Editorial Box

BAR R&D Digest is published by the Bureau of Agricultural Research (BAR), a bureau of the Department of Agriculture mandated to ensure that all agricultural research is coordinated and undertaken for maximum utility to agriculture. This quarterly publication contains articles that are based on studies conducted by NaRDSAF-member institutions.

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Meet BAR Director Nick P. Eleazar

Brisk and bussinesswise

by: Virginia A. Duldulao

He has kept a low profile but his physical presence is a standout in any gathering. And when he talks and gives his decision after earnestly listening, one can fully appreciate the combination of physical and mental endowments that Mr. Nicomedes P. Eleazer, the new BAR director, has been blessed with. He works silently and patiently but brisk and businesswise. I had been a witness to these characteristics of his being a member of the Publications Grant Committee that he heads. He allows everybody to talk with no sign of disrespect from him for one's opinion and perception. Our deliberations were quick and decisions were made fast. Outside official business, he is a sweet brother casually talking about his farm in Quezon.

Mr. Eleazer brought to his position a wealth of experience along the fields of project development and implementation, policy advocacy, research management, institutional development, and administrative and financial management. He was the assistant director of BAR from August 2001 until he finally took over the position of director this later part of 2004. As assistant director he provided leadership in evaluating research proposals submitted to the Bureau. Before he joined BAR, he served various international bodies in different capacities.

He was the team leader for a FAO-UNDP diagnostic survey for the farmer-centered agricultural resource management program and was a senior counterpart of a Japan International Cooperation Agency (JICA) expert on agricultural research management for three years. For about eight years he was the project coordinator for the International Development Research Center (IDRC) based in Canada. He coordinated the implementation of project activities in eight regions in the Philippines. He also led the team that assessed phase one of the Palawan Integrated Area Development Project, an Asian Development Bank-funded project.

While Nick (as he is fondly called by friends) exudes warmth as he discusses issues, one can discern the depth of his views and opinions. Rightly so, since his experiences and exposures sharpened him as a professional and technical man especially at the Livestock Development Council where he was deputy executive director and concurrent chief of staff at the Office of the DA Secretary, and as officer in charge of LDC on occasions. He also held responsible positions at the Department of Agriculture and the previous Ministry of Environment and Natural Resources.

The various trainings he participated in, here and abroad, prepared him for whatever position he was assigned. He was on a study tour on agricultural trade to New Zealand, agricultural mission to Queensland, Australia, study tour on corn technology, trade and policy imperatives for international competitiveness to Indonesia and Argentina, and food and dairy

page 23 ➡

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2004 Gawad Oscar Florendo Awardee for Outstanding Information Tool for Print

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What's Inside:

Blue-Green INK

by: **Victoriano B. Guiam**

A time to be reaping...

Without much fanfare, the Bureau of Agricultural Research added another feather to its cap. We are referring to the 13th Gawad Oscar M. Florendo (GOF) awards program held last December 2004 in which this magazine, the BAR R&D Digest, was cited as an Outstanding Public Information Tool (magazine category) following a rigorous screening process. To qualify for the awards for printed materials, publications are evaluated for its effect on its audience, the way the articles are made, and the message conveyed. These are in addition to the usual criteria of the problem addressed by the publication, its objectives and the audience so chosen.

Now, it is not everyday that we get an award such as this. It is an exhilarating experience but the pressure is on to us. Yes, we have reached a high, but the question now is, how do we remain there? Going a step further, how do we exceed last year's performance so that we do not remain on a plateau? The answer is to be as good if not better than what we have done so far in all departments.

How to do better in a time of transition at BAR is a challenge for us. Change is the order of the day at the Bureau with turnovers of the guard of various BAR endeavors including communications management. And so as they say in Pinoy comics serials: *"Abangan ang susunod na kabanata"*.

And so it is with our articles for this issue. They are all on something better for the agricultural persuasions they talk on. Since the month of February is fast approaching, any discussion about Valentines day necessarily leads to flowers. The rose is always a mainstay, but chrysanthemums have been making inroads into our garden consciousness. Cebu has not always been associated with chrysanthemums but there it is in our article on the industry. These plants have definitely taken root on the island where it has become an additional income earner for many.

East meets west in our two articles on vegetables. One promotes the use of a microorganism for the growing of lettuce, a leafy vegetable associated with western salads. The nitrogen-fixing *Rhizobium* bacterium apparently works also for lettuce aside from legumes. Through its action, less nitrogen fertilizer application would be required to successfully grow the vegetable on a commercial scale.

The other vegetable article talks about what happens to the very oriental *labong* (bamboo shoots) when it is dried. A favorite among practically all Filipino ethnic groups, labong can be preserved through drying. A study was done to find out the transformation characteristics of bamboo shoots as these lose water with the intention of using this knowledge in determining ideal rates and extent of the drying process for reconstituting the product in future studies.

Did you know that the common *kalamansi* plant is a national treasure? The Philippines is the recognized origin of the species and the plant is coveted by other countries. In some circles it is known as the Philippine lime. How it came to be so is a matter of taste, so to speak. Reading our article on a *kalamansi* slicer only serves to whet our appetite for the fruit.

We have three articles on three big guns of Philippine fruits: bananas, mangoes and durian. The ones on bananas and mangoes deal with postharvest concerns. The write-up on durian is mainly about its heavenly (or hellish, depending on the perspective) virtues but part of it is also about storing the fruit for future use. The banana article is concerned with diseases affecting pesticide-free banana fruits, riding on the growing consumer demand abroad for bananas which are not treated with chemicals.

Mangoes can now be commercially stored for longer periods, thanks to a study by researchers from the DA-BPRE and UP Los Baños. When the atmosphere of their containers is manipulated to get a certain balance of oxygen and carbon dioxide and temperature is optimized for storage, mangoes can last for nearly a month. This is enough time to transport Philippine mangoes to distant destinations like Europe and the USA.

Organic or natural farming is getting a big boost from government, according to our article on this subject. Interest in it has grown by leaps and bounds. The basic premise of natural farming is that the use of ecologically sound practices for agricultural production can contribute to a more stable, sustainable and vigorous production environment.

Farm animals are not about to be forgotten in this issue. While

page 18 ➡

NEWSbits

Eleazar is new BAR Director

After serving as assistant director to the Bureau for three years and four months, Mr. Nicomedes P. Eleazar, a career executive officer, is now the Bureau's director. The appointment was formalized through a simple oathtaking ceremony held last December 22, 2004, with DA secretary Yap administering the oath. When he was assistant director, Mr. Eleazar provided leadership in project proposal evaluation on agricultural research, development, and extension. He graduated from the University of the Philippines Los Baños with his BS degree in Agriculture, and his MS in Management in Agricultural Development from Cranfield University in Bedford, England.

BAR donates food, clothes to typhoon victims

An e-mail depicting the plight of the typhoon victims in Quezon was more than enough to nudge the Bureau's staff to give to those who had less. The drive to raise money to buy groceries, and donate clothes, for typhoon victims was led by BAR contractual staff. Bags of food items and clothing were delivered to the Sagip-Buhay Infanta Office in Sta. Ana, Manila. Father Francis Lucas, former parish priest of the Infanta, one of the most savagely-affected town, and chairperson of the Sagip-Buhay Infanta, expressed gratitude for the gesture of the BAR staff.

Going bananas...

postharvest practices.

Right now, other studies are being conducted to improve the quality and quantity of the non-chemical bananas. The results of this particular study have already added to our knowledge on the possibilities of improving our 'backyard' bananas.

Brisk...

convention in Chicago, Illinois, USA.

To date he is a member of different committees such as the governing board of the International Rubber Development Board, the International Network for Banana and Plantain in Asia and the Pacific, and the Technology Application and Promotion Institute of the DOST.

He was awarded a British Council Scholarship when he worked on his Master of Science in Management (Agricultural Development) degree at Cranfield University, Bedford, England. He finished it in 1993. His Bachelor of Science in Agriculture was taken at the University of the Philippines in Los Baños, 1981.

In him the present secretary of the Department of Agriculture is hopeful that research projects on postharvest and products development will be given impetus and the coupling of research and extension will be tightened. Director Eleazer will go beyond the task as he will also look into marketing initiatives so that the efforts and resources expended on research and extension will contribute to development.

Things can be different at one's own time. They can be positive or negative. But the new director is also a man at his own time that can make the right decisions at the right time.■

Reference:
Alvindia, Dionisio G., Takao Kobayashi, Yukio Yaguchi, and Keiko T. Natsuaki. Pathogenicity of fungi isolated from 'non-chemical bananas'. Japanese Journal of Tropica Agriculture. Vol. 46, No.4, December 2002.

Alternatives for the future: Organic certified bananas. Retrieved from http://www.bananalink.org.uk/future/future_3.htm

Lettuce...

effect of lettuce juice has been compared to opium minus the excitement.

Lettuce is also good for pregnant and lactating mothers since it contains folate which prevents megaloblastic anemia and strengthens the immune system of babies.

Before using lettuce in a salad, the leaves should be washed and cleaned thoroughly leaf by leaf. When thoroughly clean, they should be dried with a clean towel.

A bright future

Since the country joined the World Trade Organization in 1996, local markets have been flooded with cheap vegetable imports that are now crippling the local vegetable industry. In 1996, vegetable imports multiplied seven times to 3,900 metric tons. By the year 2002, imports zoomed to 27,500 MT worth $6.37 million. The largest vegetable imports were garlic, onion, carrots, cauliflowers, broccoli, lettuce, cabbage, tomato, and shallots.

