Part 2

Itnegs pride: Natural dye weaving technology

By Marlowe U. Aquino, Ph.D.

Original and authentic Kinamayan design expressed in an inlaod Itneg woven product.

Natural dye color extraction and processing

The actual traditional method of color extraction and processing entails endurance and perseverance due to limited time and unpredictable weather conditions. Prior to the extraction process, two important activities must be done. First, raw materials must be properly identified and selected in reference to the desired colors and dyeing purpose. Secondly, harvesting of appropriate raw materials must be carefully done to ensure better color fastness of dye extracts during color development process.

Identification and Selection

The variety of natural dye-yielding plant sources with their varying derived colors dictate the dyes to be extracted. The classification of natural dye-yielding plant sources is associated with plant parts such as leaves, barks, roots, seeds and fruits. Normally, lighter colors are derived from leaves and fruits while darker colors are derived from barks, roots and seeds. Dyes extracted from these plant parts have more subtle or pastel colors compared to the vibrant feature obtained from commercial or synthetic dyes. The selection of mature and fresh raw dye materials contributes to the purity and quality of dyes during color extraction and development processing. Raw material sources are color dependent in relation to maturity and source condition. Healthy plant parts ensure better and more desirable colors.

Harvesting

Harvesting of the raw materials had not changed since the start of the natural dye weaving practice. Using a sharp knife or bolo, spear and basket, raw materials can be dug out, cut with a knife or simply with the use of bare hands. Even with voluminous raw materials required, collectors still maintain the traditional method as a sign of respect to the gods. Prior to harvesting, collectors of raw materials in their first visit to the forest must perform simple *dawak*. Through this ritual, they ask permission from the *anitos* to grant their diggings, cutting and scraping or collection of the raw materials. This is also to seek Divine intervention for protection while inside the forest or even after the collection and harvesting of the raw materials. Over time, the practice is no longer performed because present weavers and collectors are members of the new weaving generations. However, if a new member joins the group, and not originally from the weaving family and also a first timer in the harvesting process, the *dawak* is performed briefly in a simple manner as a form of initiation to seek protection and guidance as well as to show respect to the gods for better color extraction.

Color Extraction

Dye extraction is the most critical step in color development. It determines the color fastness and accuracy of dyes when these are applied to the threads and yarns. There are two distinct dye extraction techniques. These are dyes extracted during the process of cooking and the other during fermentation. Different steps are applied to each of the techniques with careful handling and management. In the

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The joy of seaweed farming

Inside

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NOTES

Seaweed farming: A profitable venture

By Catalino R. de la Cruz, Ph.D.

On February 16, 2006 a group from the Bureau of Agricultural Research (BAR) visited the on-going Pilar Seaweeds Showcase Project in Pilar, Sorsogon, where *Kappaphycus alvarezii* was introduced for culture. Overall, the project seems to have generated interest among the coastal communities to engage in sea farming. Farmers from 11 barangays in Pilar have organized themselves into a seaweed farmers association with a cooperative to take care of the marketing. The group saw that the seaweed farms have been staked out in adjacent bays (Pilar Bay, Panlatuan Bay, Lungib Bay). At Lungib Bay, below a *Kappaphycus* farm is found *Caulerpa* or *lato,* native seaweed (*see cover photo*) being farmed at the seafloor about 5-6 m deep during high tide.

As government support to this emerging industry, a new seaweed processing plant for *K. alvarezii* (or *Eucheuma cottonii*) that will produce carrageenan chips has been built in the Bureau Fisheries and Aquatic Resources National Seaweed Development Center in Sorsogon City. It is scheduled for operation within this year with a capacity of 300 mt of raw material (38% moisture content) per month. Also, a one-ton capacity seaweed solar drier roofed and enclosed at the sides with thick-gauge plastic, was also seen at the Center. If this drier performs well it should be multiplied and distributed to the different regions to alleviate the problem of drying seaweeds during wet season.

Seaweed export is the country's third dollar earner after tuna and shrimp. At present, the Philippines ranks third next to China and Korea in the world market in seaweed export. Seaweed farming only requires low capital investment and short culture period, and yet the profit is high. Because of these favorable conditions, seaweed farming is continually expanding and attracting coastal communities to invest in it because of the good opportunity to increase their incomes and improve their quality of life. As a complementary source of livelihood for coastal communities, it can reduce pressure in the fishing grounds as well as reduce the use of toxic chemicals. Cyanide, a toxic chemical is used illegally. The environment can be preserved since the seaweed farmers have to co-manage the resource.

As of 2005, the major provinces in the Philippines producing seaweeds are Tawi-tawi, Sulu, Palawan, Bohol, Zamboanga del Norte, Zamboanga del Sur and Antique. All regions (except CAR and NCR) in the country now have identified potential areas for seaweed farming. Seaweeds research and development programs are on-going in these regions.

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Itnegs pride (part 2)....from page 24

Photo by maquino

The 115-year old pinapa Itneg woven product found in Penniarubia, Abra.

cooking process, constant stirring supported by quick hand coordination is required for color consistency. In comparison, dye extraction during fermentation requires constant monitoring which is usually messy because of testing. After the fermentation period total squeezing is required to obtain the desired colors which later on are cooked. Following is the extraction process:

1. Fermentation.
Over the years, the fermentation process has not changed in terms of consistency and accuracy of derived dye extracts. The fermented dye extracts are obtained from leaves, young shoots and fruits. The following are the procedure:

a. Prepare clean fermenting materials chopping board, knife, jars or big containers, bottles, strainer, cheesecloth and rubber band or any sealing material.

B. Select mature and clean leaves. The best dye extracts are produced from freshly picked mature leaves. Guava and *malatayum* leaves are the best sources to make quality dyes.

C. Wash leaves in a container, drain and later on sundry or airdry over night after which, these are immediately chopped and placed in big jars filled with equal proportions of water. An estimated one kilo of leaves is soaked in two liters of clean water.

d. Seal fermenting jars and containers tightly and bury in the soil. It is advisable to keep fermenting raw materials in dark areas. Close monitoring is required for a period of six to eight weeks. The longer the raw materials are fermented the better although they have strong foul odor.

e.After six or eight weeks of fermentation, the fermented leaves and or fruits are squeezed and poured in a container with cheesecloth. Set aside squeezed dye extract ready for boiling. Following these step-by-step procedures guarantee production of quality dye extract.

2. Cooking extraction.
Fresh raw materials or fermented dye extracts are cooked in pots or wide mouthed deep pan. The dye extracts are cooked for two hours to obtain desired dye consistency. The following are the step-by-step procedure:

a. Wash and clean chopped fresh raw materials. Place in cooking utensil with equal parts of water. In estimated ratio, barks, seeds, leaves and roots are boiled in clean water. Each raw material is continuously boiled for four hours.

b. After boiling, strain the dye extracts to separate the juice from the residue; obtained dye extracts are boiled for another hour to maintain dye consistency. After an hour of cooking set aside for the dye extracts to cool off.

c. Pour dye extract in clean bottles or containers sealed with rubber bands and plastic. Keep bottles tight to avoid contamination.

d. Label bottles with kind and source of color, date of production.

e. Store bottles in a safe place. Use extracts when ready for dyeing threads in the future.

Dyeing and Design Preparation

The traditional dyeing process is done immediately after the extraction of natural dyes. The process is done early in the morning following the step-by-step procedure including the dyeing, curing, washing and drying techniques. Color combinations are determined depending on the design preferred by the *inlaod* weaver. Dyeing of threads and yarns must be done carefully and singly for better color utilization. The following are the step-by-step process of dyeing:

1. Boil dye extracts for two hours; soak the threads and yarns in the boiling dye extract and cook for another hour.
2. While boiling add a mordant usually the traditional sugarcane vinegar (Suka Iloko) with a proportion of 1 liter of dye extract with three tablespoons of vinegar. Continue to boil dye extracts until threads and yarns completely absorb the dye extracts. Set aside dyed threads and yarns to cool off.
3. Wash dyed threads and yarns in cool running water.
4. Air-dry threads and yarns under shade to maintain the color fastness. The color fastness is determined by the subtle and unfading color distribution on the threads and yarns during dyeing. The threads are characterized by evenly absorbed dye coloring, permanency, and consistency.

Design preparation is done when the threads and yarns are placed in the *gor-od* of the loom or backstrap. The *gor-od* is the alignment of dyed threads tied and placed at the edge of the loom or backstrap which is used by the *inlaod* weaver as guide. The *gor-od* is pulled alternately or rolled in the step-on pin of

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Growing potato without soil

By Rita T. dela Cruz

Photo by rdelacruz

Soil plays a crucial part in farm production but it now becomes ineffectual with the advent of soilless farming or simply *hydroponics*. This technique in farming has become so promising that it even adapts to modern-day setting allowing farmers to grow potato even with limited space and without considering the 'in- and off-season' farming allowing uninterrupted production.

