Research and Development
# BAR DIGEST
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# HARNESSING PHILIPPINE NATIVE ANIMALS THROUGH R&D

***BAR R&D Digest*** is the official quarterly publication of the Department of Agriculture-Bureau of Agricultural Research (DA-BAR). A staff bureau of DA, it was established to lead and coordinate the agriculture and fisheries research and development (R&D) in the country. Specifically, BAR is tasked to consolidate, strengthen, and develop the R&D system to improve its effectiveness and efficiency by ensuring customer satisfaction and continous improvement through work excellence, teamwork and networking, accountability and innovation.

This publication contains articles on the latest technologies, research results, updates, and breakthroughs in agriculture and fisheries R&D based from the studies and researches conducted by the member-institutions of National Research & Development System for Agriculture and Fisheries (NaRDSAF).

BAR R&D Digest welcomes comments and suggestions from readers.

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R&D NOTES:

# ENHANCING THE UTILIZATION AND CONSERVATION OF NATIVE ANIMALS THROUGH RESEARCH

by: DR. NICOMEDES P. ELEAZAR, CESO IV

Biodiversity conservation is a big concern for the Department of Agriculture. It should be everyone's concern as the Philippine Constitution provides for its preservation, conservation and development since the country is one of the richest in native plant and animal resources.

For the Bureau of Agricultural Research (BAR), it sees its role in biodiversity conservation to be in the generation of greater appreciation for and in harnessing natural plant and animal endowments for the Filipino's health and wellness which are partnered with the goal of alleviating rural poverty. It believes that utilization is the best approach to their conservation. Of particular interest are those that have existing and potential economic and health values.

Philippine native animals, such as swine and poultry, have been used for food over the centuries by Philippine inhabitants. In modern times, they've had the misfortune of being discriminated upon because of their small body size, slow

growth rate and unpredictable performance in comparison to today's commercial breeds. But, slowly but surely, interest in these animals is growing as growers are finding that their limitations are far outweighed by their ability to adapt, survive and reproduce even under adverse conditions or with minimal care. Case in point: most of the animals that survived Typhoon Yolanda were found to be native ones.

While the meat of native animals is being rediscovered by consumers for their superiority in taste and nutritive value for which they command premium price, there still is the need for their re-introduction into the consciousness of the general population as the use of native animals for food remains a largely niche market, save for native pigs for lechon. Many of our young people are unaware that the dishes *tinola* and *inasal* taste infinitely better if native chicken is used in their preparation. "The production of native chickens among local households is being limited by the failure in cultural and technology transfer of native chicken production technology from parents to children" said one researcher.

Department Order No. 15 of the DA created the Program for the Conservation and Utilization of Domesticated Native Food Animals in 2010 for the development of animals that are indigenous to the country such as pigs, poultry, horses, goats, sheep and cattle. This paved the way for the implementation of the Philippine Native Animals Development (PNAD) program with the National Swine and Poultry Research and Development Center of the Bureau of Animal Industry (BAI) based in Tiaong, Quezon, serving as the PNAD Center and hub of activities.

Efforts on the conservation, propagation and utilization of native animals have been done prior to the program with the issuance of the Department Order simply marking the beginning of their implementation on a more formal and comprehensive basis. Before the PNAD Program, the BAR, having realized early on the value of this vital resource, was already busy coordinating with the DA's Livestock and Poultry Program in supporting and funding R&D projects on native animals.

With the issuance of DA SO No. 132 in 2011, BAR became part of the PNAD Program with the bureau becoming its lead coordinator for R&D. BAR Director, Dr. Nicomedes P. Eleazar, sits in its Advisory Committee while another BAR staff is in its program management. To date, BAR, has funded 21 PNAD R&D projects. The results of several of the projects on native pigs and chicken provide the core of the discussions in the articles appearing in this issue of the BAR Research and Development Digest.

One article talks about the physical appearances of native pigs and chickens established by BAI under the PNAD to enable an

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*R&D Notes... from page 5*

observer to distinguish one from the other and, perhaps, make preferences.

A researcher started out with a project about an indigenous plant used as feed for native pigs under a coconut-based agricultural system, later on diverting to native swine production itself as an agricultural system as an area for study and promotion. Seeing native pig lechon in restaurants and lechon outlets may not raise a fuss but not many people know of the circuitous route that many of these take in order to reach their markets and this is described in one article.

On the kind of products that can be made from native pigs and chicken, a strong pitch is made by one paper for processed meat prepared with natural ingredients (natural all the way!) while another did not limit itself to the proper preparation of the meat of the native pig but its skin as well.

Other articles delve into the utilization and commercialization of technologies along with the agribusiness of native pigs and chickens and describe the actors from the farmers to communities to viajeros and the consumers.

Finally, the effort to enhance the PNAD website for it to achieve its full potential is described.

With these, BAR is helping the DA see to it that the country's native animals are not only promoted, but conserved for the next generations of Filipinos. With success, our '*apo*' and '*apo sa tuhod*' would be able to know what *tinola* with manok Tagalog tastes like. ###

# Harnessing Philippi

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# ine Native Animals through R&D

by: PATRICK RAYMUND A. LESACA

The Philippines is rich in animal biodiversity among which are the commonly-termed "native animals". As referred to in here, these are the breeds of chickens, pigs, cattle, goats, sheep, ducks and other domesticated farm animals that are more adapted to the environmental conditions of the Philippines, having emerged through a long process of natural selection. Throughout history, native animals have been raised across the archipelago in numerous backyards, as subsistence agriculture, either for home consumption or raised for slaughter for special occasions, sold only when cash was needed. As such, these animals have contributed to the growth of the livestock and poultry subsector of agriculture and to the development of rural communities and local cultures.

Backyard swine and cattle raising, comprised of the subsistence backyard producers and the small-hold producers, contributes a big part of the country's livestock inventories. Native and improved breeds also form the bigger proportion of the current chicken population. Based on the Department of Agriculture's (DA) website, the livestock subsector, as a whole, came up with a 3.89 percent growth for a share of 18.61 percent of the total agricultural production for the period of July to September 2016, while the poultry subsector registered a 2.43 percent growth and contributed 17.15 percent to agriculture's output during the same period.

These native animals have the ability to grow, adapt to their environment, and reproduce even under adverse climatic conditions and low production inputs. In some remote areas and communities, small scale farmers are engaged in raising native animals, either for their main source of livelihood or as an alternative source of income. On a larger scale, commercial raisers and breeders are engaged in more intensive farming systems that patronize commercial breeds and hybrids because of their faster growth rate and larger body size as compared to native breeds with slow growth rate and smaller body size.

In addressing food security, sustainability, and other health benefits derived from meat and poultry products and by-products, the livestock and poultry industry must give its full attention to native animals in the form of research and development (R&D), extensive breeding, conservation and protection, and harnessing value chain analysis from production, processing, packaging to marketing since the production of native animals is one of the major contributors to poverty alleviation, especially in the rural areas, through the establishment of sustainable livelihood and agribusiness opportunities.

There is also a clamor for healthier and safer food for every Filipino. Some consumers prefer natural foods even if they may be

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a bit more expensive rather than commercially-grown products that are exposed to high amounts of antibiotics and growth hormones. The potential for domesticated native animals as sources of high quality protein and other essential health components is high and is now given preferential attention by the DA particularly through a program called the Philippine Native Animals Development (PNAD) Program.

**Creation of the Philippine Native Animals Development (PNAD) Program**

In order to bolster the prominent strengths of Philippine native animals, all the selection, propagation, conservation, and promotion efforts must be completely fused in one national comprehensive program.

And with the existing challenges faced by the native animal industry, it is imperative that the key players make a proactive stance in upholding the advocacy for Philippine native animals. Thus, in August 2, 2010, Agriculture Secretary Proceso J. Alcala issued Administrative Order (AO) No. 15 series of 2010, establishing the Philippine Native Animals Development (PNAD) Program. The PNAD seeks to conserve and utilize domesticated native food animals, and recognizes the opportunities in providing income and in alleviating rural poverty in using them.

The Department of Agriculture - Bureau of Animal Industry (DA-BAI) was directed to lead in the formulation of a native animals development roadmap and establish research collaboration with state colleges and universities (SUCs) and other institutions. A technical working group was created and composed of members from the BAI Livestock Development Division, BAI's Animal Product Development Center, BAI's National Swine and Poultry Research and Development Center, and the Bureau of Agricultural Research (BAR), the DA's lead agency for research and development initiatives. Other members are experts from the Department of Science and Technology - Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCAARRD), Philippine Carabao Center, University of the Philippines Los Baños, and Central Luzon State University.