However, in 2004, Basic Necessity Inc. (BNI), the country's largest lettuce producer, started exporting lettuce in September of that year to supermarkets in Hong Kong. With the backing of the government and using technologies such as *Nitroplus*, local producers can therefore hope for better times ahead and salad lovers can look forward to greener and crunchier lettuce in their salads.

Source:
1) Torres, Fe and Ma. Lourdes Sison. "Legume inoculant Nitroplus improves the seedling growth of lettuce". National Institute of Molecular Biology and Biotechnology (BIOTECH) at UP Los Baños, College, Laguna. June 2004.

2) Aguiba, Melody. RP exports lettuce to Hong Kong. Retrieved from www.mb.com.ph

OCTOBER

BAR Awards winners in 16th NRS

The winning papers and researchers in this year's national research symposium were awarded in ceremonies held at the Convention Hall of the Bureau of Soils and Water Management(BSWM) on October 5, 2004. Honorable Benasing Macarambon, chair of the Committee on Agriculture, Food and Fisheries of the House of Representatives, BAR Director William Medrano, Assistant Director Nicomedes Eleazar, and former BAR Director Eliseo Ponce presented the awards.

BAR, ATI hold first agri and fisheries tech forum

The Bureau of Agricultural Research(BAR) and the Agricultural Training Institute(ATI) held the 1st Agriculture and Fisheries Technology Forum at the Fernando Lopez Hall at the Bureau of Soils and Water Management(BSWM) last October 19, 2004. The forum was themed "Yaman sa Agrikultura at Pangisdaan mula sa Teknolohiya". Scientists presented technologies ready for adoption while selected farmers shared success stories. The forum was organized to showcase the successes brought about by commercially-viable technologies. It is also the venue to get feedback and approximate the potential impact of the technology to the clientele, and to identify interventions that can be made by the research community to aid effective communication of these technologies to its intended users.

First investors' forum highlights 11 mature technologies

An Investors' Forum was jointly held by BAR and ATI last October 5, 2004 in line with the celebration of the National Agriculture and Fisheries R&D Week, which is being celebrated every first week of October. The forum's objective was to create awareness among various stakeholders, and entrepreneurs alike to facilitate the commercialization of viable technologies for the intended users' consumption. It sought to foster a working relationship between research generators, extension service providers, and the technology end-users. Those who took part in the forum were members of the Farmers and Industry Advisory Council (FIAC), representatives from the Philippine Chamber of Commerce and Industry (PCCI), Bureau of Fisheries and Aquatic Resources (BFAR), the media, and the business sector.

Experts discuss food security in World Food Day celebration

A National Symposium on Biodiversity for Food Safety was jointly sponsored by BAR and ATI, which was held at the Fernando Lopez Hall of the BSWM last October 18, 2004. The symposium included presentations by National Academy of Science and Technology (NAST) Vice President, Emil Q. Javier, entitled, "Sustainable food Production for the Filipino People", followed by University of the Philippines Los Baños Professor Ben Malayang Jr. entitled "The Role of Biodiversity in Food Security and Environmental Protection/Integrity", and finally by International Network for the Improvement of Banana and Plantain(INIBAP) Asia-Pacific Regional Coordinator, Dr. Agustin Molina, entitled, "The Use of Biodiversity for Sustainable Pest and Diseases Management Toward Food Security and Healthy Environment".

NOVEMBER

RDMIC inaugurated

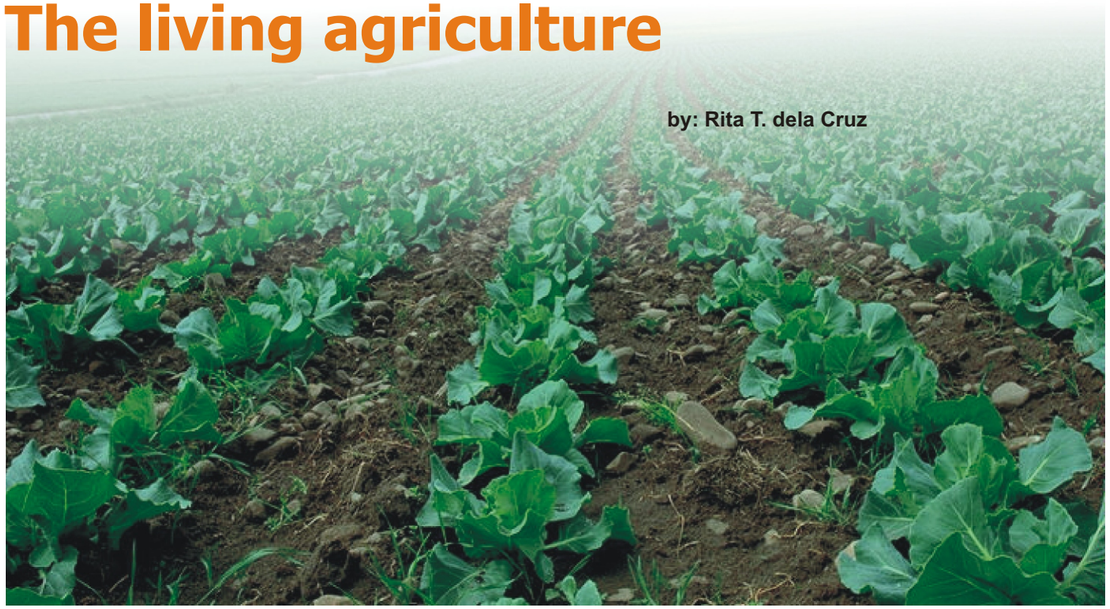
The Research and Development Management and Information Center (RDMIC), BAR's home, was inaugurated by the Department of Agriculture Secretary Arthur C. Yap last November 11, 2004. The event was attended by Philippines Rice Research Institute Executive Director Leocadio Sebastian, ICRISAT Director-General William Dar, and BAR staff and employees, led by Director William Medrano. During the inauguration program, Sec. Yap conveyed his hopes for BAR under his administration.

BAR wins second Gawad Oscar Florendo award

BAR's quarterly publication, The R&D Digest (formerly BAR Today) won the 13th Gawad Oscar Florendo for print category. It is the second Gawad Florendo for the Bureau, with the monthly newsletter, BAR Chronicle winning last year for outstanding information tool for print category. The award is given annually by the Public Relations Organization of the Philippines(PROP) to outstanding programs and projects in the field of public communication. The awarding ceremonies were held last November 17, 2004 at the AFP Commissioned Officer's Club, Camp Aguinaldo, Quezon City.

DECEMBER

Natural farming system: The living agriculture



by: Rita T. dela Cruz

The importance of natural farming in the agriculture and sustainable food system is immeasurable as we now realize. The interest in its methods is growing, especially in areas where the prevalent farming system has degraded resources that are essential to agricultural production. Health and environment considerations are also some of the big factors why some of our farmers are now shifting to natural farming. On the marketing side, farmers engaged in natural farming should have no problem as consumers now are increasingly becoming more conscious of what they eat, thus preferring the organically-produced crops. This provides better opportunities for natural farming entrepreneurs, enabling them to sell their products at premium prices.

Natural Farming System (NFS) has much potential in terms of food production and environmental conservation. Reducing dependence on off-farm inputs and creating more balanced nutrient and energy flows, it strengthens the pliability of our ecosystem. Moreover, food security is increased and additional incomes are generated.

The Korean Natural Farming Association (KNFA) referred to NFS as 'vital agriculture' because it maximizes the use of natural resources in harmony with the environment wherein self-manufactured farming materials are also being applied.

Regional forum on NFS points greater green productivity

To fully emphasize the importance of NFS, the Development Academy of the Philippines (DAP) in Visayas and the Department of Agriculture-Regional Field Unit 6 (DA-RFU 6) in cooperation with the local government units of Iloilo and Aklan, and the Asian Productivity Organization (APO), organized a regional forum on NFS for green productivity and integrated community development on 28 December 2004 at the Provincial Capitol in Iloilo City. DA Usec Edmund Sana keynoted the event.

In his speech, he commended the effort of DAP and RFU 6 for initiating such an activity and reiterated the importance of natural farming as a vital component in sustainable agriculture. He said that this is a relevant move on the part of DAP and the DA family considering recent global trends and agenda which are geared towards supporting sustainable agricultural solutions like food security and sustainable livelihoods. He added that, through practical experience and policy advocacy, we are able to raise awareness and provide information on the benefits of natural farming system in agriculture and on other agro-ecological approaches that work in a participatory way with our farmers particularly those in the regions.

DA programs and directions geared towards sustainable agriculture

According to Usec Sana, the government recognizes the potential of

page 21

Hot shoots: What happens when air drying bamboo shoots

by: Likha C. Cuevas

Who does not like *labong*? I love *labong* in my Chinese noodles. *Labong* is highly prized in vegetarian and non-vegetarian dishes in Asia, especially in Chinese and Thai cuisine. *Labong* is the inner fleshy portion of the bamboo shoot. The outer covering is composed of layers of sheath covered by silky, powdery stuff that is highly allergenic *(gilok)*. The *gilok* has to be removed to get the tender fleshy part.

In the Philippines, bamboo shoots have long been part of traditional and favorite dishes. We have *dinengdeng nga labong* for the Ilocanos, *paklay* for the Visayans, *atsara* or pickled *labong* for the most of the Tagalogs, *bulanglang na labong* for the Batangueños, and *ginataang labong* for the Bicolanos. Other dishes with *labong* include *adobong labong, lumpiang sariwa,* and *labong* with *tausi*. The *labong* is considered a health food and they are recommended for people with poor heart conditions because of their high dietary fiber and low fat content.