This technique in farming works well with potato. Since growing potato does not need soil, this means no soil-borne pests and detrimental disease such as bacterial wilt are eliminated.

With the wide uses of potato but a low consumption of it, the country must find ways to fully optimize its use especially with the popularity of French fries among fastfoods and restaurants. This would otherwise make potato a highly demanded rootcrop. It is, therefore, important that farmers find appropriate means to continuously produce more potatoes year-round.

Potato production has high income potential for farmers, especially those in Northern Luzon and Southern Mindanao where the bulk of the potato produced presently comes from. However, owing to various constraints such as limited supply of quality planting materials, low quality of potatoes in terms of content and size, lack of technical know-how among our farmers, and postharvest handling, local production could not meet the market demand.

Modified hydroponics

In Southern Mindanao, farmers found an effective way to produce *granola* and *atlantic* potatoes (two of the most common varieties grown in the country) through modified hydroponics. The technology was tried for field testing by a team from the Department of Agriculture-Southern Mindanao Integrated Agricultural Research Center (DA-SMIARC).

The technology is called 'modified' hydroponics because potatoes were grown using inert medium, sand and coco coir dust, instead of the usual soil. The use of this sterile medium proves a more practical modified hydroponics system because there are no reserve nutrients. This ensures that every plant gets the precise amount of nutrients and water it needs.

Aside from being a no-soil-used and space-friendly method, the developed technology produces better tubers with a much longer shelf life than those potatoes grown in the soil, given that the farm has been managed properly. Labor involved in tending the plants is also markedly reduced. One cycle of planting potatoes needs only 30 man-days.

How-tos of modified hydroponics

In this technology developed by SMIARC, the inputs/ materials include:10 bags of fertlizer (12-11-18), 1 liter insecticide, 1.5 kg fungicides, 85 kg seed tubers, 1000 pc polyethylene bag (24x24x.006), 20 cu m coarse river sand, 150 bags of coir dust, and 5 gallons of disinfectant. These inputs/materials are for a 200-sq-m area.

Cultural management practices are important to effectively manage and ensure optimum production of potato. Some of these are, securing quality seed tubers, disinfecting the medium with 0.5% sodium hypochlorite solution, hilling-up of the medium during the

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Philippine waters: A lifeline to millions

By Maria Lizbeth Severa J. Baroña

Photo by rdelacruz

Seven thousand one hundred islands and its 17,462-kilometer coastline have provided more than just manicured beaches that beckon sunbathing tourists. They have also become the lifeline to over a million Filipino fishermen, and a crucial component of the Philippine economy.

Emerald waters

The Philippines' fragmented terrain has given way to a whole new world of rich biodiversity and sources of livelihood. Beneath the 26.6 million ha of coastal waters and 193.4 million ha of ocean waters, is an industry that provides employment to around one million, or 5% of the country's labor force, and pumps life to the rest of the country.

For the fisheries sector, the seas are not the only sources of livelihood because we have a total of 338,393 ha swamplands, 253,854 ha existing fresh and brackish water fishponds and 250,000 ha other inland resources such as lakes, rivers and reservoirs. These are our inland resources.

The enormity of our water resources prompted the passing of the Philippine Fisheries Code, or Republic Act 8550. This law provides for the management and protection of fisheries in the country.

RA 8550

RA 8550 states that the municipality and city governments shall have jurisdiction over municipal waters. They are, therefore, responsible for the management, conservation, protection, utilization and disposition of all fish and fishery/aquatic resources in their respective municipal waters. This is further coined to “municipal fisheries”.

We fish both to have food to eat, and to have something to sell in the market. Commercial fisheries, an inevitable practice, are best managed using a licensing system for fishing itself, and for operation of fishing vessels.

There are different efforts for the management of commercial fisheries in the country. These include management of *payaos* (fish attraction devices), protection of juveniles and spawning grounds; regulation of mesh size and the use of superlights. They support fishing operations in international waters and seek early resolution of issues on disputed fishing grounds and territories.

RA 8550 also mandates the municipal and city governments to oversee inland operation of fisheries using public lands like tidal swamps, mangroves, marshes, and foreshore lands.

The fisheries industry employs one million, or 5% of the country's labor force. In aquaculture, 26% (258,480) fish farmers are engaged in different culture methods, 68% (675,677) engages in municipal fishing, and 6% (56,715) in commercial fisheries.

Fisheries and the economy

Fisheries contributes between 3 to

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Philippine water...from page 3

Photo by rdelacruz

4% to the country's Gross Domestic Product (GDP), and accounts for 15 to 17% of the Gross Value Added (GVA) in Agriculture, Fishery and Forestry Sector at current and constant prices, the second largest share next only to agricultural crops.

In trade, the fisheries sector recorded a trade surplus of $409 million in 2002, a significant increase of 6.8% over 2001. This made the sector a net earner for trade. In 2002, fishery exports amounted to US$ 96,613 million. Major export commodities include shrimp/prawn, tuna and seaweeds, while the major imports were chilled/frozen fish and fishmeal, which amounted to $97 million dollars.

Figures

The Bureau of Fisheries and Aquatic Resources (BFAR) reports that our total fish production in 2002 amounted to 3,369,306 metric tons, a 6.4 % increase compared to the previous year of 5.8% or a total production of 3,166,530 metric tons.

"The aquaculture sector showed a remarkable growth of 9.6% while, commercial fisheries grew by 6.7%, and municipal fisheries, 2%. The highest share of 40% in the total fish production came from the aquaculture sector, followed by 31% from the commercial fisheries and 29% from municipal fisheries," BFAR detailed in their 2002 annual report.

These figures essentially mean that the aquaculture sector had the highest share of 39.7% (1,338,175 MT) in the total fish production, followed by commercial fisheries with 30.9% (1,042,193 MT) and municipal fisheries with 29.4% (988,938 MT).

The Autonomous Region for Muslim Mindanao (ARMM) had the highest percentage share of regional contribution to the total fish production, with 16%. In ARMM, seaweed is the major commodity produced, followed by Western Mindanao or Region IX with 13.1%, and Region IV-B (MIMAROPA) ranking 3rd with 10.8%.

Top rate

The several thousand islands making up our country should make for a topnotch fishing industry. Despite the increasing trends in production, non-government organizations are putting the plight of the coastal communities, who are still living a sustenance kind of fishery practice, to the attention of concerned key agencies. Research and development, working hand in hand with environmental management practices, would make our marine and coastal fisheries practices both progressive and sustainable.

Sources:
http://bfar.da.gov.ph
http://www.worldfishcenter.com
http://www.fao.org

Seaweed farming...from page 2

The momentum building up in the further development of our seaweed industry (after some devastating experience, such as the short-lived boom followed by the collapse of the seaweed industry in Calaguas Island in Camarines Norte) should be maintained, not only in Bicol but for the other regions of the country as well. With thousands of hectares identified as potential expansion areas in our marine waters for seaweed farming, we should aspire to be the world's top exporter of seaweeds. Technologies on the production of seaweeds in shallow and deeper waters (where the incidence of ice-ice disease and epiphytes can be minimized if not totally negated) should now be transferred to the regions that need them.

In developing our seaweed farms, we should observe the principles in responsible aquaculture and be reminded always of the lessons learned from the collapse of seaweed farming in Calaguas Island.

The industry can be sustained with more R&D funds. We are endowed with the natural resources for the growing of economically important seaweeds species. The seaweeds species with export potentials should be identified and produced. Postharvest facilities such as efficiently designed solar driers should be put up. Moreover, credit should be extended to the farmers to start their business.

Seaweed farmers, for their part, should aim to produce and maintain an internationally competitive quality seaweed product that commands stable price. They should refrain from doing unscrupulous acts of adding impurities to their product (e.g. salt, sand) to increase its weight. These are easily detected by commercial buyers and will cause a significant reduction in price and more important, their loss of integrity and credibility.

Finally, the R& D researchers should generate appropriate and relevant information and technologies for a sustainable and robust industry.

Cassava: Surviving the menace of drought

By Maria Lizbeth Severa J. Baroña

Drought may gradually suck out life from any life form denied of moisture, but not some plants' ability to fight for it.

Built-in mechanism to fight for life in times of drought has enabled some genotypes of cassava to survive. This is what researchers from the Philippines Root Crop Research and Training Center (PRCRTC), and Nagoya University Graduate School of Bioagricultural Sciences of Nagoya, Japan found.

