



# Tissue-cultured garlic: Value adding variety

By MA. ELOISA E. HERNANDEZ  
mhernandez@bar.gov.ph

Remember the belief that garlic can drive away evil spirits? Does it? These white cloves are often seen in the dry section of the market and in every kitchen. We use them to sauté our dishes, they are fried with our peanuts and served as spices and seasoning.

In the Ilocos Region and in many parts of the country, the green tops are used for *pinakbet*, an Ilocano delicacy. Aside from being used as a food ingredient, garlic is used to treat wounds and cure certain ailments like toothache, skin diseases, and epilepsy. Its compounds are also believed to help prevent heart attack by preventing blood platelets from forming into blood clots. It is a good source of vitamins and minerals. These include calcium, potassium, phosphorus, protein, and vitamins A and C.

Garlic or "*bawang*" is one of the most economically important crops in the

country. Here in the Philippines, the Ilocos Region is the largest producer. The plant produces bulb which is surrounded by sheaths and composed of thin-shelled bulblets, cloves or set, all of which are capable of forming a new plant.

### Local Varieties

Ilocos White is the most common variety of garlic planted for commercial production in the country. It has purple to white scales, moderately resistant to insect pests and diseases. It has a prolonged span of shelf life, matures in 90 to 110 days after planting.

The Tan Bolters, another garlic variety, has bigger cloves than that of the Ilocos White. This variety is not yet officially recommended for commercial production because of unconfirmed yield performance. It has good keeping quality.

It matures from 105 to 120 days after planting.

Other varieties include *Batanes White*, *Batangas White*, *Ilocos Pink* and *Nueva Ecija Pink*. These are available in the country but are not yet officially recommended for commercial production.

### Technology

Garlic is planted on 5,312 hectares with an average production of 14,999 metric tons (BAS, 2004). Farmers in the country are still practicing the conventional method of propagation which is by cloves. This resulted to low average yield (2.82 MT/ha) due to low quality planting materials compared to other countries like Thailand, which has an average production of 10.6 MT/ha. Farmers traditionally use their previous crop's harvest as their material for their

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# Organizing the smallhold livestock raisers: Key to profitability

By ROLANDO V. KINTANA, DVM  
rkintana@bar.gov.ph



Livestock industry situationer  
In CY 2005, the livestock industry generated over P800 billion value of production (Bureau of Agricultural Statistics). This staggering amount has created allied industries worth billions of pesos. These industries include, among others, feed milling, marketing and distribution, manufacture of veterinary drugs and supplies, fresh meat production, and meat and meat by-products processing, dairy products and milk production and a multitude of other foods, cosmetics, and industrial products.  
These industries generate hundreds of thousands of jobs - from the small backyard livestock farmers comprising the bulk of the raisers to the workers of the commercial livestock or poultry farms and in all the allied industries. The irony of it all, however, is that majority of the smallhold backyard livestock farmers are poor and could hardly afford to buy the fresh meat, from their animal produce. They practice inefficient production methods that result to unprofitable enterprise. The end result

is high prices of meat and meat products that are hardly affordable to the poor people. The major reason for the inefficient production system is, the smallhold livestock farmers are disorganized.  
Potentials of livestock production  
Livestock and poultry farming has big potential as a profitable venture. This is because the meat, milk, eggs, canned meats and the like are prime food commodities with regular and high demand. In spite of the big potentials, however, the disorganized groups of smallhold livestock raisers remain poor. Apparently, only the commercial scale raisers and organized backyard raisers have profitable business because they run their business efficiently and profitably. These groups earn the bulk of the profit. The small farmer can systematically do this production by integrating his crop farming with livestock raising and earn a sustained and regular income. With experience, the farmer can expand his livestock production to earn a bigger income and

consequently, raise his standard of living.

A production scheme in livestock production  
To illustrate the importance of an organized and specialized scheme in livestock production is what happened a few years back, as reported by some national dailies. There was this major beef supplier in Tondo, who imported several hundred heads of Australian cattle and fattened them in a feedlot in Pampanga for a period of 4-5 months. The animals were slaughtered and sold as beef in the Metro Manila market. The operator organized and contracted some corn farmers who were near his feedlot to produce the corn fodder for his cows. The farmers planted corn and harvested them as whole plant. These chopped corn comprised the feed bulk, chopped to about an inch long to enhance consumption and minimize wastage. The operator paid P1.00 each per whole corn plant. A hectare of forage corn may

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## Organizing...from page 2

have a population of 60,000 plants, grown in a 45-50 days cycle, thus earning for the farmer some P60,000 for a hectare of corn. This arrangement made the farmer happy because he could not possibly earn that amount if he produced and sold the grains to the traders. The ordinary corn farmer may earn only from P35,000.00 P40,000 in about 110 day-period, if his corn yield was 4-5 tons/ha at a price of P 8/kg.

The partnership of the feedlot operator with the organized farmers who planted forage corn was a win-win arrangement. The feedlot operator was assured of a continuous supply of nutritious and palatable feeds while the forage corn farmers received premium price for their crop, in a continuing basis.

In another instance, the Lipa Multipurpose Cooperative in Lipa City or LIMCOMA, is engaged in the milling and processing of animal feeds particularly for swine and poultry, among other ventures. The produced feeds are sold to the active members of the cooperative who are into swine and

poultry raising. In this arrangement, the swine and poultry raisers are assured of a steady, available, and affordable supply of high quality feeds, ensuring profitability in their business, while the LIMCOMA has now grown into a highly viable cooperative that pays regular dividends to its members. This is another form of an efficient partnership between livestock and poultry raisers and a reliable feed supplier.

Production scheme in goat raising  
Many small farmers would like to augment their income from crop farming. Backyard goat raising is a practical and easy means to integrate in a crop farming system. Goat raising gives chevon or goat meat which is a specialty and delicacy among Filipinos. It commands higher price than pork, beef or poultry. Goat's milk is also another high end product that can give income to the farmer on a daily basis. Goat raising can be a highly profitable venture that can give a sustained income to the farmer, provided a systematic approach and collective effort among the farmers is instituted. The Office of the Municipal Agricultural Officer or the Provincial Agriculturist can

be tapped to organize the farmers into a goat raising association, in coordination with the Cooperative Development Authority. There are available technologies for intervention available at the DA, the local government units (LGUs), or even from the Internet that can be used as guide in raising goats in confinement to maximize animal production in a limited space. To operationalize this, however, firstly, a feasibility study should be conducted to determine whether the project will be profitable. If the study proves feasible, a goat raisers' group is then organized and production may start. Those with the land area may specialize in producing the feeds while others raise the breeder animals that will produce the animals to be commercially raised. A greater number of the farmers may then raise goats either to be grown as fatteners or as dairy goats or a combination of the two. The bottom line here is the attractive income and return of investment for the farmers. Continuous study on how to improve the scheme may be devised to ensure the efficiency and profitability of goat production. ☺

## Upgrading...from page 11

technicians to do the insemination activity. PCC provided training on AI for these technicians.

PCC provides them with the needed AI equipments which include the liquid nitrogen tank, semen straws and AI gun. Semen from the stored frozen semen is also provided at no cost. The liquid nitrogen required to maintain and preserve the frozen semen in the field is being provided by the national and the local government. The farmers will later on be charged for these services when the Localized or Privatized Expanded AI program becomes a viable approach for a wide-scale improvement of the carabao.

### Changing Lives

The expanded AI service has reached farmers all over the country. Mr.

Sosimo Ma. Pablico, an agricultural journalist featured personal accounts in buffalo dairying by farmers assisted by PCC. The book titled, "Changing Lives...Beyond the Draft Carabao", also revealed success stories of farmers who have availed either of PCC's 25-dairy buffalo module or AI services.

Farmers were able to source out additional income as well as generate employment for other people in their respective communities. In some of the personal accounts revealed in the book, the families were able to pay debt, send children to school, formed cooperatives, and so on.

For instance, Mr. Elpidio Balino a farmer from Cabanatuan, Nueva Ecija has been practicing AI since 1983. "Iyong isang anak ko nakagraduate ng nursing, iyong isa naman nasa Singapore na

ngayon. Commerce naman ang natapos," Mr. Balino shared. (One of my children is now a nursing graduate and the other one is now in Singapore, finished commerce). All these he attributes to milk produced by their AI breeds. His wife would sell every morning about six liters of milk produced to their neighbors giving her a daily income of P400.00.

The AI technology show great impact to the livestock sector. These upgraded buffaloes can change and improve our lives as well.

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This article was based on the study, "Reproductive Biotechnology in Water Buffaloes in the Philippines: Recent Developments and Future Perspectives" by Eufrocina P. Atabay of the Philippine Carabao Center, National Headquarters and Genepool, Muñoz, Nueva Ecija.

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ROLANDO V. KINATANA, DVM  
Guest columnist

RITA T. DELA CRUZ  
Managing editor/Layout

MARLOWE U. AQUINO, Ph.D.  
RITA T. DELA CRUZ  
MA. ELOISA E. HERNANDEZ  
MIKO JAZMINE J. MOJICA  
Writers

ANTHONY C. CONSTANTINO  
Print Manager

JULIA A. LAPITAN  
VICTORIA G. RAMOS  
Circulation

VIRGINIA A. DULDULAO, Ph.D.  
Development Communication Specialist

RODOLFO L. GALANG  
OIC, MISD

NICOMEDES P. ELEAZAR, CESO IV  
Adviser

All photos BAR unless credited

For subscription and questions, please contact:

Applied Communication Section  
Management Information Systems Division (MISD)  
Bureau of Agricultural Research  
Department of Agriculture  
3/F RDMIC Bldg., Visayas Ave.  
cor. Elliptical Rd., Diliman  
Quezon City 1104

Trunklines: 928-8505 or 927-0226  
Local Nos. 2043, 2042, 2044  
Fax: 920-227 or 927-5691  
E-mail: misd-ac@bar.gov.ph

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slow to cope with the demand for the crop's tubers, which comprise the main planting material. A high-yielding variety of ubi, VU2, was introduced to the farmer-cooperators. Vu2, a variety of ubi known for its deep purple color was developed by the Visayas State College of Agriculture (ViSCA). This is in addition to the local varieties, aromatic *kinampay* and the *baligonhon*.

