

# Tiles from bamboo made easy

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photo by Jlapitan

Researchers of the Mariano Marcos State University (MMSU) in Batac, Ilocos Norte developed a simple process that converts the bamboo pole into materials that can be readily used for furniture and handicrafts. Engineered *kawayan*, or E-kawayan, is an advanced form of bamboo products put together to form a whole new different product *kawayan* tiles.

The bamboo, known locally as *kawayan*, grows just about anywhere across the country. Its use can range from making houses, fences, bridges, walking sticks, furniture, chopsticks, food steamers, toys, construction scaffolding, hats, abaci, and various musical instruments. Flooring made of bamboo has become popular throughout the years. Its culms may also be cut and made into vases or tubes, or pipes to transport water or as containers.

Culms, also called the stems, can range in height from a few cm to 40 m, with stem diameters ranging from 1 mm to 30 cm. The stems are joined together by a node. Each node bears one leaf, and may also have one to several side branches.

## Kawayan tiles

Dr. Stanley C. Malab and Jose

A. Zafaralla of MMSU developed both the process and the machineries for the development of *kawayan* tiles, the basic material for manufacturing engineered *kawayan* products.

Tiles production starts with choosing the finest bamboo trees. The culms are harvested and cut to lengths maximizing the straight portions. The researchers noted that irregularly shaped parts of the pole are cut into not less than 18 inches.

The poles are then split manually with an approximate width of 33mm. The split parts are treated with wood preservatives, boiled, and dried in a bamboo dryer also developed in MMSU and are left to dry for four days. This process improves the slats' resistance to

borer.

MMSU also developed the *Kawayan* Tile Machine, for the shaping of slats into desired width and thickness. Flooring made of bamboo pieces are steamed, flattened, glued together, finished, and cut. The bamboo slats, after they are treated and dried, are joined together in the machine to minimize gaps after gluing them together.

The laminated slats are sorted to minimize apparent color differences. The laminates are cold-

pressed at 150 kg/m<sup>2</sup> vertical and 5 kg/m<sup>2</sup> side pressures. This is done for three hours. For making planks, the slats are applied with white glue commonly found in local hardware stores. The semi-finished products are smoothened through a sanding machine.

The researchers noted that the process and machines they developed were able to maximize the utilization of bamboo, even its most unwanted part.

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This article was based from the study, "Production of MMSU Kawayan E- Products" by Stanley C. Malab and Jose A. Zafaralla of the Mariano Marcos State University (MMSU), Batac, Ilocos Norte.

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## NOTES

### Commercializing agriculture and fishery technologies

Marlowe U. Aquino, Ph.D.



Agriculture and fishery technologies nowadays are facing new challenges in development. They are now fully scrutinized as to their appropriate uses and applicability in improving the conditions of certain commodities, industries, and even people's lives and their communities. It is obvious that the technologies have made impact on these conditions but would have been better if they have been shown along the process of utilization and application until commercialization.

It is our responsibility to show that we are doing something about these technologies which are outputs of extensive research and development. These outputs, products, processes, and services passed certain evaluation criteria to reach maturity. However, in the context of R&D, these become information shared at any given through time, various mechanisms and levels between researchers, farmers, fisherfolk, industries and all other stakeholders. Innovative processes and existing knowledge are incorporated to make them worthy of being commercialized.

For most people, commercialization is complex and to others it is a vague area within the total technology management process. In its simplest definition, commercialization is literally the selling of technology. In research and development (R&D), the concept becomes broad, yet very practical in its process and requirements. The Bureau of Agricultural Research (BAR)

simplified the process for R&D institutions in agriculture and fisheries together with key players and stakeholders to make use of the concept as well as the framework. This was done through the issuance of Department of Agriculture (DA) Administrative Order # 3, Series of 2006 otherwise known as the National Technology Commercialization Program (NTCP) Document and Operational Guidelines dated 06 February 2006 by Secretary Domingo F. Panganiiban.

The NTCP one of the flagship programs of DA-BAR through the leadership of Director Nicomedes P. Eleazar, envisions to strategically place technologies to where they are needed while transforming the agriculture and fisheries landscape from a resource-based to technology-based sectors through a market-driven approach. This will ensure that all technologies will be applied, transferred, and commercialized for maximum utility.

The selection of technologies presented in this issue is a living testimony of what the R&D have done in the past to improve the lives of people. More specifically, these are success stories that inspire and challenge other interested individuals and groups to engage themselves in more proactive and practical application of the technologies being commercialized. These articles and stories describe how important technology commercialization is in making Philippine commodities at par with those from the rest of the world in terms of quality, comparative advantage and competitiveness. 🌱

## We have the best tasting fruits in the world but...

By Miko Jazmine J. Mojica  
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There is no question about the lip smacking quality of Philippine fruits, but having them accepted in the world market is entirely a different story.

"Our fruits and vegetables are among the best in the world, but their quality deteriorates when they get transported elsewhere from the country." This was the sentiment of BAR Director Nicomedes Eleazar on the difficulty the country faces in exporting our perishables. This observation was corroborated by DA officials from different attached bureaus and agencies during the consultation-meeting held this month at BAR to discuss the prospects of exporting our fruits and vegetables to the EU market.

The officials were quick to point out the most glaring loopholes that contribute to the problem, which are poor agricultural practices and postharvest handling. These setbacks are taking their toll on both our agriculture and fisheries sectors while our neighboring countries like Taiwan, Thailand, and Vietnam are making names as credible exporters in US and Europe.

In an effort to bolster export of agricultural products to generate big revenues for the agriculture sector, the Technology Commercialization Unit (TCU) of BAR, UPLB Postharvest Horticulture

Training and Research Center (PHTRC), and various agencies from the DA met to secure commitment and delegate responsibilities on tapping the EU market.

Dr. Edralina Serrano of PHTRC expressed her view on this endeavor. "Bakit EU (Europe)? Among advantages? Una, wala silang strict quarantine measures unlike sa US. Pangalawa, maraming market sa Europe na iisa ang standard especially with regard to production. At alam naman natin kung gaano kalaki ang market ng Europe (Why EU? First, they don't have strict quarantine measures unlike in the US. Second, countries in Europe usually require the same standards especially with regard to production. And we know how big Europe's market is).

However, she acknowledged the short shelf-life of our perishables that jeopardizes our export venture. Although she is positive on the impact of exporting our produce to Europe, she said there is still no study about its economic viability.

PHTRC is proposing a program that would increase the profitability of agricultural products through export to the EU market, with the aim to establish Codes of Practice for the production of tropical fruits such as lanzones, mango, rambutan, solo papaya, and pineapple.

The program proposal indicated BAR as the funding agency while the collaborating agencies include Bureau of Postharvest Research and Extension (BPRE), Bureau of Agricultural Fisheries and Product Standards (BAFPS), Food Development Center (FDC), Agribusiness Marketing Assistance Service (AMAS), and producer cooperatives and commodity clusters.



photo by redbelacruz

During their meeting, the officials discussed the problem of high transport cost of exportation and the slow commercialization of technologies that can enhance postharvest handling techniques such as blast freezing and controlled atmosphere in the country.

The officials also pushed for establishing quality standards on the production and postproduction handling of our crops to measure up to the phytosanitary standards of other countries. Moreover, they are concerned on the sustainability of supply to satisfy the demand of the market at all times.

In the meeting, they also discussed the opportunity of exporting other crops which are not yet circulating in the export market so the country could take control where it has competitive advantage. Some of the crops which surfaced from the discussion were okra, calamansi, kaimito (star apple), alugbati, mangosteen, herbs, and pili nuts. Kaimito (brown variety), alugbati, and mangosteen are said to have high antioxidant properties which are favored by importers. On the other hand, the pili nuts from Bicol region are starting to attract chocolate companies who want to substitute the more expensive macadamia nuts with pili.

While the proposal appealed to the representatives of collaborating agencies in the meeting, they said that it will still undergo refinement to clarify the responsibilities of each agency. 🌱



photo by aconstantino



# Golden kuhol crusher grinder: A cheap, gender-friendly machine

By Rita T. dela Cruz  
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The golden apple snail (*Pomacea canaliculata*), locally known as golden kuhol, was first introduced into Philippine farms in 1983 with the hope of providing additional protein source for dietary improvement of many poor families. But its promising potential turned into a menace for farmers when the golden apple snail became a prolific pest on rice fields. It grows and increases rapidly, voraciously feeding on any succulent greens that include newly transplanted rice seedlings. It destroys farms, livelihood, and has become a burden to rice production.