Water shortage due to long absence of rain marginalizes some planting areas. Although cassava is known to tolerate drought, it nevertheless exhibits sensitivity to lack of water in its first three months, otherwise known as the 'establishment period'.

Stunted growth of roots and shoots of moisture-starved cassava results to low yield during normal maturity time.

Photo by rdelacruz

The researchers cited in their study that stabilizing the productivity of cassava would entail understanding its basic ability to withstand adverse conditions like drought. This ability, they said, is important since different cassava genotypes have different ways to deal with drought.

The researchers identified five genotypes of cassava as test materials. These genotypes were: PSB Cv-19, PSB Cv-11, VC-4, Golden Yellow, and Rayong 5. Sixty-four samples for each genotype were planted within 100 cm of one another, half of which were subjected to drought condition. During the experiment, leaf water potential, stomatal resistance, and transpiration rate were measured. After 8.5 months, the root crop was harvested.

Drought and plant physiology

Across genotypes, the highest transpiration rate was during the third month of growth both for the plants subjected to drought and those under rainfed conditions. The researchers interpreted this as an adaptive plant mechanism to maintain adequate water level to avoid leaf dehydration.

Stomatal resistance also increased during the stages when soil moisture was scarce. Except for the genotype Golden Yellow, the midday leaf water potential of the samples decreased during the later period of drought condition.

Drought and plant morphology

All the genotypes' leaf development was affected under the drought condition . The Golden Yellow genotype was least affected in the height parameter. It was observed that the storage roots of the plants under the drought condition were smaller and woody. This was explained in the study as a mechanism where root function shifts from storage of assimilates to serving as a main channel of water nutrients to the shoots as a response to water shortage.

Over-all observations showed decrease in total plant biomass, shoot biomass, root biomass, root-shoot ratio, total yield, harvest index, plant height, number of leaves, and total number of and lengths of adventitious leaves.

While stomatal resistance was increased by drought, leaf water potential and transpiration rate were reduced.

Genotypes Golden Yellow and Rayong 5 were found to be most tolerant to drought while Vc-4 was identified as susceptible. Genotypes that tolerate drought have longer and more adventitious roots as ways to adopt to water shortage.

Source:
"Adaptability traits and mechanisms of cassava to survive under environmental stress (drought) condition." by Algerico M. Mariscal, Dioscoro M. Bolatete, Jo Andreu D. Pardales, Reynaldo V. Bergantin, Demetrio V. Belmonte Jr., and Akira Yamauchi. Philippine Root Crop Research andTraining Center, Leyte State University, Baybay, Leyte and Graduate School of Bioagriculture Sciences, Nagoya University, Chikusa, Nagoya, Japan.

Ornamental fish....from page 19

days and to check if there are parasites or bacteria lurking on the fishes.

In a month, there are usually two major harvests of fishes from 2-3 ponds in Dr. Castillo's fish farm. The fishes do not stay in the ponds longer than three months. But toward the end of the year, six months have already passed before their fishes are harvested. This is because the demand is very low. Based on the status report Dr. Castillo got from some pet shops, the months of March, September, and October are the peak months for OFF sales. From May to June and toward December, people do not buy OFF because they prioritize paying tuition fees and spending for the Christmas season.

But in the case of Dr. Castillo's farm, since they regularly sell wholesale to fish distributors of pet shops, they don't experience the highs and lows of demand. "Our harvest goes directly to Cartimar, the main hub for OFF in the country. They sell our produce to pet shops," she says.

Photo by mmojica

Dr. Castiilo breeds her ornamental fishes in the aquarium before transferring them into earthen or concrete ponds.

What the fish wants

For the proper maintenance and regular production of OFF, there should be a deep or shallow well and a pump to supply water to the ponds. An abundant water supply is crucial for the maintenance of the farm. Furthermore, an aerator, an apparatus that mixes water and air for a smooth flow, is also needed. There should also be a full-time staff who lives in the farm to attend to the cleaning of ponds and feeding of fishes, as well as to perform other errands in the farm.

A backyard type of fish ponds are usually found in residential premises with limited facilities. The capital investment is low and the labor is shared by the household. Dr. Castillo suggests that for the beginner who wants to try OFF breeding, the easiest to breed are the livebearers like guppies. They lay their eggs without any interventions.

The goldfish is tedious to breed but the number of eggs it produces is high. Rather than the easiest to breed, Dr. Castillo opts for the quantity of eggs a fish produces. The livebearers are bought at a very low price and yet they are very difficult to grow. Some of the fishes produced in Dr. Castillo's farm are the silver, golden, and albino tin foil barb; albino rainbow shark; hammerhead; goldfish; shibumkin; and fighting fish.

Dr. Castillo states that there are no difficulties in following the OFF technology. But sometimes, the problem is related with the social attitude or work ethics of fish growers. Since OFF breeding is a tedious task, it requires a lot of time and focus. If one is serious in making OFF breeding a means of livelihood, she says that one must put his heart in the production and does his best to master the technology.

Government support

Given these information, what assurance can the industry have for it to thrive in the country as a sustainable livelihood?

In Thailand, Dr. Castillo says that the government gives its full support for the growth of the OFF industry. But in the Philippines, in most cases, one has to work on his own to promote an industry. "Our biggest challenge is poverty alleviation. The (OFF) industry is right in front of us. Why don't we go into this? There are so many idle lands (in the Philippines)," she quips.

Being both in the academe and the private sector, Dr. Castillo uses her capability to speak and present her ideas and expertise in front of scientific community, private sector, policy makers, and ordinary people. She said she is encouraging the people especially policy and decision makers to consider the OFF industry as potential catalyst in our economic growth. She believes that by making a lot of noise about the prospects of the industry, it can get the attention of the government and convince it to promote its expansion.

Moreover, we can be competitive because we are a tropical country; the land is available and we have an abundant water supply to maintain fish farms. Our government should support this venture especially if we want to enter the world market. Dr. Castillo emphasizes that an endorsement from the country is very important because it gives assurance to the quality of the product since it carries the name of the country.

She challenges the government further by saying, "Promotion is a costly investment but if the government is willing to do this, we, on our part as a private sector, will do our part to develop the industry. Those who cannot afford a capital to start their own business could be employees in the business. I think this is better than giving a kilo of rice and canned goods to poor families come holiday season. Why not give them the means to provide for their own families?"

For more information, please contact Dr. Lourdes V. Castillo at lvcastillo@yahoo.com.

A portable, multi-purpose smokehouse: Minimizing postharvest loss

By Rita T. dela Cruz

Photo by ydalir.co.uk

Isometric view of the multi-purpose portable smokehouse device

Photo by zfernandez

One of the critical issues affecting the fishery sector is postharvest loss. As peak season entices growth of surplus production, a lot of perishable goods is also being wasted. Wastage is now at high levels due to the lack of adequate equipment, good storage system, and poor postharvest handling practices. This is particularly true for fish.

During peak season, supply of fish is high but because fishers lack the means and knowledge to preserve or store their harvested products, these are either set aside to rot, unconsumed, or thrown away.

Throughout the years, local fishers have been smoking, drying, salting, frying, and fermenting their surplus fish as a way of preserving and storing them for future use or for the market. Among these traditional methods, drying and smoking are the simplest and widely used by local fisherfolk. These do not only prolong the shelf life of the produce but they also reduce waste at times of abundant catch and permit storage for the lean season. On the nutritional side, drying and smoking enhance the flavor making the fish as main ingredient for soups and sautéed vegetables. Likewise, preserving the fish makes it easier to pack, transport, and market.

Although fishers have been adopting these postharvest methods to preserve fish, the quality and market potential of the products are still substandard. The traditional way of smoking and drying is rudimentary and often times unsanitary and the finished product is prone to dirt and contamination.

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A portable...*from page 15*

Photo by geocities.com

Smoking fish the traditional way.

A multi-purpose and portable smokehouse

To minimize postharvest loss during peak season and improve the drying and smoking process by the local fisherfolk, Mr. Zaldy A. Fernandez of the College of Industrial Technology, Mariano Marcos State University (MMSU) developed a multi-purpose and portable smokehouse. The actual construction of the multi-purpose smokehouse was done at the Automative Building in MMSU, Laoag City.

The smokehouse was constructed using locally available stainless galvanized iron sheets and stainless round bars. It has a height of 1.83 m and a circumference of 2.44 m. It could generate heat of about 148.8 ^{o}C using 5 kg mixture of charcoal, sawdust, and rice hull.