Ubi's tale of success

Since the initiation of the ubi agribusiness development project in 2005, many farmer-cooperators profited.

For instance, in the municipalities of Dauis and Guindulman, major sites of the CPAR project, farmers are now enjoying the profit of ubi farming as an alternate crop for corn and legumes. This is in addition to their other sources of income.

Among the two successful farmer-cooperators of this project are Nestor Deloy and Benedicto Marzo.

Nestor Deloy, 46, is not only the barangay captain of Brgy. Basdio, Guindulman, but is also one of the successful farmer-cooperators of the CPAR project since its inception in 2003. He owns a 675 sq m of land which he opted to allocate for ubi farming. He planted the *kinampay* variety, which he will harvest this coming December and early January.

Deloy has been into farming since childhood and eventually pursued agriculture as a course in college. His theory-based knowledge in school eventually made him successful in farming today particularly in adopting

certain technologies to make his farm productive. "Para ba akong farmer-



## Livestock Revolution 2020: Where are we going?

By MIKO JAZMINE J. MOJICA  
mmojica@bar.gov.ph

It's that horrible smell again. The Dasmariñas town proper, one of the most prosperous and urban towns in Cavite, reeks of hog manure so awful that most people hold their breath when passing by the area where hog farms are located. The foul smell is hell for non-hog raisers, but it is heaven for those who earn big bucks from the swine industry.

A study conducted by the International Food Policy Research Institute (IFPRI), "Livestock to 2020: The Next Food Revolution", suggested that come 2020, developing countries will produce 60 percent of the world's meat and 52 percent of the world's milk. The study reasoned out that the continuing population growth, widening urbanization, and income growth in developing countries are "fueling a massive increase

in the demand for food of animal origin." Thus, it forecasts that a "Livestock Revolution" which is gradually gaining intensity particularly in developing countries could well become a means to alleviate poverty and improve the nutrition of the rural poor especially since most of them keep livestock in their homes. However, the study warned that the impact of this welcomed revolution could also be a harbinger of new problems in people's health and in the environment.

Several studies thereafter have been conducted all over the world regarding the Livestock Revolution and its implications to socio-economics, health, and the environment. Some of these will be discussed later in the article. But first, let's take a look at how

the livestock industry fares in the Philippines.

The Philippine livestock industry According to the Department of Agriculture's (DA) performance report from January to June 2006, "the livestock subsector had a 2.87 percent increment in output during the period. Its share in total agricultural production was 12.80 percent. The carabao, cattle, and goat industries did not perform well but this was offset by the gains recorded by hog at 4.17 percent and dairy at 3.15 percent. Gross value of livestock output reached P76.4 billion at current prices or 0.25 percent lower than the previous year's level."

"The poultry subsector which shared 13.56 percent in the total

agricultural production had a 1.49 percent cutback in output during the period. Except for chicken eggs which had a production increase of 4.29 percent, there was a downtrend in the production of poultry. Gross earnings from poultry production at P50.2 billion at current prices were 1.04 percent higher this year."

The Bureau of Agricultural Statistics (BAS), the statistical arm of DA, in its latest performance report on the livestock industry in the country from January to December 2005, said that except for slight decreases in the total inventory of cattle and chicken as of Jan. 1, 2006, the livestock subsectors had increased populations from last year's levels. The swine industry, which accounted for 79 percent of total livestock production, was the top performer as shown by its increased production and upward trend of prices from farmgate to wholesale and retail.

Although the production of commercial chicken decreased, native/improved chicken registered a 4.1 percent growth and had a 57 percent share of total chicken stocks. Chicken egg production also increased by 8.01 percent.

The dairy industry meanwhile registered a marked improvement as evidenced by the 5.6 percent increase in animal dairy source and 6.33 percent increase in total milk production. The increased annual average price of carabao, goat, and cow milk was also reported. It was noted that volume and value of dairy imports decreased

compared with last year's record.

The duck, cattle, and goat industries remained as mediocre performers of the whole livestock industry.

The report showed that backyard farming still dominates the country's livestock industry as evidenced by its more than 70 percent share of production in most of the livestock subsectors as against commercial farming except for the chicken industry.

#### Global perspective

In 2002, the International Food Policy Research Institute (IFPRI) submitted another report to the Food and Agriculture Organization (FAO), "Impact of Changing Market Forces and Policies on Structural Change in the Livestock Industries of Selected Fast-Growing Developing Countries". The report focused on case studies in four countries identified to exhibit high growth in their livestock sectors. These countries are India, Brazil, Thailand, and the Philippines.

The report stated that one of the major transformations in the booming hog sector of the Philippines is the emerging popularity of the application of "sophisticated integration of breeding, high-quality internal feed formulation, farrow-to-finish operations, and Hazard Analysis Critical Control Points (HACCP) compatible slaughtering and processing of branded products by the very large commercial companies."

Compared with the stable

growth of smallholder production in the hog sector, the report noted the high concentration of the broiler chicken industry to "six very large, vertically-integrated companies engaged in breeding, feed formulation, contract-growing, internal and/or toll dressing consistent with HACCP procedures, and processing of branded meat products." This was said to be affected by the rapidly growing domestic market for food-safe meat. It reported that these six integrators control the 80 percent output of the commercial broiler industry and have an effective control of the day-old-chicks market.

The report included the intensifying problem of livestock waste especially that of pig's waste. It said that poultry manure "gets off easier since a number of traders are engaged full-time in contract buying and collection of poultry manure from Southern Luzon farms." According to the report, a similar market for dried hog manure is not present in the Philippines but exists in other parts of Southeast Asia.

The problem of livestock waste pollution was reported to have been responded through zoning ordinances at the local government level which were only implemented by commercial farms. The technology of minimizing hog waste such as biodigesters is not yet an option for smallholders that make up the major production sector in the Philippines because it is not economically feasible to them.

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with the rapidly growing demand, both in the local and global markets.

Tagged as one of the country's five banner crops for export by the Department of Trade and Industry (DTI), the demand for purple yam continues to grow. Here and abroad, it is being marketed in the forms of puree, powder, dried chips, cubes in syrup, ice cream, *halaya*, and many others.

Yam is the most expensive tuber crop in the Philippines. For one thing, its selling price is much higher than white or Irish potato, sweet potato, cassava and taro.

Its nutritive value makes it a more valuable crop than other rootcrops in the country. It is rich in carbohydrates and contains 20 to 22 percent starch, vitamins A and B, iron and minerals.

In the private sector alone, the demand for yam has increased to 10-20% annually. Ubi processors in the Philippines demand as much as 49,000 tons a year from which 13,000 tons of this is exported abroad.

So far, the increasing demand for fresh tubers comes mainly from Luzon and a few from Central Visayas and Northern and Southern Mindanao where major food processors operate. Meanwhile, the demand for processed yam products come mostly from foreign countries like US, Canada, Australia, Japan, Taiwan, and other Middle East and European countries.

The supply could hardly keep up with the demand for this dollar earner since the quality and yield for purple yam is low.

CPAR's ubi agribusiness development project

Yam production is fast becoming popular among farmers especially those in marginal hilly lands, because of the prospects of a good income from it. More than that, yam promises a good life for our farmers if only we are able to exploit its full potential.

Although there is a growing demand for purple yam, cultivation and production remain to be the biggest threat to the industry. Production of yam has grown very slowly preventing the further development of the sector. According to the latest statistics provided by the Bureau of Agricultural Statistics (BAS), it took 10 years for the yam industry to double its production area.

In an effort to sustain and strengthen the ubi industry in Bohol, BAR as the funding agency, together with the municipal and provincial local government units (LGUs) as implementing agencies, in collaboration with the DA-RFU 7, Central Visayas State College of Agriculture, Forestry and Technology (CVSCAFT), and the Bohol Ubi Convergence Group, a CPAR project was initiated and established in 2003.

CPAR is an approach and strategy for technology assessment that involves the participation of the community together with the experts and researchers in identifying the most appropriate technologies that would eventually meet the community's priority needs. It tackles farmers' priorities, strategies, resource allocation, and the biophysical and socioeconomic environments under which the farm household operates.

