



BAR Research and Development DIGEST

Official quarterly publication of the Bureau of Agricultural Research

Volume 13 Issue No. 2

visit us at: <http://www.bar.gov.ph>

April - June 2011



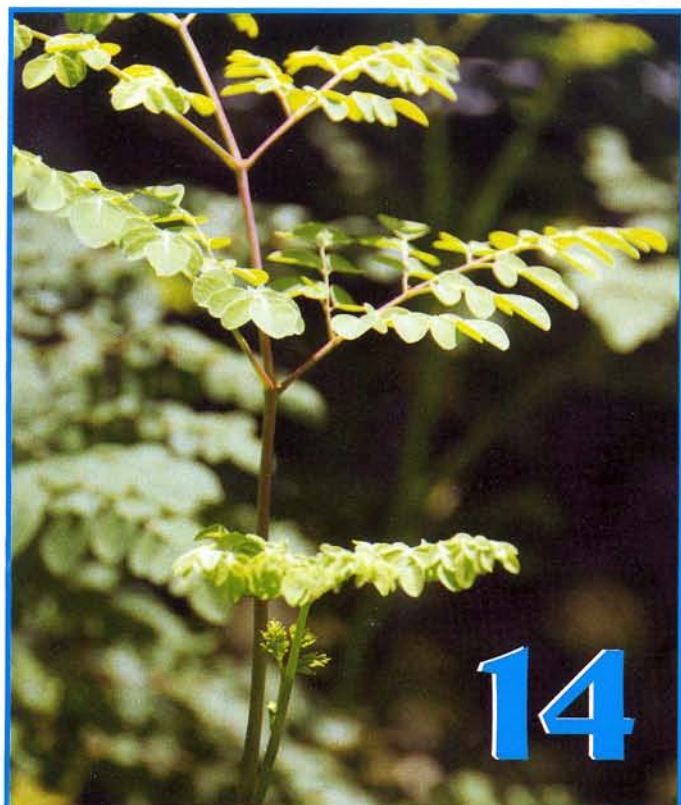
**Meeting the demand
for native lechon with Sakwa**



CONTENTS

April-June 2011

BAR R&D DIGEST



- | | |
|---|--|
| 3 <i>R&D Notes: Harnessing the full potential of R&D</i> | 16 Meeting the demand for native lechon with Sakwa |
| 5 Goodness of Mindoro tuna and bangus in cans | 18 Exploring the income-generating potential of beekeeping |
| 7 Dairy processing for a healthy and poverty-free community | 20 Blazing the trail for pigeonpea commercialization in the Philippines |
| 9 Breeding a future: Establishment of goat breeding farm | 24 Optimizing the use of sweet sorghum for bioethanol production in Region IX |
| 11 Carabao milk: Isabela's white gold | 27 Sweet sorghum: The search for best cultivar for Western Visayas |
| 13 Promoting commercial rubber production in E. Visayas using quality cloned varieties | 29 <i>Adlai</i> : Champion crop of the Subanen |
| 14 Moringa: An effective galactagogue for dairy cattle | 31 Venturing into the money-making seaweeds industry |

on the COVER:

Research and Development
BAR DIGEST
Official quarterly publication of the Bureau of Agricultural Research



Meeting the demand for native lechon with Sakwa **p16**

EDITORIAL BOARD

Rita T. dela Cruz

Managing Editor

Anthony A. Constantino

Rita T. dela Cruz

Layout

Victoriano B. Guiam

Julia A. Lapitan

Consulting Editors

Ma. Eloisa H. Aquino

Rita T. dela Cruz

Diana Rose A. de Leon

Maria Anna M. Gumapac

Patrick Raymund A. Lesaca

Miko Jazmine J. Mojica

Leila Denisse E. Padilla

Zuellen B. Reynoso

Writers

Anthony A. Constantino

Print Manager

Julia A. Lapitan

OIC-Head, ACD

Dr. Nicomedes P. Eleazar, CESO IV

Adviser

Cover photos: RBERNARDO, ZREYNOSO

BAR R&D Digest is published quarterly by the Applied Communication Division of the Department of Agriculture-Bureau of Agricultural Research (DA-BAR) located at RDMIC Building, Visayas Avenue, Diliman, Quezon City, Philippines. 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 National Research & Development System for Agriculture and Fisheries (NaRDSAF).