The device has three main parts: *head*, *body*, and *combustion chamber*. The *head* is an inverted cone type that could create a vacuum force such that the heat and smoke generated in the combustion chamber is concentrated in the body of the machine. The head has a throttle valve attached to the neck and mechanically operated to control the smoke and heat inside the device.

Meanwhile, the *body* is 0.74 m tall and has a built-in rack that can hold seven trays. The body can accommodate up to 30 kg of fish. Each tray which is removable for easy loading can hold 3-4 kg of fish. For easy cleaning, a filter is mounted at the bottom of the trays above the combustion chamber. This also helps manage the exhaust coming out from the combustion chamber, so the quality of the fish is not affected. Likewise, to effectively monitor the temperature during operation, a gauge is attached to the sidewall of the body.

The *combustion chamber* has a sliding and removable basin or manifold where the charcoal and sawdust fall. The sliding nature of the basin gives this device an advantage over any ordinary smokehouse device because it allows the operator to easily check, add, or remove the fuel. This also enables appropriate adjustments on the temperature. Attached under the manifold of the chamber is a separate depository basin for the ashes and fuel residues. To facilitate ignition, a six-ampere blower fan is attached at the side of the chamber for continuous heat. In addition, an air duct is connected at the surface of the fan going to the main body of the device to increase and maintain the circulation of heat and smoke.

Testing the smokehouse

The device was tested and evaluated by comparing it with the drum type smoker, which is usually used by local fisherfolk to smoke their fishes. The data gathered were analyzed using five parameters for the standard characteristics of smokers, namely: simplicity of operation, portability, capacity, and cost and return in smoking fish.

Compared to the conventional drum type smoker, results showed big difference in terms of fish capacity, fuel usage, time of fuel ignition, temperature, and smoking. In terms of capacity, the new device can hold three times (20 kg) more than the drum type (6 kg). Using the same amount of charcoal and sawdust as fuel, the new device can smoke an hour shorter than the conventional smoker. Likewise, the fuel ignition only takes three minutes compared to the 10 minutes of the drum type. Since the new device has a built-in throttle valve, temperature can be easily regulated and controlled unlike in the old device, thus producing better quality smoked or dried fish.

The total expense to produce the smokehouse device was P15, 000. The labor cost was 50% of the actual price of the materials used. The operational cost for smoking fish in three hours is around P2, 227 with a marketable price of P150/kg of the produce. The gross income per operation is P3, 000 with net income of P623. According to Mr. Fernandez, if the device operates once a day for three hours with 20 kg of smoked fish as produce, the break even can be attained within 28 days.

This article was based from the study, "Development of a Multi-purpose Portable Smokehouse Device" by Z.A. Fernandez of the College of Industrial Technology-Mariano Marcos State University (MMSU), Laoag City 2900. For more information, please contact him at rddirectorate@mmsu.edu.ph

Ornamental fish...from page 18

many issues on environmental protection such as cyanide blasting (cyanide shortens the shelf life of fish) that confronts the catching of OMF from the wild. OFF are now preferred because they are grown in earthen ponds, thus they are less prone to diseases and their quality can be guaranteed by growers.

Dr. Castillo asserts that there is really a big potential for the export of OFF. She said that since we do not put prices on fishes by weight but by ton, this could mean bigger revenues for the country. The United States, Japan, and Europe are big markets for the export of OFF. The typical price per ton of ornamental fishes is $1.8 M compared to the average retail price per ton of food fishes, which is only $14,500-$16,500.

She cites Singapore, a small country, that is able to export high quality OFF that pass the standards of Europe. This is because they import OFF from Thailand, Malaysia, and Indonesia which they, in turn, export to Europe. In fact, they are the top exporter of ornamental fishes, contributing 25 percent in the world trade. Moreover, in Thailand, OFF breeding is starting to be acknowledged as a big player in the Asian economy. Thailand's total annual export value of ornamental fishes is $50 M.

Everybody's kind of fish

"It's not food for the table but when you can sell it you have money to buy food," reasons out Dr. Castillo on why the OFF deserves a second look as a practical industry. According to her, compared to tilapia and bangus hatcheries wherein you need multiple hectares of ponds and a big capital, OFF breeding is low-risk and can be started with a low capital investment. It can also do a lot for the community as it will serve as a livelihood option for displaced fishermen and unemployed families.

Before, owning ornamental fishes as pets was seen a luxury. But now, even low income families can afford ornamental fish. "You see, there is a wide client base for this business. If your market is the upper middle class to high-end families, you can breed or grow *arowanas* and flowerhorn which can cost to as much as P100,000. If your market is the middle class, there are angelfish and goldfish that are worth a few hundred bucks. Even the lowest income earner can have ornamental fish as pet as there are guppies and fighting fish that cost from P5-25," states Dr. Castillo.

According to her, there are three kinds of ornamental fish producers, namely: the fish farm operator, the backyard producer, and the hobbyist. Each has a different scale of operation. There are considerations in each scale such as the size and number of ponds, the number of breeders, and the available facilities. There should be enough space for the fry because when the fishes start to lay eggs, there should be enough space to grow them. Basically, three things should be considered: population size, manpower requirement, and other farm implements.

"These are the scales to work with. But I am pushing for a fish farm business because we have nursing and hatchery facilities. These are important since you have to separate the breeder from the grow-out or else they will not proliferate. You can opt for a backyard production but if you invest a small amount, you should not expect a big profit. The hobbyists contribute a considerable supply of OFF to pet shop owners but they mostly breed for self-satisfaction. If they are not able to breed, it's okay with them. But in the case of fish farms like ours, we breed regularly for profit. This is really a business for us," explains Dr. Castillo.

Fishy business

In a fish farm like the one owned by Dr. Castillo, there are earthen grow-out ponds since tanks do not sustain the growth of fishes. If you just grow angelfishes in tanks, it may reach up to six months before they fully grow. In earthen ponds, you can already sell the

Photo by lcastillo

Ornamental fresh water fishes such as guppy and angel fish are popular pet fishes.

fish after 2 ½ months because they are able to grow fast in a big space. This is because there is natural food, depth of water, and supplemental feeding. The growth should be fast and regular or else the fish will not be marketable. You can grow up to 3,000 fry in an earthen pond. But of course, there should also be concrete tanks to hold the fishes when harvested. The fishes should be conditioned in concrete tanks for three

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Ornamental fish breeding:
Uncovering a billion-dollar industry

By Miko Jazmine J. Mojica

Your little hobby of collecting *koi* and goldfish may be your next best chance to triple your income or even higher. According to the latest records, ornamental fish breeding is fast becoming a multi-billion dollar industry.

The Bureau of Agricultural Research's (BAR) National Technology Commercialization Program (NTCP) recognized the potential of ornamental freshwater fish (OFF) breeding in the country as a viable industry. Its promotion was stirred when the Bureau of Fisheries and Aquatic Resources' (BFAR) scientist, Dr. Aida Palma presented this technology during the 2nd Agriculture and Fisheries Technology Forum held at BAR in August last year.

BFAR jumpstarted the Ornamental Fish Development Program in September. The project aims to widen the market base for the export of our OFF. It is expected to kick off soon with the two largest freshwater lakes in Southern Tagalog, the Laguna and Taal lakes, as sources of ornamental fishes.

Fisheries expert

One of the experts in OFF breeding in Pila, Laguna is Dr. Lourdes V. Castillo. She is one of the chairpersons of the newly formed Ornamental Fish Industry Council (OFIC) and a member of the Laguna Breeders Ornamental Fish Association of Southern Tagalog (OFAST).

She has briefed numerous government offices and organizations on the prospects of ornamental fish breeding for livelihood and export. Aside from her Bachelor and Master's Degree on Zoology, her experience includes working at BFAR's Freshwater Fisheries Research Station and the Philippine Council for Marine and Aquaculture Resources Research and Development (PCMARRD) as zonal coordinator. She also served as station manager for five years at the Limnological Research Station at the University of the Philippines Los Baños in Laguna where she is currently a professor of Zoology.

The lure of ornamental fish

The OFIC is a convergence of fisheries experts in the academe and government and private sectors. BioResearch, a private company, known to be the largest producer and distributor of ornamental fish in the country, is a member of this organization. Seeing that there is a big potential for the ornamental fish industry, the organization intends to explore the possibility of penetrating the world market for OFF. Apparently, the country is exporting ornamental marine fishes (OMF) but not freshwater fishes. We rank fifth among the top exporting countries of OMF, contributing 4 percent of the supply in the world market.

However, 90 percent of the ornamental fish traded is freshwater and only 10 percent is marine. Dr. Castillo states that this may be because there are

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Photo by lcastillo

A step by step process on how to start the ornamental fish breeding.