The main idea of CPAR is to fast

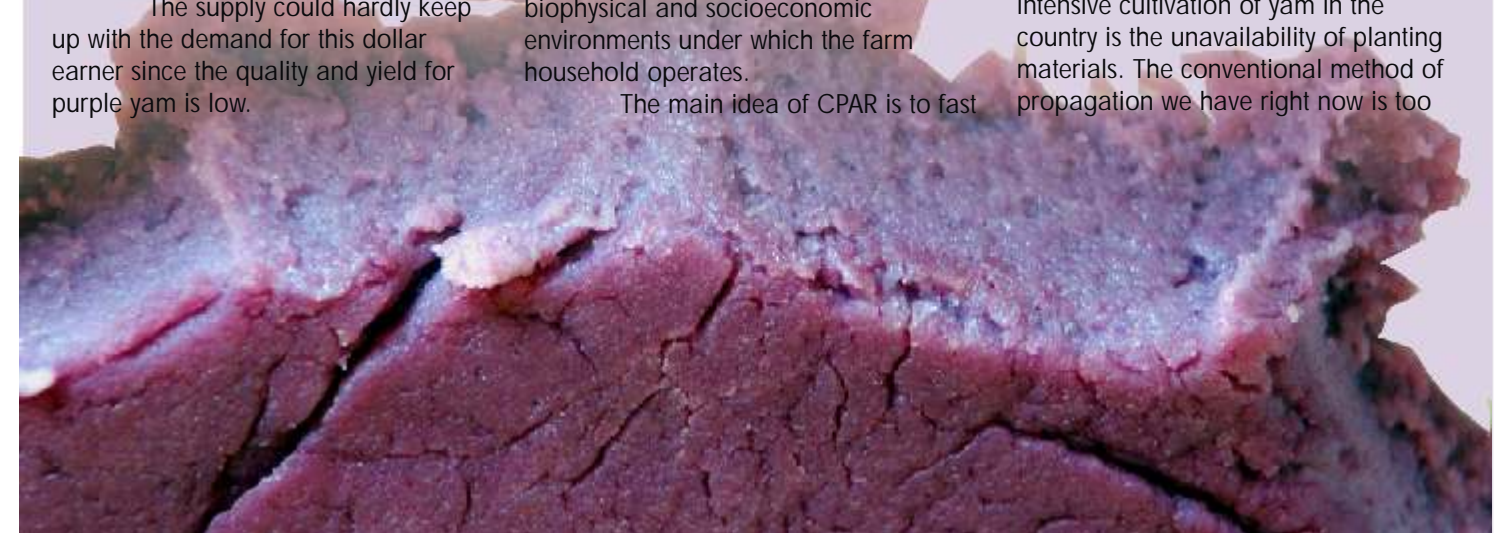
track technology promotion and adoption among farmers by following the on-farm research (OFR) approach in testing and promoting agricultural technologies. The ultimate goal is to increase the total farm productivity and income of farmers within the context of sustainable production system. It gives technology transfer a local face where a farming community finds its farming issues addressed through site-specific farming solutions.

When few years of CPAR proved successful and that many farmers are already involved and the community and LGU are fully supportive of the project, CPAR eventually graduated to the Agribusiness Development Project (ADP). In this effort, the Central Visayas Integrated Agricultural Research Center (CENVIARC), DA's regional station in Bohol, continues to research on the gaps and emerging problems about the technology introduced to the farmers.

Two main objectives of the ADP on ubi are: 1) to improve the production efficiency of ubi so as to increase the income of farmers in every cropping season; and 2) for the farmers to reduce their postharvest losses in ubi by at least 25%.

Eventually, the project hopes that the farmers establish direct marketing lines for their produce to institutional buyers and increase their share of the final market price by at least 30%. Another aim is to strengthen ties among ubi producers for collective marketing.

One of the downsides of intensive cultivation of yam in the country is the unavailability of planting materials. The conventional method of propagation we have right now is too





## The sacred *ubi* of Bohol: A tale of successful farming

By RITA T. DELA CRUZ  
rdelacruz@bar.gov.ph

**U**bi is sacred in Bohol. That was the first, striking one-liner statement I've read from a pack of ubi powder when I set my foot in Bohol province, the largest producer of ubi in the country. Yes, that one-liner is true as confirmed by the Boholanos themselves and the ubi farmers we interviewed during a site visit in Guindulman, one of the sites for the Bureau of Agricultural Research's (BAR) Community-based Participatory Action Research (CPAR) project on "Ubi Agribusiness Development Project".

In Bohol, "ubi" as they call it, is different from "ube". *Ubi* is what most Filipino call purple yam, while *ube* is the adjective which is the Tagalog translation for purple. Meanwhile, "kinampay" is a variety of *ubi* which is native to Bohol. Its flesh is a marbled purple color and is well-

known for its aroma. There are also other *ubi* purple varieties in the rest of the country but not as venerated and advertised as that of *kinampay* in Bohol. *Ubi* is not only the Boholanos' staple rootcrop but was also venerated as a sacred crop during ancient times in Bohol. During a famine, it is said that ubi was the only crop that grew in Bohol soil that saved the Boholanos from death, thus their great respect for it, so much so that it's the only staple food included in their Bohol Hymn.

When one speaks of "ubi" to a Boholano, there is always a story to tell that until today, when anyone accidentally drops an ubi to the ground or table, they would utter an apology and kiss it as a sign of reverence.

They also have an Ubi Festival wherein they hold the Miss Ubi Beauty Pageant. It is usually set during early

January, the harvest season for ubi. This annually-held event is attended by exhibitors from different local government units (LGUs) to display their different ubi varieties like the traditional, aromatic *kinampay*, *kabus-ok*, *iniling*, *tamisan*, *baligonhon*, *binanag*, *gimnay*, and *binato*. This activity provides agri-entrepreneurs a venue for promoting quality, high-value, and sustainable ubi products and services to generate income for the local producers. This year's Ubi Festival will be held on the 2<sup>nd</sup> week of December.

The prospect of purple yam production

Not only in Bohol, is purple yam important but in the country as a whole. So important that there is a need to strengthen its production, processing, and marketing to cope

*The country is also fortunate to be still free from the dreaded avian flu virus that has devastatingly affected the poultry industry of its several neighboring countries such as Thailand, Vietnam, and China.*



Philippines has avoided the rigorous competition on import and export industry of livestock because of its exemptions in trade negotiations over the last two decades. It said that smallholders have benefited from this since the price of live pigs has been consistently favorable to their business. However, the report suggested that the advances in technology on livestock which smallholders could not afford could be "a prime mover of the displacement of smallholders from the livestock sector."

The report concluded that failure to address these concerns over livestock production could defeat the opportunity for poverty reduction in rural areas that do not have access to safe products certification, regulated markets, and technology options. The report suggested four areas of policy interventions as follows: 1) formal procurement and marketing services involving purchases from smallholders so they would not be shut out of the fast growing high-value urban sector; 2) credit subsidies that favor smallholders; 3) certification of food safety or disease-free product attributes for smallholders to meet demand standards and have their product recognized in the market; and finally 4) collective action of different institutions for the preservation of the environment.

Livestock specialists from the World Bank also conducted two studies related to the Livestock Revolution. In 2001, the World Bank released a strategy for the livestock sector. Their study, "Livestock Development: Implications for Rural Poverty, the Environment, and Global Food Security" argued that "livestock can play an important role in poverty reduction, its effects on the environment can be adequately managed,

and that livestock can make an important contribution to global food security provided that an appropriate policy framework is put in place. The people-focused approach of the strategy includes the following required actions: 1) develop a deeper understanding of the key aspects of pro-poor design of livestock development operations, training modules, and enhanced awareness in pro-poor livestock development strategies; and 2) mainstream sound ecological farming practices such as integration of crops and livestock, and development of markets for organic products.

Last year, the World Bank released the results of the study, "Managing the Livestock Revolution: Policy and Technology to Address the Negative Impacts of a Fast-Growing Sector" that proposed an action plan for the international community. At the global level, it advocated expanding research on improved livestock waste management and health technologies such as increasing the efficiency of feed use, and small-scale manure crop and energy recycling systems.

At the national level, the study promoted the following: 1) preparation of a national manure management plans in countries with major current or expected problems such as Brazil, China, Thailand, Mexico, Vietnam, and the Philippines; 2) development and implementation of regional zonal planning activities, including the development of Geographical Information Systems (GIS) technology; and 3) strengthening national public animal and human health surveillance systems, particularly a closer collaboration between animal and

human health institutions. Even with these well-studied strategies and action plan, the World Bank stated that, "there is no proven package of interventions yet; trial and error approaches will be needed. Still, the threats are so significant that coordination among all stakeholders involved at the global and national levels is needed."

Philippine response to livestock revolution

What are the efforts being made in the Philippines in response to this Livestock Revolution? President Gloria Macapagal-Arroyo, this year, said that as part of the government's pump-priming programs, poultry production is a top priority with particular attention to the development of more infrastructure to link the produce to the market.

The country is also fortunate to be still free from the dreaded avian flu virus that has devastatingly affected the poultry industry of its several neighboring countries such as Thailand, Vietnam, and China.

The DA reported as of August this year that the Bureau of Animal Industry (BAI) collected more than 6,000 blood samples and more than 1,800 cloacal (intestinal, reproductive, and urinary systems) swabs from native/game fowls, chickens, and ducks from 15 regions, 50 provinces, 115 municipalities and 210 barangays and the tests yielded negative

results.

The chicken export industry benefitted from this status as shown by last year's record of \$7 million worth of frozen and semi-processed chicken, including duck meat and eggs exported to Japan, US, Korea, Vietnam, Taiwan, and Hong Kong. Moreover, new export destination prospects include China, Malaysia, Angola, Mozambique, Curacao, Singapore, and Europe.

The Livestock Development Council (LDC) in the Philippines is following a National Livestock Road Map to sustain the growth of the industry. Its major implementing units include DA's BAI, National Meat Inspection Service (NMIS), National Dairy Authority (NDA), Philippine Carabao Center (PCC), regional field units, and local government units (LGUs).

The road map is geared toward disease control and eradication, meat safety and quality, local dairy expansion, higher growth rate in the carabao sector, genetic improvement, safeguard on imports, and strengthening of local and international alliances and partnerships.

Furthermore, the DA-BAI has recently launched a program in collaboration with NDA and PCC that seeks to benefit smallholder livestock production and enhance environmental animal health management. According to DA, "the environmental animal

health management initiative (EAHMI) funded by the Italian Government and supervised by the FAO of the United Nations, will develop capabilities in the Philippines to have a safer, cleaner and more productive animal production environment. The initiative will initially benefit smallhold livestock farmers and consumers of Nueva Ecija and Laguna."

The promise of a bright industry is inviting but the repercussions it could bring are also very real. At present, the industry's performance is hinged on to the efforts of research institutions, private sector, and the programs and policies of the government to sustain the progress of the livestock sector. If these efforts are coordinated harmoniously perhaps the livestock revolution could be handled swiftly. ☺

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The dairy industry meanwhile registered a marked improvement as evidenced by the 5.6 percent increase in animal dairy source and 6.33 percent increase in total milk production.

### Tissue-cultured garlic...from page 24

next planting. This practice is at high risk of transmitting diseases from one generation to the next and consequently, losing the varieties.

