SECURITY**.

Most of the world's farmers are small-scale farmers, often themselves with inadequate access to food. Increasing the volume of public investment in agriculture is of absolute necessity said Jacques Diouf, FAO's Director-General. Diouf noted that while increased development assistance, public investment and debt relief are key elements, equal importance should be given to private sector investment.

IRRI PRESENTS NEW VISION FOR COMBATING POVERTY

Food security will continue to be a major strategy for the Philippine-based International Rice Research Institute (IRRI) and for 2007 to 2015, its first goal will be to reduce poverty among rice farmers and consumers. Other goals will

focus on environmental sustainability, health and nutrition, access to information and knowledge, and supporting efforts to develop new and improved rice varieties. IRRI's Director General Dr. Robert S. Zeigler announced the new Strategic Plan during the opening of the International Rice Congress in New Delhi, India.

Unless many Asian nations can get their rural or rice-based regions growing economically, their national development efforts could stall completely. Asia needs to invest more in agriculture and especially agricultural research. Without new ideas and technologies, their rice industries will stagnate and hold back the rest of the country, Zeigler noted.

Zeigler added that IRRI is embarking on several projects that include efforts to develop rice varieties that would help poor farmers cope with climate change and drought and to completely reconfigure the plants photosynthetic system.

ADDING VALUE TO CASSAVA

According to the Food and Agriculture Organization (FAO), many developing countries could strengthen their rural economies by converting more cassava, a relatively cheap raw material, into high-value starches. "Compared to starches derived from most other plants, it has greater clarity and viscosity, and it's very stable in acidic food products. It also has excellent properties for use in non-food products, such as pharmaceuticals and thermoplastics," said Danilo Mejia, an agricultural engineer with FAO's Agricultural Support Systems Division.

The key to cassava's future in global and domestic starch markets, FAO says, will be improvements in efficiency and quality, and a reduction in production costs. For a model of successful cassava starch industry development, African and Latin American countries should turn to Thailand, the world's top producer. The country now uses about 50 percent of its annual cassava root production to extract some two million tons of starch. Half of it goes to domestic food and nonfood industries, while the rest are exported, increasingly in the form of higher-value modified starch for specialized applications. The country is also exploring the use of starch as raw material for production of bioethanol.



PERFORMANCE PLANTS INC., SYNGENTA DEVELOP DROUGHT-TOLERANT CROPS

Performance Plants Inc. has entered into a licensing agreement with Syngenta Seeds for development of drought tolerant corn and soybeans seeds using Performance Plants Yield Protection Technology (YPT). YPT minimizes water loss in crops during drought conditions by stimulating early closure of stomata (pores) in leaves preventing wilting. The YPT trait is now moving into field trials in corn, soybean, turf and ornamentals.

The field results indicate that commercial corn and soybeans can be developed that will withstand the effects of drought, significantly improve water use efficiency, and generate powerful boosts in crop performance and yields, said David Dennis, President and Chief Executive Officer, Performance Plants.

IPGRI CHANGES NAME

The International Plant Genetic Resources Institute will be known as Biodiversity International or Biodiversity from December 2006. Emile Frison, IPGRI's Director General said in a statement that this move will reflect the current organization's strategy which focuses on improving people's lives through biodiversity research. The organization is the world's largest international institute dedicated to the conservation and use of plant genetic resources.

AFRICA

KENYA GETS NATIONAL BIOTECHNOLOGY POLICY

The government of Kenya has adopted a comprehensive national policy to guide the research, development and trade in biotechnology products, the National Biotechnology Development Policy 2006, which comes into effect immediately. According to Kenyan laws, a Policy, unlike a Bill, does not have to go through parliamentary debate. The policy has been the result of several years of debate involving all major biotechnology stakeholders and government departments. Noah Wekesa, Kenyan Minister for Science and Technology, said the policy is part of government's plan to chart its vision on biotechnology development and application. This policy will provide biotechnologists a clear framework to address fears on their safety, said Wekesa. She added that government is determined to use biotechnology for the benefit of Kenyans.

BIOTECH CROP PLANTINGS INCREASE IN SOUTH AFRICA

Genetically modified (GM) crops are now widely planted in South Africa with biotech cotton accounting for approximately 92 percent of total production. Of the total soybean acreage in the country, 59 percent was GM, while biotech corn accounted for 29 percent. GM corn plantings increased from 16.6 percent in 2005 to 29.4 percent in 2006. White corn varieties, a staple food for majority of South Africans, saw an increase from 8.6 percent to 28.8 percent. A 22-page report examines the use, development, and regulation of agricultural biotechnology in South Africa. The country can play a vital role as other African nations develop biotechnology policies since it has the most resources, scientific expertise and financial support as well as progressive regulatory system. Scientists are doing research on new varieties of GM corn, melon, millet, lupins, soybeans, strawberries, sugar cane, cotton, apples, tomatoes, sorghum, wheat, potatoes and grapes.