Environment-friendly fishpond management

By Miko Jazmine J. Mojica

Fish has always been considered a healthful choice in our diet, but the culture of fish is now drawing serious environmental and health issues because of the seeming improper practice of fishfarmers raising them.

"According to fishfarmers, the practice [of cleaning fishponds] before was to use insecticides that are usually old stocks and are banned in the market. Now, they make use of sodium cyanide. The poison is known and called 'sodium' not 'cyanide'. We know how vicious sodium cyanide is. Mistakes could happen and the poison could end up on one's plate. We have seen the tragedy in Bohol where several children died due to food contaminated with an agricultural pesticide, mistaken as food ingredient by the one who cooked the street food," lamented Dr. Florentino C. Sumera, an expert in organic chemistry at the University of the Philippines (UP) Diliman. Although, he said that,there is minimal risk the fish sold in the market will be laced with cyanide, he is worried about the dangers in mishandling fish poison.

Concerned by the destructive implications on our environment and health problems to fishfarmers caused by the prevalent use of sodium cyanide in fishpond management, Dr. Sumera piloted a study to devise an effective alternative to the fishfarmers' use of toxic chemicals to clean their ponds of unwanted fishes before the next grow-out.

"While visiting the fishponds in some provinces of Central Luzon, I noticed that *Derris trifoliata,* a derris plant considered as weed, colonizes most of the unused lands nearby. I thought of the possibility of using this plant as substitute for the highly toxic sodium cyanide. This kind of derris plant is the most available among the different types of derris such as *Derris elliptica* which is usually found in mountainous areas," Dr. Sumera said.

Photo by fsumera

Application of derris extract to fishpond

Photo by fsumera

Debarking the derris plants.

Derris trifoliata is from the family Leguminosae that has more than five common names in the Philippines but is more popularly known as *sila-sila*. *Sila-sila* is a flowering shrub that usually grows in mangrove swamps and muddy shores. However, its most utilized parts are its roots and stems. It is believed that they have anti-contusion, analgesic, and insecticide properties. In Nagoya, Japan, a study showed that its rotenoid contents might have valuable anti-tumor properties.

Dr. Sumera's study titled, "Use of *Derris trifoliata* (Leguminosae) root extracts for fishpond management", compared the insecticidal properties of *D. trifoliata* with other derris species such as *D. elliptica* and Derris *"uwak".*

The derris species contains rotenone which is known to have high insecticidal property. According to Dr. Sumera, rotenone is a natural product extracted from plants and is known for its selective fish toxicity that is why it is approved for fishpond management in developed countries like the United States. Rotenone, which is considered environmentally safe, biodegradable, and easily neutralized, can be obtained from derris which is endemic in the Philippines.

Dr. Sumera said that *D. trifoliata* has low rotenone content compared to other derris species but its formulation (root extract) with acetone can reach a comparable toxicity with that of *D. elliptica.* The formulation can kill fish species such as *Oreochromis niloticus* fingerlings within 30 minutes.

The *Derris trifoliata* he used in his study

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Environment-friendly...from page 7

was obtained from the mangrove swamps of San Roque in Paombong, Bulacan. The roots of the mature plant (0.91 cm diameter) were cut into about 15 cm pieces prior to their transport to the Natural Sciences Research Institute (NSRI) laboratory in UP Diliman where the bark was stripped for further extraction. Fresh root barks were used to maximize the extraction and prevent loss from absorption of solvent by the dried root bark. Acetone was used in the formulation of the *sila-sila* extract instead of ethanol to maximize the extraction of its rotenone content which is said to be more soluble in such solvent.

Dr. Sumera observed that the unwanted fishes are more sensitive during summer months since the salinity of water is higher. The different species of unwanted fishes have different tolerance to the toxicity of the extract depending on their life stages. The fishes that were affected during his study trials in decreasing order of effectivity, include: *bidbid, aligasin, liwalo, lulungi, kataba, dalag, tilapia, biyang puti, biyang lungga, and biyang bangayngay*. He said that all of them were affected after 15 to 30 minutes except for *biyang lungga* and *bangayngay* which succumbed only after more than an hour.

Photo by fsumera

Dilution of derris extract

In spite of the good results in his study, he recognized some limitations that have to be addressed in using the *sila-sila* extract. “The stability of the extract has to be controlled. It is effective only for a month and should be kept at a low temperature prior to use. However, further studies showed that if the active rotenone is separated immediately from its aqueous medium by fractionation, the effectiveness can last for more than a year even without keeping it in the refrigerator. It is also wise to protect it from sunlight. This is why they should be contained in brown bottles,” he explained.

The Bureau of Agricultural Research (BAR) which funded this study in collaboration with UP-NSRI is now assisting Dr. Sumera in the commercialization of this technology. In August last year, Dr. Sumera presented his study in BAR's Technology Forum while in October of the same year, it was one of the National Best R&D Papers in BAR's National Research Symposium (NRS). To date, the technology is being applied for patent with the assistance of BAR's Intellectual Property Rights Office (IPRO).

During last year's NRS, Dr. Sumera was asked at an open forum about the safety of extracting rotenone from the roots of the derris plant as it contains poisonous properties. He explained that handling derris roots provides only minimal exposure since it only contains 0.00454% rotenone. “From my calculation, a child weighing 20 kg has to eat around 2 kg of the roots before rotenone can affect him. The problem is when rotenone has been extracted and concentrated (0.180 mg/ml in solution). But this process is done in a well equipped laboratory. It is here that the extract has to be treated as ordinary pesticide and common precautions have to be implemented. As a new pesticidal product, the requirement for approval by the Fertilizer and Pesticide Authority (FPA) also holds,” he said.

Dr. Sumera said that the use of toxic agents is essential in controlling fish predators and competitors in fresh and brackish water ponds. But he stressed that there is a need for safer and more practical alternative than insecticides and sodium cyanide which contains environmentally hazardous materials and are costly because they are usually imported. Based on his cost analysis, he believes that the fish farmers who have a bounty of *D. trifoliata* plants around their environment could economize by using its extracts instead of the more popular insecticides.

On the other hand, he recognizes that his technology still has to be properly promoted and fishfarmers must be educated on the benefits and proper use of derris extracts. According to him, some fishfarmers from Bulacan, Laguna, Zambales, and Palawan have already tested the extract, but generally, most fishfarmers are not yet enthusiastic to use it because the effect of the extract is not as instantaneous as sodium cyanide. “I think that, if our fishfarmers are aware of the hazards they contribute to the environment by using sodium cyanide, they will change their practice and opt for the derris extract. This can happen with the aid of the government. With some of the provinces already banning the use of sodium cyanide, there is no other recourse but to use the environmentally friendly solution,” Dr. Sumera stressed.

For more information, please contact Dr. Florentino C. Sumera through the following addresses and contact numbers:
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New ways...*from page 16*

Photo by senorpescado.com

products include boneless, belly strip, and prito-cut bangus, and breaded fillet (which comes in different flavors), shanghai, and siomai from tilapia meat.

While creating a niche in the bangus and tilapia export market, Fisherfarms needs a steady supply of fresh fish. They depend on the abundant supply from fish producing provinces in the country, but they are practicing a buy-back scheme.

As a subsidiary to the earlier established Feedmix Food Nutrition Specialist, a company that produces and sells aquafeeds, Fisherfarms also serves as marketing arm for Feedmix. Feedmix was reported to be the first to introduce to the Philippines the high heat treatment (HHT) technology which apparently manufactures aquafeeds for healthier fish.

“This scheme addresses two concerns. First, it assures the fish growers who use Feedmix that their produce will be bought by Fisherfarms. Second, it addresses the issue of traceability. The export market is a sensitive market. We don't want it to trace chemical residues in our fish that maybe harmful to consumers. The use of fish feeds from Feedmix assures both the company and the fish supplier's profitability,” explained Gimelo.

Fisherfarms is still in its early stages of development but is already planning to expand its plant sites to reach “every segment of the market”, including the local distributors. However, Gimelo admitted that they are affected by the sudden strengthening of our peso, making their company less competitive with those of Taiwan, Indonesia, and China that also export fish.

Further, he discussed two issues that need to be addressed, the patent for bangus deboner (for boneless bangus) and the trade cost. “Right now, Taiwan is importing our deboners (a tool resembling a tweezer used to pull out fish bones). The country should be able to get patent for this. As to trade cost, our competitors like Taiwan and China will have cheaper products since they are nearer to the mother vessel where the cargoes are loaded. We can't really do something about this, but what we can do is to produce high-value and high-quality products to be more efficient on the production side,” stressed Gimelo.