Although considered a threat in rice production, many farmers are (again) looking at the golden kuhol at a different perspective. The golden kuhol being remarkably nutritious and easy to digest, farmers have discovered it to be a good source of supplementary feed for livestock and poultry. It stimulates fast growth and reproduction. The snail meat provides protein and energy-giving fat while the shell contains calcium, phosphorous, vitamins, and minerals. Now, a lot of farmers do not see these golden kuhol as a threat to the fields but rather an opportunity to improve their livelihood.

Golden kuhol are collected from the fields, crushed, mixed with raw rice bran, and then fed right away to the animals. There are times when animals are fed with pure golden apple snail straight from the fields. Studies showed that healthier and heavier livestock are produced using this feeding scheme. Ducks fed with snail meal can attain more or less than 70% increase in egg production rate. Further, due to its high nutrition, snail meal could replace fish or meat and bone meal in broiler diets.

Opportunities abound, but farmers continue to ignore them due to the

laborious and time-consuming task of manually crushing the snails. But as R&D continues to find solution to farmers' problem,



researchers from the Department of Engineering and Technology of the Camarines Sur State Agricultural College led by Engr. Marife L. Pesino designed and developed a mechanically operated golden kuhol grinder-crusher. This machine does not only minimize laborious work of crushing but it also saves time from manually picking the snails from the fields and different farm locations. It also gives opportunity for farmers to culture golden kuhol in one specific area mainly for feed supplement.

The opportunity of converting golden kuhol into useful feeds also saves a lot of money for our farmers, as they do not have to buy expensive molluscicide to control it, making it environment-friendly. Likewise, by converting the snails into feed supplements the farmers spend less for expensive feeds for their livestock and poultry. This likewise reduces the need for imported fishmeal feeds and save the country's foreign exchange.

Generally, farm equipment and



photos courtesy of mpesino

machineries i.e., tractor, water pump, fruit loader, thresher, etc., are never gender-friendly. Women and children who also work in the farm use machines that are laborious and strenuous to operate. But with the new kuhol crusher-grinder, which was designed and conceptualized by a lady engineer, crushing and grinding are no longer tedious as before. The machine is mobile, making it easy to transport.

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# Clanging the gates of modernization with BAR at the helm

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Dr. Marlowe U. Aquino, head of the Technology Commercialization Unit of BAR, in one of the forums on technology commercialization. photo by aconstantino

Almost a decade ago, the Congressional Commission on Agricultural Modernization handed down the verdict on the performance of the agriculture industry. It was not a pretty picture the verdict painted. But the Commission's findings also cited agricultural research and development as one investment that has given the highest return in spite of its being grossly neglected, getting less than a third of the World Bank-recommended percentage of public investment on R&D.

With this state of public investment in research, whatever technological advancement we have managed to achieve must be effectively transferred to the users, if only to keep the agriculture industry afloat.

This has not been the case. It has been pointed out time and time again that lack of effective and sustained programs to bridge research and development to the communities and the ultimate users of technologies is lacking.

The NTCP

Finally, the Department of Agriculture has decided to institutionalize the transfer of technology from the R&D community to the intended users. DA has tapped the Bureau of Agricultural Research to manage and coordinate its National Technology Commercialization Program (NTCP).

NTCP's objectives are to accelerate the commercialization of technologies for a market-driven agriculture and fisheries industry; to consolidate technology

commercialization activities of government agencies, state colleges and universities, and local government units for a common commercialization framework; establish the economic viability of mature technologies; demonstrate the practicality of location-specific technologies at the grass root level; stimulate new business and economic development, enhance trade, and help preserve the environment and improve the rural quality of life by facilitating the dissemination of research results to the public and private sectors; accelerate the adoption of production and processing technologies and help expand and maintain the market for the industry's products, and; to help strengthen the link between research, development, and extension.

Commercialization defined

Technology commercialization is viewed by the NTCP through three perspectives: as a process, as an approach, and as a strategy.

As a process, a mature technology should work for positive developments on the agriculture and fisheries sectors, while as an approach, it supports the maintenance of quality and supply of these sectors' products. As a strategy, it provides the impetus for development of enterprise by enhancing the social marketing of commodities.

Technology and production

Agricultural production has three types: small-scale, medium-scale, and large scale. Regardless of the scale of production, technology plays an important part in the whole process.

Although AFMA gives much emphasis on technology-driven as opposed to resource-driven production, the technology commercialization program recognizes that it is foolhardy to separate the two. It suggested that technology and resource should be complementary and interactive.

Another element in a production system that is important in the design of extension modules is the organizational aspects of production that as the scale of production increases, the complexity of the



organizational make-up of the system, composed of people, also becomes more complex. An extension module for a technology intervention should be able to delineate the effects of this intervention to the people in the production system.

In essence, a technology intervention in a farm should mean two things: improvement and innovation. These two are related in the sense that as a production system improves; there will also be areas where innovation must take place.

#### Intervening technology

The scales of production are never homogenous. This fact is oftentimes overlooked in technology intervention. It is, however, recommended by the NTCP document that a community-based approach be assumed by extension and other related programs. This way, the nuances of the variations of a community's production system is more apparent, therefore easier to deal with.

#### Indigenous technologies

Farmers and fisherfolk have been employing technologies that had aided them in their farms long before the government vehicles carrying well-meaning technicians and extension workers ply routes to far-flung farms and coastal communities.

These technologies have been referred to as "indigenous technology":

one derived from decades of living closely with the elements of the environment, forming a tight mix of tacit knowledge and ingenuity on the part of the farmers.

NTCP has acknowledged the importance of documenting existing indigenous knowledge. Creating a place for indigenous technology in the technology exchange efforts of the government is seen as an advantage.

#### Which technology?

A technology is considered commerciable if, first, it meets the requirements of the technology transfer process; b) the technology has market potential; c) should enhance the use of technologies for agribusiness; d) should help improve the production management system to increase its efficiency; e) should help the complementation of technologies through commercialization; f) should insure cost-efficiency in production and could improve product quality technology synergy; and, g) should be able to position products at different levels of the market.

#### BAR and NTCP

BAR has assumed two strategies to implement the technology commercialization program: technology infusion and technology mediation.

BAR has recognized that this will

help achieve one of the requirements of the Medium-Term Development Plan, specifically institutionalizing the development of agribusiness system.

Along the process, BAR was faced by an inevitable component of agribusiness development: enterprise development. A developed enterprise, at any level, is a prerequisite for agribusiness development, the NTCP document stipulates.

"The stage of agribusiness systems development is situated in the production activities of large scale and commercial farming systems." This said, BAR's role in this stage is technology mediation. The commercialized technology will be involved in the processes of improvement, innovation, and change.

BAR will operate under the principles of: a) community mobilization, organization, and development; b) participation; c) resource management; d) knowledge management; e) multi-disciplinary orientation; f) complementation; g) teamwork; h) partnership; and, i) systems orientation.

BAR's Technology Commercialization Unit reported at year-end last year, after the first eight months of the implementation of NTCP on what has been done under the program. Three technology fora were conducted last year, and participated in by members of the DA National Research and Development System in Agriculture and Fisheries (NaRDSAF) including private companies, farmer/fisherfolk groups and organizations.

In the process, BAR arranged and forged agreements with international and local organizations including the Asian Vegetable Research and Development Center (AVRDC) The World Vegetable Center for vegetable crop testing, evaluation and commercialization, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) for sweet sorghum and pigeon pea testing, evaluation, and commercialization; the Philippine Carabao Center (PCC) for its reproduction technology using in-vitro production and embryo production techniques for water buffaloes, and the Pampanga Agricultural College (PAC) for

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photos from sunna.ino

stakeholders of the industry. Concerned stakeholders include the Research Development and Extension (RDE) sectors, strawberry farmers, processors, retailers (including high end market sector), and consumers.

For the project on *Varietal development, conservation and production of planting materials*, it hopes to: 1) collect, characterize, and maintain a strawberry germplasm seed bank including seed and runner for local genotypes of strawberries and some foreign collections; 2) identify potential genotypes and hybrids; 3) develop protocol in certification of planting materials and; 4) produce at least 5,000

certified runner planting materials that can be availed of by farmers.

The project on *"Production and postharvest technology assessment and intervention (maturity indices and handling)"* aims to: 1) identify the maturity indices in harvesting berries for fresh market; 2) identify at least three kinds of packaging materials for pre- and post-harvest handling; 3) establish one handling method from harvesting to marketing and; 4) establish protocol for pre-cooling fresh berries after harvest.

For the *"Integrated Pest Management (mite pests)"* project, it is expected to: 1) introduce an efficient predator of spider mites on strawberry;

and 2) develop mass rearing and field release techniques for the predator.

For projects 4 and 5 on *"Product development and marketing"* and *"Establishment of strawberry databank and technology transfer,"* the objectives are to: 1) develop and introduce new recipes in the market, particularly low sugar and sugar-free jam and spread, and 2) identify one-serving packaging materials for jam and spread (for project 4); and 1) establish database for strawberry, and 2) conduct promotion for the industry (for project 5).