The PNAD aims to: (1) develop programs, projects and activities for the conservation, production and marketing of native animals; (2) promote the domesticated native animals as regular table food for Filipinos; (3) expand the contribution of the domesticated native animals in the gross domestic product (GDP) in general, and to agriculture in particular; (4) develop and promote enterprises from domesticated native food animals; (5) promote the native animals as potential export niche product of the Philippines; and (6) develop farming standards and good practices on domesticated native food animals.

**Research and Development Breakthrough**

Covering PNAD's program implementation from 2010 to 2016, various research and development interventions took place resulting from the technical support and funding given to 21 R&D projects on native animals by BAR. These projects focused on phenotypic data collection, characterization and analysis; proper selection and improvement of feeds; promotion of native animal breeding production management; commercialization of value-adding technologies; and value chain analysis of native animal products, among others.

The bureau has also created linkages with other national government agencies, SUCs, non-government organizations (NGOs) and other research institutions on the conduct of research projects particularly on how the innovative technologies developed by various research initiatives could immensely help our farmers in producing healthy and superior breeds through proper selection of native breeds, construction of proper housing facilities, new feeding techniques and effective health management practices.

Over the years, BAR has strengthened the livestock and poultry industry by supporting R&D projects on native animals, and the endeavors of BAI and the NSPRDC. From way back and looking forward --- it is assured that this partnership will become stronger with the end goal of strengthening the Philippine native animals industry. ###

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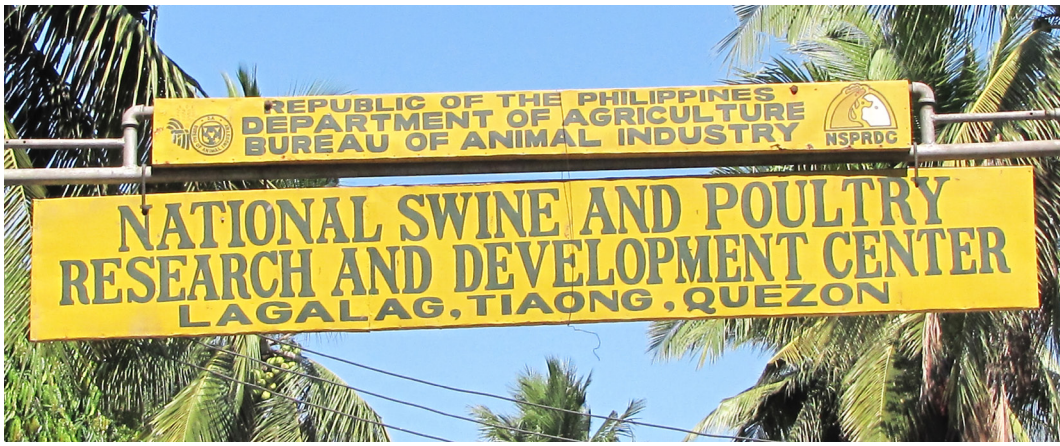



Department Order No. 15, series of 2010 of the Department of Agriculture (DA) that created the Program for the Conservation and Utilization of Domesticated Native Food Animals in 2010 for the development of animals that are indigenous to the country also led to the implementation of the Philippine Native Animals Development (PNAD) program.

As the PNAD Program deals with the existing populations (breeds/strains) of native animals, one of its tasks is the characterization (observation for common observable physical characteristics) of these breeds/strains to develop baselines or reference points. Much of this attention has been given to native pigs and chickens. The following are their descriptions based mainly on PNAD sources.

**Native chickens**

Based on different accounts, there are several populations of native chicken in the country. The known ones are Paraoakan, Camarines, Darag, Banaba, Bolinao, Joloanon, and Bohol. There are also appreciable numbers of the wild Red Jungle Fowl and the Western Mindanao State University-developed Zampen. There reportedly are a Palanan strain in Isabela and a *Manok Bisaya* in Cebu. Others could still be out there waiting to be noticed. The *sabungeros* among us may know as native strains are used extensively in breeding fighting cocks.

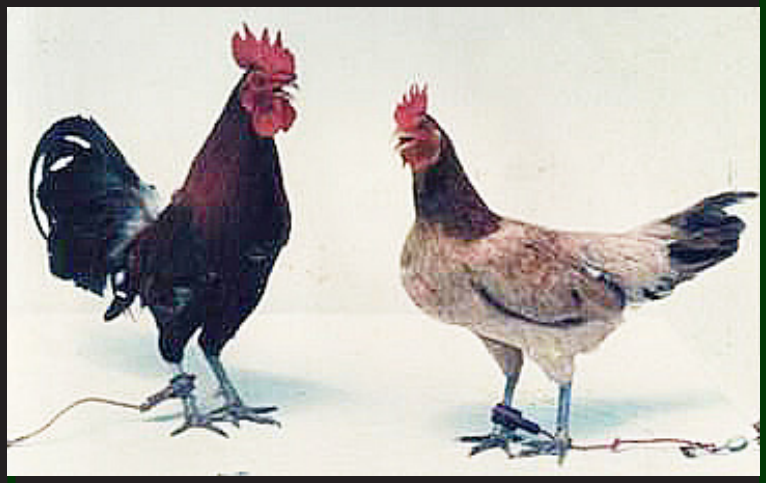
Of these, four breeds have been recognized under the PNAD program and are: Paraoakan, Banaba, Joloanon, and Darag.

***PARAOAKAN.*** This native chicken is the biggest chicken breed in the Philippines. At maturity, the male can weigh 2.5 kg and female, 1.9 kg. The Paraoakan is generally black in color, has long legs, bigger body, longer neck and bigger head than other native breeds. It stands upright, predominantly of yellow shank, white skin, red earlobes and red plumage. The tail is black with some white feathers at the base of the tail. For the hens, the average body length is 41 cm, wingspan of 46 centimeters, shank length of 7 centimeters and chest circumference of 15 centimeters.

***JOLOANO.*** The Joloano is a heavy breed, with straight body posture. Also called Basilan chicken, the Joloano breed is believed to have originated in Mindanao and is commonly used for cockfighting. The mature weighs at about 2.20 kilograms for male and 1.50 kilograms for the female. The native breed has a good posture at upright position. The rooster has red to red-orange plumage color and the tail is black or black with white. The head is plain with pea combs for both rooster and hen. The bird has bright red earlobes. The hen has brown plumage. The shank is yellow to white for both rooster and hen. The hens lay light brown eggs, each weighing 51 grams. The growth performance is 37 grams at day old, 167 grams at 1 month, 501 grams at 2 months, 904 grams at 3 months and 1,115 grams at 4 months.

# THE NATIVE CHICKEN AND PIG BREEDS/STRAINS OF PNAD

by: VICTORIANO B. GUIAM
photos courtesy of BAI-NSPRDC



***BANABA.*** The Banaba native chicken has yellow to reddish plumage with black tail and black wing feathers. It holds the wings close to the body. The tail is carried very upright and the hackles are bright orange. The head is large with a single comb and bright red earlobes. The Banaba Black (BBI) female is black in plumage while the Banaba Brown (BBr) female has brown plumage. Both Banaba breeds are with black and yellow feathers in their necks. The shank is white to gray (slate) in color. The skins on the breast and beneath the wing are not pigmented (white). They are high flyers, with a wing span of 42 centimeters for the rooster and 37 centimeters for the hen. The average mature weight is about 1.49 kilograms for males and 1.06 to 1.20 kilograms for females. The average egg weighs 22 grams at day old, 97 grams at 1 month, 330 grams at 2 months, 730 grams at 3 months and 920 grams at 4 months.

***DARAG.*** The native chicken strain is local to Western Visayas which evolved from the Red Jungle fowl. The typical plumage for the male, which is locally called *Labuyo* or *Alimbuyog*, is the red wings, hackle and black feathers and black tail. Meanwhile, the female has yellowish-brown plumage. Generally, the breed has a single comb, with whitish earlobe and gray shank. The adult male weighs an average of 1.3 kilograms while the female weight at an average of 1.1 kilogram. The chickens are mature and ready for slaughter at age 75-120 days.

**Native Pigs**

Significantly, the meat of native animals is being rediscovered by many consumers for their superiority in taste and nutritive value for which they now command premium price. Native pigs are known to be lean in fat, a trait that is good for the health.