There is now a considerable demand for fresh bangus and tilapia in the international market. The prospect of tapping our rich fish resource to penetrate the export market could stimulate our aquaculture industry anew, opening greater opportunities for employment and profit.

For more information, please contact Mr. Alvin Gimelo on the following addresses and contact numbers:
Dampol 2nd A, Pulilan, Bulacan. Tel. Nos. (634) 676-2780. Telefax: (632) 299-8303. Email: agimelo@yahoo.com. You can also visit the Fisherfarms website at http://fisherfarms.ph/.

Growing potato...*from page 22*

suggested weeks after planting, dehaulming (cutting all foliage and stem when leaves start turning yellow), hand digging during harvest, and collecting produce using plastic crates.

The total cost for the three cycles amounts to Pph65,865 with a gross income of Pph85,050. This totals to a net income amounting to Pph19, 185 for the 200-sq-m area planted. The return of investment (ROI) is 29.13%.

For more information and copies of their information kit, please contact the Knowledge Management/FITS Center, Bago Oshiro, Tugbok District, Davao City or through telefax: (082) 293-0109 or 293-0136 or email them at: smiarc@yahoo.com or louiepacaana@hotmail.com

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Photo by geocities.com

New ways to look at fish processing and fish export

By Miko Jazmine J. Mojica

Photo by www.aquaculture.co.il

The province of Bulacan can expect a boom in its economy, courtesy of seafood processing.

Fisherfarms Inc., a private-owned company based in Pulilan, Bulacan is specializing in integrated seafood processing. It is only five years in the industry but has already tapped the big export market for processed fish in the country. The company is already known for its tilapia and bangus products by international buyers such as the U.S. and Japan.

The company's general manager, Mr. Alvin Gimelo, said that Fisherfarms, Inc. is the country's biggest and most modern company in the fish processing industry today. It invested millions of pesos for the establishment of its plant in Bulacan that features a "state-of-the-art factory with complete breeding facilities, grow-out farms, advanced feed manufacturing facility, monitoring and management of grow-out, and strict postharvest system such as transporting live fish to an environment-controlled processing facility."

This sounds like a big wave of economic progress for Bulacan. But its ripples are expected to be felt to as far as Northern Mindanao. Aside from creating job opportunities for the Bulakeños, Fisherfarms Inc. obtains its supply of bangus and tilapia from various fish-producing provinces in the country. Aside from Bulacan, its bangus comes from Pangasinan while its tilapia comes from Pampanga and Batangas.

As early as now, Fisherfarms, Inc. is recognized by the international market for its quality bangus and tilapia. It is also negotiating with Australia, Middle East, and Canada as potential markets. At the local market, Gimelo said that Fisherfarms has penetrated the big supermarkets such as Uniwide, Rustan's, and Isetann. Even Jollibee's Crispy Bangus Belly is processed at Fisherfarms, Gimelo said.

But why is this company proving to be so promising at such a fresh start? The company's edge, even at the start is due to its powerful combination of state-of-the-art facility and serious R&D investments. "It is a fact that we have better fish quality compared to our neighbor countries, but we also have a big problem in maintaining the freshness of our products for export. We just don't have the right facilities. But at Fisherfarms, we are able to address this problem," Gimelo said.

The company imported its facilities to be able to apply the best technologies for fish processing. It uses the individual quick freeze (IQF) technology that allows faster and more efficient freezing time. "It takes no more than an hour to freeze and seal in the freshness of fish as compared to the usual freezing technology which takes more than four hours," Gimelo said.

Gimelo further explained that they maintain their working environment at 5-8ºC to ensure the "cold chain". For their value-added fish processing such as smoked fish, they imported Germany-made smokehouses and hardwood to produce quality product. Moreover, to ensure that their products are accepted by the export market, Fisherfarms had their facilities certified by the Hazard Analysis Critical Control Points (HACCP) system.

Fisherfarms is the first company in the world to produce at least nine variants of processed tilapia. According to Gimelo, the value-added products from bangus and tilapia are not yet popular in the export market, but they are sensing importers' interest on their sausage and smoked fish products. Right now, he said, the most in demand products are the frozen whole, and clean and gutted milkfish and tilapia.

The wide selection of value-added (ready-to-cook and microwaveable)

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Sweet sorghum: Raw material for ethanol

By Maria Lizbeth Severa J. Baroña

Photo by jlapitan

We dread the steady rise of fuel prices, but we are not without options. You have probably heard of *ethanol* and how groups, especially those who are espousing the cause of protecting the environment, are batting for widespread use of this alcohol.

Ethanol is a renewable fuel that is considered environment-friendly and could help reduce the country's dependence on oil imports. It is a high-octane, water-free alcohol produced from the fermentation of sugar and converted starch, such as that from corn, potato, and sugarcane.

Ethanol is widely used in countries such as Brazil, the United States, Canada, Thailand, Japan, China, and India. The Philippines has also started programs on ethanol.

In May 2005, President Gloria Macapagal Arroyo launched the National Bioethanol Program of the Philippines in San Carlos City, Pangasinan to mark the signing of contracts for a P1.5 billion-ethanol and power generation plant, which is the first in the country.

Wanted: Alternative raw material

Raw materials cannot keep up with the demand of producing ethanol. This is one of the reasons why scientists from the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) conducted a study to determine the advantages of using sweet sorghum, a grain sorghum with sugar-rich stalk, as raw material for ethanol production.

Sweet sorghum is one of the two fundamental seeds which the Government of India, through ICRISAT, turned over to the Philippines for testing, and probably use, if found to be viable under Philippine conditions. Sweet sorghum has a wider range of adaptability, more rapid growth, and higher sugar accumulation and biomass production potential than sugarcane.

Ethanol in fuel

Pure ethanol is not used as a motor fuel, instead, a percentage of ethanol is combined with unleaded gasoline. Combining ethanol with unleaded gasoline makes for lower fuel cost, increased fuel octane rating, and decreased harmful emissions.

Although any amount of ethanol can be combined with gasoline, the combinations, E10 and E85 are the most common. E10 simply means that the fuel is made up of 10% ethanol and 90% unleaded gasoline. E85 is 85% ethanol and 15% unleaded gasoline.

E10 is recommended by most automakers because of its clean-burning, yet high performance characteristics. In the United States, almost one-third of the country's gasoline has been blended with ethanol since 2004.

E85, however, is recommended as alternative fuel for flexible fuel vehicles (FFVs). If E85 is not available, these FFVs can operate on straight gasoline or any ethanol blend up to 85%.

Sweet sorghum's edge

The cost of cultivating, crops growth duration, and water requirements of sweet sorghum are far lower than that of sugarcane. While sugarcane is cultivated for a year or more, sweet sorghum takes only four months. Sugarcane requires around 36,000 cubic meter of water in a cropping season, sweet sorghum only requires 8000 cubic meters. Studies show that the cost per liter of ethanol production from sweet sorghum is lower than that in producing from sugarcane molasses. Producing ethanol from sweet sorghum is also less polluting.

Sweet sorghum is found to grow well in the northern part of the country. If the National Bioethanol Program of the government pushes through, we can stop holding our breaths for those fuel prices rollbacks, and bat for a certain degree of self-sufficiency in our fuel needs.

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A closer look at tariff changes and fish trades

By Maria Lizbeth Severa J. Baroña

Although a Philippine Law prohibits importation of fish for community wet markets, local producers are still facing the challenge of imported fish flooding the wet markets. Illegal activities like smuggling a crime that carries a heavy penalty - have a lot to answer on this predicament, but it also pays to look into trade policy reforms affecting small to medium- scale fisher folks, a recent study argued.

The tide of world trade reality is just one of the things the fishing industry has to take into account, along with productivity and marketing issues, to nudge the Philippine fishing industry forward. Nevertheless, there are trade reforms that the government can work with to protect the interests of small fish markets and producers.

Trade

Trade is a voluntary exchange of goods or services between and among individuals, groups, organizations, countries. Trade that takes place between two parties is called *bilateral trade*. If more than two parties are involved, it is called *multilateral trade*.

The simple barter, and exchanges of goods that our early ancestors engaged into has evolved into a global practice. This is where trade “policies” come in handy. Rules of trade between nations. help producers of goods and services, exporters, and importers conduct their businesses peacefully.

Countries have manufacturers, farmers, and fisherfolk producing goods that other countries may need. Government of these countries protect the interest of their end of the bargain by putting policies into place.

Philippine trade

The Philippines' entry into the Association of Southeast Asian Nations Free Trade Area Common Effective Prefential Tariff (ASEAN-CEPT) liberalized the fishing industry in the early 1990s.