The Bureau of Agricultural Research (BAR) funded the ISRDP in its effort to boost the strawberry industry through R&D particularly on increasing its yield in the local market and improving its postharvest technologies.

For more information on the program, please contact Dr. Sonwright B. Maddul, consortium director, HARRDEC and vice president for Research and Extension, BSU, La Trinidad, Benguet with telefax at (074) 422-1656 or 422-6504 or email at: [vpres@mailer.bsu.edu.ph](mailto:vpres@mailer.bsu.edu.ph). You may also contact Dr. Lita Molitas-Colting, chair of the Fruit KCS and professor, BSU, La Trinidad, Benguet at telephone no. (074) 422-2402 or fax at (074) 422-2281 or e-mail at: [our@mailer.bsu.edu.ph](mailto:our@mailer.bsu.edu.ph)

#### Golden kuhol...from page 21

The design and concept of the crusher-grinder was based on the existing hammer mill machines used in efficiently reducing sizes of feed materials but is comparably more efficient. The machine is low-cost and affordable as it is made from indigenous materials.

The golden kuhol crusher-grinder has seven main parts: mainframe assembly, hopper assembly, upper rotor housing assembly, and lower rotor housing assembly. Its rotor assembly consists of a swinging and rotating hammer blades that crush and grind golden kuhol through a replaceable perforated screen. The design of the golden kuhol crusher-grinder is not only economical and environment-friendly but more important, the machine is gender-friendly.

Performance tests showed that the machine could efficiently and perfectly crush and grind golden kuhol when operated at 1500 rpm and 2070 rpm, respectively, with the desired particle size recommended for optimum feed digestibility.

For more information, please contact Engr. Marife L. Pesino, MSAE, RAE of the Department of Engineering and Technology, Camarines Sur State Agricultural College, San Jose, Pili, Camarines Sur, Philippines.

#### Clanging the gates...from page 4

the commercialization of sweet tamarind.

NTCP, in partnership with the Young Farmers Program of the Office of Senator Ramon Magsaysay Jr., will expand to accommodate other commodities like vegetables, plantation crops, rootcrops, ornamental crops, fisheries, and livestock. It will also be conducting trainings on technology assessment, packaging, promotion, agribusiness and market development, and community development.

"The technology commercialization program will bring about equity and justice in transferring, commercializing, and diffusing technologies that will revolutionize Philippine agriculture for productivity and profit," the NTCP document promises.

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photos by aconstantino & rdelacruz



# Improving strawberry production through integrated R&D program

They are red and seeded on the outside, fleshy and juicy in the inside. They have this small, regal-looking, green leafy cap and stem that adorn its crown. That's fresh, plump strawberry (*Fragaria ananassa*) for you. But their fine-looking appearance does not last long. Strawberries are delicate, requiring gentle handling to prevent bruising.

In the Philippines, strawberries are only grown in cool areas like Benguet and Baguio. And for those who love strawberries, this type of cool-loving fruit has to undergo the long travel so that it could still come out fresh for customers in the far cities and provinces. Unfortunately, problem in transporting continues to hound the strawberry industry. A lot of the strawberry growers in Benguet and Baguio still use the old ways of packing and transporting their products i.e., through rough bamboo baskets and *kaing*. Thus, postharvest losses are high.

The processing of strawberries such as jams, jellies, juices, and sweets is a good solution to avoid their spoilage. Unfortunately, the industry still lacks the facilities to do this. Most of the processed products like jams are still sold in big containers and bulky bottles making their transport still a big hassle.

Another problem of the industry is the non-availability of varieties suited in the humid areas of La Trinidad. Although strawberries are considered a high value crop, produce remains to be sold in the sidewalks and small booths.

In increasing its production, potential areas should also be established. Planting strawberries could be a good alternative source of livelihood for upland farmers. Growing strawberries could substitute vegetable production in some areas since it is now becoming less profitable due to the coming in of cheap imported vegetables and the growing of upland vegetables in lowland areas,

particularly in Mindanao.

Related to the lack of high yielding and suitable varieties of strawberries, pest and diseases also pose as the leading problems of growers. Until now, there is no protocol on the production of planting materials for strawberry and non-availability of certified planting materials which farmers can use. These contribute to the deterioration of yield and quality of strawberries.

Given this scenario and problems hounding the strawberry industry, the Bureau of Agricultural Research (BAR) has recently supported an integrated program on strawberry, *Integrated Strawberry Research and Development Program (ISRDP)*, with the Highland Agriculture and Resources Research and Development Consortium (HARRDEC) and the Regional Resources Research and Development Network (RARRDEN) as coordinating agencies. The lead agency for this integrated program is the Benguet State University in

cooperation with the Bureau of Plant Industry - Baguio National Crops Research Development Center (BPI-BNCRDC), Department of Agriculture Regional Field Unit (DA-RFU), Office of the Provincial Agriculturist- Benguet Province (OPA), and the strawberry growers, processors, and retailers.

The integrated program on strawberry comprises of five major projects, each addressing the major problems facing today's strawberry production in country. These are: 1) varietal development, conservation and production of planting materials; 2) production and postharvest technology assessment and intervention (maturity indices and handling); 3) integrated pest management (mite pests); 4) product development and marketing and; 5) establishment of strawberry databank and technology transfer. The project started in 2005 and continues to 2006.

The integrated program is implemented in consultation with all

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# From tuba to sugar

## No more intoxicating than sweetening

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Who would have guessed that something sweet would come out of normally intoxicating drink like "tuba"? *Tuba*, or coconut toddy, can be made into a healthy form of sugar, and is becoming a lucrative source of income for a lady farmer in Balingasag, Misamis Oriental.

A local association in Balingasag, called Linabu Coconut Planters Association (LCPA), to which Luisa Molo is a member, happens to have a three-year research project funded by the Asian Development Bank through the Coconut Genetic Network, implemented by the Philippine Coconut Authority.

The linkage between the LCPA and these agencies enabled Molo to undergo skills training, which is a part of the project, and performed her own experiments which led to the perfection of the technology of extracting sugar from *tuba*.

Source of the alcoholic drink

Juice is extracted from the bud of the coconut's inflorescence. The juice, most of the times is fermented, giving it the alcoholic kick that rural communities have grown to like. The fermented juice, called *lambanog*, is the common alcoholic drink in the coconut region. The fact that it is almost 98% proof means it got more kick than most alcoholic drinks served in finer circumstances.

But *lambanog* is not all that the coconut toddy is about: the sweet toddy extracted from the bud also contains essentially 12 to 18% sugar (sucrose).

From coco-sap to coco-sugar

Since the technology of turning coco sap to sugar has attracted private investors keen on marketing the resulting product abroad, the farmers in Molo's locality were encouraged to extract toddy from their own coconut trees to satisfy rising demand.

The sap is boiled to get rid of its water component. This is usually done under moderate heat with constant stirring. Once the liquid

thickens at 115°C, the thickened sap is removed from the heat under continuous stirring. The thick liquid will then finally break down into granular form, and there is your coconut sugar. It is important to air-dry the sugar before packing it for the market.

Healthy

Since the sugar is natural and organic, it is a healthy source of sweetening. Although it sells at about P100/kilo, it is bound to change, following law of supply and demand, that a large supply of coconut toddy would definitely help decrease the price.

A profitability analysis of the technology has been promising. Using enterprise budgeting, a farmer can earn almost P600,000 net income in a year using coconut sap from 100 coconut trees.

It was seen during the profitability analysis that even if the price of the sugar is decreased by 10 to 20%, the farmers would still earn a profit. Further reduction of prices will decrease their profit by certain percentage, though. But the analysis showed that if it is the coconut toddy supply that is reduced by 16%, the profit of the farmers will drop by 50%. If toddy supply further drops by 33%, the farmers will not have profit at all.

The profitability and sensitivity analysis of the coco-sugar enterprise showed both a promise and an opportunity. While a healthy sweetening



photos by Philippine Coconut Authority (PCA)

can now be made available to sweet-tooths everywhere, the sensitivity of the economic viability of coco-sugar to market forces have opened opportunities for coconut farmers to increase their income by tapping their trees for that all-important toddy.

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# Extracts from aloe:

## Not only a natural healer also a poultry growth enhancer

By Rita T. dela Cruz  
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**A**loe vera (*Aloe barbadensis*) is one house plant that is hard to miss. It comes from the family of lily; it is spiky, succulent, and perennial. It is native to the eastern and southern part of Africa but it has spread throughout many of the warmer regions of the world like the Philippines. Physically, it is a short-stemmed plant that could grow from 80 to 100 cm tall, spreading by offsets and root sprouts. The leaves are lanceolate, thick and fleshy with thorny edges and with color ranging from deep green to grey-green.