The Institute of Plant Breeding (IPB) developed a technology for the production of a new variety of garlic to solve pressing problems. The Crop Science Cluster (CSC) of IPB developed a technology to produce *organic, virus-free, true-to-type planting materials* of garlic for distribution to farmers. The team that worked on this is composed of Lilian F. Pateña (project leader), Gloria S. Rodulfo, Lolita M. Dolores, Roberta N. Garcia, and Jonathan L. Juanillas, together with Dr. Ramon C. Barba, academician and scientist, National Academy of Science and Technology (NAST).

#### On Testing

The experiments that tested the viability of the technology were divided into four aspects: improved tissue culture protocol; genetic fidelity testing; virus-free indexing; and garlic organic farming.

#### Tissue culture protocol

"Start with a bulb dividing it into cloves to undergo heat therapy," the project leader said. Heat therapy produces clean planting materials and removes the virus. The normal heat therapy takes two hours but producing the bulb for commercialization would require more energy and time. "We experimented to determine if we could shorten the period. The result showed that 30 minutes would be fine without losing anything, getting about 78-81% survival rate. For the market, it is good enough," Ms. Pateña explained.

This result is important in the commercialization of the technology as this step will save time and energy.

Tissue-culture is useful in mass producing garlic. "Besides producing clean, disease-free and virus-free varieties, we also produce more," Ms. Pateña said.

At present, the team has a total of 1,078 cultures comprising of shoot cultures and *in vitro* bulblets, 131 from the old collection (7 varieties, 15 accessions) and 947 from the new

collection (7 varieties, 9 accessions).

#### Genetic-fidelity testing

Fidelity means there is no variability and the variety can be considered true-to-type. Six enzymes were tested. These included 6-phosphogluconic acid dehydrogenase (6-PGA), isocitric acid dehydrogenase (IDH), shikimate dehydrogenase (SDH), malate dehydrogenase (MDH), peroxidase (PX), and acid phosphatase (AP). A variant, malate dehydrogenase pattern, was observed in tissue-cultured Tan Bolter.

"If found to be the same as the parent, then mass production can be pushed through," Ms. Pateña explained. "Generally what gets in, is what gets out," she added.

#### Virus-free indexing

Tissue-cultured and non tissue-cultured garlic planting materials were indexed for viruses using the two potyvirus antisera namely, Onion Yellow Dwarf Virus (OYDV) and Leek Yellow Streak Virus (LYSV) by indirect enzyme linked immunosorbent assay (ELISA).

A high percentage of cultures of the six local varieties (Cagayan, Batanes, Ilocos White, Mindoro, Nueva Ecija Pink and Tan Bolter) was found to be virus-free (74-93%) while the imported "Elephant Garlic" which is comparatively cheaper had the most virus infection (41%).

"These showed that we are importing not only cheap varieties but we are also importing the diseases and viruses in the garlic," Ms. Pateña revealed.

According to her, the project was able to show that the imported varieties of garlic are indeed virus-infected. This should caution us in importing to prevent infection of our local cultivars.

#### Garlic organic farming

For the past 3 years (2003-2005), organic farming was practiced to produce tissue-cultured garlic bulbs. Four of the local varieties (Cagayan, Ilocos White, Mindoro and Tan Bolter) were produced organically.

In October to November 2006, a demo farm was put up in Ilocos Norte in cooperation with the local farmers and the

provincial government.

#### Value-adding

"The methods on this technology have their unique characteristics," Dr. Barba proudly said. "As we mentioned the main purpose of the study is to produce vegetative planting materials that are similar to the parent material" Dr. Barba added. It should be able to produce varieties that are the exactly the same as the traditional ones except that they are certified and clean and can be used for 3 years generation.

The major issue in garlic production is the ability to produce clean varieties. "Knowing the garlic farmers in Ilocos, the introduction of cultured varieties is no longer a problem as organic farming is now being introduced," Dr. Barba revealed. As organic farming is being practiced, the use of chemical fertilizers will be totally eliminated.

The technology does not only produce garlic organically, but also virus-free planting materials. Infected varieties can be cleaned, producing clean planting materials. The propagation rate is more than that of the conventional way.

The other benefit of the technology is, it further increases relationship with rice production. Water retained after rice harvest can still be utilized, saving time and resources in irrigation. The water retained in the mulch will conserve water and protects the clove.

With the many benefits of garlic to farmers and consumers, the technology of producing clean, virus-free, true-type planting materials should be given proper attention. "Government should provide funds to support this project as it reaches a large number of beneficiaries," echoed by the group.

This study was initially funded by Bureau of Agricultural Research for the period 1 October 2001 to 30 September 2002 and recently for 1 July 2005 to 30 June 2006.

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Sources:

This article was based on the study, "Organic, Virus-Free, True-To-Type Tissue Culture Garlic (*Allium Sativum* L.)" by Lilian Pateña, et. al. of the Institute of Plant Breeding, College, Laguna.



Fuel can be easily loaded or unloaded because of the sliding fuel and ash basin which are included in its main features. Fuel can be easily ignited through disposable or recycled papers at a maximum of four minutes. When the fire starts, it requires lesser attention and management since it already has a built-in ventilation system duct. Moreover,

and taste and highly acceptable in terms of aroma and color.

#### Convenience in operating

Physically, the 4-in-1 smokehouse processor has more added features, it is bulkier than the MPPSHD but since its main feature is its collapsibility, it is portable and can be moved from one place to another. The device weighs about 70 kgs which can be easily handled by one to two persons.

the 4-in-1, as the evaluation showed, is economical in terms of fuel consumption.

For easy monitoring during the smoking process, the door of the drying-smoking chamber is made of transparent glass. Likewise, the device has a built-in temperature reading indicator and a controller. It has a throttle valve which is mechanically operated for heat operation and a built-in multi-purpose boiling chamber.

During the testing, two main

problems were encountered: fuel continuity and smoke exhaust that inconvenienced the operator. However, these problems were easily solved. According to Mr. Fernandez, extra sets of bamboo trays used another form for the continuous and everyday operation of the smokehouse processor. Meanwhile, a collapsible smoke chimney was fabricated as an extension to the present chimney to serve as exhaust for the smoke coming out of the drying-smoking chamber. This was also used to reroute the exhaust of smoke.

When the inventor was asked the other great things about his invention, he said that aside from its complete features, this smokehouse processor is good for different production sizes: family-size, medium-size, and even for large-production size. ☺

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*This article was based on the study, "Multi-Purpose Portable Smoke Bin for Smoking and Drying Fish and Other Products" by Zaldy A. Fernandez of the College of Industrial Technology-Mariano Marcos State University (MMSU), Laoag City 2900. This paper won the AFMA R&D Paper (technology generated category) during the recently held 18<sup>th</sup> BAR National Research Symposium.*

*For more information, please contact him at 0918- 4229357 or e-mail him at rddirectorate@mmsu.edu.ph*

#### What if...from page 18

which threatens food security in the country," the researchers articulated.

Furthermore, the study also evaluated the steps taken by the government through two policy responses as follows: 1) The import ban on poultry products as a preventive measure against the disease; and 2) The removal of import tariffs on non-poultry meat products to stabilize the supply of meat in the country.

The researchers found that the

results for an import quota have the following implications. "First, to the extent that it is effective in controlling the entry of infected poultry products, its costs on the economy are far less than dealing with an outbreak. Second, the imposition of an import quota benefits the producers of poultry products and causes an increase in the supply of fresh meat in the domestic market. Third, the 'major' cost of the import quota is its adverse effects on

the other sectors," they stated.

During the 18<sup>th</sup> National Research Symposium in October organized by the Bureau of Agricultural Research (BAR) of the Department of Agriculture, the study was presented and won the first prize for the socio-economics paper category of the AFMA Best Paper Award. The study was funded by the SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA) based in UPLB. ☺

# The Philippine Carabao Center ...has gone a long way

By MA. ELOISA E. HERNANDEZ  
 mhernandez@bar.gov.ph



Façade of the PCC building in Muñoz, Nueva Ecija

Conserve, propagate, and promote the carabao as source of milk, meat, draft power, and hide to benefit the rural farmers. This is the overarching mandate of the Philippine Carabao Center (PCC).

PCC's mission is to improve the general well-being of rural farming communities through carabao genetic improvement, technology development and dissemination, and establishment of carabao-based enterprise thus ensuring higher income and better nutrition for them.

#### Humble beginnings

"We started from a mere project funded by the United Nations Development Programme-Food and Agriculture Organization (UNDP-FAO) in 1982," PCC Executive Director Libertado C. Cruz said. From an idea of back crossing murrachs with 48 chromosomes with those with 50 chromosomes, the project then produced a cross breed with 49 chromosomes. The problem then as to whether the resultant breed would be acceptable to farmers or not was answered. There was a remarkable acceptance rate of the breed, being able to produce three to four times more milk, thus providing not just additional but

higher income to farmers.

"Since we have proven that the breed is good and acceptable to farmers, we moved from here to create the PCC," Dir. Cruz added.

By virtue of Republic Act 7307 known as the Philippine Carabao Act of 1992 signed on March 27, 1992, the PCC was born and became operational in 1993.

#### ISO certified

During the 13<sup>th</sup> anniversary of PCC on April 3, 2006, the institution received the renewed three-year ISO Certification 9001-2000. The certification cites PCC's management system of its carabao crossbreeding program, strengthening of water buffalo gene pool, enterprise development, and provision of social and technical services, conforming to ISO 9001:2000 standards. PCC first earned its ISO certification in January 2003.

#### Programs

PCC's Carabao Development Program is a continuing organized effort to improve the genetic potential of the native carabao for meat, milk, draft, and hide that would lead to the development of buffalo-based and related enterprises

aimed at increasing income and nutritional status of farming communities.

The programs of the PCC can be classified into three major components, namely: (1) Genetic Conservation and Utilization; (2) Social and Enterprise Development; and (3) Research and Development.