For subscription and inquiries, please contact:

Applied Communication Division-Publication Section

BUREAU OF AGRICULTURAL RESEARCH

Department of Agriculture

3/F RDMIC Bldg., Visayas Avenue

cor. Elliptical Rd., Diliman, Quezon City

PHILIPPINES 1104

Trunklines: 928-8505, 927-0226, 928-8624

Local Nos: 3011, 3012, 3027

Fax: 920-0227 or 927-5691

E-mail: acd@bar.gov.ph

Articles are also available online.

Visit our website at: <http://www.bar.gov.ph>

Articles may be reprinted with permission from the management.

ISSN 1655-3934

© Bureau of Agricultural Research 2011

Harnessing the full potential of R&D

BY DR. NICOMEDES P. ELEAZAR, CESO IV

Part of the continuing efforts of the Bureau of Agricultural Research (BAR), as the national coordinating body for the agriculture and fisheries R&D of the country, is to reach out to broad and specific segments of the R&D community to harness the full potentials of research and development (R&D) for the benefit of people and society.

One collaborative effort that BAR continues to intensify in bringing technologies that can be used by farmers and fisherfolk is through the Technology Management for Competitive Agriculture and Fisheries (TMCAF), a DA-NAFC-BAR initiative with assistance from the Government of Japan (GOJ) through the Kennedy Round 2 (KR2), also known as the Grant Assistance for Underprivileged Farmers (GAUF).

KR2 is a grant facility designed to assist developing countries, like the Philippines, to achieve food sufficiency by implementing and financially augmenting agriculture and fisheries projects throughout the country. The program specifically aims to speed up the availability of mature technologies to farmers and fishers' for enhancing their profitability and incomes. With effective commercialization of technologies, agriculture and fisheries can be transformed into a market-oriented sector.

This program enables to generate valuable information on the implementation of strategies being adopted, the benefits and impacts on the various stakeholders, problems and constraints encountered, and lessons learned. As a modality, the program fast track the dissemination of R&D results to the public and potential investors and, in the process, helps strengthen the linkages among research, development and extension.

The second quarter issue of the *BAR R&D Digest* is a continuation of the first issue featuring 10 more projects funded under the DA-NAFC-BAR KR2 initiative that created impact at the grassroot level.

Our covered story for this issue discusses raising native pigs and the growing the demand for native *lechon*. The article talks about the production of native pigs as a viable alternative livelihood for those who wanted to get involved in swine raising but, cannot cope with the high price of commercial feeds and for those who do not have enough capital for housing and maintenance. One important component of the project is improving feed availability through the integration of *sakwa* as feed. *Sakwa* is a by-product of "Gabing San Fernando" (*Yautia spp.*) which thrives well in deep, loose, friable, and sandy loam soil with abundant organic matter and moisture. It is well-adapted in plateaus, can tolerate shaded conditions and is resistant to adverse climatic conditions. Farmers use *sakwa* as feeds for swine, particularly at the finishing stage. The sliced *sakwa* and the leaves are usually given fresh or boiled with feed concentrates.

Another featured project is the "Commercialization of Canned Tuna in Oil and Bangus French Style through Improved Packaging and Labeling," which

next page



is being implemented by the Mindoro State College Agriculture Technology (MinSCAT) in Labusan, Bongabong, Oriental Mindoro. In commercializing these canned fish products, the project ultimately hopes to encourage livelihood activities using the transferred technology and to provide employment opportunities to fisherfolk and out-of-school youth in the locality through value-adding.