A GOOD HARVEST NOT END TO CYCLE OF MALNUTRITION, WARNS WFP

Despite predictions of generally improved harvests in the Sahel region this year, the United Nations World Food Program (WFP) warned that localized crop failures persist contributing directly to malnutrition. The Sahel is a semi-arid belt that comprises parts of Mauritania, Senegal, Mali, Burkina Faso, Chad and Niger in West Africa. Malnutrition does not simply disappear with the arrival of the new harvest and return the next lean season. WFP and partners are fighting a battle that cannot be won over a few weeks or months, said Jean-Jacques Graise, WFP senior deputy executive director. A report by the aid agency Oxfam said that while spending on food and humanitarian aid has

increased, aid for agricultural production in sub-Saharan Africa dropped by 43 percent between 1990-1992 and 2000-2002. Oxfam has criticized the approach to hunger, saying that poverty, not hunger, is the main cause of food emergencies.

NEW DESERT LOCUST THREAT IN NORTH, WEST AFRICA

The United Nations Food and Agricultural Organization (FAO) warns of another possible locust invasion of North and West Africa. Adults of the crop-devouring insects were recently detected in northwestern Mauritania and neighboring countries have already been warned by the FAO Locust Group to increase the level of alert against the threat. In 2004, an upsurge caused heavy damage in parts of West Africa. By summer 2005, the surge ended, thanks to unfavorable weather and control operations. FAO intends to test a new control method which employs a natural fungus called *Metarhizium anisopliae*. The fungus infects locust hoppers in such a way that they stop feeding and die within one and three weeks.

THE AMERICAS

NEW PEW INITIATIVE/NASDA WORKSHOP REPORT ON PEACEFUL COEXISTENCE

The Pew Initiative on Food and Biotechnology and the National Association of State Departments of Agriculture (NASDA) held in Boulder, Colorado on March 2006, a workshop aimed at identifying options for advancing the peaceful coexistence of conventional, biotech and organic crops in the marketplace. Participants included representatives from state and federal governments; GE, conventional, and organic farmers, the European Union, seed companies, food processing and marketing companies, academe and the biotech industry. The highlights of the report are: Growers of conventional and organic crops have been denied access when unable to meet market specifications; the lack of standardized, internationally accepted marketing standards, testing methodologies, and protocols pose a challenge to marketing chains, and; overcoming the challenges and capitalizing on the opportunities provided by peaceful coexistence will require a combination of market, research, farmer-to-farmer communication and Federal, state and local government efforts.

US\$1.1 MILLION AWARDED FOR RESEARCH ON INVASIVE PESTS

The United States Department of Agriculture (USDA) has announced US\$1.1 million have been granted to universities in Arizona, Michigan, Minnesota, Montana, Ohio, Texas, and Washington to study the economic implications of preventing, controlling, or eradicating invasive pests and diseases. The control of pests and foreign animal diseases is a priority in protecting our environment and agricultural sector, said US Agriculture Secretary Mike Johanns. Research will help identify effective strategies for preventing the introduction of invasive species and managing their presence.

ON THE HORIZON: AFLATOXIN-FREE NUTS

Researchers at the USDA-ARS Western Regional Research Center discovered a way to almost eliminate aflatoxins in nuts, such as almond and walnuts. Aflatoxin is a cancer-causing compound produced in nuts by the fungus *Aspergillus flavus*. Bruce Campbell and colleagues determined that some antioxidants can prevent the fungus from producing aflatoxins. One antioxidant is caffeic acid, a natural ingredient in coffee beans and a compound found in many crops. Researchers observed that by applying caffeic acid to walnuts and pistachio extracts, the level of aflatoxin produced by the fungus was reduced by 95%.

ASIA AND THE PACIFIC

AUSTRALIA APPROVES 24 GM COTTON LINES

Australia's Office of the Gene Technology Regulator approved Monsanto Australia Ltd.'s application for the limited and controlled release of about 24 GM cotton lines with different genes that are expected to enhance water use

efficiency. The release involves preliminary (proof of concept) research covering a maximum total area of 20 hectares on up to 10 sites during each of the two summer growing seasons of 2006-2007 and 2007-2008 in New South Wales and Queensland.