It is ubiquitous in almost every house garden and is either used as accents for landscaping or for its medicinal value. Since it is easy to grow and maintain, it is widely used as natural groundcover or container plant in rock gardens.

For its medicinal value, the juice of its thick, spiny-edged, and fleshy leaves are well reputed for its natural healing effect. The aloe plant's healing powers are most widely touted for being able to treat skin conditions. It has anti-inflammatory properties, which may explain why it has

been known to lessen the pain and swelling associated with itches and burns. Many of the medicinal uses of aloe vera are common knowledge. What is less known, however, is its uses in poultry.

Aloe as growth enhancer in chickens

Broiler production alone already comprises 85% of the poultry meat requirement of the Filipinos. Although the demand is high, the industry could hardly make up with the requirement due to high prices of commercially and imported feeds. Thus, the poultry industry particularly on the part of the raisers, continuously find means to lessen their cost of production. One way is to look for alternative source of feed supplement that is not only cheap and can boost the growth of chickens but most important, is organic and readily available.

In the recent study of Mr. Feliciano R. Bejar of the Samar State College of Agriculture and Forestry and Ms. Remedios P. Colapo of the University of Eastern Philippines, Northern Samar, this dilemma in the broiler industry was particularly addressed using extracts from aloe vera. Unknown to many, this plant is not only valued for its medicinal components but it also plays an important role in promoting growth in chickens.

Mr. Bejar



photos from demandord.se

conducted a 42-day experiment to study the growth performance of 90 broilers whose drinking water was mixed with aloe extract. The chickens subjected to this study were randomly distributed into five aloe extracts treatments: 5 ml, 10 ml, 15 ml, 20 ml per gallon of drinking water, and plain water as control. The method followed a complete randomized design (CRD), which was replicated three times.

In order to determine if the aloe extract indeed created an effect on the growth of the chickens, the researchers used five parameters to measure growth performance of broilers: 1) body weight; 2) feed consumption; 3) feed conversion ratio; 4) water consumption; and 5) return of investment. They also determined sensory evaluation of the broilers given the drinking water supplemented with the aloe vera extract. A sensory evaluation was conducted to evaluate the meat for its color, desirability, intensity, texture, tenderness, juiciness, and general acceptability.

Aloe vera leaves were first subjected to toxicity test at the Philippine Rootcrops Laboratory, Leyte before juice was extracted. Results showed no effect to the chicken fed. Researchers found that all animals subjected to this particular study became more active after receiving the aloe extracts.

Result of the 42-day experiment showed that the final weight and gain in

retailers or wholesalers from within the region or fruit processors outside the region. Jackfruit is mostly sold fresh from picking but it can also be processed for longevity and easy transport.

With the recommended cultivars developed by EVIARC for commercial production, the Center has also developed various technologies to process jackfruit adding its market value. Jackfruit is being processed into preserves, puree, tart, jam, tart, pastilles, and juice. Marketing of these products is done either through orders or sold during agri fair, symposium, and farmers' field day. Processing of jackfruit is being done in Abuyog Experimental Station wherein EVIARC has a cooperative that handles the marketing of these products from the developed cultivars.

Aside from its usual food use (young fruits cooked as vegetable and seeds are either boiled, roasted, and slated dried as table nuts), jackfruit has other uses. The rags or the non-edible portion of jackfruit is very rich in pectin and can be used in the preparation of jelly, tart, and leather (chewy sweets). There is now a great demand for it among local manufacturers. Unknown to many, its wood is used in the manufacture of guitars, good source of

photos by redelacruz



timber, furniture, and carvings. The jackfruit latex, in combination with vinegar promotes healing of wounds and glandular swellings. Its wood has a sedative property and its roots can be prepared as a remedy for asthma.

At the international market, the potential of this fruit lies on the processed products. In 1995, the Animal Husbandry and Agricultural Journal reported that the Philippines

export earnings from jackfruit averaged about half a million dollars annually.

This earning could go higher if the jackfruit's potential is developed. Likewise, the country could develop the other uses of this multi-purpose fruit tree for value-added benefits.

For more information on jackfruit and its processed products, please contact Ms. Teodora C. Sacay, Main RIARC, Brgy. Bagong Silang, Babatngon, Leyte or through her mobile phone no. 09198201989.

Aloe extract...from page 7

of fresh produce, such as fresh fruit and legumes. This gel is tasteless, colorless and odorless, and is safe and environmentally friendly and can be an alternative to synthetic preservatives such as sulfur dioxide.

Some preliminary studies have also suggested that it may be a powerful antiviral agent, and potent immune system enhancer. It is being tested as a possible treatment for certain types of cancer and conditions as serious as diabetes. Although promising studies like this are still waiting validation, still, it's good to know that a house plant as ubiquitous like the aloe vera could create such potent effects.

This article was based on the study, "Growth

*Performance and Sensory Evaluation of Broilers Supplemented with Aloe Vera (Aloe barbadensis) Extract in Drinking Water* by Feliciano R. Bejar of the Samar State College of Agriculture and Forestry, San Jorge, Samar and Ms. Remedios P. Colapo of the University of Eastern Philippines, Catarman, Northern Samar.

The paper was presented during the "23<sup>rd</sup> PSAS Visayas Convention", 17-19 August 2005, Bacolod City and won the Best Paper Award. It was also presented during the "42<sup>nd</sup> PSAS National Convention," 20-21 October 2005, Heritage Hotel, Manila.

For more information please contact: Mr. Feliciano R. Bejar, lead researcher and director for External Affairs and Special Projects, Samar State College of Agriculture and Forestry, San Jorge, Samar.

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photos by redelacruz

## A thumbs-up to the many uses of jackfruit

By Rita T. dela Cruz  
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There are at least 18 uses of jackfruit (*Artocarpus heterophylls* L.) both for commercial and non-commercial purposes. Its fruits, trunk, leaves, and roots can be for household consumption or processed commercially. This added to the already high rating popularity of jackfruit. It's one of the most widely-cultivated fruits in the country due to its excellent adaptation to a wide range of growing conditions.

In the Visayas, jackfruit is a priority commodity. In fact, major jackfruit growing areas in the country are located in Western, Central, and Eastern Visayas. At the Eastern Visayas Integrated Agricultural Research Center (EVIARC), an R&D network of the Department of Agriculture where jackfruit is one of their priority commodities for research, it was noted that this production of this fruit has been steadily growing through the years. It enables Eastern Visayas to export 100-500 fruits or 2-3 tons/week to other

regions and major cities like Cebu and Manila.

For many years, jackfruit is continuously grown as backyard crop mainly for family consumption, either as vegetable if it is still young or as dessert and processed food when mature or ripe. It is planted erratically and usually left to grow until it bears fruits. Jackfruit trees are not demanding and bear fruits as early as three years after planting. It grows up to 70 feet and produces fruits that weigh as heavy as 50 kg per fruit.

### Accession/cultivars of jackfruit

EVIARC has identified four jackfruit cultivars/varieties for commercial production in Eastern Visayas: AES Jak#1, AES Jak#2, AES Jak#3, and AES Jak#4. They are differentiated according to height of tree, growth and habit, type of leaf, type of fruit, and seeds. The fruits are distinguished according to weight, size, shape, flesh color, skin thickness,

texture, percentage of edible portion, total soluble solids (TSS), and latex. Meanwhile, seeds are differentiated according to size and weight. All of the 4 cultivars have a spreading growth and habit; and an alternate, oblong, and dark green type of leaf.

Among the four cultivars developed by EVIARC, AES Jak#4 bears the heaviest fruit at 12.3 kg, the largest percentage of edible portion (46%), and the highest TSS, which is 27 degrees Brix. Meanwhile, AES Jak#3 or more popularly known as *Noknoka* is the sweetest and preferred for preparing juices and processed sweets. It is the tallest among the cultivars growing to about eight meters and bears the second smallest fruit weighing 6.9 kg only and the least percentage of edible portions (31.5%).

### Innovative uses of jackfruit

The demand for jackfruit is high. Farmers can sell their produce either to

weight of the broilers were significantly affected by the aloe vera extract supplementation. Broilers given the aloe extracts as drink supplement (5-20 ml) significantly improved their growth rates compared to those broilers given plain water, which showed the lowest final weight and gain in weight.

In terms of feed consumption, broilers given the 15 ml and 20 ml of aloe extracts in their drinks rated the highest (ave. of 3387.78 g and 3148.89 g, respectively) while those given the plain water rated the least (2737.22 g). This result, according to the researchers implied that the final weight and gain in weight were strongly influenced by the feed intake of the chicken.