Through the Asia Pacific Economic Co-Operation (APEC)'s Early Voluntary Sectoral Liberalization, which lists the number of products and tariff reductions committed by member states, our country committed fish products to this scheme. It means that negligible tariff rates will be applied to imported fish by 2002.

A tariff is a tax on imported goods. When a shipment arrives from one country to another, an official of the receiving country inspects the contents and charges a tax according to the tariff formula.

To protect the interest of local fishers, the Philippine Fisheries Code of 1998, also known as Republic Act 8550, banned importing fish for the wet market, except when sanctioned by the secretary of the Department of Agriculture in situations where there is a dire need to

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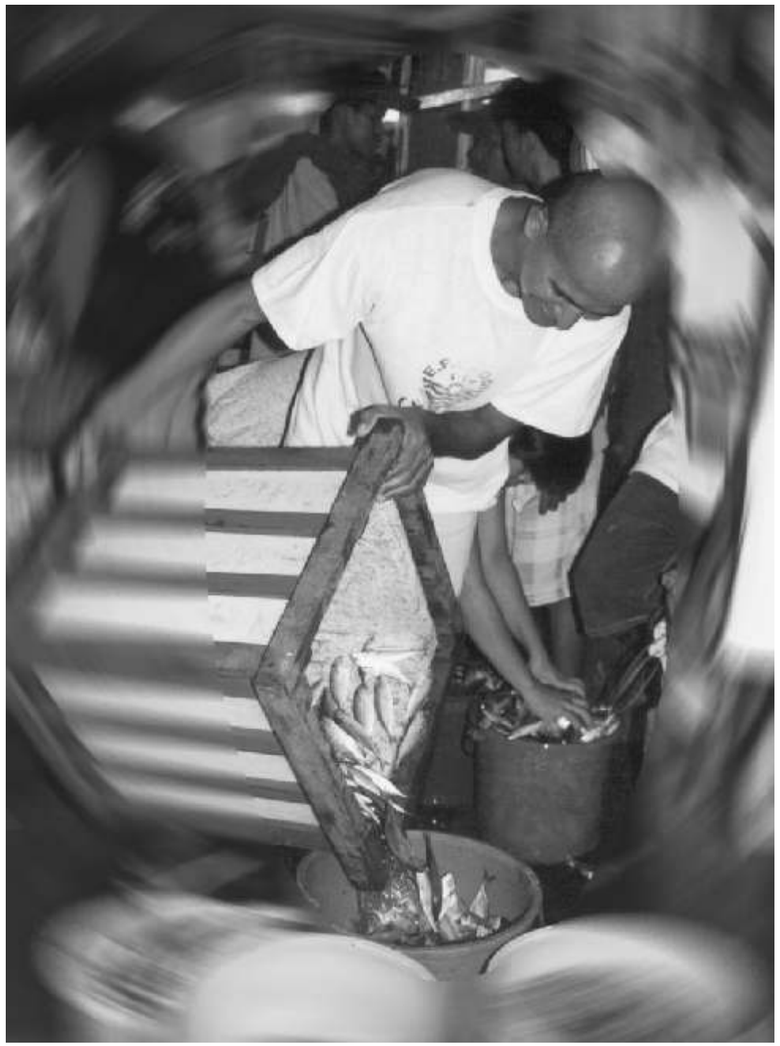

Photo by rbernardo

Rice-based farm...from page 14

growth and fallow period. This reduces the cost of feed. In return, the ducks help in the control of golden snails and weeds. Moreover, their droppings add fertility to the soil. With these benefits, Fred ventured into duck egg production, salted egg, and *balut* making.

He started with 100 ducks for his quality-salted eggs. His friends and his neighbors composed a panel to taste his and his wife's salted eggs. The news widely spread that Engr. Fred's homemade salted egg were of quality and soon became popular. The orders came by swiftly making their small business now a micro-enterprise. At present, they supply salted eggs not only in Hibago but in other parts of the country such as Manila, Baguio, Sorsogon, Pili, Tigaon, and even Laguna where farmers commonly raise ducks.

From eggs to profit

When Fred became one of the first farmer-cooperators of the CPAR project in 2003 and his rice farm became the model farm, DA awarded him 100 ready-to-lay ducks. This is to answer the high demand for duck eggs. According to Fred, his ducks have good semen quality, a requirement to produce quality eggs. The male-female ratio of his ducks is 1 male for every 10 females. Aside from salted egg, Fred's family is also engaged in *balut* making, which he admitted, is more profitable than salted egg. This is because producing salted egg takes about three weeks for the eggs to be of superior quality.

Photo by rdelacruz

Engr. Fred poses with his wife next to BAR's CPAR signage.

Fred serves as “sure market outlet” for other farmers in the community who are also into duck raising. On the average, he buys 3,000-5,000 eggs/day from other farms. He also gets 15,000 eggs/day from his outside suppliers and 500 eggs/day from his own farm. All this fills up his salted egg production quota of about 60,000 eggs/week.

As for the benefits, Engr. Fred said that, there's not much waste in duck egg production because those that are not of quality, are cooked into *balut* and *penoy*. And since he is into integrated farming, the ducks feed on *kuhol* that infests the rice field. Likewise, the droppings from ducks become good natural fertilizer for the soil. He does not only save on molluscicide but also protect the environment.

Fred who discovered a treasure in duck egg production is now one of the progressive and financially capable farmer partners of this project. He is now a proud owner of a brand new car because of duck eggs. According to him, the return on investment (ROI) in product processing more than doubled which encouraged them to pursue it as a micro-enterprise in the community. The project has kept him and the people busy and provided livelihood and extra income for their family.

Itnegs pride (part 2)....from page 23

the loom or a roller of the backstrap with the use of a *bapor*. The bapor is a boat shape container where dyed threads are placed. Weaving starts after *gor-od* is in place together with the other colors to make the patterns. The *bapo*r is slid in and out of the *gor-od* to make the design vertically. Every slide of the *bapor* makes the design horizontally and vertically with the movement of the hands and feet of the weaver. As soon as the design is done, alternate guide is prepared with the use of colors as marks. Each color is assigned a code to serve as the design pattern. The weaver then makes the necessary calculations and counting for the size of the designs and patterns. The number of counts is guided by the maneuvering of the feet and finger-hand coordination of the weaver. Counting is necessary to insure that the designs are of equal sizes and distance. It takes a skillful weaver or designer to know the number of colors and counts to prepare the desired designs Forty-eight strands are used for the traditional design and 24 strands for modified and new designs.

With the emergence of modern dyeing technologies, the natural dye weaving technology of the Itnegs was not affected in terms of authenticity and originality. This is also supported by the creativity and artistry expressed in their finished woven products. As a result, the technology and its woven products were recognized locally and internationally. Furthermore, it became the bases for the *inlaod* Itnegs' social, economic and technological development while boosting their culture and heritage and maintenance of their cultural integrity and dignity.

Source: Aquino, Marlowe U. *Dynamics of Weaving and Development of an Itneg Community in Abra, Philippines*. Unpublished Ph.D. dissertation. University of the Philippines Los Baños, April 2005.

Rice-based farm + ducks = success

By Rita T. dela Cruz

Photo by rdelacruz

Fred with his workers cleaning the salted eggs.

This equation summarizes what Wilfredo Lanusga or simply *Fred* has experienced in raising ducks in a rice-based farming system. Fred is a successful farmer-cooperator of the Community-based Participatory Action Research (CPAR) on "Diversified Farming Systems Agribusiness Development Project in Bicol Region." One of the project's main components is duck egg production, salted egg and *balut* making in an irrigated lowland eco-zone.

The project is an initiative of the Bicol Integrated Agricultural Research Center (BIARC) and the Department of Agriculture-Regional Field Unit 5 (DA-RFU) in coordination with the local government unit (LGU) of Ocampo, Camarines Sur with funding support from the Bureau of Agricultural Research (BAR).

This CPAR project took off in 2002, initially with its rice-based agribusiness diversification. It also aims to enhance the capability of the farmers to manage their own farm resources towards sustainable diversified productivity and develop in them initiative to become responsible members of the community.

The CPAR program of BAR is in response to the twin goals of the DA of giving priority to the agribusiness development of communities, thus the establishment of the micro-enterprise on duck egg production and salted egg processing in Brgy. Hibago, Ocampo, Camarines Sur, the site of the project.

Within one year of implementation, this CPAR rice-based farming project has been found to have a great agribusiness potential not only at the individual level but also of the whole community, as evaluated by a group from BAR.