Native pigs are generally described as being comparatively small, usually plain black or spotted black in color, have long face and snout, with short and low set body conformation, erect ears, prolific, highly adapted to local conditions and able to survive extremes of weather and limited availability of food. The other possible colors - black with touch of white in other body parts, brown, gray and white – could be the result of crossbreeding which is often done by small producers to shorten the age to breeding and marketable size. The development of the Berkjala, a cross between imported Berkshire and the local Jalajala, is one instance of cross breeding. This native pig strain has since disappeared and is now thought to be extinct.

Two strains of native pig have been described under the PNAD program and are: BT-Kalinga and BT Black. The BT-Black is essentially a new breed developed from existing ones by PNAD researchers. The following are their descriptions from the PNAD center.

***BAI TIAONG BLACK (BT BLACK).*** BT Black was a product of random mating from the three foundation stocks of Quezon, Marinduque and Benguet native pig which were selected based on their specific traits and qualities such as weight gain, litter size, body conformation and color. Good litter size and mothering ability are the distinct advantages of this particular breed of native pig. The line is black in coat color while its head is straight. The young boar has short and cylindrical snouts while the gilt and sow have long and thin snout. The male pigs have pricked or erect ears while those of the females are semi-lopped to pricked or erect. The line has a straight backline. The body weight is 35 kilograms for gilt, 34 kilograms for the young boar, 92 kilograms for sow and 44 kilograms for the adult boar. The average body weights of male BT Blacks are 0.8 kilograms at birth, 14 kilograms at 3 months, 25 kilograms at 4 months. Those of the female are 0.73 kilograms at birth, 14 kilograms at 3 months, and 24 kilograms at 4 months. The recorded average litter size is 6.4 piglets with an average weight of 880 grams.

***BAI TIAONG KALINGA (BT Kalinga).*** This native pig strain has good mothering ability and its meat is commonly used for family occasions and traditional rituals in the mountain provinces. The Kalinga is resilient and can thrive and survive despite minimal inputs given to them. The line is black with white snout, white underbelly and white legs with white line or stars in the forehead. The boar has a short and cylindrical snout while the sow's is a long and thin one. The head of the sow and boar of BT Kalinga are straight. The ears are pricked or erect. The animal has a swaybacked backline with a sagging belly. The body weight of the boar can reach 79 kilograms while that of the sow is 67 kilograms. The average body weight of the male is 0.62 kilograms at birth, 10 kilograms at 3 months and 16 kilograms at 4 months. The average weight of the female is 0.53 kilograms at birth, 8 kilograms at 3 months and 15 kilograms at 4 months. The recorded average litter size is 6 piglets with an average weight of 640 grams. ###

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# Involving the school and the community in raising native chicken in Bohol

by: ANNE CAMILLE B. BRION

Native animals are sought after by many consumers due to their perceived health benefits apart from their distinctive taste. Additionally, they are sources of high quality protein food and livelihood among backyard and small-scale growers and raisers. While unstable growth and production performances have been the major setbacks of the native animal industry for years, their ability to adapt to local environmental conditions, feed on locally-available feed materials, resist pest and diseases that plague modern breeds, and survive even with minimal care put them at an advantage over the commercial breeds. Nowadays, their products are also increasingly becoming preferred by health-conscious consumers who are willing to pay premium price for native animals and their products.

According to Dr. Agapita J. Salces, animal breeding and genetics specialist from the Animal and Dairy Sciences Cluster of the University of the Philippines Los Baños (UPLB), raising native chicken is an important component of rural farming communities as it provides healthy food and additional income to small-scale farmers and their families. "These native chickens are good sources of high quality meat as they contain high protein, low fat, and higher concentration of free amino acids," she said.

One of the strains that Dr. Salces believes has the potential to be commercialized is the Boholano strain of Philippine native chicken. "This native chicken strain is genetically distant from other genetic groups. The female has plain and red plumage pattern, single comb, and weighs 1.2 kg. The male, on the other hand, has wheaten color, also single comb, and weighs 1.4 kg at maturity. Despite small body size, the females can produce 160 eggs per hen per year. This strain also has a unique taste," Dr. Salces explained. Being a tourist destination in the country, Dr. Salces sees the prospect of native

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chicken production to prosper in Bohol where demand and value would continuously grow along with tourist arrivals in the years to come.

In 2016, Dr. Salces led a project that will re-educate and encourage a community in Bohol to venture into native chicken production and re-establish it as a family production system. "The production of native chickens among local households is being limited by the failure in cultural and technology transfer of native chicken production technology from parents to children. Historically, native chicken production is a household system that involves both the parents and their children in taking care of the native chicken. Here, eggs become their daily sources of protein, meat as an occasion food, and the excess from the eggs and meat becomes a source of cash," Dr. Salces added.

Supported by the Bureau of Agricultural Research (BAR), the project, "School and Community Level Commercialization for Boholano Strain of Philippine Native Chicken," aims to commercialize Bohol native chicken production at the community level, and re-educate primary students and parents about the economic value of science-based native chicken production. The project is a collaboration with the Department of Agriculture-Ubay Stock Farm; Philippine Carabao Center; Department of Education–Ubay, Bohol and Southwest District III units: and the Parents-Teachers Association (PTA) of Lomangog Elementary School.

In its first year of implementation, a series of activities were undertaken. Parents were oriented on the basics of starting a native chicken production farm. Topics included proper handling of chickens, feeding management, multiplication scheme, egg and meat production, and proper health management. Also, management, when it comes to different growth stages of native chicken production, was explained to them in detail. As for the teachers, they were also equipped with information about the proper handling of animals, animal feeding, and health management in preparation for the implementation of the project.

Under the project, equipment and materials needed in native chicken production were distributed among the project cooperators. These included polynets and nipa which are needed for proper housing management of the native chickens.

With the implementation of the project, increase in income among its cooperators are hoped to be achieved. "Likewise, it will influence the growth of local food service enterprises that will result to increase in income and strong purchasing power of the cooperators and other stakeholders of the chicken industry. As income increases, social benefits such as better education, good health, and nutrition for the whole family, will be realized," Dr. Salces said. ###

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*The article is based on the proposal and annual progress reports titled, "School and Community Level Commercialization for Boholano Strain of Philippine Native Chicken".*

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photos courtesy of ASALCES

# NATIVE PIG TECHNOLOGIES PRODUCT OF R&D INVESTMENT

by: DIANA ROSE A. DE LEON

An answer to a problem is not something simply grasped out of thin air. Research is needed to arrive at science- and evidence-based recommendations that provide solutions to the problem. In the case of the agriculture sector, researches are done to develop technologies and approaches that address the various issues challenging the sector. And because of the technologies and knowledge that have been developed, agriculture stakeholders especially the small-hold farmers now have the chance to uplift their lives for the better.

**Low-cost native pig production**

With 73 percent of the total swine population coming from backyard raising in the countryside, intensive government support to R&D is done to develop technologies and practices that will fit the economic, social and cultural conditions of backyard level swine production. Native pig-raising, a long-neglected subset of swine production, has been awaiting the opportunity to be improved with technologies purposely developed for it.

Cheap, easy-to-do, and profitable - these are the three basic characteristics a farmer is looking for in an introduced technology before he/she will decide to adopt it. The usual practice of rearing of native pigs, especially in rural areas, requires only minimal labor and cost of inputs as native pigs are already well-acclimatized to local conditions to the point that, even without proper housing, commercial feeds and vaccines, native pigs can survive.

Keeping these in mind, the Bureau of Agricultural Research, one of the institutions that support the advancement of native pig R&D, looked out for researches that will generate technologies fitting these criteria and, at the same time, will encourage commercialization of native pig production. The bureau was not disappointed. Scientists and researchers answered the call and have generated much of the needed information and technologies.

***A. Native pig pen***

One of such projects was the "Conservation, Evaluation and Commercialization of the Philippine Native" led by Dr. Rene Santiago of the Bureau of Animal Industry-National Swine and Poultry Research and Development Center (BAI-NSPRDC) which has, as one of its outputs, recommendations on the

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construction of low-cost native pig pen using locally-available materials.

Even though, generally, native pigs can thrive under adverse conditions and tolerate temperature changes better than the commercial breeds, extreme weather conditions can still be fatal to them, thus protection from illnesses and injury need to be in place.