Meanwhile, no significant results were found in the feed conversion ratio (FCR) of broilers although numerically, those chicken given the aloe extracts showed slightly better FCR than those given plain water. Likewise, aloe vera supplementation did not significantly affect the carcass and sensory characteristics of the broiler meat, retaining the acceptability and saleability of the product.

For the dressing percentage (weight of the carcass and organs after the treatment was applied), again, those given the aloe extract supplementation command the highest dressing percentage while the unsupplemented ranked the least. This means that the heavier the final weight, the better is the dressing percentage in chickens.

For the economic competency, analysis showed that chicken whose drink was supplemented with aloe extracts showed the best return of investment (ROI) among the treatments with 30% ROI compared to the 7.5% of the unsupplemented.

### What is in aloe vera?

Aloe vera is not only a natural healer, it's also a growth enhancer in poultry. Hearing that, one might think, it's too good to be true. Essentially, the leaves of aloe vera are often for external uses only, they are not meant to be taken in. But with the study of Bejar and Colapo, it's now clear that it's safe for animal intake. Thus, it is important to know what's in the aloe vera that makes it both a natural healer and a growth promoter in chickens.

Physically, the leaf of an aloe vera is composed of three layers. The first layer contains a clear gel, which is contained within the cells of the generous inner portion. Then there's the *anthraquinones* contained in the bitter yellow sap of the middle leaf layer and the fibrous outer part of the leaf that serves a protective function.

The content of the aloe vera leaf is just 0.5 - 1.5% solid, with an average pH value of 4.55. This solid material contains over 75 different nutrients including vitamins and minerals.

Aloe vera is rich in vitamins and minerals. Specific vitamins include: Vitamin A (Beta-Carotene), Vitamin B1 (Thiamine), Vitamin B2 (Riboflavin), Vitamin B3 (Niacin), Vitamin B5, Vitamin B6 (Pyridoxine), Vitamin B12, Vitamin C, Vitamin E, Choline, and Folic Acid. The vitamins A, C, and E are responsible for the aloe's antioxidant activity while vitamin B and choline are involved in amino acid metabolism and vitamin B12 is required for the production and development of blood cells.

Among the important minerals found in aloe vera are: calcium, chromium, copper, iron, magnesium, manganese, potassium, phosphorous, sodium, and zinc. These minerals are

essential for good health and are known to work in synergistic combinations with each other, with vitamins and other trace elements.

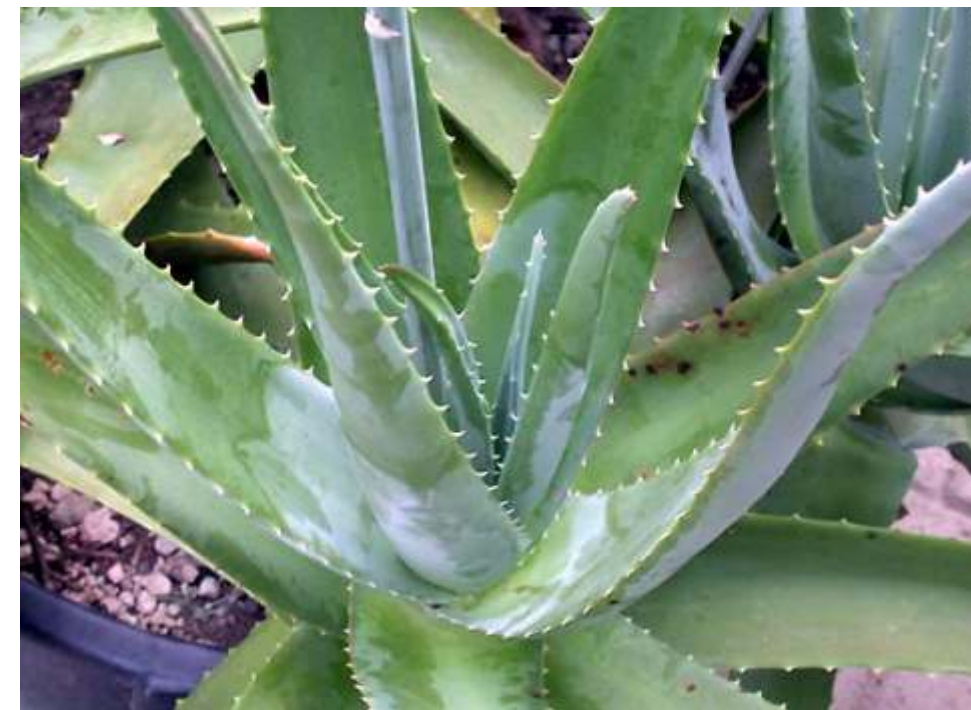
Aside from vitamins and minerals, aloe vera is rich with enzymes (help the breakdown of food sugars and fats), hormones (aid in healing and anti-inflammatory activities), sugars (i.e. glucose and fructose that provide anti-inflammatory activity), *anthraquinones* or *phenolic* compounds (aid absorption from gastro-intestinal tract and have anti-microbial and pain killing effects), lignin (increases the blood circulation), *saponins* (provide cleansing and antiseptic activity), *sterols* (antiseptic and analgesic), amino acids (basic building blocks of proteins in the production of muscle tissue), and *salicylic acid* (works as a pain killer).

### Other recent, important uses of aloe vera

With the build-up nutrients and capability of aloe vera both as natural healer for humans and growth promoter in poultry, it's not surprising that the scientific community finds interesting and effective uses of this plant wonder.

In Spain for instance, researchers at the University of Miguel Hernández in Alicante have developed a gel from aloe vera that could prolong the conservation

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photos from ruhr-uni-bochum.de



# Imported lamp trap: Effective pest control for cotton bollworms

By Maria Lizbeth Severa J. Baroña  
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look for.

## High Frequency Pest Killing Lamp

This lamp is being manufactured in China. The proponents of the study imported one of this high-frequency-vibrancy light trap from its manufacturer, Jiaduo Science Industry and Trade Co., Ltd., and tested its effectiveness in controlling bollworms over a 9000 sq m farm at 44 days after planting. It is automated to switch on at nighttime and off, at daytime. The light trap attracts various winged insects to its high-voltage wires and electrocutes the insects.

Insects were collected daily up to the 78<sup>th</sup> day after planting. Application of chemical spraying against cotton bollworm was also noted in a farm of the same size, just 200 m away from the lamp. All other cultural practices for cotton like land preparation, fertilization, and irrigation were followed.

## Lamp works

The daily collection showed that the lamp attracted the most number of insects during the first three days of its installation. Through the collection, it was also noted that the number of bollworms increased at 45 DAP and 78 DAP, the time when the cotton plant is in its flowering stage and/or squaring stages. The high incidence of bollworm shows the ineffectiveness of chemical-based pesticides.

The single female pest, at natural mortality, can lay approximately 500 eggs during its peak egg-laying season. Multiply this figure by the number of female bollworm laying

eggs in the farm, it is clear that chemical spraying every three days is not enough to control the burgeoning bollworm population.

As if a fertile female bollworm is not trouble enough, migrating pests from nearby farms with tomato, tobacco, and corn plants also find their way to the cotton farm.

The cotton farm with the high-frequency light trap registered an average of 11.38 cotton bolls per plant, compared to the farm without the lamp, which had an average of 9.8 cotton bolls per plant.

Actual harvest showed that the farm with lamp had 20% higher yield than the farm without the lamp. The farm protected by the lamp yielded 1664.58 kg/ha of cotton bolls, while the farm without the light trap harvested 1387 kg/ha, a 277.58 kg/ha difference.

As far as chemical pesticide spraying is concerned, the farm with the lamp was sprayed only once, as compared to the farm one without the lamp, which was sprayed three times during the study.

Partial budget analysis showed that the 20% increase in cotton boll harvest makes up for the additional expenses for the installation of the lamp. The lamp, which costs P6000, has a life span of 4 years, with three cropping per year. This gives a net benefit for the farm with lamp at P7052.78/ha.

A chemical-free farm and an additional P7052.78 income/ha? The farmers are in for a good deal with the High Frequency Pest Killing Lamp.

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This article was based from the study, "Efficiency of High-Frequency Resonant Pest-Killing Lamp in Controlling Cotton Bollworm, *Helicoverpa Armigera* Hubn" by AD Solsoloy, F. Calamaan, LC Paraon, M.Damo, and N. Cacayorin of the Cotton Development Authority, MMSU, Batac, Ilocos Norte



photos from ars.usda.gov & earth-wear.com

This is one lamp that does not need rubbing to make a wish come true.

Scientists from the Cotton Development Authority (CODA) tested a China-made light-trap to control bollworms in cotton and found that the lamp actually reduces incidence of the pest resulting to increase in yield.