The Genetic Improvement Program ensures an indigenous germplasm which can be useful to breeding. "We collect the best of the best of our pure breed dairy for our semen laboratory which later on will be used by the National Artificial Insemination (AI) Program," Dir. Cruz proudly mentioned. He added that those breeds have better performance in terms of milk production. "We genetically improve the productivity of our native animals," Dir. Cruz added. This is aimed at improving the breed of the native animals to produce crossbreeds that have better potential for milk production.

Efforts to conserve Philippine carabao germplasm *in vitro* and *ex situ* are being undertaken. A population is kept and stored for this breed group. In a separate gene pool for Philippine carabao, selection and organized breeding is applied. An open nucleus herd of elite Riverine breed, essentially Murrah, form the National Gene Pool for Riverine Buffaloes (NGPRB). Also, PCC lends purebred Murrah bulls to some farmers' groups that cannot directly avail of AI services.

The social and enterprise development component promotes cooperative development so that small-hold farmers can have access to resources and allows them to participate in decision-making as well as develop their potentials for business and viable enterprise.

Under this component is the buffalo-based enterprise that utilizes existing buffaloes. "Organizing farmers into primary cooperatives enables us to easily transfer technology and it is also a good venue for marketing," Dir. Cruz discussed. Organizing farmers develops the social and the technical aspects.

"Social caters to the human side such as developing leadership," Dir. Cruz said. Trainings are likewise provided to technicians serving the cooperatives and the Local Government Units (LGUs).

The cooperatives that federated to form the Nueva Ecija Federation of Dairy Carabao Cooperatives (NEFEDCO) are being supported by PCC in collaboration with the Nueva Ecija provincial government. This was established on January 18, 2006 and registered with the Cooperative Development Authority on May 22, 2006. These primary coops under the umbrella of NEFEDCO are beneficiaries of PCC's 25-cow dairy buffalo module. This is a facility utilized by PCC to loan out 25 heads of purebred female dairy buffaloes (Bulagarian murrha) to qualified farmer-recipients (one per family). Payment is in the form of returning to PCC the first offspring of each female buffalo at breedable age (18 months).

The technical aspect focuses on the animal side. "PCC provides training on milk handling and processing to primary coop members. Testing the milk produced to check its quality is also being taught by PCC. This aspect deals on animal production, feeding, and marketing," Dir. Cruz explained. The Center has also trained paraveterinarians who now administer regular deworming and vaccination of animals in the coops. Village-based AI technicians were also trained by PCC so that inseminating the animals in the coop is done by them.

The Center's R & D addresses technology and policy gaps and establishes a more efficient and profitable buffalo-based enterprise. This is further divided into two aspects: human and social. The human aspect is concerned about policies while the social focuses on marketing. "We start developing technicians later on

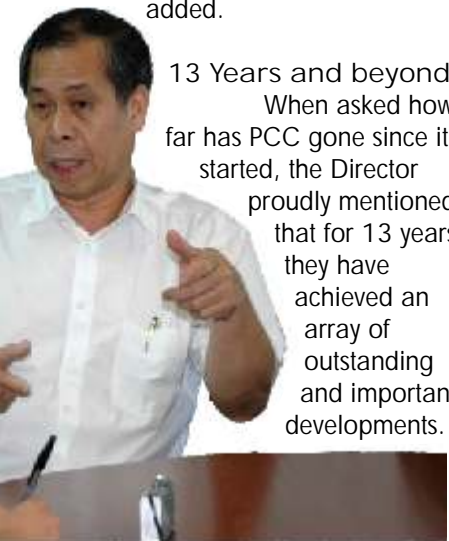
develop the capability of LGUs with limited technicians, then private technicians. Training the village-based technicians will lead to the privatization of AI services,"

**Collaboration**

The overwhelming success of the agency was achieved through its collaboration with other attached bureaus and agencies of the Department. Dir. Cruz enumerated the agencies working with them. The National Dairy Authority (NDA) is more on expanding the milk feeding program and generating direct market for milk producers by establishing cooperatives. The Livestock Development Council (LDC) focuses on setting directions and sourcing of additional funds. The Bureau of Animal Industry (BAI) facilitates the genetic improvement program together with the LGUs. LGUs serve as front liners in dealing with the farmers. The Bureau of Agricultural (BAR) provides funding support to the Center's R&D.

Dir. Cruz further mentioned that BAR has been providing scholarship grants and training assistance to them. BAR further strengthened their biotechnology and technology commercialization programs, and improved their laboratories.

"BAR is a very good partner in terms of the human resource development" Dir. Cruz mused. "Strengthening the human resource for me is number one; without the right people we cannot do so much. This, is for me, the biggest role of BAR," Dir. Cruz added.



PCC Executive Director Libertado C. Cruz being interviewed by the author.

13 Years and beyond When asked how far has PCC gone since it started, the Director proudly mentioned that for 13 years they have achieved an array of outstanding and important developments.

"We were able to set genetic resource in the form of gene pool for a nationwide genetic improvement program. We were able to import 3,700 female breeding buffaloes from Bulgaria," Dir. Cruz answered. These buffaloes increased in number and have become our source of semen.

"We have developed our human resource capability to undertake research. Through the buffalo-based enterprise we were able to recruit and train people with unique expertise in research as well as in extension," Dir. Cruz added. "We trained people in the LGUs. We have developed a system and a pool of human resource capabilities in the country," Dir. Cruz said.

"At the scientific community, I think we were able to develop a level of credibility to the point that we are now recognized as one of the leading institutions in buffalo development in the world," Dir. Cruz proudly mused. "The Institution has a very clear program and direction which are being utilized by many countries now as model in developing their buffalo program," Dir. Cruz added. He cited India, Indonesia, and Thailand as examples. Now, Sri Lanka is also looking at how it can possibly adopt our crossbreeding program.

Nueva Ecija is the National Impact Zone (NIZ) for dairy buffalo enterprise. "We want to demonstrate, few years from now, that most of the animals in Nueva Ecija are close to pure breed and they will become the source of dairy buffaloes," Dir. Cruz revealed.

A strong collaboration was established between the Nueva Ecija provincial government and various local government units. The model of impact areas has been replicated in smaller magnitude in the regions covered by the PCC network. There are 13 Regional Impact Zones (RIZ) at present.

The PCC has gone a long way in reaching farmers through its numerous products and services. Indeed, it has become an outstanding institution in the country and its name reverberates among all stakeholders in the livestock industry today.

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# 4-in-1 portable smokehouse

## The latest in fish smoking technology

By RITA T. DELA CRUZ  
rdelacruz@bar.gov.ph



Everyone wants an easy life. In business, easy life means less work, without compensating profit. In the fish smoking business, it means less procedure but still yielding greater and quality output.

This is exactly the driving force behind the fabrication of a 4-in-1 portable smokehouse device, the latest in fish smoking technology developed by Zaldy A. Fernandez of the College of Industrial Technology, Mariano Marcos State University (MMSU) Laoag City campus. He previously fabricated a multi-purpose, portable smokehouse device (MPPSHD) in 2003, which also gathered interest among stakeholders in the fish smoking industry, both smallhold and big time.

**The main features**

As the name implies, the newly-developed device is a 4-in-1 smokehouse that carries on the four major processes in smoking fish: marinating, boiling, drying, and smoking. With this one machine, all these four processes can be done in one major sweep without the hassle of going from one machine to another.

The 4-in-one smokehouse is like an elongated box (see picture at right) with an upright oven-like feature in the middle. It consists of three major features which are collapsible for mobility. These include: marinating chamber, boiling chamber, and the drying-smoking chamber. As a device, it has four main features: the boiler, trays and body, marinating chamber, and fuel chamber.

How does this 4-in-1

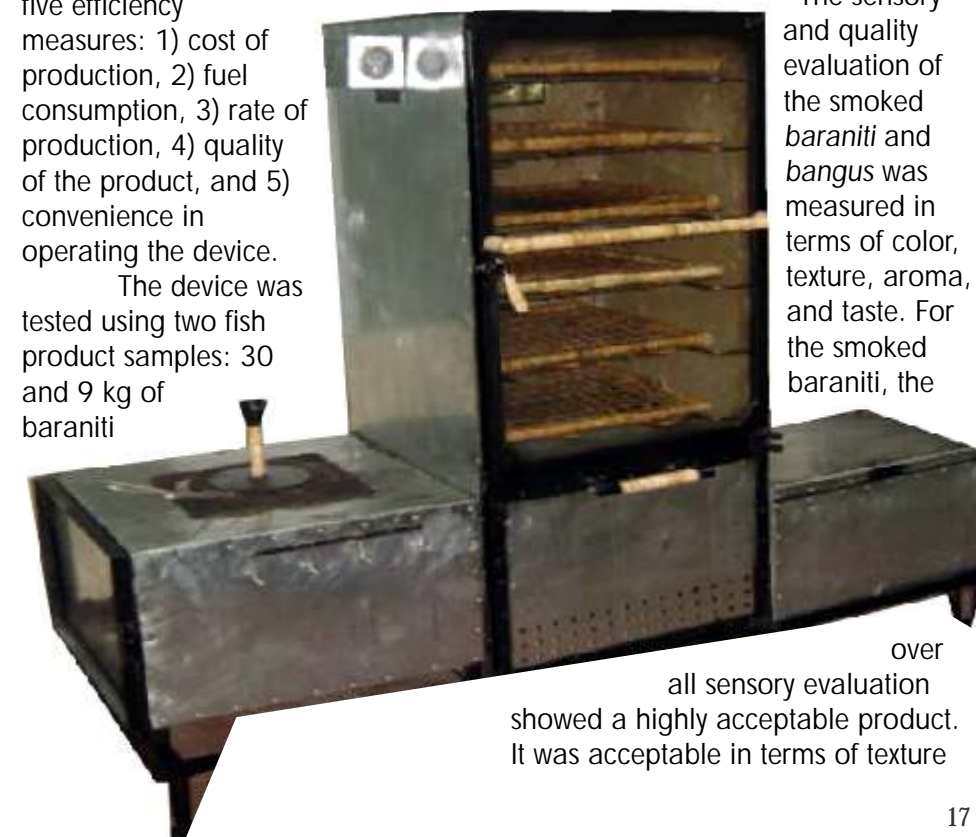
smokehouse processor differ from other conventional types of smoking devices like the Pangasinan stove, the *pilon* type, the drum type, the smoking pot, the *batya* for marinating, the boiler developed by the Department of Science and Technology (DOST), the *pugon* type, or the MPPSHD?