The team of Dr. Santiago made use of locally-available materials to put up a low-cost pig pen. He recommended the use of nipa shingles as roof, and bamboo poles as railings. For flooring (base), instead of cement, he recommended the use of dry coconut husk, and rice straw or dry leaves. For bedding, the grower can make use of a mixture of soil, salt, and coconut coir dust/ saw dust/rice hull (see figure 1). The bedding may last up to two years, requires minimal cleaning, and does not emit foul odor. Afterwards, the used bedding materials can be turned into organic fertilizer.

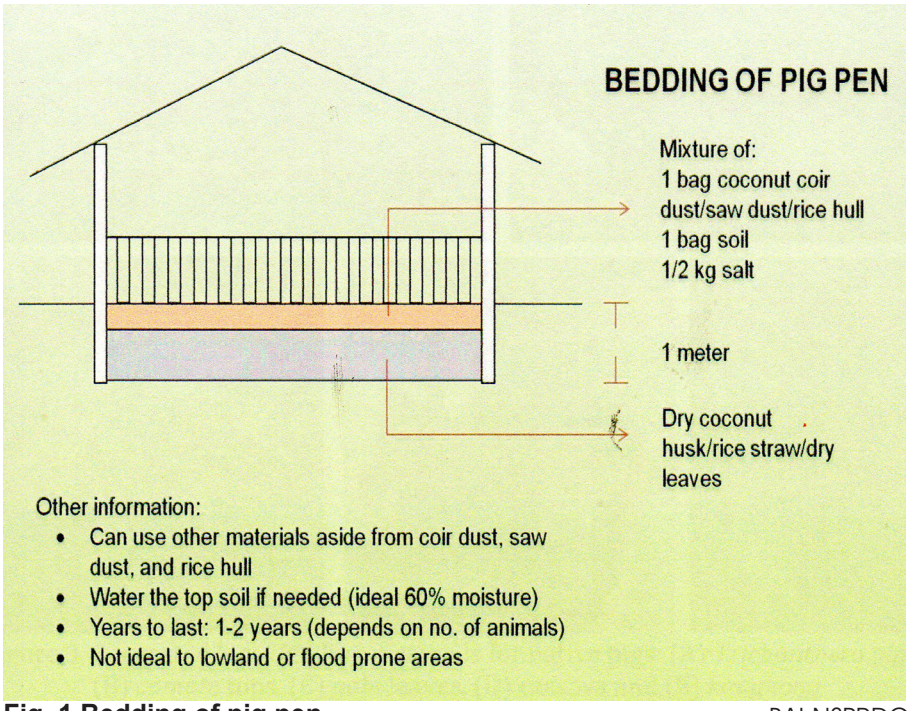


**Fig. 1 Bedding of pig pen**

source: BAI-NSPRDC


***B. Feeding Materials***

What to feed is another important variable to consider in native pig production. Though the native pig can scavenge for its food and eats what it can find in the farm, raisers still need to ensure that it gets the necessary nutrients which can be taken from natural forage such as indigenous plants, vegetables and root crops to achieve the desired marketable weight and meat quality.

Another BAR-funded project led by Dr. Mary Jean Bulatao of University of the Philippines Los Baños (UPLB) titled, "Native Swine for Lechon de Leche Production: Improving feed availability through integration of Sakwa as forage in coconut-based production system," was implemented to assess the feasibility of using locally-available plants as feeding materials such as *sakwa* or *gabing San Fernando*, and *Trichanthera* (madre de agua) to supplement the needed nutrients for native pigs.

*Sakwa*, the corm of the plant *Gabing San Fernando,* was proven to be a good substitute for corn as feed ingredient. *Trichanthera* is a good source of protein and calcium. Other recommended feeding materials are *gabi* leaves, cassava, camote tops, *kangkong*, sweet potato, herbal plants and kitchen leftovers. Based on the data gathered, there was an increase in the average daily gain of the native pig when they employed this feeding system.

**Commercialization of Packaged Technologies**

Seeing the effectiveness of these technologies, and the desire to increase the number of adopters, Dr. Rene Santiago and Dr. Roberto Rañola of Conservation and Development Specialist Foundation, Inc. (CDSF) conducted another project titled, "Demonstration and Commercialization of Native Swine Production Technologies in Selected Areas in the Philippines", to widely promote and commercialize these technologies.

Five provinces - Kalinga, Bulacan, Camarines Sur, Sorsogon, and Cebu - were chosen to be the project sites for the transfer of technologies as these provinces already have existing production and big markets for native pigs.

Each of the chosen project sites were given a technology demonstration facility including a model three-unit native pig pen in which the design and the materials used depended on the suitability of the targeted construction area. The project cooperators were provided with start-up initial stocks of native pigs consisting of one boar and three sows, and cuttings of *Trichanthera* to be planted around the production area. In support to this, trainings for the project cooperators on native pig production and management were held. A series of seminars on native pig production and management were also conducted in Cebu and Ilocos Norte to promote and disseminate the technologies for wider adoption.

To ensure the sustainability of the project and expand the number of cooperators, the project team followed the payment scheme that requires cooperators to return a number of piglets to the project as repayment that will, in turn, be passed on to other cooperators. The local government unit will be responsible for the selection of the next set of cooperators.

The availability of technologies mentioned above is a leap forward to the realization of the potentials of the native pig to contribute on the country's attainment of food security, agricultural growth, and income-generating opportunity for the Filipino people. ###

# Native pig raisin new opportunities

Nothing is more iconic than to see served in any Filipino table the delectable *lechon*. Preceding the arrival of the Spaniards, crispy roasted pig skin was already enjoyed by our pre-colonial ancestors, thanks to our Chinese neighbors. Today, every celebration with lechon serves as a reminder of how much Filipinos value the sharing of one's blessings with others in the community.

Over many years, the pig used in *Lechon Baboy* was sourced out from commercial breeds. But now a team of researchers at the University of the Philippines Los Baños (UPLB) has ushered a resurgence of the use of native pigs in making lechon.

One delicious and traditional roasted pig is more commonly known as *Lechon de Leche*. *Lechon de Leche* is smaller and more affordable than the usual *Lechon Baboy* seen during family reunions and town fiestas. It is a smaller dish as the pig that was roasted was one still suckling on its mother's teat.

In Quezon province, *Lechon de Leche*'s tender meat and crispy skin gets a flavor upgrade if the pig that was roasted is native. Native pigs can usually be seen roaming around and feeding on the foliage in the community. If a person were to travel across Quezon Province, a common sight would be dark-skinned, spotted native pigs freely walking along the highways. Seeing the market potential of native swine in Central Luzon, Dr. Mary Jean G. Bulatao of UPLB's Agricultural Systems Cluster conducted the project, Native Swine for *Lechon de Leche* production: improving feed availability through integration of sakwa as forage feed in coconut-based production systems, a BAR-funded research that provided farmer-beneficiaries with the resources needed to raise native pigs.

To ensure the project's sustainability over time, Bulatao and her team introduced the repayment scheme called *Dos por Cinco* (two of five) in which the beneficiaries ceded a part of their native livestock to another beneficiary.

As Bulatao and her team consolidated the results of their research as it concluded, it became apparent that the said research could be further improved. They drafted another research proposal that served as the second phase of the first project.

The new project picked up from the major issues and concerns that the researchers observed in the previous study. Phase II was titled, Agricultural Systems Approach to the Commercialization of Native Swine in Quezon.

For this phase, native swine production was viewed as an agricultural system composed of inputs (feeds, herbal plants, breeding-ready pigs), outputs (weanlings, meat products), and people representing different roles in the process from breeding up to marketing. By looking at native swine-growing as an Agricultural System, points for improvement could be easily mapped out and issues given holistic solutions.

This project started in the last quarter of 2011. Beneficiaries were picked from four municipalities in Quezon province, namely, Mulanay, San Narciso, Infanta, and Real.

Demonstration clusters were established to further guide the Native swine growers on how to operate the enterprise in a systematic manner, whether it is in constructing a shelter for the livestock, or in growing the herbs to be integrated into the pig's diet, or in marketing their livestock to businesses that prepare lechon.

A major component to Bulatao's research was the development of new meat-based products derived from native swine. Where the first project focused on revitalizing native swine in support of the demand for *lechon de leche*, Bulatao's team introduced native pork *tapa* and skinless *longanisa* into

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by: EPHRAIM JOHN J. GESTUPA

the commercial spotlight in the second one. Last August 2015, a pork processing center was established in Brgy. Latagan in Mulanay in a move started by the town's Rural Improvement Club.