Not all bamboo can be grown for *labong*. According to the Bamboo Information Network under the Philippine Council for Agriculture, Forestry, and Natural Resources Research and Development (PCARRD) of the Department of Science and Technology (DOST), the edible species are: Kawayan tinik *(B. blumeana)*, kawayang. kiling *(B. vulgaris)*, giant bamboo *(Dendrocalamus asper)*, Yellow bamboo *(Bambusa vulgaris var. striata)*, Bayog *(B. merrilliana)*, bolo *(Gigantochloa levis)*, Machiku *(D. latiflorus)*, kayali *(G. atter)*, patong *(D. asper)*, and laak *(B. Philippinensis)*.

Bamboo

labong

Drying bamboo shoots

There are many ways of preserving and eating bamboo shoots all over Asia. They can be eaten fresh (like in *lumpiang sariwa*), pickled or dried, preserved in sugar, or it can be used as flavoring in powder form.

Drying is one of the ways used in preserving food. According to Dr. Ponciano S. Madamba of the College of Engineering and Agro-Industrial Technology at UP Los Baños, "product quality is a major consideration during any food preservation process. During drying, special attention has to be paid to the properties of the dried product in terms of utility and application." Madamba said that quality can be characterized by the changes in physical structure and appearance of food items during the drying process and these are: color, texture, taste and aroma, rehydration capacity, porosity, density, and product shrinkage.

Madamba conducted a study to determine the physical changes of bamboo shoots with regard to shrinkage, density, and internal porosity and related these physical properties to moisture content. These essential data were then used in the realistic mathematical modeling and simulation in analyzing designs and optimization of mechanical dryers.

Density and moisture

Madamba found that the physical changes of density, porosity, and the shrinkage of the bamboo shoots during drying are, "important input parameters in a realistic mathematical model characterizing the process as well as the design simulation and optimization of the drying systems."

Using the data obtained in this study, Madamba concluded that the apparent density of bamboo shoot slabs (with measurements of 5.0 x 3.2 x 1.8 cm) and dried in a convection oven and a tray dryer operating at 70^{0}C and 7.2% relative humidity), "fitted excellently to a second degree polynomial (SOP or quadratic) model (app = 1338.6 + 0.99MC 0.051MC2) as well as the empirical model developed by Lozano et al. (1983) for fruits and vegetables (app = 13.81.4 168.1 (MC/MC0) 4.9 exp (3.8 x (MC/MC0), where app is the apparent density, MC is the percent moisture content, and MC0 is the initial moisture content.

Simply put, the apparent

page 19 ➡

Natural farming...

natural farming system in agriculture not only in promoting food security but also in its other advantages. As it has less input requirements, government would rather support it than to remedy problems associated with land degradation and other production related practices. He added that the true and genuine answer to problems of hunger and malnutrition should be founded on programs and policies for sustainable agriculture. He cited some of the directions and programs of DA that are geared on sustainable agriculture, to wit:

1) Establishing the basic policy statement and principles for upland agriculture development

A Memorandum Circular signed by former Secretary Luis P. Lorenzo provides the policy for the establishment and development of upland agriculture as one of DA's major programs which shall serve as the guiding principles for current DA initiatives and interventions being implemented in the uplands. This guideline is consistent with President Arroyo's 10-point legacy agenda, particularly in facilitating the development of 1 to 2 million hectares of land for agri-business purposes, and its drive towards the generation of 6 million jobs in 6 years.

In recognition of the economic potentials of upland agriculture in the country and in support to the preservation of agro-biodiversity, this guideline could provide opportunities for balancing development and environment. While environmentally sensitive, the uplands can be managed in a sustainable manner that can support a wide range of agricultural activities. The uplands are the ultimate expansion areas for future sustainable and modern agricultural development that would require special and location-specific technologies and production systems. Our highlands, for instance, have high potentials for the development of high value semi-temperate crops, herbs and ornamentals, livestock and even freshwater fisheries.

2) Launching of the QUEDANCOR credit window for organic rice farmers

Sustainable agriculture has been re-introduced as a measure to address environmental concerns, food security and in increasing farm income. As organic rice farming gains ground, more farmers have shown interest to go organic. However, it takes about two years or four cropping seasons to convert from conventional to full organic farming. Thus, it is necessary to provide financial support to enable small farmers to facilitate adoption of low cost farming technology that has been tested to produce nutritious organic rice. The role of QUEDANCOR as an agricultural credit provider is critical in advancing the organic rice industry.

Usec Sana explained that in Memorandum Circular No. 329, signed by QUEDANCOR President and CEO Nelson Buenaflor on October 2004, QUEDANCOR approved its Credit Window Program For Organic Rice Farmers. Generally, the program hopes to provide farmers access to credit through QUEDANCOR to facilitate the upscaling of the organic rice industry. Specifically, the program hopes to provide and make available regular credit and technical support to farmers in Luzon, Visayas, and Mindanao areas who are into organic rice farming. QUEDANCOR's credit window program held its pilot testing on organic farming in Camarines Sur, Agusan del Sur, and Negros Occidental.

3) BAR's support to natural farming system

The Bureau of Agriculture Research (BAR), being the lead national agency for coordinating R&D, is advocating natural farming system as an important strategy. This could be in the form of funding of researches/activities related to NFS. BAR is geared towards developing knowledge, methods, and technologies that can make the agriculture sector competitive and efficient. With natural farming, the Bureau is giving farmers technology alternatives towards sustainability and greater profitability. Under our national programs, BAR is funding projects/researches on or related to natural farming. One of these is the varietal evaluation of selected vegetables grown under organic conditions which is implemented by the Institute of Plant Breeding (IPB). With the good potential of natural farming system, BAR has committed its support and assistance to this endeavor to improve the lives of farmers and achieve greater sustainability while at the same time preserving the environment. ■

Kalamansi...

stainless steel casing was perforated at the bottom for seed separation and beneath the perforated casing was a strainer for seeds passing through the casing. The extracted juice passed through both the casing and the strainer.

The verdict

Fruit size was an important independent variable that significantly affected all responses, according to the engineers, except for extraction efficiency at 95% level of significance. Drum clearance had a significant effect on feeding capacity, extraction efficiency, overall acceptability, and capacity ratio. The speed of the presser had no significant effect on all the response variables at 95% significant level.

Madamba and Rafosala concluded that the performance of the fabricated machine was acceptable. "However, the opening of the top hopper should be widened to minimize clogging when using large fruits. The inclination of the internal hopper should also be slightly increased," they recommended. The engineers also recommended that the spacing between the grooved square bars on the periphery of the presser drum should also be increased to not less than 50 mm to increase the capacity and minimize clogging.

If this machine would soon be commercially available, then manufacturers of concentrated *kalamansi* juice won't be having a hard time removing that bitter taste. Then our summers would be more refreshing since we won't have to squeeze hard for a *kalamansi* juice by the beach. We'll just have them by the bottle.

Sources:
1. Madamba, Ponicano S. and Ben-hur C. Rafosala. Design, development, testing, and optimization of a citrus juice extractor. The Philippine Agricultural Scientist. Vol. 85, No. 3, 273-282. September 2002. Contact: Dr. Madamba at Agricultural and Bio-Process Division, Institute of Agricultural Engineering, College of Engineering and Agro-Industrial Technology, UP Los Baños, College, Laguna. Emal: pmadamba@laguna.net; psm-upfi@laguna.net; www.laguna.net.pmadamba.com/
2. Kalamansi. Asia Source. Retrieved from the world wide web: http://www.asiafood.org/glossary_1.cfm?alpha=K&wordid=2698&startno=1&endno=25

Technology...

The farmers were also trained in herd management and jointly collected data on stock inventory, growth performance of the goat, mortality, etc, with the researchers. With their participation, they imbibed the technology better and, therefore, improved the utilization of the technology.

Communication matters

The authors concluded that the communication structure in the Goat Upgrading Technology Commercialization Program was largely informal because the relationships were based on friendship, kinship, and shared interest. This way, communication is facilitated, and mutual understanding is achieved better.

The findings of the study support the importance of mutual understanding in a participatory communication milieu and prove that the basic pursuit of humans to strive for mutual understanding with fellow human beings is best achieved through effective communication.

Source:
Carbonel NR, F. Librero. "Communication behavior and utilization of upgraded goat production technology in Nueva Ecija."

Sugarcane...

While the chemical N fertilizer increased sugarcane yield by 37% to 48% in both locations, the distillery effluent increased yield by a staggering 64% to 71% in both locations. In Tuy, the highest yield was from the plots fertilized with full dose of chemical N fertilizer plus distillery effluent, while in Lian, the highest yield was from the plot fertilized with distillery effluent alone.

This, according to the team, is considered the ultimate measure of the effectiveness of distillery effluent since yield was increased by the application of distillery effluent alone, way above the yield figures given by recommended chemical N fertilizer treatment.

These results showed that the use of distillery effluent alone, or in combination with full or half rates of chemical N fertilizer can give higher yields of sugarcane than using chemical N fertilizer alone. Also, the study found out that distillery effluent alone can give the same benefits as chemical N fertilizer and can therefore substitute for the recommended chemical N fertilizer.

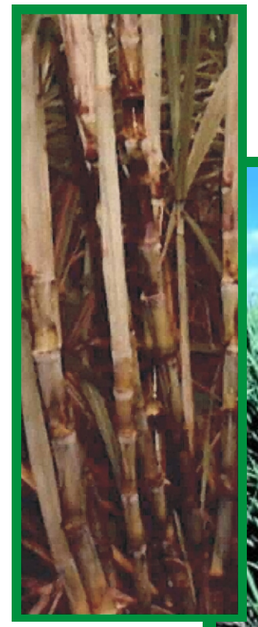
The effluent's high potassium content also increased the soil's exchangeable potassium, the net available N, net available P, exchangeable K, and the organic matter content of the soil.