Simply, this new 4-in-1 portable smokehouse device carries all these features, from the old-fashioned *batya* type of marinating to the *pugon* type of smoking fish. The new device is a shortened version of all the former models.

**Performance capability**

The feasibility and portability features of this 4-in-1 smokehouse processor was determined following five efficiency measures: 1) cost of production, 2) fuel consumption, 3) rate of production, 4) quality of the product, and 5) convenience in operating the device.

The device was tested using two fish product samples: 30 and 9 kg of *baraniti*



(*Caesio caerulea*) and *bangus* (*Chanos chanus*). For fuel, the following were used: combination of charcoal, sawdust, and guava leaves.

In terms of marinating, boiling, drying, and smoking, result of the test showed a performance average mean of 3.81 for the machine which according to the statistical treatment used, falls on a very satisfactory performance level.

The total expense incurred in the fabrication of this 4-in-1 portable smoke processor is P21, 027.60. Distribution of expenses included: materials (P15,526.00), electric power (P412.60), water (P82.00), labor, 30% of material cost (P4,657.00), and travel (P350.00).

The sensory and quality evaluation of the smoked *baraniti* and *bangus* was measured in terms of color, texture, aroma, and taste. For the smoked *baraniti*, the

over all sensory evaluation showed a highly acceptable product. It was acceptable in terms of texture





# What if "The Outbreak" finally occurs

By MIKO JAZMINE J. MOJICA  
mjojica@bar.gov.ph

model of the Philippines. Patterned after the ORANI-G model of Australia, it is designed for evaluating the macroeconomic and sectoral effects of any economic policy changes or exogenous shocks that may be introduced into the country's economic system."

According to the researchers, out of the 229 industries that compose the model, 28 belong to the *Agriculture, Fishery, and Forestry* sector. The model also has four economic agents, namely, households, firms, government, and foreign agents. "Households act as consumers of goods and services. Firms use primary and intermediate inputs in the production of goods and services. Government collects taxes, buys goods and services, and provides public goods. Finally, foreign agents transact with local agents through exports and imports," they explained.


The researchers also explained that the key relationships in the model are represented by the following: (1) input demand equations, (2) commodity supply equations, (3) household demand equations, (4) government demand equations, (5) market clearing conditions for commodities and primary factors, (6) macroeconomic relationships, and (7) other identities.

The TARFCOM model was mainly used to demonstrate the impacts of the avian flu outbreak on the poultry sector and its related industries or subsectors which the researchers referred to as "production and consumption shocks". According to the



researchers, they found the TARFCOM model suitable for the analysis of the effects of avian flu outbreak on the country's economy because it captures the relationships among the various agents and industries in the economy. Therefore, they added, it facilitates the evaluation of how changes in the poultry sector will affect the economic activity in other industries and their feedbacks.

Based on the results of their study, they pointed out that there are combined effects of these production and consumption shocks that are expected to have negative effects on the economy. "First, aside from the obvious decline in the production of the poultry sector, outputs of related industries that provide inputs to the sector such as animal feeds and corn are likely to be adversely affected as well. Second, the contraction in the poultry sector and other industries is expected to cause a decline in aggregate output and employment. Third, an outbreak is expected to reduce the supply of meat

 Turn to page 18

Chickens raised and produced through open type? In western Mindanao, open-range-type upgraded native chicken production is a common practice to increase the fowl's protein requirement in a semi-commercialized enterprise. A demonstration farm is found in one of the research stations of DA-Regional Field Unit XI of the Western Mindanao Integrated Agricultural Research Center (WESMIARC) in Zamboanga Sibugay province.

The demonstration farm which serves as breeding area and source of upgraded



grasses. This provides for the organic feed requirement and natural sources of feed for the chicken. Based on the experience of DA-WESMIARC, natural free flowing water helps in cooling the area and the chickens can swim and enjoy the water coming from the creek or spring.

Technical requirements Based on researches and actual farmer/raiser experiences, the native chicken ORTP is very feasible.

## Galang chicken, anyone?

By MARLOWE U. AQUINO, Ph.D.  
maquino@bar.gov.ph

stocks is a perfect site for the open-range production system. This production system was introduced by the DA-WESMIARC manager, Dr. Francisco Geromo and DA-DBC Station Superintendent Ms. Fe Gomez. The farm is improved through the results of adaptability tests and action researches on the improvement of native chicken using Kabir cockerel and tried management practices in Ipil and Dumalinao, Zamboanga del Sur. This on-farm research led to the identification and participation of farmer/raiser cooperators of the new native chicken production system.

Bio-physical requirements of ORTP production

Open-range type production (ORTP) requires simple management within open spaces where native chickens could freely graze and move around. An average of 1000 to 5000 square meters (0.5 hectare) is ideal for a minimum of 1:25 ratio of cockerel and native hens or

more depending on the management of the given land area. Since this is open-range, the number of chicken may increase to manageable proportions. This type of farm is best on an upland plain to slightly rolling or less productive area (rocky) or under fruit trees or plantation crops such as rubber, coconut, and banana.

The system is best in a Type IV climate where there is an equal distribution of rainfall throughout the year. This condition ensures minimal infestation and prevalence of pests and diseases. Historically, native chickens are generally resistant to pests and diseases because of their natural adaptation to their physical environment.

Minimal vegetation is suggested to be part of the land area to serve as shelter during slight rain showers and too much direct sunlight at high noon. It is also the best source of natural food for the animals such as crawling insects, earthworms and even

The technology is very simple and easy to follow by an ordinary farmer including interested individuals who want to engage in a small-scale business considering that the native chickens can thrive on locally available feedstuffs, can be ranged, and are resistant to major pests and diseases.

**Housing**

Although the ORTP is in open spaces, simple yet affordable and easy to maintain native chicken housing is also a must to ensure increased production. At the very least, a farmer or raiser can build improvised shelter which includes a mating pen or perch house, individual nest and brooder house. The materials could be bamboo scraps, nipa leaves and logs that serve as foundation and structure for the main chicken house. When the house is not in use, this could serve as a resting shed for the farmer and his family or for simple outdoor activities such as picnics and games.

### Feeds and feeding

Feeds given to native chickens do not require much attention. Feeding starts immediately as soon as hens are at brooding stage. They must be provided with booster or starter mash feeds ideally given in each brooder house. During the rearing stage, the chickens are fed with locally available feeds (rice/corn binlid, corn/rice bran and *ulon-ulon*, full grains of rice) and they can range/graze on the grasses abundantly found in the area. By nature, they freely scavenge the soil in search for crawling insects and worms. However, farmers and raisers can use farm by-products such as ground corn cobs and chopped leguminous fodders together with salt to augment their feed requirement. A feeding trough, strategically placed within the area with fresh and clean water, should be strategically located in the area.

### Care and management

Giving vitamins and antibiotics when necessary is encouraged. Using the alternative but sequential ration, this can be done in 3 days with water + vetracin or soluvites; 4-5 days with plain water; and 6-7 days with water + electrolyte. Deworming (following recommended dosage) is done every three months. To control mites and lice, area sanitation must be done. This is supported by bathing of hens after weaning the chicks (usually one month after hatching) with detergent and bathing the rooster every week with detergent. This practice ensures the chickens to be free from infestation of pests and diseases. Supplemental feeding including vitamins and minerals, administered when appropriate, ensures the chickens' health and vigor for quality meat.

### Social and economic contributions

Socially and culturally, chicken is part of the main course of authentic and original Filipino cuisine. They dictate the nature of our culinary style and skill to come up with delicious menu. With this developed and innovative technology, Filipinos are

assured of quality chicken meat. Since the technology is after the improvement of the physical characteristics of the native chickens particularly body size, proper management is a must. This even contributes to a longer period of production.

With today's food and health concerns, native chickens produced organically or with lesser vitamins, minerals and antibiotics in their body is the "in" thing. This is also the reason why specialty restaurants cater to the health conscious customers. This technology is gaining popularity. The meat produced out of this chicken commands higher price, has socio-cultural relevance and there is a better meat quality that is tender, meatier, and tastier when prepared and cooked as *tinola* (broiled chicken with vegetables and seasoning), *inasal*, (grilled and barbeque that originated in Bacolod City), *adobo* (dried chicken meat stew), *pinikpikan* (traditional chicken preparation commonly served in the Cordilleras), and *tinobook* (chicken delicacy preparation common in Zamboanga Sibugay).

### Cost and return

Technology users, takers, and adopters can successfully engage in native chicken ORTP in two production scales, small and medium scale enterprises.

For small scale enterprise the cost of production totals to Php 9,958.00 with 10 breeder pullets and 2 rosters at Php 150/layer or rooster in one year cycle. For medium scale enterprise, the total cost of

production is Php 34, 198.00 with 40 breeder pullets and 4 roosters at Php 150/layer or rooster.

The costs of production for both enterprises include housing and fence, vaccine and veterinary drugs, feeds and supplements, and labor. The net income derived from the small and medium production scales are Php 9,542.00 and Php 61,800.00, respectively. The ROI for the egg produced is 96% and 181% for the meat. The specific details of the cost and return analysis could be secured from the technology developer.

The increasing demand for native chicken produced using this technology has become an alternative livelihood for backyard farmers and raisers. With proper support from local government units and continuous technical support from researchers and poultry experts, this will make our farmers self-reliant, goal-oriented, and motivated.