Two articles highlighting on the recent research results from the livestock sector are also featured in this issue. The "dairy processing for a healthy and poverty-free community" discusses the processing of Carabao milk into dairy products based from a technology commercialization project with the San Pablo Livestock and Dairy Development Association (SPLDDA) as beneficiary. The aim of the project is to build the capacity of the members of the association from animal health management to dairy production, processing, and marketing. On goat breeding, the article, "Breeding a future: Establishment of goat breeding farm," features the project of the Bataan Peninsula State University (BPSU), venturing into a smallscale goat breeding farm that consists of 100 upgraded does and four purebred bucks. The project aims to help uplift the socio-economic condition of the underprivileged farmers

goat breeding operations. Given the many healthful benefits and uses of *Moringa* to humans, its effectivity as a galactagogue was also explored in dairy cattle through a technology commercialization project that integrates *Moringa* as an alternative, viable, and cheap source of feed for dairy cattle. The project also promotes the intensive cultivation of *Moringa* for leaf meal production to increase milk production of dairy animals and generate increased income for the farmers.

Also featured is a benchmark research on beekeeping in Sorsogon that explores its income-generating potential. Beekeeping is an emerging trend in Sorsogon providing additional income as it is an ideal alternative livelihood because of the simple technology requirements, minimal processing, ready market, and suitability to rural livelihood.

An introduced crop from India, pigeonpea is slowly blazing the trail of commercialization in the country. A comprehensive project on accelerated pigeonpea production and utilization was supported by BAR and is featured in this issue. The project hopes to come up with an all-encompassing study on pigeonpea commercialization from seed production, food processing, establishment of a pilot processing plant, and establishment of market linkages for food products

developed from pigeonpea.

The last three articles focused on the recent adaptability tests and evaluation of sweet sorghum varieties in Eastern Visayas, Western Visayas, and Western Mindanao.

Two sections on CPAR projects were also featured in this issue: *adlai* and seaweeds. As priority crop under the DA-High Value Commercial Development Program (HVCDP), BAR is currently supporting RDE initiatives on *adlai*. Specifically, BAR's programs on *adlai* include developing the technologies on its cultural management practices, postharvest and processing, and seed production systems. Moreover, it aims to promote *adlai*'s use as feed for livestock and poultry, and recommend promising *adlai* varieties for registration in the National Seed Industry Council (NSIC). Meanwhile the CPAR project on seaweeds is a success story in Region 6.

We hope that this issue of the BAR R&D Digest provides our readers with the sufficient information on the current RDE priorities of the bureau. We believe that a sustainable and competitive agriculture sector must and should always be supported with market-oriented programs and projects that will not only ensure more profits for our small farmers, fishers and their families, but will also pave the way to uplift the majority of our people from poverty and hunger.###



Goodness of Mindoro tuna and bangus in cans

by Ma. Eloisa H. Aquino

Several commercial companies are now processing regular tuna in can with twists in flavor and preparation that suit the Filipino taste.

Television, radio, and print media often bombard the public daily with advertisements, plugs, and commercials on food in various forms. Particularly popular are canned tuna and *bangus* products. The hype has helped increase interest and acceptance of consumers because of their palatability and variety of choices. These can be served as easy on-the-go meals.

Several commercial companies are now processing regular tuna in can with twists in flavor and preparation that suit the Filipino taste.

But this goes for the big processing companies. Lucky enough, we have a local institutions that is now

producing fishery products with tuna and *bangus* as specialties.

The Mindoro State College Agriculture Technology (MinSCAT), Bongabong Campus in Labusan, Bongabong, Oriental Mindoro, implemented a project titled, "Commercialization of Some Fishery Products (Canned Tuna in Oil and *Bangus* French Style). The project aims to introduced locally-made fish products through improved packaging and labeling. This initiative was supported and funded by the Bureau of Agricultural Research (BAR).

MinSCAT goes into fish canning

MiSCAT is not only a college that

offers the degree, Bachelor of Science in Fisheries, MinSCAT in Bongabong Campus also serves as the Provincial Institute on Agriculture and Fisheries and the only fishery educational institution in the entire Oriental Mindoro province. The College provides knowledge and skills on the culture, propagation, and wise utilization of fish and other fish products through proper preservation.