The study's findings will have a double edged positive impact as a solution to both high fertilizer cost and the alcohol distilleries' liquid waste disposal. Thus, it responds to the perennial quests for sustainable waste management and sustainable agriculture.

Sources:
Sison MLQ, FG Torres, FRP Nayve, VP Migo, WL Fernandez. "Recycling distillery effluent as liquid fertilizer for sugarcane". National Institute of Molecular Biology and Biotechnology(BIOTECH), University of the Philippines Los Banos, College, Los Banos, Laguna. 2003

Distillery effluent: Fertilizer for sugarcane

by: Ma. Lizbeth J. Baroña



Two problems – one environmental and the other agricultural– can actually cancel each other out.

A minimum of 150,000 liters of distillery effluent is produced from each of the 12 alcohol distilleries in the country everyday. On the other hand, the high cost of fertilizer has rendered sugarcane production in the country incapable of sustaining the needs of the country's sugar industry.

A study conducted by the team of Dr. Ma. Lourdes Q. Sison, Ms. Fe G. Torres, Dr. Fidel Rey P. Nayve Jr, Dr. Veronica P. Migo, and Dr. William L. Fernandez, of the National Institute of Molecular Biology and Biotechnology(BIOTECH) found that distillery effluent can be a cost-effective fertilizer for sugarcane.

What is an effluent?

An effluent is the liquid waste that flows out of a treatment facility, which is discharged to bodies of water. Effluent from distilleries is difficult to dispose because of its high biological oxygen demand, and its extremely dark color.

After studying the chemical make-up of distillery effluent, the team found out that it contains considerable amount of organic material, nitrogen, potassium, phosphorus and other elements that are beneficial in fertilizing crops. More importantly, unlike other industrial bi-products, distillery effluent does not have heavy metals or toxins.

Sugarcane production and the sugar industry

The Philippine sugar industry used to be a bright spot in the country's agriculture and trade sectors, having been one of the largest foreign currency earners. But the industry has been weighed down by problems stemming from low sugarcane yield and high cost of production. Fertilizer is one of the major inputs that led to high cost of production and the decline of the industry.

Aside from its being costly, imported inorganic fertilizer causes environmental pollution by increasing soil acidity, leading to the inavailability of other elements vital to plant growth. The study found that small-scale sugarcane farmers in Batangas shell out about P4,500 to P6,000 per hectare for fertilizer alone. Organic fertilizer on the other hand, is cheap and completely biodegradable. There is a need, though, to find adequate sources of organic fertilizer to tap.

Testing distillery effluent as organic fertilizer

Field experiments were done in two sites: in Tuy, Batangas from May 7, 2000 to March 2, 2001; and in Lian, Batangas, from February 1, 2001 to December 6, 2001.

The sugarcane cultivars, Phil 75-44 and Phil 87-15, were used in Tuy and Lian, respectively. The treatments included an unfertilized control, the recommended rate of chemical N fertilizer or RRC(175 kg N/ha), half of the RRC(0.5 RRC), the recommended rate of distillery effluent (RRE),and the combination of RRC and RRE.

The rate of distillery effluent application for Tuy(139 kg N/ha) and that for Lian(182 kg N/ha) is the same as that of the 175 kg N/ha RRC. Recommended cultural practices for sugarcane were followed during the course of the experiments.

Three months after planting, data on plant height and number of tillers were gathered. Cane tonnage, sugar yield, and sugar content were also analyzed . The effect of the distillery effluent on chemical soil properties was also determined from soil samples.

Distillery effluent can be organic fertilizer

On its effect on plant height, the distillery effluent alone increased plant height and is comparable with the chemical N fertilizer at full and half rates.

page 20

Hydroponics finds its way into backyards

by: Ma. Lizbeth J. Baroña

You may be living in the middle of the metropolis with only a few square meters of space for a backyard or none at all, but this shouldn't keep you from having your own vegetable "farm". The technology that allows for this possibility is the Simple Nutrient Addition Program, or SNAP hydroponics.

Soiless farming

Hydroponics is the technique of growing plants without soil. It is not a new concept. This technique is believed to have been practiced in the famous hanging gardens of the ancient city of Babylon, which is considered one of the ancient world's eight wonders.

In the modern day setting, hydroponics provides the long-term solution for vegetable production even under urban settings. With this, there is no issue of "in and off-season" farming because hydroponics system allows for uninterrupted farming.

Although hydroponics has been around for some time, it is only beginning to find its way into the Philippine farm setting. Hydroponics farms are already found in Cavite, and recently, in Clark Field, Pampanga. These hydroponics systems, however, were developed abroad making it expensive and unavailable for ordinary vegetable growers.

In a study conducted by Dr. Primitivo Jose Santos and Eureka Teresa Ocampo of the Institute of Plant Breeding (IPB), at the University of the Philippines Los Baños (UPLB), the scientists found that vegetables like lettuce, sweet pepper, celery, and cucumber can be successfully grown using a simple hydroponics system called SNAP hydroponics.

Low cost, low maintenance hydroponics system

Past experiments at the IPB made breakthroughs in using simple hydroponics systems where plants can be grown in a solution while using electrically-driven compressor pumps.

However, these systems that depend on the availability of electric supply become useless during power interruptions, which occur quite often in the country. Lack of power causes water-logging in the systems. The plants die if active aeration is not restored within the day.

This observation provided the impetus for the development, not only of a low-cost, but also a low-maintenance, passive aeration system.

SNAP hydroponics

The design of the snap hydroponics system is based on readily available materials found in a regular household. The system uses passive aeration, which does not require electricity.

There are four simple things needed to construct a SNAP hydroponics system: a seedling plug, the culture pots, the nutrient solution, and a shelter, which can be your house's overhang roof.

Seedling plugs can be created using Styrofoam cups with holes at the bottom. To hold the plant in place, plug a bit of coconut coir dust at the bottom. Place a piece of net at the cut-off bottom to hold the coir dust and also to allow the roots to grow downward to the nutrient solution.

The culture pot is simply the container that holds the solution and the styrofoam cups containing the seedlings. For the solution reservoir, get a box and line the bottom with polyethylene sheet to keep the solution from leaking. The lid of the box is used to hold the cups. Cut out holes on the lid, big enough to hold the Styrofoam cup by its neck.

The nutrient solution is made up of tap water and fertilizer mix. Some commercially available fertilizer mixes can be used in snap hydroponics. The mix is dissolved in water (the mix is 80-90% of final volume of the solution). The solution must be dissolved very well.

page 17

Hot shoots...

density of bamboo shoots tended to increase during drying in a polynomial fashion while the true density increased linearly with decreasing moisture content. This can be explained by the higher density of sorbed water as well as its interaction with the material at low moisture contents, Madamba expounded.

The equations above were adequate in characterizing the response of bamboo shoots to drying.

Porosity and moisture content

Madamba also concluded that internal porosity develops during drying and is non-linearly related to the residual moisture content. Particle porosity depends on the initial amount of moisture, composition, size of the material, including the type of drying. The evolvement of internal porosity, according to the researcher, is due to the removal of water in the intercellular space which instead is replaced by air. Therefore, the more water removed in drying bamboo shoots, the more pore spaces within the material is created.

This means that the higher internal porosity in dehydrated products, the more beneficial it is, "as rehydration would be faster because of the presence of more sites where water is absorbed, resulting in a better reconstituted product."

Bamboo shoots vs fruits and vegetables

Drying bamboo shoots may differ from the drying of fruits and vegetables in the sense that shrinkage in bamboo shoot slabs, as observed by Madamba, is fiber-oriented and is different from the isotropic (having the same properties in all directions) shrinkage reported in fruits and vegetables. This means the shrinkage is anisotropic (a structure whose appearance varies with the angle of observation), which depends on the geometry of the sample, like in garlic and apple disks.

Now that the physical properties involved in the drying of *labong* are now better understood, perhaps instant (reconstituted) *labong* is not far away. We will then have an easier time stocking up on *labong* and have *lumpiang sariwa* any time of the week.

Reference: Madamba, Ponciano S. Physical changes in bamboo (Bambusa phyllostachys) shoot during hot air drying: Shrinkage, density, and porosity in drying technology. Vol. 21, No.3. 555-568, 2003
Philippine Vegetable Sampler. From the world wide web http://www.tribo.org/vegetables/labong.html
Bamboo Information Network. From the world wide web. http://www.pcarrd.dost.gov.ph/cin/bamboonet/features%20-%20food_prprtn.htm
Bamboo shoots: Food for all seasons. From the world wide web. http://www.dost.gov.ph/media/article.php?sid=291

Tilapia...

Moina).

As with the formation of the testis or spermatogenesis, fish fed with diet 5 (*Moina* and fry booster) exhibited larger spermatocyst diameter, which means an increased surface area for more spermatogenic cells.

These results, according to the researchers, show that high nutrient composition, better digestibility, and food palatability account for the excellent growth performance of the fishes fed with the *Moina*-fry booster combination,

Source: Jaravata E.E., A.A. Herrera, and J.S. Abucay. "Effect of the quality of first food on the development of the gut, testis, and skeletal muscle of the genetically male tilapia (GMT)". University of the Philippines Manila, University of the Philippines Diliman, Central Luzon State University. 2004

GIS...

the province of Aklan are susceptible to soil erosion because of their greater slope gradient and length. Satellite images show that vegetation in Aklan is 36% mixed brushwood and 18% grassland.