The beneficiaries were called on to engage in capacity-building activities so that they will not be limited to breeding, but also learn the business side to native swine raising. Accordingly, the beneficiaries also underwent training on disease prevention, herbal plants utilization, feed production, product development, financial management, marketing and entrepreneurship.

Prior to the introduction of the project to the community, the swine farmers were compelled to sell their livestock to village agent-assemblers which then sold the stocks to municipal agents who, in turn, passed these to trucker assemblers who deliver pigs to business establishments that cook and sell *lechon*. Mark ups in prices occurred with every step. To improve the farmers' income from the sale of pigs, a solution that was studied and tested by this research was to cut across middlemen and traders through the establishment of farmer-organizations as direct suppliers to the kitchens of meat processors, not only in Metro Manila, but also to the rising markets for native *lechon* in Lucena City and Dasmarinas, Cavite.

Last August 7, 2014, the project's beneficiaries met up with other project stakeholders from the academe and local government as well as businessmen and women involved in selling native pig products. The activity was dubbed as the 1st Quezon Native Swine Forum and Workshop and it was during this event that the beneficiaries took it upon their own farmer's organization to shoulder the delivery of native pigs to the meat processors who sell finished products to consumers. By doing so, the farmer organizations are helping increase the profit that can be realized by farmers who breed native pigs.

According to Dr. Nestor Garcia of the Agricultural Systems Cluster at UPLB, the farmer organizations who have agreed to become consolidators are currently raising the funds needed to start buying and transporting native pigs.

With the demand for healthy and organic protein sources ripe and in full swing, UPLB has managed to prep Quezon Province for it to become a hub perfect for anyone looking for delicious *Lechon de Leche*, all while making a lasting impact on the farming communities in the province. ###


photos courtesy of MBULATAO

# NATIVE LECHON PIG SOURCING IN LUZON, VISAYAS STUDIED

by: PATRICK RAYMUND A. LESACA

If you are searching for a way to gain an edge on your business operations or to be competitive in the industry you belong to, consider one of the business world's most valuable tools: the value chain analysis. It is describes the full range of activities which are required to bring product or service from conception, through the different phases of production, delivery to final consumers. The value chain perspective looks at the economic system surrounding the generation of value added associated with a product or process. (Kaplinsky and Morris, 2001).

The goal of value chain is to ensure that those in charge of each stage of the value chain are communicating with one another and to assure that the product is getting to the hands of customers as seamlessly and as quickly as possible. The end result is that customers derive the most benefit from the product for the cheapest cost.

The Center for Environmental Law and Policy Advocacy (CELPA), Inc. was commissioned by the Bureau of Agricultural Research (BAR) to conduct a Value Chain Analysis (VCA) of Native Lechon in the Philippines. This partnership, represented by Dr. Araceli T. Oliva, CELPA President and Dr. Nicomedes P. Eleazar, BAR director, resulted to the conduct of two separate VCA studies - one for Luzon and one for the Visayas.

The Luzon study, which is already completed, was conducted from November 2014 to March 2015, while the project study in the Visayas, with a one year project duration, is still on-going. Dr. Corazon T. Aragon of CELPA is the project leader for both studies.

**Overview of the Native Pig Industry**

The Philippine native pig is either black or black with a white belly, lop to semi-lop ears (ears that droop or hang down nearly covering the eyes) and straight back. Minority of the population is brown, spotted brown or spotted black. These animals can be found in many parts of the country. In Luzon, for instance, we have the provinces of Quezon, Marinduque, Masbate, Abra, Kalinga, and Mt. Province. In the Visayas, they can be found in Negros Occidental, Iloilo, Aklan and Capiz in Western Visayas, while we have Negros Oriental, Cebu and Bohol in Central Visayas.

Native pigs are known for their ability to grow and reproduce even under adverse conditions as well as tolerate heat and cold environments better than imported ones. They are also more resistant to parasites and common diseases as compared to the commercial or imported breeds. Since native pig raising only needs a small capital investment, it is popular among small-scale farmers because of its low cost of production inputs in terms of its housing and feeding.

Traditionally, these animals are best known in their roasted form, "*lechon*", which is a popular food during special occasions in the Philippines. Native pig *lechon* is tastier, crispier and has leaner meat compared to the imported breeds. Moreover, the meat has more nutritional value as it has higher protein content and lower fat and cholesterol content compared to commercial pig meat.

A detailed value chain analysis of the native lechon value chain will identify constraints and opportunities in native pig production, trading, and *lechon* processing, and provide a reference point for improving the business environment and support services rendered to different stakeholders in the value chain. It will also provide guidance to prospective investors who are interested in venturing into native *lechon* processing. Further, a market study on native pig production showing the dynamics and role of each player along the value chain is imperative to determine the demand for the animal as a commodity, i.e., the native pig *lechon*.

As pointed out by CELPA, no detailed market study has been done yet on native pig *lechon* production to determine the demand for it as a commodity. As a result, the project undertook a series of market reconnaissance in selected provinces in Luzon and in the Visayas. Both CELPA studies aim to: 1) prepare an industry value chain map for native *lechon*; 2) present the general characteristics of the actors involved in the value chain; 3) identify the value-adding activities at every stage of the value chain; 4) determine the costs and profit of producing and marketing live native pigs and native *lechon*; 5) analyze the nature of inter-firm relationships and determine the financial position of key players in the value chain; 6) identify and analyze the market trends and opportunities of native *lechon* and the existing support service providers and their adequacy; 7) examine the business enabling environment affecting the native *lechon* value chain; and 8) determine constraints and opportunities and suggest priority upgrading strategies/intervention to address the identified constraints for the benefit of native pig farmers, *lechon* makers and other stakeholders.

**Value Chain Analysis of Native Lechon in Luzon**

The study was designed to analyze the native pig *lechon* value chain in selected major native pig-producing provinces in Luzon. The provinces of Quezon and Marinduque were selected as the study areas because these are the top two native pig-producing provinces in Luzon where native pigs are raised for *lechon*. Burias Island in Masbate was added as another study area because it is another source for native pig traders operating in Quezon province.

Primary data were obtained through personal interviews with 184 producers of native pigs for *lechon*, 25 native pig assemblers/consolidators, 43 native pig assembler-wholesalers, 21 native pig wholesalers, and 32 native pig *lechon* processors. Key informant interviews of the Municipal Agriculturists, and Provincial Veterinarians of Quezon and Marinduque were likewise conducted to gather additional information on the status of the native pig industry in their respective municipality/province and the types of support services that they provide to native pig farmers.

*Market Channels and Geographic Flows*

The market channels show the key players involved in the flow of native pigs from the farm to traders and then to lechon processors until it reaches the end-markets. The three types of key players in the market channels are: 1) farmers/growers, 2) traders (assemblers, assembler-wholesalers, wholesalers), and 3) *lechon* processors. In some areas, there are native pig *lechon* processors who sell and deliver within and outside

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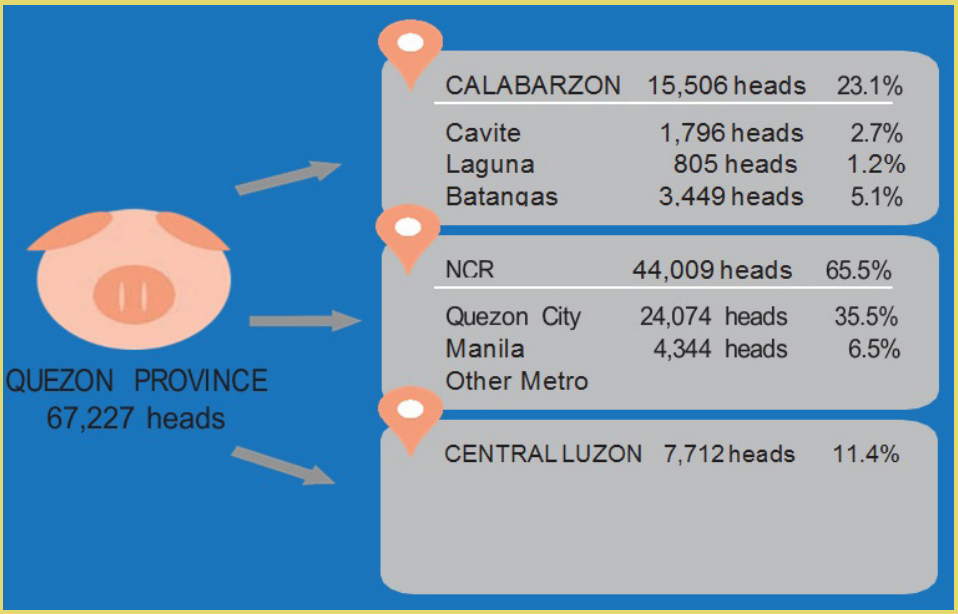


**Fig. 1 Geographic flow of native piglets and fatteners shipped-out from Quezon Province, 2014**

their municipality/district. Others have a stall or restaurant where they can sell and display *lechon*.