"In its 45 years of existence, MinSCAT has continuously engaged in developing different fish processing practices including the canning of different species of fish," said Dr. Edna G. Piol, MinSCAT campus administrator.

From what started mainly as a subject for students, the said campus now produces canned products such as tuna in oil, and *bangus* French style.

Marketing and commercializing canned fish products

These products have already gained recognition, hence the demand has been gradually increasing. Locals and even tourists bring home products as *pasalubong* or *pangregalo*.

"These canned products have become popular not only in the different places in the province but also in other places, locally and even abroad, because of their quality and palatability, and the fact that they meet established sanitary standards," Dr. Piol proudly mused.

The project is funded by BAR through its National Technology Commercialization Program (NTCP), and the National Agricultural and Fishery Council (NAFC) through the Japan Official Development Assistance's (ODA) - KR2 Program Grant Assistance for Underprivileged Farmers (GAUF). Projects funded under KR2 aim help farmers and fishers uplift their lives by increasing their productivity and income through the technologies generated from the project.

"In coordination with BAR, MinSCAT proposed for the development of a technology package of showcasing the transfer of fish processing technology," Dr. Piol explained. She added that the project will give an opportunity for the College to become

opportunity for the College to become the Center of Development (COD) and, later, Center of Excellence (COE) in fisheries in the province of Oriental Mindoro.

"Through the financial assistance provided by the BAR-NAFC, the College was able to intensify its research, extension and production activities," Dr. Piol said. Likewise, funding was also made available for the development of product labeling and packaging. She added that the College was able to renovate its Fish Processing Laboratory and was able to acquire additional equipment for fish processing. "The financial assistance provided by BAR is



Widespread promotion of these products will highly contribute to increasing their popularity and to bringing our canned tuna in oil and bangus French style to the bigger market.

being used not only for production purposes but also for the transfer of technology to the community members that can become the basis of an alternative source of livelihood therefore contributing to increased food production in the province of Oriental Mindoro, in particular, and in the country, in general," Dr. Piol said.

Outreach activities

Lecture-demonstrations on fish processing were conducted by the College's technical and extension staff in the different municipalities of the province. These were actively participated in by students, fishers' wives, out-of-school youth and other interested individuals. Some of the participants have since engaged in smallscale enterprises by producing and selling canned products and other processed fish products.

"The training provided opportunities to gain knowledge and insights on preserving fish like

insights on preserving fish like canning," Dr. Piol explained. She added that it enhanced the entrepreneurial spirit of the fisher wives in the community, maximizing the use of fish caught by the local fishermen in the process.

The College also sought assistance from the Department of Science and Technology (DOST) on brand development such as the design of the product label. The LGU of Bongabong and other municipalities in the second district of Oriental Mindoro where the trainings were conducted also supported the project.

Dr. Piol believed that the fish canning industry in MinSCAT has a definite advantage in terms of quality, sanitary standards of preparation, and unique palatability of the canned products processed by the college. "Widespread promotion of these products will highly contribute to increasing their popularity and to bringing our canned Tuna in Oil and Bangus French Style to the bigger market," she added.###



Dairy processing for a healthy and poverty-free community

| by Miko Jazmine J. Mojica |

Milk and other dairy products are some of the most common sources of nutrition to humans of all ages. Cow's milk is a popular choice as it is particularly a good source of protein, fat, and carbohydrate.

In the Philippines, another source is carabao milk which is gaining a reputation as the "complete food". According to the Philippine Carabao Center (PCC), it contains protein, fat, lactose, vitamins, minerals, and water. Moreover, it is said to be richer and

creamier compared to milk from cows and goats because of the higher percentage of milk fat, making it a good source of energy.