All these factors were used to generate a soil loss map. The data show that erosion is relatively low in about 82% of the province's total land area. But 3.3% are classified to have severe erosion potentials. These lands are located along areas with high slope and/or covered with grass.

The municipality of Tangulan had the highest projected erosion rate, while the municipality of Kalibo had the lowest. Approximately 6,000 hectares with severe erosion rates are in the municipalities of Madalag and Libacao.

In terms of land cover, the highest erosion-risk areas were grasslands with 19.8 t/ha/yr, followed by secondary forests with 4 t/ha/yr, then brushwoods mixed with plantation with 3.6 t/ha/yr.

The study concluded that erosion in these areas can be mitigated by implementing practices like cross-slope farming, and minimum tillage. GIS was proven to be an effective tool in determining erodable areas long before the arrival of torrential rains, therefore allowing measures to be effected in advance to save the soil, and to save lives.

Sources:
·1. A.D .Moscoso. "Identification of erosion-prone areas in the Province of Aklan using Geographic Information System(GIS)". School of Technology, University of the Philippines Visayas, Miago, Iloilo, 5023. 2004

·2. G. Wall, C.S. Baldwin, and I.J. Shelton. "Soil Erosion - Causes and Effects". Ontario Institute of Pedology and Ridgetown College of Agricultural Technology. 1987, retrieved from http://www.gov.on.ca/OMAFRA/english/engineer/facts/87-040.htm, on 11.25.04

Longer shelf...

Brighter prospects

The prospects for increasing Philippine fresh mango exports are bright. The expansion of current export volume is possible. Japan and Hong Kong, the major markets for Philippine mango, are expected to continue their import growth in the next few years. The United States and the European countries are also potential markets for fresh Carabao mango. Mango in processed forms, such as dried, jam, chutney, and puree, has a growing demand abroad.

The local market has stabilized in recent years. However, higher prices due to low supply and competitive imported fruits such as apples and oranges may have shifted consumers' preference to these items. In terms of production technology, there seems to be no serious problems in the mango industry as relatively high levels of technology exist in the major growing provinces of the country.

A major constraint to the growth of the industry is financing. Mango takes at least six years to mature and many mango growers may find the cultivation of mango trees a very costly venture. A threat to the country's present competitive position in mango export is the expanding mango production of Malaysia, Thailand, and Australia to meet the growing worldwide demand for this commodity. Business strategies may include the establishment of collection and processing centers in the major producing areas, establishment of nurseries for planting materials of recommended varieties, massive production in big plantations, and the provision of export marketing assistance such as market research and packaging. To fully tap the export potential of mango, the government and private sector must jointly address the pressing problems of the industry.

Source:
1) Lagunda, Ramiro Edilberto, Nestor Asuncion, Robelyn Daquila, Ruben Manalabe, Kevin Yaptenco, Noida Flor, Elda Esguerra, and Sherman Chavez. "Establishment of a controlled atmosphere protocol for export of Carabao mango". Bureau of Postharvest Research and Extension, Muñoz, Nueva Ecija and Postharvest Horticulture Training and Research Center, UPLB, Los Baños, Laguna. June 2004

Vaccine...

Newcastle disease, vaccination is not a common practice among our poultry raisers particularly those engaged in backyard farms. This is because the cost of vaccines is very high and are not readily available locally and have to be imported from other countries.

ND vaccine now locally produced

The group of Dr. Cadeliña of the Biologics Vaccine Production Laboratory of CENVIARC of RFU 7 has been producing locally the inactivated oil emulsion *Newcastle* disease vaccine and is licensed by the Bureau of Animal Industry as a manufacturer. So far, the ND vaccines are being distributed among backyard native chicken raisers situated in Region 7 namely, Bohol, Cebu, Siquijor and Negros Oriental. Region 7 accounts for 9.35% of the entire poultry industry population. Distribution is being done through the Provincial Veterinary Offices.

With this vaccine now developed, the CENVIARC expects to vaccinate at least 80% of the upgraded native chicken population in Region 7 and hopefully, reduce production losses.

Reaping...

our native chicken may be a hardy breed, it is not exactly immune to the Newcastle Disease of domestic poultry. Native chicken growers in Region 7 can consider themselves lucky as they have a source of low-cost Newcastle Disease vaccine in Cebu City.

We may be reaping from what we have sown. But resting on laurels is not our wont. We shall continue to seed the soil for the future harvest.

On its economic advantage, the locally produced ND vaccine is 19% cheaper than the commercially available vaccine. The ND vaccine amounts to P1.60 per dose only compared to the P1.98 per dose of the commercial vaccine.

Dr. Cadeliña believes that with the adequate budget support to produce more ND vaccines, this would lead to improved output of our backyard native chicken raisers.

For more information, please contact Dr. Rachel B. Cadeliña, Agricultural Center Chief, DA-RFU 7, M. Velez St., Cebu City or contact her at telephone no. (032) 254-7087, (032) 255-3686, fax at (032) 256-3063 or e-mail at: cenviarc @ yahoo.com

Source: Cadeliña, R. B., D. B. Capuno, and V. G. Batoy. "Newcastle disease prevention and control program for upgraded native chicken." Presented during the DA-BAR Agriculture and Fisheries Investors' Forum on 5 October 2004, BSWM Convention Hall, Visayas Ave., Elliptical Road, Diliman, Quezon City.

Fatter and greener lettuce with *Nitroplus*

by: Junelyn S. de la Rosa

For salad lovers, nothing is more disheartening than soggy or sorry-looking lettuce in your salad or even in your favorite hamburger. An excellent salad or sandwich needs to have crisp and flavorful lettuce leaves. Today, salad lovers have something to smile about.

Recently, scientists from the National Institute of Molecular Biology and Biotechnology (BIOTECH) at UP Los Baños have found a new method of growing fatter and greener lettuce by using *Nitroplus* with the farmers' practice of using organic manure. The scientists said that they harvested 81% more leaves and they are optimistic that the new method could help boost local lettuce production.

Lettuce: King of vegetables

Lettuce, called the "king of salad plants", has rounded leaves and a stem that contain a milky juice. Varieties of lettuce differ in leaf color, size, and texture. The color of leaves ranges from light to dark green with darker leaves containing more vitamins. Lettuce can be divided into two kinds: the loose-leaf lettuce whose leaves hang on all sides and the true head-lettuce that resembles a cabbage with the leaves drawn together. Scientists say that the loose-leaf variety contains higher nutrients since it has the advantage of being more exposed to sunlight compared to the cabbage-like variety.

Lettuce is rich in vitamins, especially the antiscorbutic vitamin C. It is bulky, low in food value but high in health value. It is rich in mineral salts especially alkaline elements. Fresh lettuce contains dietary fiber, protein, carbohydrates, vitamin A, vitamin C, calcium, iron, magnesium, and potassium. These nutrients keep the blood clean, the mind alert, and the body in good health. When buying lettuce, it is important to select those that are fresh, crisp, and green-leafed. The leaves should be free from wilt, rot, and rust.

What is Nitroplus?

Nitroplus is a microbial inoculant developed by BIOTECH that is used for legumes such as soybean and cowpea to increase their yields. *Nitroplus* contains *Rhizobium sp.*, a bacterium that forms nodules on the roots of the plants and fixes nitrogen in the air, hence, increasing plant growth and yield. Studies have shown that soybean inoculated with *Nitroplus* showed a 124% yield increase. Using *Nitroplus* inoculant also reduces the amount of fertilizer needed by the plant and that nitrogen in the soil is conserved for other crops.

Growing lettuce with Nitroplus

In the study, the scientists tested the effect of the *Nitroplus* inoculant using the Grand Rapid lettuce variety during the 2002 wet season. The inoculant was applied on the seeds at the rate of 1g/ gram of seeds. The researchers found that *Nitroplus* for soybean *(Bradyrhizobium japonicum* strain USDA 110) and for garden pea *(Rhizobium leguminosarum* bv *viciae* strain pea Bag) increased the yield of lettuce by 16 and 24 %, respectively. Upon harvest, leaf yield increased by 81% using both *Nitroplus* and the usual farmers' practice of applying manure.

Benefits and uses of lettuce

Lettuce offers lots of benefits and it has a variety of uses. For instance, magnesium in the lettuce juice is good for muscular tissues, the nerves and the brain. It is also a remedy for common ailments such as constipation, diabetes, anemia, and insomnia. Studies have shown that lettuce contains a sleep-inducing substance called "lectucarium". In fact, the sedative

page 23

GIS identifies Aklan's soil erosion hotspots

by: Ma. Lizbeth J. Baroña

The 2004 report of the United Nations Environment Program indicates that the Philippines is one of the countries with large areas of very degraded soil. The province of Aklan – famous for its Boracay beaches – devotes 47% of its land area to agriculture, an industry that is vital to the economic health of the province. A study by the University of the Philippines Visayas(UPV), conducted by Mr. Alan Dino Moscoso identified the soil erosion prone areas in the province as a basis for soil conservation vis-à-vis proper land-use and planning.

Why does soil erosion occur?

Soil erosion is a naturally occurring process on all lands. It may be a slow process that continues relatively unnoticed, or it may occur at an alarming rate causing serious loss of topsoil. The topsoil contains most of the soil's nutrients. The intensity of rainfall, soil erodibility, and lack of vegetation are factors that cause erosion.

The impact of raindrops on the soil surface breaks down soil and disperses the soil aggregates. Soil movement by rainfall (raindrop splash) is usually greatest and most noticeable during short-duration, high-intensity thunderstorms. Although the erosion caused by long-lasting and less-intense storms is not as spectacular or noticeable as that produced during thunderstorms, the amount of soil loss can also be significant, especially when compounded over time. Runoff can occur whenever there is excess water on a slope that cannot be absorbed into the soil or trapped on the surface.