## Farm safety

Once again, taking central stage on the debate on safety in agricultural production is the sustainability of existing methods in controlling pests that mostly come in the form of chemical-based pesticides. Chemical residues lacing the vegetables that would eventually find their way on our dining tables pose health risks. These chemicals also harm farmers who regularly spray chemical-based pesticides on their farm.

But when a desire for a good harvest meets the threat of pest and diseases, those chemical bearing bottles is the first help the farmers will turn to. It is there, it is accessible, and somehow provides the quick assurance the farmers

# A mango recipe for success

By Maria Lizbeth Severa J. Baroña  
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photos by jlapan

More than two decades ago, a newly-wedded couple from Urdaneta, Pangasinan dreamt big. Using as capital the money that were pinned on the bride's wedding dress during the traditional wedding celebration that totaled to P2,500.00, a company rose to become a major fruit supplier to one of the biggest fruit juices company in the country.

But not without the sheer perseverance and resolute faith of the dreamers, Lito and Charito Arenas.

## "Sipag, tiyaga, pananampalataya"

The couple initially engaged in mango trading business. Mang Lito went far and wide to establish contacts with buyers in adjacent towns and provinces and earned enough to establish himself as a mango contractor.

Mang Lito's entrepreneurial instincts were not just all about being savvy

with prospective buyers. He developed a deep sense of understanding of the mango industry by attending trainings and seminars on production technologies.

His family owns a 3-hectare mango farm. As their business grows, he was able to own and lease a 17-hectare mango plantation in Bolinao, Pangasinan and another 7 hectares in Binalonan. These mango farms are the major sources of mango fruits supply.

## Initial struggles

Mang Lito encountered problems caused by high input and fertilizer costs. He circumvented these problems by seeking financial help through creditors endorsed by the Department of Agriculture.

## The big break

His time away from home establishing contacts throughout Luzon



photos by jlapan

paid off when opportunities to supply KLT Fruits, Pure and Rich, and Tres Martires poured in. This prompted Mang Lito to establish buying stations in two provinces.

But the best is yet to come. The biggest break in the business came exactly a decade after the Arenas couple started their mango trading business. Zest-O Corporation, one of the major fruit drink manufacturers in the country contacted Mang Lito.

Today, the company that Lito and Ching Arenas built is supplying 60% of the mango demand of Zest-O Corporation.

## Going international

The international market opened its doors to Mang Lito's company when he was introduced by a friend to mango distributors to Hongkong. Soon, the mangoes found their way to Hongkong, and later, Japan.

## Grounded

The soft-spoken Pangasinense couple is now reaping the fruits of a dream-come-true through a successful company founded on sacrifice, total dedication, and trust in the Divine Providence.

Mrs. Ching Arenas relates that their eldest child, a Business Administration degree holder is most likely to take over the helm of the business.

"Our eldest is his father's right-hand in the business.", she said beaming. She went on to relate that their second child has a degree in Banking and Finance and is also a registered nurse. It is worth mentioning

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has unique reddish color on its base. It weighs 357.33 g and is 13.70 cm long. It is 7.43 wide and 6.32 cm thick making Sweet Elena obviously bigger than most mango varieties. Its ovoid shape also adds to its appeal. Its skin, unlike ordinary mango varieties, is orange. It is also smooth and is about 0.08 mm thick and the skin weighs only 39.58 g Its flesh is 81.61% edible, which means only a little part of Sweet Elena is put into waste. It has yellow to orange tinge, juicy and has moderate aroma. Its softness and scanty fibers makes it worthy of being the best mango of all. The seed of Sweet Elena is flat, 27.80 g in weight; 9.68 cm long and 3.73 cm wide. Its tree stands 15.3 m tall and bears fruit annually from December to April. This tree yields 100-120 kaings of mangoes every harvest. (MIN Info News, April-June 2003 wherein Sweet Elena was declared the 2002 PINAKA Winner)

Sweet Elena has already been registered with the National Seed Industry Council (NSIC) on 18 October 2002 with the certification of registration awarded to Mrs. Penida Moselina Malabed, owner of the mango tree in Sta. Cruz, Zambales where the Sweet Elena was first identified by RMTU researchers. The study was conducted for three years in coordination with the Bureau of Plant Industry (BPI).

The certificate of registration was awarded in 2003 by Department of Agriculture (DA) Secretary Luis P. Lorenzo during the 2003 Mango Forum. Today, 1.5 ha is planted to Sweet Elena at the RTMU San Marcelino campus to maintain a source of quality planting materials.

#### Expanding the Sweet Elena

Aside from the 1.5 ha that has been allotted to plant Sweet Elena at the



photos from jadedafrika

RTMU San Marcelino campus, some 1,000 seedlings are also being grown at the DENR-PAWB-Dizon Botanic Fruit Garden, Ninoy Wildlife Parks, Diliman, Quezon City. These seedlings are pest- and disease-resistant with superior fruiting quality.

As part of the government's effort to maintain a gene bank of Zambales' Sweet Elena, the Bureau of Agricultural Research (BAR) is funding a project on the "Establishment of Scion Grove and Germplasm Production of Mango (Sweet Elena)" in collaboration with the local government unit (LGU). Also, the establishment of scion grove is done in partnership with farmer stakeholders.

The project is in cooperation with the Central Luzon Integrated Agricultural Research Center (CLIARC)

with the Provincial Agriculture Office (PAO) of Zambales and the Municipal Agriculture Office (MAO) of Palauig as implementing agencies. The project was initiated in January 2005 and will last up to December 2008.

The specific objectives of the project include: 1) establish scion grove; 2) produce Sweet Elena grafted seedlings from 2000 to 5000 seedlings; 3) establish one to two nurseries for propagation of Sweet Elena grafted seedlings; and 4) promote Sweet Elena through propagation of grafted seedlings and participation in trade fairs.

The site for this project is in Locloc, Palauig, located at the northern part of Zambales with an elevation of 10-40 meters above sea level. The place is accessible by any type of transportation.

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that Mang Lito is also a nursing graduate. But agri-business took firm grip of his fate.

Mrs. Arenas said that their products now range from supplying mango fruits, mango seeds and dried mangoes. She said there is room for expansion, but stressed that as of the moment, the couple are concentrating on their existing products, and being able to

supply the demand that has been dropped on their lap. This, in a nutshell, is the essence of the dream that was shaped 16 years ago.

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photos by mmojica



## "Lapu-lapu sends my kids to school"

By Miko Jazmine J. Mojica  
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"Growing and selling *lapu-lapu* sends my kids to school," Alfredo A. Ocon casually says during a conversation inside his little floating hut in a cove at Palawan. Mang Alfredo, 43, has been fishing like most men living along the cove of Tiniguiban, Puerto Princesa, to support his family. He recalls that he has been into fishing for eight years when he decided to augment his source of income by adopting the grouper culture technology seven years ago.

The "grouper culture in cages" technology was introduced by the aquaculturists from the Inland Sea Ranching Station (ISRS) in Tiniguiban. ISRS is one of the research outreach stations in Region 4B (MIMAROPA) of the Department of Agriculture -Bureau of Fisheries and Aquatic Resources (DA-BFAR). The technology was disseminated in January 1996 to meet the growing demand for grouper or *lapu-lapu* in the local and world market. This package of technology also provides an excellent opportunity for the livelihood of coastal dwellers in Palawan, where grouper fingerlings abound, to improve.

"Before I adopted the technology, I just catch fish from the cove for food and income when I sell it. After I have learned the technology from ISRS, I realized I don't need to depend on what I could catch in the waters but I

could culture the fish myself and earn more," says Mang Alfredo. Aquaculturists from ISRS offer free technical assistance for interested groups or individuals. They also monitor the fish cages of the adopters so they could assist them in the proper cultural management and marketing strategy.

Mang Alfredo set up the floating net cages and hut that are needed for the grouper culture himself. He also manages and maintains his fish cages with the help of his two children (both male) who are both teenagers and his wife who sells the fish to the local market. Since they are encouraged by aquaculturists to culture marine species other than grouper, Mang Alfredo also learned to produce snapper, seacucumber, and crabs.

The grouper and snapper, which are both carnivorous, are fed with trash fish everyday. Mang Alfredo intercroops these two species in the net cages, putting shelters for snapper in the upper section and grouper shelters in the lower section. They also both take 6-7 months to grow in cages before they are harvested and sold to the market. On the other hand, sea cucumbers are mainly detritus-feeder and are allowed to grow for nine months.