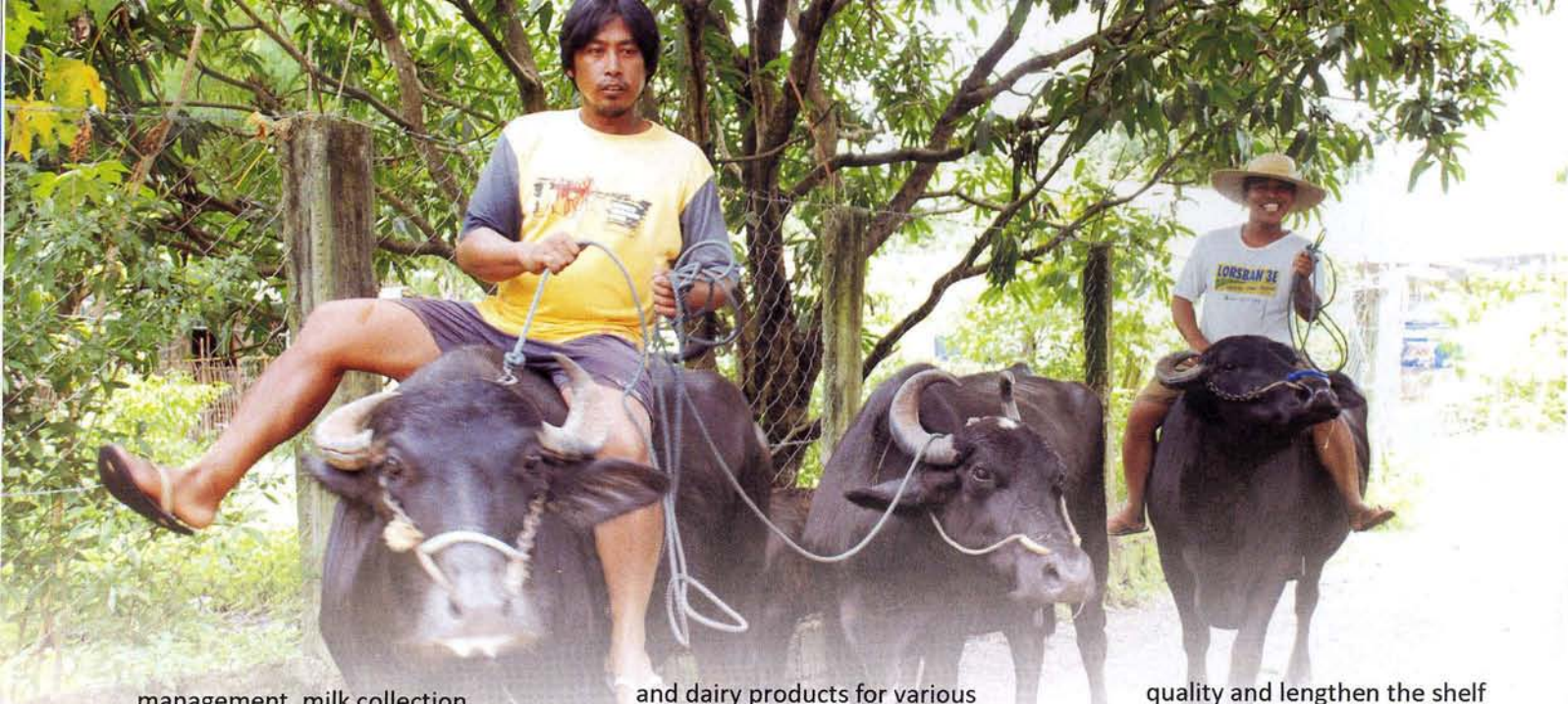
In the province of Isabela, a project was initiated to promote carabao's milk and dairy products as an effective source of nutrition while uplifting the lives of the local people involved in dairy farming and processing.

With funding from the Bureau of Agricultural Research (BAR), the municipal local government unit (MLGU) of San Pablo, Isabela embarked

on a project to enhance the development of the village-level dairy industry as a sustainable source of income and nutrition to the locals.

The San Pablo Livestock and Dairy Development Association (SPLDDA) was chosen as the project's main beneficiary. The aim of the project is to build the capacity of the members of the association in dairy animal husbandry, from health management to dairy production, processing, and marketing.

An existing Dairy Processing Center of the SPLDDA was used as the venue for trainings on animal health nt of



management, milk collection, and processing. The facility had been built through the initiative of the local government of Isabela, Department of Labor and Employment (DOLE), and Philippine Carabao Center (PCC).