MALAYSIA'S BIOTECH COUNCIL APPROVES BIOSAFETY ACT

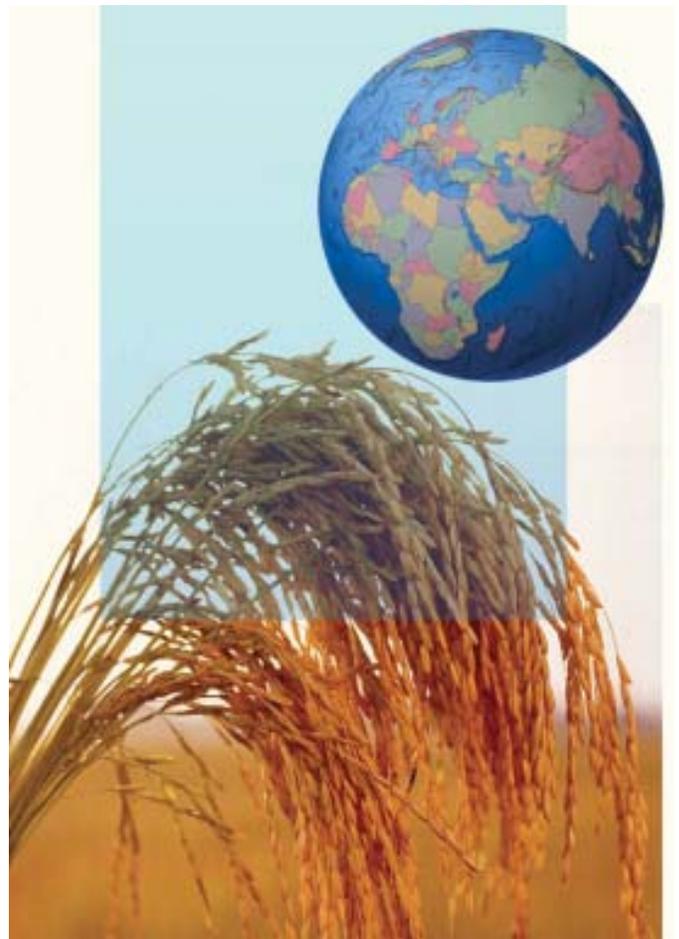
Malaysia's National Biosafety-Biotechnology Council approved the Biosafety Act in a meeting chaired by Prime Minister Dato Seri Abdullah Ahmad Badawi, and attended by Cabinet members who discussed the implications of the Act on the country's biotechnology industry. The Biosafety Act is expected to complete the National Biotechnology Policy which aims to regulate the use of genetically modified organisms. It is expected to be discussed in Parliament this November. The proposal to set up a National Biosafety Board will also be tackled in Parliament next year.

INDIAN PM URGES SCIENTISTS TO TAP BIOTECH POTENTIAL IN RICE

While inaugurating the second International Rice Congress (IRC) 2006 in New Delhi Prime Minister Manmohan Singh said owing to the ecological, social and cultural diversity of rice based production systems, rice cultivation can address concerns relating to food security, nutrition, poverty, food safety, and environmental and natural resource sustainability. What is need is further application of science and technology to develop rice economies as in the cases of golden rice and iron-rich rice.

KHUSH RECEIVES SWAMINATHAN AWARD FOR LEADERSHIP IN AGRICULTURE

Gurdev Singh Khush, a rice breeder from the International Rice Research Institute (IRRI), has been awarded the Swaminathan Award for Leadership in Agriculture by the Prime Minister of India Manmohan Singh during the International Rice Congress 2006 in New Delhi. Khush led the development of more than 300 high yielding rice varieties that played significant role towards achieving the Green Revolution. ■



Variety accreditation and biosafety guidelines: a harmony

From page 31

Bt Corn Experience

At present, the NSIC has registered and accredited more than twenty Bt corn varieties. This Bt corn contains the MON 810 transformation event. Does this mean the Bt corn varieties were subjected to the NCT? Yes, it was. In the case of the first varieties that have been registered and accredited, a coordinated NCT and biosafety field tests were undertaken. This means that during the field test of MON 810 event, the transformed variety was an NSIC-registered and approved variety. The NCT protocol requirement of number of replicates, population sample, and number of trials were complied with then by the applicant. And, the members of the Corn and Sorghum Technical Working Group (CSTWG) of NSIC were invited to visit the site of the biosafety field tests.

At the end of each biosafety field tests, two sets of data were gathered, organized, and evaluated. First was the biosafety, second was NCT data requirements. The first and second set of data was sent to the Biosafety authority and NSIC, respectively. Of course, the CSTWG of NSIC analyzed and evaluated the second set of data.

Let it be known however, that the MON 810 technology owner only submitted the second set of data when they had gotten a biosafety permit for propagation.

Existing NSIC Guideline

To date, only the CSTWG has an existing guideline in the registration and accreditation of transformed crop varieties. The NSIC policy is that, it can only accept and evaluate NCT data of genetically modified crops only when the transformation event had been approved for propagation by the Bureau of Plant Industry.

In addition, if the transformed variety is NSIC-registered and accredited, the CSTWG can accept NCT data generated from biosafety field tests. Otherwise, the variety undergoes a full-blown NCT that requires 2 dry and 2 wet seasons trial across more than ten testing sites in the Philippines.

Positive Implications

With the existing guidelines of NSIC, the technology developer is encouraged to use NSIC-registered and accredited varieties. Doing so, and if the techno developer has an intention to register his variety, he saves some cost intended for NCT.

The NSIC shall also formulate other relevant policies concerning variety registration and accreditation of genetically modified crops, especially now that the public research institutions are now transforming papaya, rice, eggplant, and tomato.

The take home message is that, the two distinct policies can be harmonized making the government more responsive to the needs of the seed companies, without of course sacrificing safety of human, animals, and the environment. (*Dr. Vivencio Mamaril is a member of the BPI-Biotechnology Core Team*)



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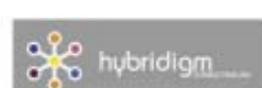
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