"We are able to sell everyday at the local market. We mainly produce *lapu-lapu* and snapper. We sell *lapu-*

*lapu* at P250 to P300 per kilo while snapper is P150 per kilo. Sometimes, when we are able to harvest seacucumber, we can sell them up to P3, 500 per kilo and P3, 600 if dried. Those who run Chinese restaurants buy them for making soups and other recipes such as chopseuy", says Mang Alfredo.

Mang Alfredo remarks that the local market is competitive and he plans to expand his production once he has enough money. In the meantime, he continues to maintain his quality-ensured *lapu-lapu* and other marine species so that his children could finish school.

He also shares a testimony on the health benefits brought by *lapu-lapu* according to the belief of some Chinese. Once, he says, a woman from Manila who has cancer sought him to buy his *lapu-lapu*. The woman boils the fish alive and puts ginger, onion, and tomato in the broth and drinks it. Apparently, she did this once a month for four months and signs of cancer in her body were gone. "The Chinese say that the strength of the *lapu-lapu* is transferred to your body once you drink the broth. It is also believed to help women regain their strength after giving birth," Mang Alfredo explains.

Now who is willing to try that to prove it a second time?



# Complementing science with spirituality: A case of successful community development

By Miko Jazmine J. Mojica  
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Engr. Elmer T. Ferry

photos by PAES

“As long as you have vision, money will come.” Who could disagree with this statement coming from a man who was able to make an impact on his community? He moved the people to action including the hopefuls and the almost hopeless. The man is Engr. Elmer T. Ferry, agricultural engineer and influential pastor in a Christian community in Puerto Princesa City, Palawan. The hopefuls are the youths while the almost hopeless are the city's prisoners.

## Three rolled into one

Engineer Ferry is the agricultural center chief of Palawan Agricultural Experimental Station (PAES), Sta. Monica, Puerto Princesa, a Research Outreach Station of the Department of Agriculture in Palawan. He said he has three visions for Palawan: eradicate mango pulp weevil that has plagued its mango industry; expand its promising cashew industry; and establish a strong vegetable industry that the city still lacks.

“In 1994, God spoke to me that I will become PAES superintendent,” said Engineer Ferry. “It was also then that I had the ‘calling’ to preach,” he added. It was in 1997 when he started to do pastoral work in Life Renewal Christian Ministries. Eight years later, he was appointed Agricultural Center Chief III of PAES.

Prior to this, Engineer Ferry worked for the Palawan Integrated Area Development Project Phase I (PIADPI) in 1982 to 1989, first as farm technician then as agricultural engineer. From 1993 to 2000, he was at the helm of the Provincial Agricultural Center (PAC) in Palawan where he introduced the drip irrigation system. He became Agricultural

Center Chief II in 2002 and had a short stint as Regional Technical Director of DA-MIMAROPA Region. It is almost two years since Engineer Ferry took over the leadership of PAES and he has already made his mark both as leader and servant of the community.

## 100 days to success

“I thought carefully about what I can do and what God wanted me to do. I am a dreamer; I want to make things happen. It occurred to me that I can mobilize people by giving them the skills they need to help themselves. I enjoined the different sectors of the community from the local government units (LGU), business sector, the youth, even the military and the prisoners in our city jail. In collaboration with Rep. Abraham Kahlil Mitra, 2<sup>nd</sup> district of Palawan, we provided them 100-day training on

vegetable growing,” recounted Engineer Ferry. After the training, he said the military students were so pleased they took it upon themselves to train their comrades in other military camps in Palawan.

In Palawan where the population is getting thicker and employment is becoming limited, Engineer Ferry responded to the needs of the students who were anxious about their future. He started with 10 graduating and new graduates of agribusiness from the Western Philippines University (WPU) in Puerto Princesa who are willing to train under his tutelage.

After 100 days, he saw the determination of these students to use their acquired skills fully to have a steady source of income. “It is my hope that these young farmer-entrepreneurs would become the catalysts of an invigorated development of the vegetable industry in the whole province of Palawan”, said Engineer Ferry. “We encouraged other students to join us by showing them how it empowered us to support ourselves and help our families. We are now starting a cooperative to expand the group,” said William M. Ochia, leader of the young farmer-entrepreneurs.

## Loving thy neighbor

“I only used to hold Bible studies with some inmates of the Puerto Princesa City Jail (which is a stone's throw away from PAES) when the jail's warden, Col. Amado A. Concepcion Jr., asked me if I could share my expertise in agriculture to the inmates so they can

photos by rdelacruz



# Sweet Elena mango: The sweetest of the sweetest

By Rita T. dela Cruz  
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The Philippines, being reputed for its abundant tropical fruits, is also home to the world's sweetest mangoes. In the 1995 Guinness Book of World Records, the Philippine mango was listed as the sweetest fruit in the world defeating other countries that also produce tropical mangoes (*Magnifera indica*). This citation opened a great opportunity for the country to establish domestic market and bright potential to compete in the world market both in fresh or processed forms.

Currently, mango ranks third among the fruit crops being produced by the country, next to banana and pineapple. The Philippines supplies its mangoes to Japan, Hong Kong, Singapore, and recently to the United States and Australia. In terms of world production, the Philippines ranks 6th among the top 10 mango producing countries of the world with an average production of 1 million metric tons per year.

## Picking the sweetest strain

The Philippine mango, i.e. carabao mango, is the country's export

varieties and is considered one of the best variety of mango in the world. Over the years, scientists and researchers have developed different strains of this sweet fruit to continuously improve its export quality. As of now, there are already 10 recommended mango strains for carabao mango registered and recommended by the National Seed Industry Council (NSIC). One of these strains is the Sweet Elena, which was identified as the “sweetest of the sweetest” and the best mango variety in the country today. Sweet Elena was regarded as the sweetest and the biggest mango in the Philippines for three consecutive years by the Bureau of Plant Industry (BPI). Sweet Elena is a new strain of carabao mango that originated in Sta. Cruz, Zambales. Two researchers from the Ramon Magsaysay Technological University, San Marcelino campus (RTMU-SM), Dr. Ester Mariñas and Prof. Remedios Lim, discovered and identified this mango variety.

According to the comparative study conducted, Sweet Elena is proven superior over other four leading mango

varieties including Guimaras' *Talaban* and *Fresco*, Ilocos region's *MMSU Gold*, and Zambales' *Lamao*. Sweet Elena is superior in terms of weight, sweetness, soluble solids, edibility of flesh, and physical appearance.

In terms of weight, Sweet Elena has the highest fruit weight of 357.33 grams, which is 68 grams heavier than that of *Talaban*, the largest among the mango varieties studied. In terms of sweetness, Sweet Elena is not far from varieties like *MMSU Gold* and *Talaban*. It has 18.98 total soluble solids (TSS) compared to *MMSU Gold* and *Fresco* which both have 19 TSS. Sweet Elena has 81.61 percent edible portion or flesh and so far the highest among the varieties of mango identified in the country. As to the physical feature, it is attractive with the presence of red tint at the base of the fruit.

## Getting physical

Smooth and big on the outside, fleshy and sweet on the inside that's Sweet Elena for you!

Physically, Sweet Elena has exceptionally smooth skin, small seed and



# Getting water to the farms cheaply

By Maria Lizbeth Severa J. Baroña  
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Farms that are idle during summer months due to scarcity of water can now be made productive. This is what a newly developed hydro-powered water pump guarantees.

"Using water to pump water" is how Dr. Reynaldo C. Castro and Mary Ann Baradi of the Philippine Rice Research Institute Batac, Ilocos Norte, the developers of the machine, sum up what the technology they developed is about. The hydro-powered water pump uses the energy generated by the movement of a flowing water to drive a commercially available water pump to allow water from its nearby source to flow to the farms.

The technology is especially useful during dry months when farmers choose to leave their farms idle because transporting water from its sources which are usually far costs too much. This means foregone productivity and income that should have come their way had their lands been used.

The study cites that in Ilocos Region alone, there are 34,860 ha of farm whose agricultural productivity is not



photo by PhilRice

optimized due to lack of facilities for irrigation. The problem is due to the expensive pumping of water from its sources to the farms.

Although motorized pumps are available in the market, farmers do not have the resources to buy them. Hydraulic rams, designed to aid the transport of water from its sources to farms, only work on places with sufficient drops in elevation. In addition, hydraulic rams are also expensive. Treadle pumps, aside from being laborious, are also limited by their pumping capacities and the height where water could be pumped.

This lack of cost-effective

alternative makes the hydro-powered water pump appealing.

After two experiments and going back to the drawing board to improve the prototype, the researchers came up with a hydro-powered water pump that is simple, effective, and economical. The final prototype of the machine, after undergoing modifications, can pump up 102 cubic meters of water per day more than the water requirements of one hectare of corn.

This hydro-powered water pump may not have the sophistication most often looked for in newly developed machinery, but it has the potential to increase agricultural productivity and income, employment, and sustainability.