Several government institutions were tapped to conduct training activities and provide technical assistance to the project which include the PCC, Agricultural Training Institute (ATI), Isabela State University (ISU), and Department of Science and Technology (DOST).

Moreover, the association also coordinated with the Department of Social Welfare and Development (DSWD) and the Department of Education (DepEd) to supply the milk

and dairy products for various government nutrition and feeding programs in the province.

According to Mr. Romeo Mamauag Jr., project leader and municipal agriculturist of San Pablo, the association is now producing carabao's milk and their own dairy products such as *pastillas de leche*, *kesong puti*, pasteurized milk, and yoghurt where before, the association merely supplied milk produce to other dairy products manufacturers.

In terms of sustainability of this type of income-generating activity, Mr. Mamauag said the association still has to be given a little more time to recover the capital spent for this project. Moreover, he said that in order to sustain the good

quality and lengthen the shelf life of the dairy products, additional investments are needed. In the meantime, he is proud about the success of the association in tapping the local market for their products.

"So far, these dairy products are being supplied to local markets and commercial stalls at the local airport. Association members also take orders from *balikbayans* who usually look for the dairy products they are making. Now, they are earning more from this source of livelihood," said Mr. Mamauag.

Hopefully for the SPLDDA, this livelihood promotion effort could only be the start of more carabaos to milk and create a truly significant impact on

...the association is now producing carabao's milk and their own dairy products such as *pastillas de leche*, *kesong puti*, pasteurized milk, and yoghurt where before, the association merely supplied milk produce to other dairy products manufacturers



BREEDING A FUTURE:

Establishment of goat breeding farm

by Maria Anna M. Gumapac



Goats (*Capra hircus*) are one of the most important domesticated animals raised in our country. A bit overlooked by the mass as compared with pigs, chickens, and cows, goats are underrated as farm livestock. One of the oldest domesticated animal species, they have been raised for their milk, meat, hair, and skins for much time all over the world. As of the twentieth century, they have even gained a bit of popularity as pets, such as the so-called "fainting goats."

As a potential source of quality meat known as chevon, which is comparable to beef, goat-raising in our country started in the 1970s and demand for such has grown since then, including demand for chevon itself. In many parts of the world, chevon is the primary source of protein. Muslims, in particular, have a preference for chevon because of their religion's strict prohibition on pork consumption.

There are a number of varieties in goat products and by-products aside from chevon. Goats' milk is also becoming a popular commodity in rural areas, as it is essentially used similarly to

cow or carabao milk to produce fresh milk, cheese, ice cream, and butter. It is even used in the cosmetics industry for its high Vitamin A content. Furthermore, goats are important source of fiber and skins. The hides in particular are valuable when processed into leather.

The goat industry at a glance

The country's goat industry is generally considered to be for smallholders or small-scale operations only. In fact, tethering is still the predominant system being practiced. Originally made famous as a "poor man's cow," this popularity served to increase our goat population inventory, total volume, and value of production.

According to the Bureau of Agricultural Statistics, the top goat-producing regions in terms of inventory as of 2007 were Region 6 with 14.30 percent of the total goat population, followed by Region 1 with 12.6 percent, Region 7 with 12.5 percent, Region 11 with 9.3 percent, and Region IV with 8.6 percent.

Unfortunately, supply in general cannot meet the demand. Increased farm gate prices and very low

per capita consumption due to shortage of marketable animals indicate the scarcity of the aforementioned commodity. Because of this, the Bataan Peninsula State University (BPSU), with the support of the Bureau of Agricultural Research (BAR), ventured into a small-scale goat breeding farm that consists of 100 upgraded does and four purebred bucks. Overall, the proposed project aims to help uplift the socio-economic conditions of the underprivileged farmers through the use of proven technologies in goat breeding operations. More specifically, the proponent aims to orient livestock farmers with a more scientific approach to goat production/breeding in order to equip them with the necessary production practices and farm management skills in goat production/breeding - through a farmers' livestock school so as to reduce the chances of failure in this endeavor in the future. It also aims to determine the cost-benefit ratio of establishing a semi-commercial goat breeding farm, as well as determine the acceptance level by farmers of the terms of new technologies in goat breeding/production.