Starting with a small capital, it can become a big business with the proper management skills and motivation of our chicken farmers. ☺

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For more information, please contact Dr. Francisco R. Geromo, center manager of the Western Mindanao Integrated Agricultural Research Center (WESMIARC), Ipil, Zamboanga Sibugay or email your inquiries through wesmiarc@yahoo.com



supported her all the way to follow her passion. "The BAR and DA-RFU I assisted me in my financial needs to finish my dissertation but since my research required me to put up an experimental poultry house that I had to monitor 24/7, I had no choice but to put up one in our backyard and mortgage our house and lot to cover the expenses. My family was behind me all the time, supporting me in my every decision," said Dr. Datuin.

Equipped with an even wider knowledge and experience both technical and practical, she was assigned as breeding station manager at the DA-Integrated Satellite Station III, Sta. Barbara, Pangasinan in 2002. True to her steadfast commitment to agriculture and rural development, she organized the first Regional Duck Festival in the country that showcased new technologies related to ducks. She also gave lectures and hands-on demonstration on how to make quality salted eggs, duck leche flan (custard), and duck burger. She believes that these value-added activities are good sources of additional income to rural farm families.

Dr. Datuin's involvement in the collaborative research of the International Livestock Research Institute (ILRI) and PCARRD on Crop-Livestock System Research and Extension Network (CASREN) developed her interest in conducting researches on goats aside from her previous concentration on ducks. Her commitment to the project, "Enhancing Smallhold Goat Production in Region I" in 2003, which was implemented in over 25 sites across the region was recognized as one of the Best R&D AFMA Papers when she presented it in 2005 at the BAR's 17<sup>th</sup> NRS.

From time to time she is tapped as resource speaker to promote Technology Commercialization on the Production of Quality Salted Eggs at BAR. She is also closely coordinating with the Duck Raisers Association of the Philippines.

She considers her development of quality salted duck eggs for export and the commercialization of goat production as the highlights of her career on livestock R&D. Among the numerous awards that credited her performance is the Best Project Proposal Award given to her during the graduation of the International Poultry Training Course at the Barneveld College, Netherlands in 1994 for her paper on the establishment of a smallholder poultry production unit for a sustainable livelihood project. At the national level, from 1990 to 2005, she bagged seven awards for her papers presented at BAR's NRS, among others.

Her current designation as chief of the Livestock R&D in Region 1 and concurrent assistant manager for support services of the Ilocos Integrated Agricultural Research Center (ILIARC) in Bacnotan, La Union have not tied her down exclusively to these assignments. At present, she is also the project leader of BAR's Community-based Participatory Action Research (CPAR) on Goat Agribusiness Development

Project in six sites of Region I, and most recently, a special order from the Agriculture Secretary for her to seat as member of the Duck Industry Road Map technical working group.

A positive mental attitude and unwavering dedication to her field of expertise is what makes Dr. Datuin deserving of recognition. She said she always uses her conscience in undertaking any activity she gets her hands on and believes that agriculture development in the country could be done by unleashing the great potential of farmers as leaders in their communities.

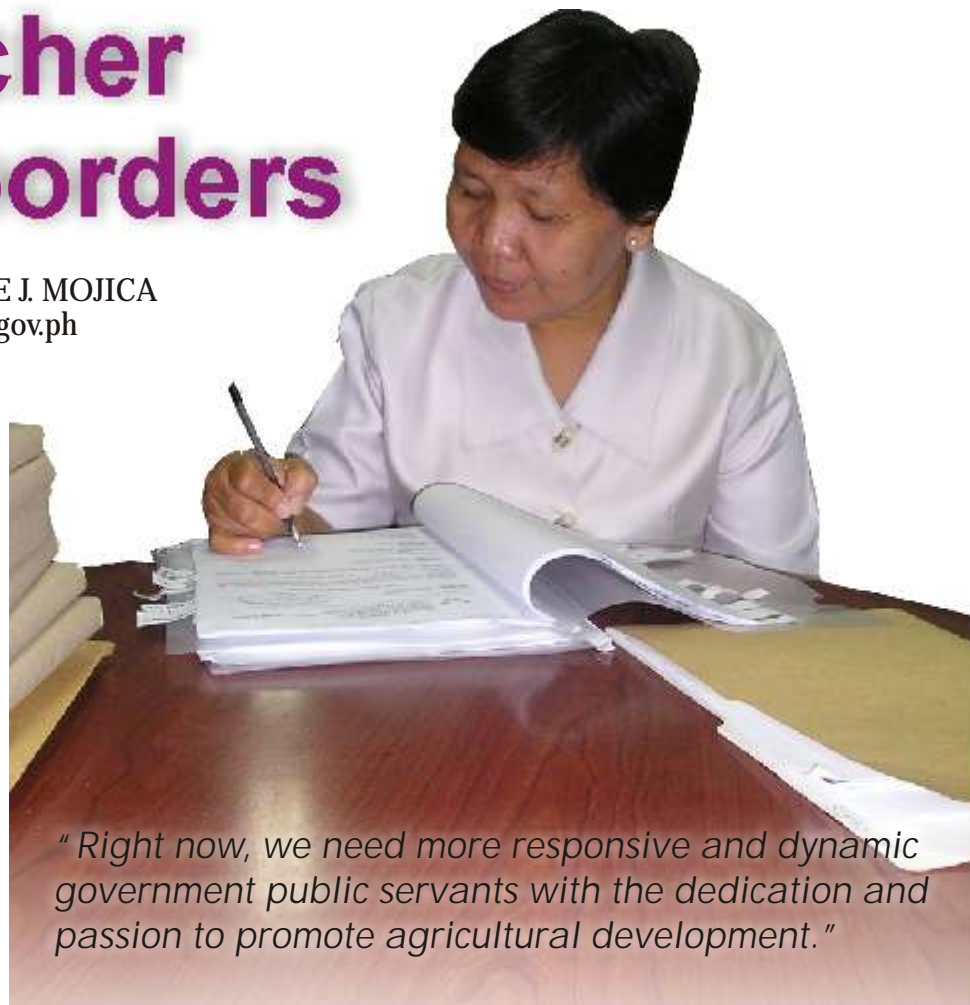
"Right now, we need more responsive and dynamic government public servants with the dedication and passion to promote agricultural development. The government and the private sector should work hand in hand to promote and sustain the development of agriculture for both crops and livestock. We should maximize our natural resources and skills to attain this goal and at the same time protect our environment. These must be done now, we can't afford to delay. We should not wait for other nationalities to help us do it," Dr. Datuin stressed. ☺



Sen Ramon Magsaysay, Jr. (second from left) hands over the plaque to Dr. Jovita Datuin (right) during the BAR's 17th National Research Symposium.

# A researcher without borders

By MIKO JAZMINE J. MOJICA  
mnojica@bar.gov.ph



*"Right now, we need more responsive and dynamic government public servants with the dedication and passion to promote agricultural development."*

How far would a researcher go to conduct an experiment and finish a study? Moreover, how far would she go to finish a research study in agriculture when she knows well that she will receive no more than a meager compensation from the government and probably also a little recognition for doing it?

If you were the researcher, would you give up most of your weekends including holidays just to gather data for your research? Would you juggle a day's job, a doctoral degree study, and the seventh month of your pregnancy at the same time? Would you put up an experimental poultry house in your backyard to be able to monitor it 24 hours until the research period is finished? Would you loan from different financing institutions and mortgage your house and lot to finish your study?

This researcher did all of these and yet there's no sign of her stopping or taking other profession to earn a bigger income to support a big family. Dr. Jovita M. Datuin, a researcher specializing in livestock development, is a picture of a joyful woman who does not regret a single decision she made just to follow her passion to extend applicable and sustainable technologies developed through research to farmers in the countryside.

As a scholar of the Department of Agriculture's (DA) Agricultural Support Services Project, she was able to finish her master's degree in Animal Science major in ruminant production at the Central Luzon State University (CLSU), Nueva

Ecija in 1986. After her MS degree, her inherent interest in sharing her expertise was manifested when she requested to become a part-time instructor at the Virgen Milagrosa Educational Institution (VMEI, now Virgen Milagrosa University Foundation) at San Carlos City, Pangasinan while she was assigned at the Operations Division of the DA Regional Office. Early on, she had been aware of the limited funds for research and development (R&D) especially on livestock researches which is expensive and laborious. Hence, she learned to partner collaborative researches with VMEI.

When she was designated manager at the Regional Integrated Agricultural Research System (RIARS) at Tebag, Sta. Barbara, Pangasinan in 1989, her skills in research and development work were honed and tested as she was also assigned as

project leader for Livestock R&D in DA Region I. Moreover, she began to get more involved in extension work as resource speaker. "Weekends and holidays became regular working days for me just to gather and analyze data for my research," said Dr. Datuin. It didn't take long before her dedication paid off. She first received recognition for her research works as BAR's AFMA Best Paper Awards during its National Research Symposium (NRS).

After 18 years of continuous service to the government, she was granted a scholarship by the DOST-PCARRD to take up her doctoral degree in Animal Science, major in animal nutrition. "Soon after the delivery of my seventh baby, I went back to finish my studies and research work at the CLSU." recounted Dr. Datuin.

The goodness of heart may be running in her entire family who



# Upgrading buffaloes, improving lives

By MA. ELOISA E. HERNANDEZ  
mhernandez@bar.gov.ph

When we see a farmer, in our minds is also a carabao since they are partners in the farm.

They till the soil. The carabao is his beast of burden, pulling the plow and harrow and hauling farm produce when market time comes.

With the current carabao population of 3.33M, 99.9% is raised at backyards by small-hold farmers, while only 0.1% is found at commercial farms.

The Philippine water buffalo locally known as *carabao* not only serves as a multi-purpose animal but also as good source of meat and milk.

Technologies to improve the buffalo not only as a source of draft but more importantly of milk and meat have been developed to increase its population and its profitability.