The data gathered by CELPA from native pig farmers and traders in the study showed that native pig farmers in Quezon produced 57,955 heads of native pigs for *lechon*. Bulk of the native pigs sold by the farmers or roughly 32,000 heads were sold to assembler-wholesalers, while 26,200 heads were sold to assemblers, and only 50 heads were sold directly to wholesalers. In the province of Marinduque, 23,598 heads of native pigs were produced by the farmers, 14,685 heads were sold to assemblers, while 9,213 heads were to assembler-wholesalers. In Burias Island, Masbate, farmers usually sold their native pigs to assemblers and assembler–wholesalers. Of the 7,538 heads that were sold, 685 heads were procured by assemblers, while 6,853 heads were purchased by assembler-wholesalers.

In the geographic flows, the final destinations of *lechon* shipped out from Quezon, Marinduque, and Burias Island in Masbate are recorded as follows:

The province of Quezon, being the biggest source of native pigs for the *lechon* market, shipped out 67,227 heads in 2014. This figure includes pigs of both local and external origins. Of this total, 60,320 heads came from various municipalities while 6,907 heads were procured by seven Quezon traders from Burias Island, Masbate (1,835 heads), Marinduque (4,790 heads), and Mindoro (282 heads). In 2014, the total number of native pigs shipped-out from Marinduque was 76,396 heads. Metro Manila was the major final market destination of native piglets and fatteners from this province. About 71,586 heads of native pigs were shipped out from Marinduque and were absorbed in Metro Manila, while from Masbate, 5,703 heads and 1,835 heads went to Manila and Quezon province, respectively (see figure 1).

*Trading and Marketing of Native Pigs*

Based on the available list provided by the Office of

the Provincial Veterinarian in Quezon province in 2014, there are 79 wholesalers operating in the province of Quezon in that year and most of them hail from the municipalities of Lopez, Mulanay, General Luna, Macalelon, Catanauan, Buenavista, San Andres, San Francisco, Sariaya, Candelaria, San Narciso, and Guinayangan.

Some native pig traders are only confined to their municipality in sourcing for the animals, while others sourced their native pigs outside their municipality especially during the months of November and December. They also source native pigs in Burias Island in the month of January when there is low supply of native pigs in Quezon province since most of the native pigs in the province have been sold the previous month. A total of 14 wholesaler-shippers, out of the top 20 wholesaler-shippers from Quezon province, were covered in this study. Of the 79 native pig wholesalers in Quezon, 20 traded and shipped out 1,000 to 6,741 heads of native pigs per trader per year in 2014.

*Native Pig Lechon Processing and Marketing*

There are a total of 64 native pig *lechon* processors in Luzon. The La Loma District in Quezon City, which is the major site of native pig *lechon* establishments, is also tagged as the *lechon* capital of the Philippines. Although there are many excellent *lechoneros* in Metro Manila, people still prefer the District for native pig *lechon*. Mila's *Lechon*, Pingping's Native *Lechon* and Restaurant, Inc., Mang Tomas *Lechon*, and Monchie's *Lechon* are just some of the top picks. Other popular *lechon* processing business establishments in Metro Manila are Lydia's *Lechon*, and Elar's *Lechon.* The *lechon* processors consider native pigs as the best for lechon because they claim that the meat is tastier and has less fat, and the skin is crispier.

**Value Chain Analysis of Native Lechon in the Visayas**

Based on the first quarter progress report (March – May 2016), CELPA had conducted separate interviews for native pig farmers, traders, native *lechon* makers in selected provinces in Central, Western and Eastern Visayas. The Provincial Veterinarians in Negros Occidental, Bohol, Iloilo, and Capiz have already provided list of major native pig-producing municipalities in their respective municipalities. Of the 11 native pig-producing municipalities in Neg. Occ. that were identified by the Provincial Veterinarian, seven top native pig-producing municipalities were selected by the Value Chain Research Team of the project proponent. The team interviewed 195 pig farmers, 15 traders, and 9 (nine) lechon makers in Neg. Occ.

**Suggestions for improving the native pig *lechon* industry**

In summation and as pointed out by the project proponent, native pig growing has a great market potential owing to the enlarging market for native pig *lechon* in the domestic market throughout the year. The native pig production industry in the study provinces, however, is beset with a number of problems that includes the constraint of native pig supply not keeping pace with the growing demand.

In order to enhance competitiveness of the native pig *lechon* value chain in Luzon and Visayas, collaborative efforts of government agencies, the private sector, and the state universities and colleges (SUCs) should focus on the priority constraints and strategies/interventions identified in the study which were validated by the stakeholders. It is also deemed important that there should be interplay of various stakeholders in the native pig *lechon* value chain in terms of collaboration and cooperation in order to drive improvements in the different layers of the chain.

*CELPA, Inc. is a duly constituted consulting firm legally registered with the Securities and Exchange Commission of the Republic of the Philippines. It was formally organized to help promote economic growth while maintaining a healthy sustainable management of natural resources, particularly forests, as a strategy for community development. CELPA also provides technical and managerial services in agriculture and rural development.*
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# Going natural with PROCESSED FOOD

by: DARYL LOU A. BATTAD

Is there such a thing as healthy, processed meat?

The Department of Agriculture – Southern Tagalog Integrated Agricultural Research Center (DA-STIARC) in Lipa City gives a resounding yes to this question through a project on meat processing that makes use of herbs and spices instead of synthetic ingredients that are made up mostly of chemicals.

With the high population of native pigs and native chicken in the province of Batangas, the project team figured that the meat from these native animals, once processed and enlivened by natural herbs and spices, would not only be a good match, but a downright healthy mix.

**Why native animals?**

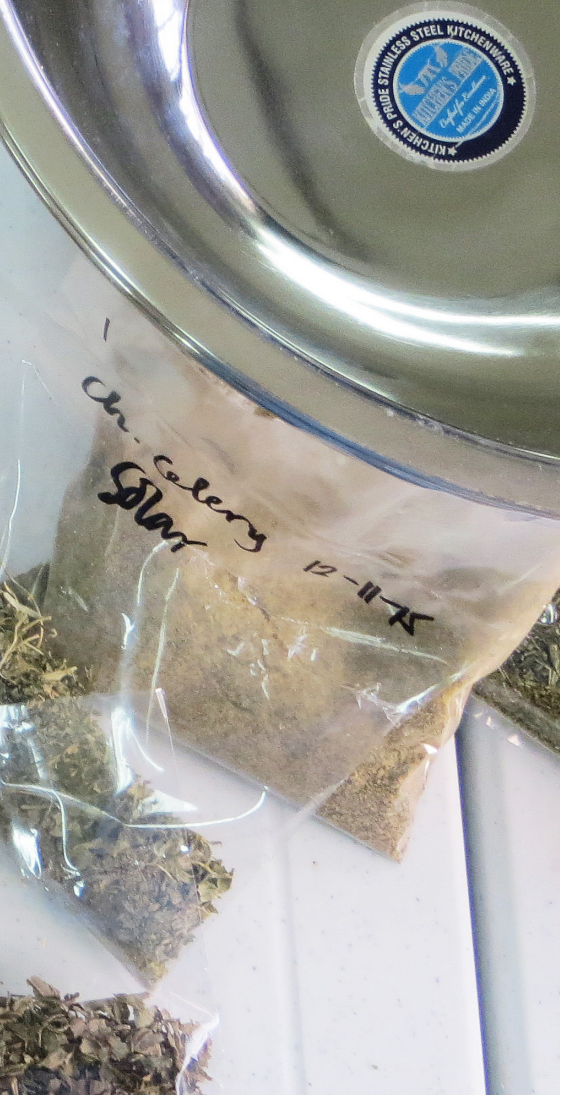
Native pigs are known to be more adapted to local conditions especially under the Philippines' changing climate pattern. Also, they are considered to be more resistant to diseases and parasites and are low maintenance as they are able to grow well on indigenous or locally available feeds. Native pigs are best known for the unique taste and crunchiness of their meat, making it a more gastronomically appealing choice over hybrid pigs.