Breeding for a future

The project was located in the BPSU Abucay Campus, and was set up to use primary and secondary data as sources of information. Primary data was to be taken from interviews with established goat breeders and institutions, particularly in relation to small ruminant production. To be specific, the Tarlac College of Agriculture (TCA) was the primary source of knowledge regarding the farmers' livestock school on advanced goat production technology and other technical aspects. Actual goat breeders from Bataan and nearby provinces were also to be interviewed. Information gathered from this primary set of data was to be used in identifying current production practices, marketing strategies, and problems and prospects in goat production/breeding. On the other hand, secondary data was to be taken from publications, books, articles, and other related literature to help identify the past and current situations of the goat industry.

Implemented back in December of 2009, the project was initially planned to be operated in a semi-commercial scale with 100 upgraded does and four purebred bucks. It was intended for the farm to produce upgraded stocks as breeders and for slaughter, as well as serve as a model to showcase the viability of goat-raising in the area. The following activities and strategies were to be taken into consideration during the operation of the project: source of stocks, age and weight of stocks, breeding, culling and selection, pasture establishment, feeding, house/fencing, breeding, herd health, and record keeping.

However, the project encountered difficulties, including a high rate of mortality. Back in December of 2010, records show 70 heads under the goat technology commercialization project. As of last year, the breakdown included the following: 13 heads of does that are lactating; 11 heads of does that are gestating; 20 heads of doelings; 24 heads of kids; and 2 heads of bucks. It was already indicated, however, that mortality in every herd is inevitable. Two heads died due to respiratory disease and another five growers died due to diarrhea and



colds, although causes of mortality were not attributed solely to diseases as evident in the fact that to heads of does died a week after kidding.

As of July 2011, a total of 56 live goats are under the project. Of the three bucks—one Anglo Nubian and two Saanen—only one was spared. Cause of death appeared to be due to Caprine Arthritis Encephalitis (CAE) and age. It should be known that according to *GoatWorld.com*, published reports suggest that goats are infected with CAE virus as newborn kids. Ten were spared out of 16 dry and/or pregnant does as the rest expired due to age. Other kids and doelings were not excluded as cause of death indicated pneumonia and diarrhea—in some cases, even both.

It has been found problems are localized to high mortality of breeders during the acclimatization period and high mortality of kids from lactating to weaning ages.

Given that the aim was for the project to reach the 100-doe level, procurement of does and doelings as well as additional breeder bucks are in the mindset so as to negate the loss. Aside from the procurement of additional stocks, old does are recommended to be replaced with doelings as breeders. Furthermore, it is being considered to hold no more

as to give more room for does and kids.

On a more positive note, the Bangkal, Bataan Upland Farmer's Association, Inc. have been identified as adaptors of the technologies and strategies that is currently being applied in this project. Their members frequent the project during the breeding stages and when they come across unexpected difficulties of problems with their own stocks.

It is encouraging to note that despite the problems this project has encountered, its members have not been deterred as they continue to achieve the original objective of helping uplift the socio-economic conditions of underprivileged farmers, as it continues to persist and succeed today. This project is continuing to provide our farmers with options as well as an opportunity to learn and adopt new technologies with regard to goat breeding/production.

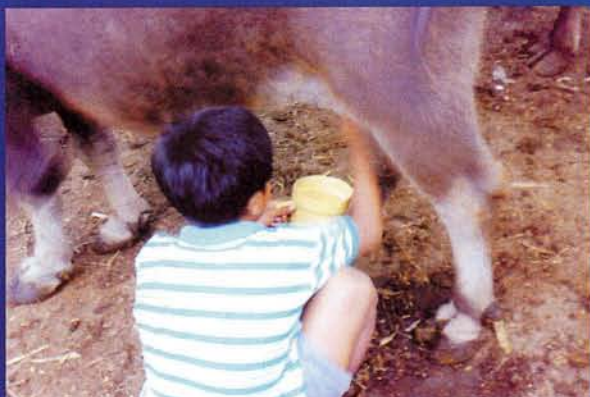
This project's proponent, members, adopters, along with BAR—in light of its Vision and Mission of "...a better life for Filipinos" and "...reduce poverty through technology-based agriculture and fisheries sector"—certainly look forward to realizing the potential from goat breeding.