Soil erodibility is the tendency of the soil to be eroded. Soils with faster infiltration rates, higher levels of organic matter and improved soil structure have greater resistance to erosion. Sand, sandy loam, and loam textured soils tend to be less erodible than silt, very fine sand, and certain clay textured soils (Wall, Baldwin, Shelton, 1987).

The presence of vegetation helps keep the soil in place thus increasing the soil's resistance to erosion. The plant and residue cover protects the soil from raindrop impact and splash, therefore slowing down the movement of surface runoff and allowing excess surface water to infiltrate.

Where in Aklan is erosion most likely to happen?

The researcher used the Universal Soil Loss Equation(USLE) developed by Wischmeier and Smith(1978). USLE is an empirical method developed to compute annual soil loss as mass per unit using factors that cause sheet and rill erosion. This model incorporates soil erodibility, slope length and gradient, rainfall, land and crop management, and other inputs.

For rainfall, precipitation values recorded in Kalibo, Aklan that were interpolated show that annual rainfall in the province ranges from 1,402 to 2,678 mm. Aklan's soil information show that 32% of the area is Alimodian Clay, 30% is undifferentiated mountain soil, and 9% is Sapian Clay. Erosion is positively related to greater slope gradient and slope length. Topographic maps indicate that the southwestern portions of

page 19

The blooming...

payment in cash and by credit (*utang-bayad* system). Marketing costs include the following: labor cost, hauling and delivery, and depreciation cost. Labor and hauling/delivery costs make up most of the total cost incurred. Davis computed the average cost incurred in marketing the flowers and she found that farmers spend P0.91 per dozen.

Traders

According to the study, the traders' sources of chrysanthemums were farmers (77.79%) and their fellow traders (assembler-wholesaler-retailers and wholesaler-retailers). Marketing practices done by traders were: hauling/delivery, trimming, grading, and selling. Davis said that among the three middlemen, the retailers incurred the highest marketing cost (at P1.95 per dozen), followed by the wholesaler-retailer (at P1.43 per dozen). The retailers get the highest profit (valued at P12.67 per dozen), followed by the wholesaler-retailer (P8.55 per dozen). Assembler-wholesaler-retailers get a profit of only P5.66 per dozen.

Problems

Davis' study revealed that farmers suffer from their products' low price while their production costs is high. Others have trouble with the credit system of payment. Traders also have trouble with the flowers' storage and low sales due to high competition. Other sources of problems for the traders are the raids against peddlers at the Freedom Park in Cebu City, seasonal swings in supply, and high cost of transportation.

Recommendations for marketing

Based on Davis' study, the price spread in marketing chrysanthemums is high. In terms of consumers' peso paid for cutflower, Davis computed that, "only 47 centavos went to the farmer and the remaining 53 centavos went to the middlemen wherein retailers gained the highest profit."

Davis recommended that producers themselves must do the other marketing services so that they can obtain higher prices for their products. "Price spread can be narrowed down if producers organize themselves into an organization or cooperative to handle the marketing of their produce." This way, handling and delivery expenses for every producer can be minimized. Davis added that the organization can also help producers in the procurement of needed inputs by bulk to lessen production costs.

So after reading this article, every time you joke about the chrysanthemum spelling, you will remember how that flower ends up on people's coffee tables.

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2. Cutflower industry situationer report. Department of Agriculture. Retrieved from the world wide web
http://www.da.gov.ph/agribiz/cutflower.html

Hydroponics...

A shelter can be your garage or any place that provides sunlight and good aeration in your house because the system needs to be protected from the elements.

Setting up

Anchor two-week old seedlings in the coir dust plugged in the styrofoam cups. Allow the roots to grow for a week by placing them in shallow trays with 1 cm-deep nutrient solution. When the root averages 1-2 cm, place the seedlings in the culture pots.

Submerge the bottom of the cups in the solution while the plants are at seedling stage. Once the roots become longer, decrease amount of solution in a way that a space is created between the bottom of the cups and the surface of the water. The space allows for passive aeration. This level of water is maintained as the plant grows.

One person can maintain the system, which can also be used year-round. Vegetables such as lettuce, sweet pepper, cucumber, and celery can be produced successfully in snap hydroponics. Cost and return analysis shows that this system is profitable, especially with leaf lettuce.

A basic premise to keep in mind about SNAP hydroponics is its simplicity. A modification of these simple principles allows for large-scale vegetable production that can be done right in your backyard.

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2. Retrieved from the world wide web, at http://archimedes.galilei.com/raiar/histhydr.html (November 22, 2004)

Going bananas: The attack of the fungal enemies

by: Likha C. Cuevas

The Japanese love our bananas, especially the non-chemically treated ones. In fact, the Food and Agriculture Organization (FAO) estimated that Japan annually consumes 9,000 tons of these organically grown tropical fruits. The Japanese say that they like these bananas because they are healthy and tasty since these types of bananas are not sprayed with chemicals during planting and postharvest operations.

What are these bananas? Mostly, these are the kind of bananas that farmers plant in their backyards.

However, since these commercially important fruits are not treated with chemical pesticides, they are highly susceptible to postharvest diseases that cause early decay or rotting. These make the fruits difficult to transport and their damaged appearance could turn-off consumers. Until now, there are no available reports on the causes of decay and rotting. All we know is that these postharvest diseases are associated with different fungi, which includes 46 species.

Dionisio Alvindia of the Bureau of Postharvest Research and Extension (BPRE)-Department of Agriculture (DA) in Muñoz, Nueva Ecija, together with Japanese scientists, examined the ability of these fungi to inflict damage or cause diseases to the non-chemically treated bananas. They also evaluated the economic importance of these fungi in causing postharvest diseases.

Fungi going for bananas

Alvindia and his team isolated 46 fungal species from non-chemically treated bananas from the Philippines. They found that 38 species were pathogenic (they cause diseases) and eight were non-pathogenic to the fruits. The non-pathogenic species are: Verticillium tricorpus, Trichoderma saturnisporum, and some unidentified species belonging to Monilia, Cylindrocarpom, Spiromyces, Oedocephalum, Oiiodendron, and Aureobasidium.

The research team noted that the lesions caused by these harmful fungi consisted of oval blemishes, with colors ranging from chocolate brown to black on the banana skin (or peel). The lesions for all these species were similar but they vary in size depending on the species.

Ten species that cause diseases to wounded bananas even cause lesions to unwounded ones. The species that caused the greatest damage to bananas (according to the size of lesions they cause and their infection rate) are: Lasiodiplodia theobromae, Colletotrichun gloeosporioides, Phoma exigua, Colletrichun musae, Penicillum waksmanii, Penicillum citrinum, and Aspergillus flavus.

The serious pathogens that affect only wounded fruits are: Thielaviopsis paradoxa, Phomopsis sp., Fusarium verticillioides, and F. Oxysporum.

What to do with fungal pathogens?

According to the researchers, "the active pathogens are a serious threat and should be considered in the control of postharvest diseases because of their potential to induce decay in fruits with intact and wounded surfaces."

They recommend that open cut wounds in the crown as well as cuts and bruises on the fruit surface should be protected against active pathogens. The researchers also said that the less active pathogens can also cause fruit decay through fresh cut wounds on the crown and through cuts and bruises that were acquired during postharvest operations because they have enough time to infect and induce the decay of vulnerable fruits. However, the potential of the non-pathogenic fungi as biocontrol agents should be explored.

This study conducted by Alvindia and his team showed that non-chemical bananas are more susceptible to infection by various fungi, which contributes to the difficulty of preserving their quality, compared with regular plantation bananas. To alleviate huge losses, the researchers recommended that pest control should start during the production (growing) and subsequently, during the postharvest operations of these bananas. They attributed the poor quality of Philippine non-chemical bananas to lack of proper cultural management, careless handling, and poor

page 23

Longer shelf life for our *Carabao* mangoes

by: Junelyn S. de la Rosa

Today, the mango industry is booming like never before. Recent export statistics have shown a very healthy surge in sales and revenues. Indeed, foreigners can't seem to have enough of our juicy, sweet Carabao mangoes, now aptly called the Philippine Super Mangoes and marketed under that name in neighboring countries such as Japan, South Korea, Hong Kong, and Singapore, as well as in Australia, France, Belgium, United States and other parts of Europe.

Recently, a new study by a group of postharvest scientists spells more good news for the mango industry. Using the "Controlled Atmosphere Technology", the scientists have designed a new equipment that can store fresh mangoes for at least 28 days, enough time to transport them by sea to our farther neighbors who have not yet sampled these luscious fruits.

The Philippine Super Mango

The Philippine Super Mangoes or Carabao mangoes *(Mangifera indica L.)* are gaining popularity as an exotic, seasonal fruit in foreign markets. This variety is famous for its sweet pulp which is golden yellow and waxy-soft in texture. It is ranked as the country's third most important fruit crop after bananas and pineapples. Last year, fresh fruit exports which were mostly sold to Hong Kong and Japan raked in US$31.01 million.

Mangoes are either sold fresh or processed into a variety of products. Green or immature mango is often used as a salad ingredient, appetizer, or juice. The mature or ripe mango is consumed as a dessert or processed into products such as beverages and confectioneries like jams, candies, chutney, ice cream, and mango pies.

Longer shelf life

While mangoes are the third most important fruit crop in the country, exporting them to other countries has been hampered by strict phytosanitary measures and its relative short shelf life of only 10 days. Because of its short shelf life, mangoes are transported via airfreight, thus, exporters incur higher costs that result to higher retail prices.