Native chickens possess similar qualities, particularly their high resistance to diseases and the ability to subsist on farm by-products, thus requiring minimal care.

These attributes are seen as good for ease of production especially for rural growers. Moreover, their benefits to health, compared to commercially-bred animals, are an advantage adding to their appeal as rural enterprises.

**Getting rid of unnatural ingredients in processed meat**

Nowadays, people are becoming more conscious of their health. This is manifested by the rising demand for safe and natural foods in the market. Ironically, processed foods, specifically, processed animal meat, still dominate the market despite the insistence and preference of people in choosing healthier, natural food products. This was the motivating force behind the






project, "Technology Development and Commercialization of Production System and Meat Processing from Organically Grown Native Pig and Native Chicken", led by Wilmer Faylon, a Senior Science Research Specialist at DA-STIARC.

Generally, the project aims to increase the income of the native animal raisers through commercialization of technologies developed for the production of organically grown native pigs and chicken and processing of the meat with the use of natural ingredients. Thus, the project also targets to develop the technology for healthy processed meat, to cater, not only to the creation of livelihood for the native animal raisers, but to the promotion of the consumers' health as well.

The project followed already existing technology in raising native animals by means of organic practices. The animal growers utilized *sakwa*, or *gabing* San Fernando, cassava, and *madre de agua* or *trichantera* as feeds for the native pigs. For the native chicken, they were fed with forages such as *trichantera*, *indigofera*, *ipil-ipil*, and *Arachis pintoi* (mani-mani). The animals were reared for ten months, in 200 and 300 square meter paddocks for native pig and native chicken, respectively.

In shunning the use of synthetic ingredients and chemicals in preparing processed meat from native pigs and chicken, essential organic herbs and spices were established in a 100-square meter nursery in the station that will be used as natural substitutes.

The herbs and spices used in the processing and development of meat products, include Philippine oregano, Thai basil, Chinese celery (kintsay), hot pepper, annatto (atsuete), black pepper, garlic, and lemongrass along with nipa palm vinegar, rock salt, naturally fermented soy sauce, cassava flour, and raw sugar.

**Making the call for healthier processed food**

With alarming reports from health organizations regarding processed foods, the government can be an instrument in raising awareness to encourage more people to consider healthier alternatives.

The processed meat presently available in the market cannot be seen to be a declining industry as its value and the demand for it from the standpoint of commerce and convenience remain strong and, therefore, still has a big following albeit health risks. That's why the project team deemed it is high time that people are made aware that they have better, healthier options with food processed with natural ingredients.

Now, there can be healthier options for tapa, burger patties, tocino, smoked ham, siomai, and lechon belly, thanks to the research team behind this project who thought that health is indeed, wealth. ###

# EXPLORING THE MONEY-MAKIN OF M


Raising pigs is a popular enterprise in the Philippines. Processing its meat is just one part of this proliferating industry. Processing its skin, a by-product, is another significant economic activity, the potentials of which the swine industry can take full advantage of.

Taking into consideration the call of the government to promote the country's native animals and optimize their potentials, the Animal Products Development Center (APDC) of the Bureau of Animal Industry (BAI) embarked on a study to develop improved processing technologies for meat and skin from native pig (Black Tiaong strain). The two-year study titled, "Improvement of Processing Technologies for Meat and Skin from Black Tiaong Strain of Native Pig", was led by Nenita R. Estante of APDC. Funded by the Bureau of Agricultural Research (BAR), the study aimed to characterize the carcass of native pig, develop meat products, and improve tanning techniques for its skins. According to Estante, the project aspired to increase the public's awareness on the use of native pork for food and of pig skin as leather given the improved technologies on processing developed by this study.

**Potentials of Black Tiaong native pig**

With the growing demand for pork, local production could hardly keep up and is one reason for large importations. One of the ways to meet the local demand is by increasing the potentials of native pig as food which studies have shown to be a healthier choice to the usual commercial pork. According to Estante, "native pigs are already becoming extinct, thus utilizing them would not only help meet local demand for pork but also help increase the profits of native pig producers/livestock raisers and meat processors."

Physically, native pigs possess characteristics that are distinct to them. They are usually pure black or sometimes spotted. They have a long face, long snout, erect ears, and short and low set of body conformation. They have small body size and have slow growth rate compared to commercial ones. They thrive well and reproduce under natural environment. The young native pig (13-73 days old) usually weighs 2-13 kg while the adult (6-9 months) weighs 30-35 kg.

Native pigs are not picky eaters; they can live on feed ingredients that are farm-grown or locally-available that include gabing San Fernando (*Yautia* sp.), sweet potato, banana trunks and leaves, rice bran, and even vegetable rejects. Native pigs are stronger and have high resistance to parasites and diseases. They can easily adapt to local conditions and can tolerate hot and cold weather. They need less management requirement and require minimal expense on housing facility. Since they can be grown organically (without commercial feeds and chemical inputs), they have high economic advantages for organic swine producers.

The Black Tiaong (BT Black) is a breed developed by BAI through crossbreeding strains of native pigs from Benguet, Marinduque, and Quezon. It has faster growth rate compared to other pure native pigs and still retains its good characteristics. BT Black is known for its pure black color. The boars have pricked or erect ears while those of the female are semi-lopped to pricked or erect. The sows have good mothering ability and good litter size of eight piglets. A two-month BT black weighs an average of 9 kg while a five-month old can weigh 35 kg. The meat of BT black is excellent for lechon.

**Native pig, the healthier choice**

The increasing number of health-conscious consumers opens up opportunities for native pigs as a healthier choice of meat. And since native pigs are mostly organically-grown, preference for native pig lechon has led to the growth of local demand for native pigs which calls for higher production. The premium price that they command

# G POTENTIALS
# EAT AND SKIN FROM NATIVE PIG

by: RITA T. DELA CRUZ

and their health advantages give economic encouragement for swine growers to consider native pigs.

In the study of Estante, the carcass of the BT strain of native pig was flayed and evaluated for yield and quality characteristics. Freshly cooked meat was subjected to sensory evaluation. Results of the meat quality chemical analysis showed that native pork is higher in moisture, crude protein, and ash content than commercial pork. It was also found that native pork is lower in crude fat, carbohydrates, food energy, calorie from fat, and cholesterol content than commercial pork.

When it comes to cholesterol content, native pork has lower levels than commercial pork at 22.40mg/100g. With its lower cholesterol content, it serves as the best choice of meat for older and health-conscious people.

**Meat products from native pork**

One of the main objectives of the APDC study was to characterize the quality of meat of native pigs and develop processing technologies for its meat products so that they do not only taste good but are also healthy and have long storability.

Recipes were standardized and then subjected to consumer tests and shelf life studies. Among the meat products included in the study were: *lechon*, smoked bacon, fresh native sausage (*longanisa*), hotdog, and dried *tapa* (pork jerky).

Standardization of the native pork lechon recipe was done using the parameters of skin color, meat color, flavor, crispiness of the skin, juiciness, tenderness, and general acceptability. Meanwhile, in the standardization of recipes for developed native meat products, these were subjected to evaluation as to their sensory attributes (i.e., color, flavor, saltiness, sourness, toughness, smoked flavor, and general acceptability).

Results of the consumer taste test showed that almost all of the respondents liked the *lechon*, smoked bacon, fresh native sausage, and hotdog, with most appreciating the dried *tapa* (jerky).

All developed products from native pigs were vacuum packed to seal in the freshness and ensure longer storability. Results for the shelf life studies showed that hotdog lasted for one day at Room Temperature (RT), 8 days at Chiller Condition (CC), and 35 days at Freezer Condition (FC). Fresh native sausage lasted for 2 days at RT, 3 days at CC, and 97 days at FC while vacuum packed smoked bacon lasted for 6 days at RT, 7 days at CC, and 70 days at FC. For dried *tapa*, the group of Estante recommended the use of anti-mold agent to prevent the growth of yeasts and molds.

**Economic potential of native meat products**

Given its unique flavor and leaner meat quality, the price of native pig is higher than that of commercial pig. The price of a 14-kg standardized native *lechon* costs around P7, 042.00 with production cost of P5,865.62compared to a 14-kg commercial *lechon* which costs around P4,200.00 - P5,600.00. This trend goes the same for other native pig products.