The researchers suggest that an aggressive promotion and use of the hydro-powered water pump will lead to productivity of idle lands during dry months, and increased productivity and income for our farmers.

Source:

"Using Water to Pump Water; The Hydro-Powered Water Pump", Reynaldo C. Castro and Mary Ann U. Baradi, Philippine Rice Research Institute, Batac, Ilocos Norte (This paper was an entry to the 2004 National Research Symposium sponsored by BAR under the applied research category)

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length should be separated from shooters or those which are beyond 10 cm in size to avoid cannibalism. Stocking rate should be 15-20 fishes/m<sup>3</sup>. Feeds can be shrimps or finely chopped trash fish given at a rate of 10 percent of the total body weight. The fry should be fed two to four times daily. When stock size is already more than 10 cm in length, feeds could be given at a rate of 5% of the stock's total weight.

In a span of six months, the fish could grow up to 750 grams or more and is ready for harvest. Harvesting is simply done by lifting the net, but this should be done with care since putting the fish to

stress can damage their quality. They should not also be fed a day prior to harvest.

The harvested grouper could be sold alive and currently has a starting price of P250/kg. The total production cost of grouper culture including setting-up the net cages is estimated at P212, 888. Since two cropping cycles is possible, total sales of P364, 500 is likely. The estimated return on investment is also high at 71 percent, with a net income of P151, 612.

If one is interested in adopting this technology for business, aquaculturists advise that the suitability of

the site and abundance of fingerlings and fishfeed must be ensured. Further, proper cultural management and marketing strategy are important to succeed in the culture of grouper fish. Officials of ISRS caution about the "copycat mentality" of some particularly in this technology. "Some individuals and businessmen decide to adopt the technology on impulse when they have seen its potential without getting the right information and skills necessary to do it well. Eventually they give up or are able to produce but not with the quality and consistency that is needed to thrive in the business," they explained.

do something productive. With the help of the DA, the project to train selected inmates to cultivate the empty land within the jail's premises and fill them with fruits and vegetables started," said Engineer Ferry.

The city jail is unlike most prisons where one is accustomed to see in the evening newscast or the movies. Here, upon entering its gate, if you're an expected guest, you are greeted by the guard with a smile and warmly welcomed by the inmates through a song number prepared by its choir. More than a jail full of criminals, the place is neatly maintained and looks like a shelter for people who walk around freely and busy attending to the vegetables they grow in their manicured backyard. Surprisingly, one could feel inner peace and solace inside this place where violence and unrest are expected commonplace.

When some of the inmates guided the group from DA-BAR and PAES to their rooftop, they were greeted with a beautiful garden complete with a small hut, benches, and Bermuda-carpeted floor put up by the inmates themselves. The inmates, who wear red shirts instead of orange, were accommodating and courteous while relating to the group how they started to till the lands and grow melon, honeydew, squash, bitter melon, cauliflower, bottle gourd (upo), bell



photo by PAES

peppers, and a variety of other fruits and vegetables. Some of them also showed the group their mini poultry farm where they raise chickens and ducks.

"Our families come here and sell our harvest. We are helping them in a way and enjoy ourselves in the process," said one inmate. "If not for Pastor Ferry, we will probably not realize that there is still hope for people like us," said another. At present, 400 inmates were trained in this "Gulayan" project through the efforts of Engineer Ferry and DA staff. Engineer Ferry said he borrowed money from a local supplier of agricultural inputs (seed, fertilizer, pesticide) to be used in training them. By the grace of God, he

said, the amount was repaid when the trainees started to harvest and turned the project into a micro-enterprise.

For the industry and discipline that prevail at the Puerto Princesa City Jail, it is only expected that they receive the highest recognitions. In September 2005, then DILG Secretary Angelo T. Reyes named the Puerto Princesa City Jail the best in the country. For this year alone, the city jail bagged two major awards, as the cleanest and greenest city jail in the country in January, and as one of the tourist attractions in Puerto Princesa in May.

Seeing beyond the picture

Engineer Ferry said that he still has a long way to go to realize the vision he set for the development of the agriculture industry in Palawan. According to him, they have developed in PAES six promising cultivars of cashew. One of these, the Mitra variety, had already been approved by the National Seed Industry Council. Ninety percent of production in the country is concentrated in Palawan.

"What I really aim now is to enjoin the private sector here in Palawan to action to boost the vegetable industry. I want a comprehensive program on this to make it happen. As to mango pulp weevil, only God can tell. But I see beyond the picture and believe that as long as you cultivate the hearts and minds of people for a higher goal, then I'm on the right track," Engineer Ferry said with conviction.



photo by PAES



# Lapu-lapu culture means business

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photos by mmojica

You may like it steamed, deep fried, grilled or "sashimi", but do you know how the delectable *lapu-lapu* is grown? The grouper fish or *lapu-lapu* in the Philippines is widely cultured in the pristine waters of Palawan and in other parts of the country. This commodity is valued for its superb taste and its big potential in the export market.

The R&D workers in a research outreach station (ROS) in Puerto Princesa City, Palawan believe that this industry could rake in revenues for the country and become a steady source of income for the growing population of coastal dwellers. Thus, the technology "Grouper Culture in Cages" is being endorsed for commercialization through the National Technology

Commercialization Program (NTCP), a major program promoted by the Department of Agriculture Bureau of Agricultural Research (DA-BAR) for the enhancement and promotion of agriculture and fisheries technologies.

The Inland Sea Ranching Station (ISRS), one of the Research Outreach Stations (ROS) of DA's Bureau of Fisheries and Aquatic Resources (BFAR) Region 4B in Puerto Princesa City, Palawan, is the source of the technology. ISRS started to commercialize the technology for adoption of fishfarmers in January 1996 in Puerto Princesa and in other parts of Palawan such as the Malampaya Sound and Calamianes Group of Islands.

Palawan is ideal for grouper culture because this fish commonly inhabits coastal waters, rocky shores, and coral reefs. The aquaculturists of ISRS

thoroughly studied the set-up of the culture cages for grouper production from site selection, net cage specification and construction to grow-out, harvest, post-harvest, and simple cost and benefit analysis of starting a business by adopting the technology.

According to Mr. Roberto R. Abrera, Aquacultural Center Chief II and Manager of BFAR's Regional Fisheries Research and Development Center Region 4B (MIMAROPA), there are about 40 cultivable species of grouper belonging to family Serranidae but only two are popularly cultivated at present, the orange-spotted (*Epinephelus coioides*) and black-spotted (*Epinephelus malabaricus*) grouper. In Palawan, the orange-spotted grouper is locally known as "loba" or "green grouper" while the black-spotted grouper is "lapu-lapu".


Abrera said it is difficult to differentiate one species of grouper from the other because of its ability to change colors. Nevertheless, their colors vary under different environmental conditions and physiological states but their general characteristics are the spots, stripes, and blotches in skin, wide mouth, and protruding jaw. Other cultivable species include the brown marbled grouper, dusky-tail grouper, leopard coral trout, barred-cheek coral trout, and humpback grouper. The source of stock for grouper fingerlings for commercial cage production is apparently still dependent on the wild, but collecting them is not a problem because they usually gather in coastal waters near mangrove areas, estuaries, and seagrass beds.

In selecting the site for setting-

up the floating net cages, water condition, depth, and quality should be considered. "Net cages must be set-up in calm waters such as lagoons, coves, inlets, or bays to avoid strong waves and current that may damage them," advised Ms. Myrna B. Candelario, ISRS Officer-In-Charge and Senior Aquaculturist. "The water must also be free from pollution and the cages are within the fish cage belt or mariculture zone authorized by the local government," she added.

Since the ISRS aims to disseminate technologies that are environment-friendly, simple, and low cost, they are recommending the use of indigenous or available materials in constructing the net cages. The following are the basic requirements of assembling a floating cage: cage frame made of galvanized iron pipe, wood or bamboo; concrete blocks, plastic containers filled with sand and galvanized pipes as sinkers; four pieces of plastic containers or empty plastic drums tied together as floaters; and nets. The floaters must be securely tied to the cage frame. The ideal structure is 10 sq m with nine sections measuring 2.5 x 2.5 m each. The net which should resemble an inverted mosquito net should measure 12.5 cm<sup>3</sup> (2.5 x 2.5 x 2 m). It should be fitted in the cage frame using monofilament twine. Finally, for its anchor, concrete blocks should be placed beneath the four corners and mid-section of the structure. Its weight should be two times the weight of the cage.

According to the aquaculturists of ISRS, nursing the newly acquired seedstock is necessary for the conditioning of fish prior to grow-out culture in the net cages. Grouper fry that are only 2 to 10 cm in

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