The Philippine Carabao Center (PCC), an attached agency of the Department of Agriculture, has organized and extended its services to improve the genetic potential of the native carabao

for meat, milk, and draft through its Carabao Development Program. Various reproductive biotechnologies were developed and utilized which resulted in improved carabao for the country.

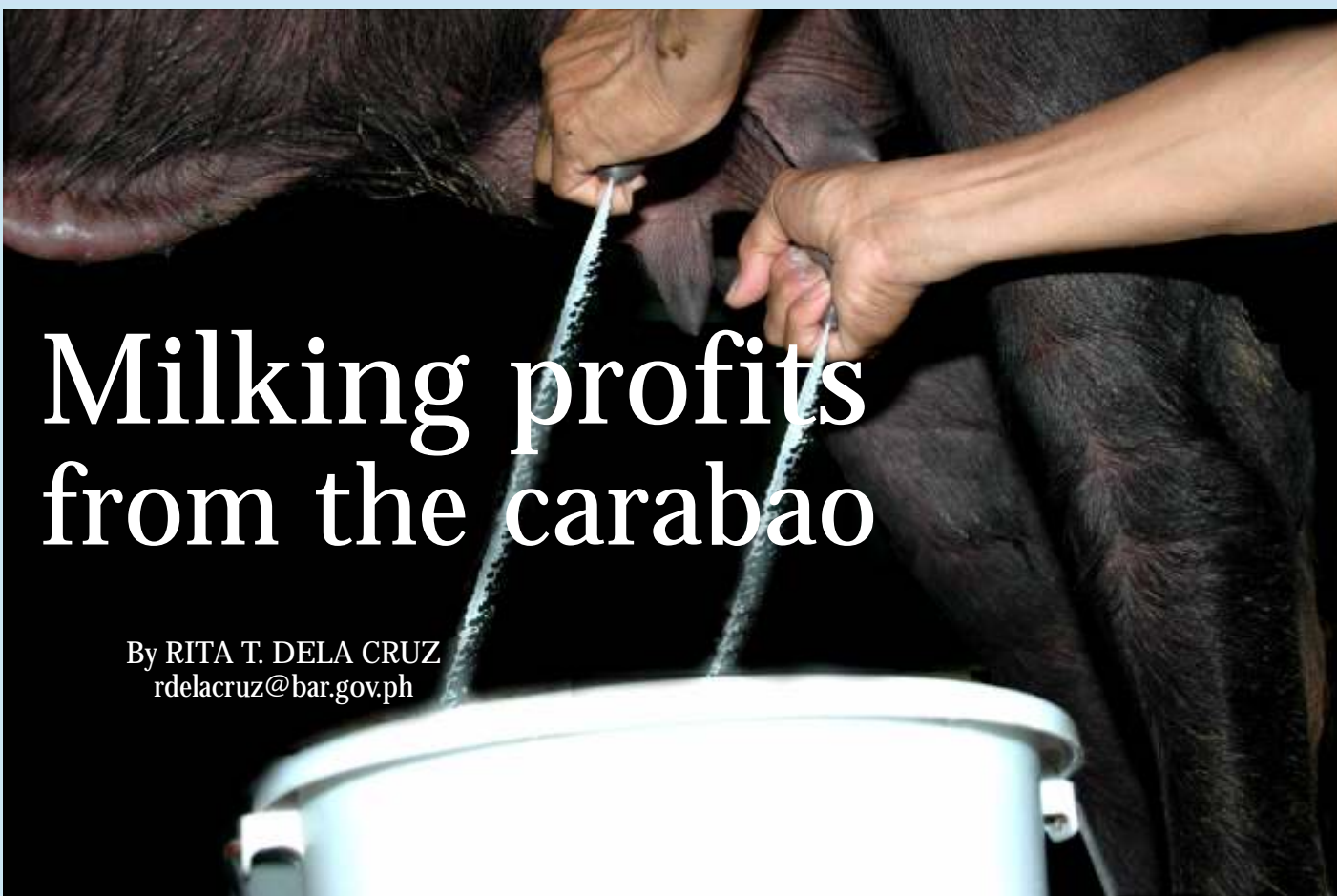
The Artificial Insemination (AI) technique in upgrading buffalo is a technology being practiced by the Center. This started through the UNDP-FAO funded project for carabao upgrading in 1980. At first, PCC sourced out frozen semen contained in ampule from India. They provided trainings for technicians at National Artificial Breeding Center (NABC) for one month to further facilitate AI. This led to the establishment of our own semen laboratory in the country.

Thirteen centers of the PCC network lead in the nationwide implementation of AI activities. These are at: Mariano Marcos State University (Batac, Ilocos Norte); Cagayan State

University (Piat, Cagayan); Don Mariano Marcos Memorial State University (Rosario, La Union); Central Luzon State University (Muñoz, Nueva Ecija); University of the Philippines at Los Baños (Los Baños, Laguna); Leyte State University (Baybay, Leyte); West Visayas State University (Calinog, Iloilo); La Carlota Stock Farm La Granja (La Carlota City); Ubay Stock Farm (Ubay, Bohol); Mindanao Livestock Production Complex (Kalawit, Zamboanga del Norte); Central Mindanao University (Musuan, Bukidnon); Mindanao State University (Marawi City); and University of Southern Mindanao (Kabacan, North Cotabato).

To further disseminate information on AI, the Expanded AI program had been launched. This initiates the privatization of the AI services, tapping the village-based private

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# Milking profits from the carabao

By RITA T. DELA CRUZ  
rdelacruz@bar.gov.ph

I am a fan of *gatas ng kalabaw* (carabao milk) and its by-products. Being a local of Los Baños, where the Dairy Training Research Institute (DTRI) is located, carabao's milk and its by-products like *kesong puti* (white cheese) and *pastillas de leche* (milk candy) sold along the streets is a common sight. I remember when I was a kid, carabao's milk was sold in long-necked bottles carefully sealed with banana leaves. Even the white cheese was then packaged with banana leaf to keep its freshness.

Today, these traditional means of packaging carabao milk and cheese are rare. What we have now are the dainty packaging we see in the malls, products displayed in stalls that sell chilled carabao's milk in carefully sealed bottles, pastillas and cheese wrapped ornately in all their glamor. Yes, even my old time favorite carabao milk's packaging did change. That "promdi" (provincial) touch is gone.

Carabao, not only a farm buddy but an indigenous livestock resource in the Philippines, plays an integral component in every smallholder mixed farming systems. True to its nature, the carabao is a domesticated animal that is not only a farmer's best friend but has become a symbolical source of power for every Filipino farmer. The advent of new technologies like high-powered tractors and other machines introduced in the field slowly displaced the carabao's role in the field. There are areas in the country, though, where carabaos are still the farmer's beast of burden. Or, maybe, these are the small farmers who cannot afford the expensive modern farming machinery.

The carabaos do not only play a lead role in traditional farming as they are also our main source of protein. The carabao meat (or

carabeef) is an important ingredient in processed foods i.e., sausage, luncheon meat, meat loaf, etc. Even the canned corned beef is partly composed of carabeef. Manufacturers of processed meat are in dire need of carabeef because of its inherent high water holding capacity especially in processed form. The products containing carabeef are attractive to consumer because they do not lose much of their original form when cooked. Moreover, compared to beef, carabeef is cheaper, making the cost of production highly competitive.

More than the meat, carabaos are also a profitable source of milk either sold fresh or processed.

Milking profit from the carabao According to the Philippine Carabao Center (PCC), carabao's milk is considered the "most complete food" because it contains protein, fat, lactose, vitamins and minerals, and water. Carabao's milk is richer and creamier

than cow's milk or goat's milk due to its high percentage of milk fat which is a good source of energy. It contains riboflavin or Vit. B2 needed for normal growth, agent against skin swelling, inflammation of the

choco milk, pastillas de leche, kesong puti, milk-o-jel, condensed milk, cheese spread, ice cream, mozzarella, or *rennet* (coagulated milk) are just some of the many products from carabao's milk.

Pastillas de leche is one

*More than the meat, carabaos are also profitable sources of milk, either sold as fresh or processed.*

lining of mouth and tongue, and dizziness. It has Vit. A for clear eyesight and Vit. D, calcium, and phosphorus for strong teeth and bones.

Carabao's milk, when it's still in the mammary gland is still clean and free of microbes. But once the milk has been secreted from the mammary gland, it easily becomes susceptible to bacteria that come from the surroundings, air, materials used in milking, or human interactions. Since the milk is highly nutritious, it becomes an efficient medium for the bacteria to spread. This is the reason why fresh milk are spoiled easily.

PCC identified three ways to maintain the freshness of carabao's milk. Immediately after milking, fresh milk must be stored inside an ice box or refrigerator. Second, milk must be pasteurized or cooked to kill the microbes and be safe to drink. This is usually done by heating the milk for 30 minutes at 63 °C or 15 seconds at 72 °C. The milk should be chilled and maintained at temperature of 4-8 °C. The third and last means is proper storage. If not all consumed, milk must be stored in an ice box or refrigerator to control the spread of microbes that are not killed during the pasteurization process.

To avoid wastage, milk must be processed. Pasteurized milk,

favorite native delicacy or sweets. With a tinge of the Spaniards' influence, as the name implies, it is made simply of milk and sugar. Since the ingredients are simple, the finest possible quality milk and sugar is absolutely very important. Bulacan is well-known for pastillas production but lately some of the best pastillas made from pure carabao milk come from Nueva Ecija. Aside from pastillas, there is also the ever famous kesong puti which is the Philippines' version of the salty cottage cheese made from carabao's milk. Another ingenious product of cheese making in the country is our very own carabao mozzarella. The appearance is somewhat similar to the typical mozzarellas of the Italian, but our version has slight grey pastiness when sliced. ☺

Source: "Mga Produkto Mula sa Gatas ng Kalabaw." Published and distributed by the Philippine Carabao Center, Department of Agriculture.