From an OFW to a full-time farmer

Fred is a B.S. Mechanical Engineer but is now successfully engaged in the *Golden Egg Enterprise*, a community micro-enterprise on duck production in Brgy. Hibago, Ocampo, Camarines Sur. He was an Overseas Filipino Worker (OFW) in Saudi Arabia for 15 years (since 1982) when he finally decided to settle down in the Philippines and use his earnings to engage in farming. He owns a three-hectare rice farm but did not know what to do with it, or at least maximize its full potential.

In 2000, he attended seminars conducted and facilitated by BIARC to learn skills in farming and at the same time scout for business opportunities. It was here that he learned about integrated farming and how it can provide alternative livelihood not only for himself but to his community since a lot of his neighbors in Brgy. Hibago have no alternative jobs. He discovered that he could engage into duck raising while making full use of his rice farm since essentially, rice farming and duck raising complement each other. The rice farm provides grazing area for ducks during the rice vegetative

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A closer look...from page 10

Photo by rbernardo

stabilize demand and supply. Only restaurants and canneries or institutional buyers - are allowed to import fish.

The question is: are these trade policies helping our local producers by protecting them from competition of less expensive commodities? Or do these policies punish the small-scale fisherfolk by bringing in rivalry that gives our folks no chance to compete because of problems already intrinsic with the fishing industry?

Economic experts from the University of the Philippines Los Baños, U-Primo Rodriguez and Yolanda T. Garcia, analyzed the effects of trade policies, specifically, tariff changes, through an analysis of trade regulations using the AsiaFish Model. Specifically, they evaluated the impacts of the 2000-2004 tariff changes on the fisheries sector using a model designed to capture the dynamics of the industry.

The AsiaFish Model is a "multi-market equilibrium model for evaluating the effects of technology and policy changes on the prices, demand, supply and trade of various fish types".

Simply put, the model's structure is as follows: the domestic supply of a specific fish type come from two sources, domestic and foreign (imports). This is then allocated among households (consumption), firms (intermediate demand), and foreign agents (exports).

The domestic price of a fish is determined by the interaction of supply and demand.

The model is also divided into three categories: producer, consumer, and trade cores. The producer core differentiates between fresh and processed fish output. The consumer core describes the behavior of households, which put into account income classes and geographical location. Finally, the trade core is composed of a series of export and import demand equations, which is simplified by the assumption that the country is a small open economy.

The three-staged budgeting framework of the model describes the household spending on food. The second stage disaggregates "food" into cereals, beverages, fruits and vegetables, other meat, fish, and Ofood. Ofood labels food items that may come under the "miscellaneous" category.

Items "fish food", is the model's third stage. Fish is further broken down into *anchovy, roundscad, squid, shells, milkfish, tilapia, shrimp, other fish,* and *processed fish*.

Effect of tariff changes

Decreasing tariff rates will cause three things: a) decrease in domestic production, b) increased domestic consumption of fish, c) rise in imports.

Why these effects?

Fall of import prices would in turn cause these: a) a rise in demand of imported fish, and b) given that domestic prices are constant, a decline in import prices that will make domestic products, or those that are produced in the country, less attractive.

This will cause a fall in demand for domestically produced fish.

If consumers prefer buying imported over domestically grown fish, the price of the latter will fall. This, the study said, will affect production, consumption, imports, and exports. Local producers will lack the incentive to make a good harvest due to low prices of their produce, as a response to competition with imported goods with low prices.

Since both the prices of imported and domestic fish fall due to the decrease in tariff, total consumption for fish rises, holding other variables constant. But, the net effect is still a rise in imports because decreased prices of domestic and imported goods have competing effects on import.

Also, tariff changes will make processed fish an important source of export income. This is because this fish type will experience the largest increase in quantity of imports, if export prices are kept constant.

The finding of the study is an important tool in validating whether tariff changes can help determine a certain government policy or program. If tariff changes affect the production of a certain fish type, and the government happens to venture on promoting this fish, it would be handy to consult the specific effects of this tariff changes to make policies come hand-in-hand with realities in fish farms.

Sources:
The Effects of Trade Policies on the Philippine Fish Markets. U-Primo E. Rodriguez and Yolanda T. Garcia, Department of Economics, University of the Philippines Los Baños, College, Laguna

SUCCESS STORY

The joy of seaweed farming

By Rita T. dela Cruz

It all started with a simple curiosity, the others just followed and soon, he is hooked. This is the case with Mang Ramiro Panganiban, one of the successful farmer-cooperators of the Community-based Participatory Action Research (CPAR) on "Seaweeds Showcase Project" in Pilar, Sorsogon. The project is being implemented by the Bureau of Agricultural Research (BAR) together with the Bureau of Fisheries and Aquatic Resources (BFAR) Region 5, the Sorsogon State College (SSC), and the Local Government Unit (LGU) of Pilar.

For Mang Ramiro, 38 years old, his being into seaweed farming started with a simple curiosity and the will to succeed. Before engaging into seaweed farming, he was into drift gill net or *pagpapalutang*, getting by and providing his family on a mere subsistence level. From his fellow fishermen, he learned about the potential of seaweed farming and the growing number of fisherfolk engaging into it. He also learned about the LGU's project on seaweeds. "*Try-try lang baka dito pala ako kikita*!" (I just tried. Maybe this is where I will have better earnings) says Mang Ramiro with a glee.

He started seaweed farming in 2003. It was also during this time that he became one of the farmer-cooperators and was appointed chairman of the Seaweed Farmers and Traders Association (SFTA) in Dao, Pilar, Sorsogon. Composed mainly of seaweed farmers from 11 coastal barangays of Pilar, the organization is headed by Mr. Jose Razel Monzales, also a seaweed farmer. In 2005, the Association grew from three to its now 138 members. As farmer-cooperator, Mang Ramiro was given materials for seaweeds farming like straw, rope, boat, and 15 kg of seaweed seeds as starters.

Benefits

For Mang Ramiro, the additional income that he would bring home to his family was his initial motivation for engaging into seaweed farming, although, he believes in its potential to change the lives of his fellow fishers. He is not aware of the statistics of seaweed farming but he was right all along.

According to the Food and Agriculture Organization (FAO), commercial production of seaweeds through farming is at present limited to a few countries in East Asia making it a high value crop with a high demand in the world market. The Philippines is noted for the culture of seaweeds (particularly *Eucheuma* and *Caulerpa*) along with Japan, China, Korea, and Taiwan.

In Pilar, Sorsogon, the most widely cultivated species of seaweed is the *Kappaphycus alvarezii* (known before as *Euchema cottonii*), due to its high marketability and demand compared to seaweeds like *K. striatum or Saccul* and *spinosum* type now known as *E. denticulatum*.

When asked about the benefits Mang Ramiro gets from seaweeds farming, he was jubilant in saying, "*Ah marami!*" (Plenty!) In the span of three years, aside from the boat and the materials he got as farmer-cooperator, his income increased.

Photo by rdelacruz

Mang Ramiro happily shows his one-week old Kappaphycus.

The volume of production in one harvest amounts to about 4, 200 kg of fresh seaweeds or 600 kg when dried. His own seaweed farm, which measures 50m x 50 m, earned him P50,000 in 2003 when he harvested 900 kg of fresh seaweeds. With this income, he was able to put his three children to school. Aside from seaweed farming, Mang Ramiro did not stop from his old job as drift gill net fisher because as he says, "*Dagdag kita din ito*!" (It's an additional income).

Since Mang Ramiro is a bonafide member of SFTA, pricing of his produce is not a problem. The Association also serves as a sure market outlet for him and the other members.

Hurdles

Like any endeavor, Mang Ramiro encountered some problems like weather condition, i.e. storm. In 2005, for instance, he said that his income went down to P3, 000 per harvest of 800kg of fresh seaweeds due to the erratic weather condition. Since their seaweeds are cultivated in the shallow part of the sea, the fluctuation in the salinity of water needs also to be closely monitored because it affects the quality of the seaweeds.

When asked why his harvest went down from 900 kg of seaweeds in 2003 to 600 kg last year, he explained that he gave some of the seeds to his colleagues so they too could start. "*Gusto rin kasi nilang mag-try magtanim kaya minsan pinamimigay ko yung seeds*, (They also like to try so I gave them the seeds)" reckoned Mang Ramiro.

Although seaweed farming is not as demanding in terms of maintenance, Mang Ramiro said that sometimes, it becomes difficult for him since he does everything from planting to harvest. He regularly clean the ropes (every 3 days) where the seaweeds are planted. He also does the delivery of the harvest to the market.

Mang Ramiro believes in the saying, "No pain, no gain" and added that in every endeavor, one must persevere to achieve something. What is important, he said, is that people learn from experience. When asked whether he will farm seaweeds for life, he said an astounding "yes" and ends it with, "*Bilib ako sa seaweeds* (I believe in seaweeds)."

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