Thirty kilos (30kg) of native pork can produce 31 kg of hotdog which costs around P6,882.00. Production cost is P5,732.13 for a profit of P1,149.87. Meanwhile a kilo of native pork can make 1.30 kg of fresh native sausage which costs around P326.30. With a production cost of P272.07, it can provide an earning of P54.23. A 10-kg of

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native pork can produce 7.90 kg of smoked bacon which can be sold for around P3, 989.50. With a production cost of P3, 327.60, there is an earning of P661.90.

Dried *tapa* from native pork is not yet available in the market which is limited to fresh *tapa*, thus this is a good opportunity to introduce this new product to consumers. A kilo of native pork can produce 310 grams of dried *tapa* that costs around P408.90 providing an earning of P68.12 for a kilo of native meat.



**Safer tanning technique for native pigskin**

Aside from carcass characterization and development of meat products, the study looked into the tanning technique of the native pig's skin as this material can be another source of income for growers. Specifically, the study looked into the potential of natural replacements to the ingredient, Nonylphenol Ethoxylates (NPE), as degreasing agent for tanning pigskins.

Native pigskin leather has a distinctive grain structure due to the hair penetrating through the useable grain layer that leaves holes which, along with other pores, makes for "breathing leather" that allows air ventilation which is important for leatherwear such as shoes, gloves and jackets. However, pigskin has high deposits of fat in it, thus, the need to degrease them properly. Degreasing is an essential part of the tanning procedures particularly for native pigskin. Improper degreasing can result to improper quality tanning and reduce the longevity of the leather.

The leather industry is a thriving sector in the country generating jobs for many Filipinos. Leather from the skins of animals such as cattle and carabao is one of the most important economic by-products of the meat industry.

A search for suitable replacements for NPE as a degreasing agent for removing the fat from the native pig's dermis was made under the study. This chemical has been banned in the international market because of its ill effects on the environment and human health. It is not easily degraded and is also costly.

The group of Estante looked into the potential of using pig's bile and paraffin as natural replacements to NPE. Pig's bile and paraffin are cheaper and are easily degraded in the environment.

The study conducted five treatments and three trials. To determine the quality of the resultant leather from the five treatments, the pigskin was subjected to fat analysis and physico-chemical tests. Using pig's bile and paraffin to replace NPE, results of the treatments produced acceptable outcomes in terms of fat content, tensile strength, elongation at break, and thickness for leather.

The use of paraffin and bile as replacements for the harmful chemical in degreasing the skin was shown to give good results as the leather passed the quality parameters based on international standards. ###

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# TAKING NATIVE PIG PRODUCTION IN TAGKAWAYAN TO GREATER HEIGHTS

by: MA. ELOISA H. AQUINO

Consumers nowadays are becoming more health conscious. As a result, demand for native and organically-grown farm products, including livestock, have grown and now commanding premium prices. Given this, the promotion of native pigs and native chicken is very timely and relevant. This is why, as the Department of Agriculture's (DA) lead coordinating R&D agency for agriculture and fisheries, the Bureau of Agricultural Research (BAR) is strengthening the native poultry and livestock industries by supporting R&D projects that can develop needed technologies.

Native pigs are typically small, black-colored, and spotted animals. Resistant to parasites and diseases, they can thrive well on locally-available feeds. Native pigs can adapt to local conditions and can tolerate hot and cold environments. Meat from these animals is superior to those from commercial breeds in cooking qualities and as a more healthful food.

With the goal of strengthening, enhancing, and sustaining native pig production and commercialization with good processing technologies in Tagkawayan, Quezon, the Southern Luzon State University-Judge Guillermo Eleazar (SLSU-JGE) proposed the expansion of the project, "Native Pig Production and Commercialization of Developed Processing Technologies", in the said municipality. This extension aims to further propagate native pig stock dispersal and promote the production of enhanced processed meat products.

The new activities under the expanded project include (a) maintenance of the demonstration farm and native pig breeders as source of stock; (b) intensified information-education campaign on native

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pig production; (c) identification of native pig growers and determination of the existing population of native pigs; (d) promotion of developed processing technologies for native pork products; (e) assistance to potential growers and processors; and (f) conduct of market study on native pork products.

"The on-going project is an offshoot of the promotion of native swine production in Tagkawayan, Quezon which aimed to showcase the technologies in native pig production like the housing facility management, the forage materials, good agricultural practices in feeding, and health care management," Ms. Nemia Pelayo, project technical adviser said.

The project started with 54 heads of sows, boars and piglets and now has 80 heads in the demonstration farm and 76 heads in project beneficiaries' sites. Aside from native pig production, training on meat processing was also undertaken by KALIPI members (*Kalipunan ng Liping Pilipina*) at the Bureau of Animal Industry-Animal Products Development Center in Valenzuela City.

"Through this project, we can enhance the different recipes that can be made from native pig. We are going to introduce to our beneficiaries and to the community the use of indigenous housing materials, natural farming system and natural forage for feeding our native stocks", Prof. Rufo added.

The project recommends the housing facility to be made of indigenous materials like coco lumber, bamboo, wood poles, haystack (cogon), coconut leaves, thatch (nipa), and *anahaw* for the structure; and coconut husk, coir dust, rice hull as dry bedding materials. Natural feed materials can include vegetable trimmings, trash fish, *Trichanthera*, rensonii grass, *pongapong,* banana leaves, *sapal*, *ipa*, *paliat*, *binlid*, milled corn. Feeds are given either in raw or cooked form at least twice a day, morning and afternoon. However, the pigs are given leaves for their in-between-meals.

As part of the health management practices, the team is regularly assisted by

the Municipal Agricultural Office (MAO) and the Livestock Inspector and Office of Provincial Veterinarian, Lucena City.

As discussed by Prof. Rufo, the technology can reflect a return on investment (ROI) of 38% in ten (10) months. With expenses at P4,340.00 and sale at P100.00/kg, a 60 kg pig priced at P6,000.00, an income of P1,660.00 can be gained.

The cooperators may get different ROIs depending on the materials used for their housing and the feeds as these are based on the available/immediate resources in their area.

"*Malaki iyong market potential for native pig kasi iyong supplies ng lechon meat at native pig meat sa Manila ay mababa pa, so mataas iyong demand kasi everybody is into organic, back to basic, healthy living*," Tristan Jhon Pia, project beneficiary said.

Native pig production is better than commercial pig production in terms of feeds, capital investment and management. Native pigs can thrive on locally grown forage, in housing facility made of indigenous materials, and are less susceptible to illnesses and adverse climatic conditions and, therefore, are low in cost of investment while commercial pig production requires high investment due to the price of commercial feeds, housing materials used and intensive attention required by the breeds.

"*Ang main goal naman ay mapayabong, mapaunlad, mapayaman ang mga farmer beneficiaries. Dere-derecho ang pagdami ng mga baboy dahil mabibilog ang mga baboy. At kahit malapit sa mga schools o sa mga bahay, walang amoy dahil naturally-grown,*" Pia added.

The project beneficiaries formed the Native Pig Raisers' Association of Tagkawayan, Quezon with 22 registered members. The association is now an active advocate of native pig raising, promoting the commodity, not only in the project sites, but also in nearby municipalities.

"*At the start of our dispersal project, only a few showed interest as beneficiaries; kasi mahirap daw alagaan, matagal lumaki ang native pig. Ngayon, marami na ang interested na maging beneficiary*"; Pia shared.

The project entitles the beneficiary to a set of three (3) female and one (1) male piglets and requires them to return six (6) female and two (2) male piglets which will be issued to two (2) beneficiaries. The project team regularly visits the project beneficiaries' sites in Barangays Bamban, San Vicente, Munting Parang, Casispalan, Tunton, Mansilay, Kinatakutan and Magsaysay.

To date, there are 30 beneficiaries in 11 Barangays (with additional three (3) Barangays: Mapulot, Rizal, and Poblacion). Four beneficiaries have returned two sets each of piglets which were distributed to eight (8) new beneficiaries. ###

Shiitake mushroom (*Lentinus edodes*) is an edible mushroom native to East Asia. Due to its medicinal properties, shiitake is widely cultivated and consumed in many Asian countries. Hence, in support to the promotion of the health and economic potentials of shiitake mushroom in the country, the Bureau of Agricultural Reserach (BAR) funded a project titled "CommerciaLization of Shiitake Production and Product Development Technology in Nueva Vizcaya." This is being implemented by the Nueva Vizcaya State Univesity (NVSU) in Bayombong, Nueva Vizcaya. The project will support the existing mushroom development program of NVSU in engaging in commercial shiitake spawn production, continuing optimization of substrate composition, and value-added processing and by-product development. *(Photo by PLesaca)*

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