Recently, scientists at the Bureau of Postharvest Research and Extension (BPRE) in Muñoz, Nueva Ecija and the Postharvest Horticulture Training and Research Center at UPLB, Los Baños designed a storage equipment using the "Controlled Atmosphere Technology".

This technology ensures that the amount of oxygen, carbon dioxide, temperature, are optimum within the container to extend the storage life of the mangoes. The scientists also considered fruit maturity, stage of ripeness and timing of the application in working out the protocol.

Using a one-ton storage chamber with a controlled atmosphere, the scientists found that Carabao mangoes can be stored for 4 weeks and still retain preferred characteristics such as peel color, sweetness, firmness, total soluble solids, and tartiness.

page 18

Durian: Undisputed king of tropical fruits

by: Junelyn S. de la Rosa

Hate them or love them- the durian *(Durio zibethinus)* remains the undisputed king of tropical fruits. Despite its weird appearance and notoriously awful smell, its sweet custardy texture and heavenly flavor can make one swoon and join the masses of durian aficionados all over the world. Durian fruits are also packed with nutrients that our body needs to remain healthy and strong.

A healthy treat

Native to Southeast Asia such as Indonesia, Thailand, and the Philippines, durian fruits resemble a hedgehog, hence, its name durian which means "thorny" in Indonesian. More importantly, this unique fruit that "tastes like heaven, smells like hell" is full of important nutrients. It contains proteins, lipids, minerals (calcium, iron, magnesium, phosphorus, potassium, sodium, zinc, copper, and manganese) and vitamins (vitamin C, thiamin, riboflavin, niacin, pantothenic acid, vitamin B6, and vitamin A).

Durian fruits are sold either per kilo or per piece at prices ranging from P35 to P65 per kilo depending on the size and quality of the fruit. Also, durian fruits are usually consumed fresh or processed into paste, powder or other products such as ice cream, cakes, and confectioneries.

Today, durian is one of the high-value crops in the country with a bright potential for export to other countries more so because the local fruiting season is later than in other durian-growing Southeast Asian countries. Hence, the government has launched a campaign to boost durian production in Mindanao and other suitable locations.

Choosing a good durian

According to durian experts, there are three ways to choose the tastiest durian on the shelf. First is by checking that the fruit doesn't have worm holes, man-made holes, or gaping bottoms. Chances are fruits with holes either have worms inside or have been damaged through excessive handling.

Next, is to grip the durian by putting your fingers in the spaces between the thorns and shake. Fruits that make hollow sounds are most likely all seed and no flesh while fruits that feel heavy for their size are either unripe or waterlogged and, therefore, should be rejected.

The final step is to smell the fruit. An overrich, strong, fetid odor indicates that the durian is overripe, while no smell at all means the fruit is unripe. A faint aroma of bitter sweet butterscotch and almonds with a bouquet of wild honey and a hint of smoked oak is a winner- that means you have a durian with a thick, creamy, bitter-sweet tasting flesh that you can enjoy.

A better way of storing durian

Recently, a group of scientists found that the kind or variety, harvest periods or maturity, and low temperature affect the quality and storage life of durian fruits. They say that the best time to harvest durian fruits is at 110 days from anthesis or the opening of the flower bud. Fruits harvested at this age have high total soluble solids, high total reducing sugar, and low titrable acidity that are comparable to fruits harvested at full maturity of 120 days. This means that 110-day old fruits are as sweet, aromatic, and tasty as mature fruits.

Also, the scientists found that it is best to store processed durian pulp at a temperature of 10^{0}C. At this temperature, durian pulp can last for three months. They also recommend using other postharvest techniques to prolong shelf life such as the use of food waxes and Modified Atmosphere Packaging (MAP).

Finally, in terms of varieties or cultivars, they recommend *Puyat* over the *Nanam* and *Duyaya*. *Puyat* is superior in flavor, sweetness, and sugar content. It is not bitter and its pulp is saffron yellow or dark yellow which is preferred by consumers in both the local and international markets. ■

Source:
1)Añabesa, Miguela, Demetrio Oria, and Elda Esguerra. "Effects of maturity and temperature on the postharvest behavior and storage life of durian". Southern Mindanao Integrated Agricultural Research Center (SMIARC), Bago-Oshiro, Tugnok District, Davao City. March 2004.
2)Tan, Alfred. "How to choose a good durian". Retrieved from www.ecst.csuchico.edu

The blooming chrysanthemum industry in the Queen City of the South

by: Likha C. Cuevas

"What's your favorite flower?
"Chrysanthemum!"
"How do you spell it?
"C-H--- oh! I was wrong. My favorite flower is rose."

That joke is familiar but are we familiar with chrysanthemum?

Chrysanthemum is an herbaceous bush and the flowers come in large and medium sizes or in clusters. Cluster chrysanthemums can be found with more blooms per stalk and that's why they are preferred for flower arrangements. Some of the varieties produced in the Philippines, particularly in Cebu, are *Puto-Puto* and Buddha (unregistered varieties).

Chrysanthemum is one of the leading cutflowers in Cebu City. People prefer these flowers because they are hardy and are available in different forms and colors. Many people, especially in the barangays of Busay, Malubog, Bonbon, Babag, Pong-ol Sibugay, Taptap, Adlaon, Sirao, and Guba in Cebu City depend on the chrysanthemum cutflower industry.

The chrysanthemum cutflower industry

According to the Department of Agriculture (DA), the cutflower industry is considered as one of the country's sunrise industries. "The domestic supply of cutflower is still insufficient to satisfy the demand which results to large importations of cutflowers especially during the peak season." Aside from chrysanthemum, the country produces anthurium, aster, orchids, rose, gladiola and baby's breath. The biggest markets for the country's exports of other live plants and cuttings are Korea and Japan.

Such is the contribution and untapped potential of cutflowers in our country's earnings, especially the impact of chrysanthemum in Cebu, that Nimfa P. Davis of the DA Regional Field Unit 7 (RFU 7) investigated how the local chrysanthemum industry operates. She studied the socio-economic status of the chrysanthemum producers, determined the quantity produced by

the flower farmers, described the marketing practices of producers and traders of chrysanthemum, found out the marketing problems of the growers and traders, and established the flow, cost, and margins of marketing chrysanthemum.

The situation

In Davis' study, majority of his respondents (75 total) were males. Only three were single and the rest were married. Most of the grower respondents finished elementary education and only a few attended formal training on cutflower production. According to the study, there is a positive correlation between the monthly income of the farmer and their level of education and the number of trainings attended. In other words, as their level of education and the number of trainings attended increase, their income also increases.

In one cropping season, the growers can produce an average of 449 dozens of chrysanthemums. The growers practice grading (according to size of flower and length of the flower stalk) and packing before selling the flowers to their buyers.

The respondents preferred directly selling their flowers to the consumers (43.4% of the respondents) while others preferred delivering the product and the pick-up method. Results of the study showed that the farmers' source of price information are their fellow farmers while the rest reported that their sources are both fellow farmers and middlemen. Most of the respondents sold their flowers to assembler-wholesaler-retailers while others were selling their products either to wholesaler-retailers or to retailers located in Cebu City market or in nearby municipalities.

Majority of the respondents, according to Davis, received

➡ page 17

The best feed meal for genetically-male tilapia

by: Ma. Lizbeth J. Baroña

Researchers have found a feed formulation that enhances growth and development in genetically male Nile tilapia (*Oreochromis niloticus* L.) or GMT.

The group, Evangeline Jaravata of the University of the Philippines Manila, Annabelle Herrere of the University of the Philippines Diliman, and Jose Abucay of Central Luzon State University studied the growth response of tilapia fry to different food combinations.

GMT and their diet

Growing Nile tilapia (*Oreochromis niloticus* L.) is an important component of the Philippine aquaculture industry. It is also an important food in the tropics, especially in Asian countries.

The authors of this study cited the development of the "YY male technology", which was developed at the University of Wales Swansea, recently. The YY male technology is a breeding program that combines feminization and offspring testing that results in the production of novel males with YY genotype instead of the typical XY genotype. This resulting progeny or offsprings are dubbed "supermales" and have the ability to produce genetically male progeny or GMT.

Previous studies showed that the feeding habits of the Nile tilapia have an effect on the early development of their gastrointestinal tract. Although several studies have been conducted on the development of the Nile tilapia, none has been made on the development of GMT on different diets. The researchers therefore sought to determine the development of the GMT's gut, testis, and skeletal muscles with different formulated fish diets.

For the first period of the experiment, the researchers developed the diet as follows: Diet 1 contained *Moina* (a zooplankton) alone; Diet 2 contained fish meal and rice bran; Diet 3 contained fry booster; Diet 4 contaminted fish meal, rice bran, and *Moina;* and Diet 5 contained fry booster and *Moina*.

Around 200 GMT Nile tilapia fry samples were placed in tanks. In each tank, the fry samples were fed with a diet combination. Feeding was done four times a day for 30 days.

The second period of the experiment was done after 30 days of feeding when the fingerlings were transferred still grouped based on their diet - to earthen ponds where natural food plankton is available. Although feeding them the formulated diets had stopped, they were fed with fishmeal three times a day in the earthen pond until they were 150 days old from the first feeding.

Results

Fish fed with diet 5 *Moina* and fry booster showed the highest body weight, body length and gut length at different developmental stage, although diet 5 was not significantly different from diet 1*(Moina)* and diet 3 (fry booster) after the 150-day period. Fish fed with diet 2 (fish meal and rice bran) showed the lowest body weight, and body and gut length. The researchers attributed this low result from the possible unpalatability of the component of diet 2. On the other hand, diet 1 had both high protein and good digestibility components.

The fish fed with the *Moina*-fry booster (diet 5) feed combination also exhibited the best developed stomach with thicker muscles, longer and deeper mucosal folds, and more gastric glands. The anterior intestines of the fishes fed with this meal combination were also the best developed with thicker muscles, longer and deeper mucosal folds, more abundant goblet cells, and longer and more compact microvilli.

The use of light and scanning microscope revealed bigger muscle fiber diameters in fish fed with diet 1 *(Moina*), diet 3 (fry booster), and diet 5 (*Moina* and fry booster), while there were small muscle diameters in fish fed with diet 2 (fish meal and rice bran) and diet 4 (fish meal, rice bran, and

page 19

Nothing bitter about *kalamansi* juice

by: Likha C. Cuevas

Nothing beats a freshly squeezed cold *kalamansi* juice on a hot summer's day or iced black tea with *kalamansi* and honey to cool you down after a day at the beach. My mom used to make *kalamansi* juice when I was coming down with the sniffles.

Aside from making citrus drinks and adding 'oomph' to the otherwise boring black tea, *kalamansi* is also part of the Filipino daily menu. From marinating chicken and pork chops to making soy sauce-*kalamansi* dipping sauce for *inihaw na isda*, *kalamansi* is important to everyday life.

The *kalamansi* or sour lime (x *Citrofortunella mitis* (Blco) J. Ingram & Moore) fruit is only 2-3 cm (1/2-1 in) in diameter which is sometimes green or green-yellow. Small and round with slightly flattened ends, they can be picked green or ripe but the juice stays sour. This citrus is also popular; it is halved and placed alongside dishes of mixed fried noodles and similar one-dish meals in Malaysia and Singapore. In the Polynesian islands, the fruit is added to bland fruits such as papayas to make jam.

Squeezing made easier

Some have made machines to squeeze out the juice and for easy commercial manufacturing. However, when the juice is machine-extracted, the peel and the seeds are crushed together and the peel oil is released, thus, making the juice a little bitter. The bitter taste is detectable too in the juice of manually squeezed samples.

Dr. Ponciano Madamba of the College of Engineering and Agro-Industrial Technology, UP Los Baños and Mr. Ben-hur Rafosala of the University of Southeastern Philippines designed, fabricated and tested for performance a juice extractor that lessens the bitter taste.

According to Madamba and Rafosala, the natural bitter taste of *kalamansi* is considered good for digestion and aids in blood circulation. "Excessive bitterness, however, should be avoided during the processing of the juice to make it commercially viable and acceptable in local and foreign markets."

Bitterness can be minimized with appropriate mechanical extraction, according to the engineers, wherein the seeds are not crushed and the peel is not squeezed. "The design of a mechanical juice extractor that does not crush seed and peel is essential for a *kalamansi* juice processing system."

First prototype

Madamba and Rafosala designed, fabricated, and tested a pototype *kalamansi* juice extractor. Juice was extracted using an offset orientation of the casing assembly with respect to the rotary drum. "The drum was also equipped with equally spaced blades for initial piercing of the fruit before juice extraction," the engineers explained. Satisfactory capacities, extraction efficiencies and capacity ratios had been achieved but the engineers found that the product had low overall acceptability and the values obtained were not acceptable. The juice had a bitter taste because the seeds and peel were crushed during extraction.

Second prototype

After the first prototype, the engineers thought of adding a slicer section to the second prototype to prevent squeezing the fruit peel and seeds, thus avoiding the bitter taste. The slicer cuts the fruit into halves and then it allows the halves to fall into a rotary drum presser that extracts the juice and separates it from the peel, the pulp, and the seeds.

In a nutshell, the second prototype can be described this way: A stainless steel slicing knife was placed closed to and underneath the primary hopper opening in between two slotted drums. Up to five pieces of large whole *kalamansi* fruits at a time could be conveyed into the slicing section. The slotted drums rotate in opposite directions and brought the whole *kalamansi* fruits in contact with the slicing knife, which cut them in halves.

After slicing, the halves fell into the rotary drum presser enclosed in a stainless casing with an offset orientation. Extraction was achieved by compression as the calamansi halves passed between the rotary drum and the casing. The

page 20

Vaccine to cure *Newcastle* disease in chicken locally produced

by: Rita T. dela Cruz

Researchers from the Central Visayas Integrated Agricultural Research Center (CENVIARC) of the Department of Agriculture, RFU 7 have been producing locally the Inactivated Newcastle Disease vaccine to control (if not eradicate) the occurrence of *Newcastle* disease (ND) in native chicken. *Newcastle* disease is a highly infectious viral disease that affects poultry and other birds, attacking mostly the lungs and the nervous system. According to Dr. Rachel Cadeliña, project leader, the locally produced vaccine was proven to reduce the incidence of this disease, thereby increasing farmers' productivity and profitability. Moreover, the ND vaccine is cheaper than the commercially prepared vaccine now available in the market.

Newcastle disease: Bane of the poultry industry

Newcastle disease is an endemic disease in almost all regions of the country. Commercial chicken flocks affected with the disease could immediately get 90-100% mortality rate. According to the Animal Health Yearbook published by the Bureau of Animal Industry (BAI) in 2002, out of the 130, 479 reported cases, 31.9% or 41,597 were the reported deaths due to the occurrence of this disease.

Native chicken farming plays a crucial role in the poultry industry with small backyard farmers in the countryside as the main producers. Native chicken, being the main source of meat and eggs in the rural areas, is the most common type of chickens raised by backyard farmers, constituting 56% of the country's total poultry population. Thus, the occurrence of Newcastle disease would have an immense effect on the production of our local native chicken raisers.

Dr. Cadeliña refrigerating the newly-produced Newcastle vaccines.

The immense appeal of raising native chicken among our farmers lies in the fact that this kind of chicken is very easy to maintain. It requires little attention and minimal feeding. Native chickens are usually left loose in free range and fed only twice a day, usually with leftovers. When unfed, native chickens just scavenge the farm for food thereby acting as efficient waste disposers converting scrap into valuable animal protein. Moreover, raising native chickens does not require specialized housing as they roost on trees come evening time.

The only main factor now that limits and which could potentially downgrade further the production of native chickens is the prevalence of Newcastle disease.

Unfortunately, despite technological advances in vaccine and management systems, Newcastle disease continues to be the unrelenting bane of the poultry industry. The disease can cause huge decreases in egg production and losses in body weight, accounting for at least 57% mortality in backyard operations. According to the Animal Health yearbook (2002), the poultry industry loses about Php 6.1 billion yearly due to this disease.

Vaccination: For prevention and control

Raising native chickens is mostly practiced as a backyard enterprise scale and are seldom vaccinated. Since *Newcastle* disease is a highly contagious disease, controlling it through veterinary sanitary measures alone is not effective. It is therefore advised that once the disease becomes endemic in the area, a systemic vaccination of the entire flock be carried out at once.

According to Dr. Cadeliña, while vaccination is the most effective preventive measure against

page 18

Technologies communicated?

by: Ma. Lizbeth J. Baroña

What goes on in the mind of a farmer while a technology is being promoted or demonstrated to him? What could farmers have been thinking when the genetic improvement research on native goats was conducted by the Central Luzon State University-Small Ruminant Center (CLSU-SRC) in their midst? Did the farmers understand the technology? Are there infidelities in communication that might hinder his understanding?

The questions of how communication variables can be described, interpreted, or explained in relation to farmers' level of communication is what the study of Nenita R. Carbonel and Felix Librero sought to answer.

The researchers, during the conduct of the Goat Upgrading Technology Commercialization Program may have consciously or unconsciously employed the convergence model of communication developed by D. Lawrence Kincaid (1979).

In this model, communication is a two-way street. This means that all participants in the communication process encode (create and share) and decode (perceive and interpret) information until mutual understanding is achieved. This is also called "participatory communication" where the sender and receiver of information shift roles easily, anytime.

Participatory communication aids technology utilization

Transfer of technology, which gained popularity in the 1960s, is a unidirectional flow of communication where research results are delivered to extension workers who, in turn, package the information for dissemination to farmers. In this process, there is no mechanism where the farmers themselves can be the source of information.

Participatory communication allows for an exchange of ideas between the sender and receiver of information, changing the focus from a one-way technology transfer process into a participatory one. This way, the extension workers and the farmers exchange new information, and feedback on the technology disseminated. The farmer therefore becomes a vital member of the communication process, rather than one who is a passive recipient of technology.

Three research sites in Nueva Ecija were selected: Muñoz, San Jose City, and Lupao. Using the triangulation technique to gather data, 41 goat farmers were surveyed. This was supplemented by interviews with eight key informants.

The study found that the goat farmers' utilization of the upgraded goat production technology depends on three things. These are: information-seeking and sharing behavior, communication networking, and participation in technology development program.

The farmers' interpersonal communication is rich, the authors said. Through this, the farmers were able to learn about new technologies and other information pertinent to farming. This informal system of communication was found to have significant influence on the farmers' use of a new technology. The authors also noted that farmers are more comfortable hearing about new technologies from fellow farmers, perhaps because of the same interests they hold, and the immediate feedback they gather. More importantly, they communicate with one another with less inhibitions.

The study also found that information about a new technology flows through a link of interpersonal communication mediators. This means that the implementation of the technology commercialization program for goat was aided by a group of farmers who had their own sources of information inside and outside their villages. This network is mostly based on kinship, friendship, and shared interest. This kind of relationship does promote mutual understanding.

Participation in technology delivery programs, as found by the study, enhanced the goat farmers' information-sharing and seeking behavior. Their participation in a program enabled the farmers to utilize the technology with technical assistance.

page 20