####

The article was based on the study, "Establishment of a 100-doe level goat breeding farm," by Gregorio J. Rodis of the Bataan Peninsula State University. For more information please contact Mr. Rodis at (047) 237-3078 or at

Carabao milk: Isabela's white gold

| by Zuellen B. Reynoso |



Indigenous to the Philippines, the carabao has been part of the farming family's animals since time immemorial. Known as *kalabaw* in the country, adult carabaos, which can weigh up to 2,000 kilograms, are widely used not only for pulling the plow, but also for transporting the family and farm products to the market. Carabao milk is also popular as food as it is complete with essential vitamins and minerals, not to mention its protein, lactose, fat, and water contents that make carabao dairy products all the more enticing for consumers. And because there are various dairy products that can be easily processed from carabao milk, such as yogurt, *pastillas de leche*, *kesong puti*, pasteurized milk, going into this venture creates for higher profit even for individual homemakers.

The Philippine Carabao Center (PCC) created way back in 1992, ensures that we are able to "conserve, propagate, and promote the carabao as source of milk, meat, draft power, and

hide to benefit the rural farmers" (Hernandez, 2006). Through programs that focus on genetic conservation and utilization, social and enterprise development, and research and development, the PCC, together with the National Dairy Authority (NDA), has been able to expand, not only the knowledge on carabaos and its dairy produce, but also in the ways in which we are able to fulfill a national, and possibly, even an international market demand.

Dairy products in the Philippines

Dairy products are foodstuffs that are produced by using milk primarily from cows or domestic buffalos and even sheep, goats, camels, and horses. Being the third largest market for dairy products around the world, milk, cheese, butter, and yogurt are just among the basic products that are of highest consumption in the country – especially in Metro Manila.

Demand for fresh milk from business (e.g., coffee shops and output

supermarkets) and consumer markets (e.g., households and schools) continues to increase. With basically around 13 dairy processors in the entire country in operation, supply becomes unmistakably lacking. With only a handful of dairy processors, and limited knowledge on proper feeding of carabaos, output of smallholder producers, cooperatives, government-related agencies, and commercial farms combined are unable to meet the ever increasing dairy needs of the country.

As demand for dairy products is constantly increasing, the potential profitability in this industry is practically endless. Further development of the dairy industry will not only generate employment and increase the income of local farmers, but will also aid in attaining food security and improve nutrition (through efforts such as the government's milk feeding program for children).

Product development in Isabela

The second biggest province in



the Philippines, Isabela is one of the first class provinces in the country in terms of income. Possessing a large area not only for pasture and agricultural development, but also includes fertile fishing ground, Isabela is abundant in food resources. However, although carabao milk production is available in this province, assistance on the commercial production of various dairy products is still required according to the San Pablo Livestock and Dairy Development Association (SPLDDA).

Appropriate training in animal husbandry, in the conversion of carabao milk into various dairy products, product marketing, and even management and development of entrepreneurial capabilities of the members, among others, are needed in order to further develop the dairy industry in San Pablo, Isabela. In order to make milk harvesting a profitable enterprise, it is not enough that the dairy farmer knows about the how-tos, but also the knowhow to ensure that they are able to harvest the highest quantity and quality of milk to create marketable dairy products.

Headed by the municipal local government unit of Cabagan, Isabela, the technology commercialization project that focuses on the processing of carabao milk to make dairy products, began in the second quarter of 2009 with a projected duration of two years. A collaboration

between Isabela State University (ISU) and the Department of Agriculture – Bureau of Agricultural Research (DA-BAR), the project titled, “Technology Commercialization: Processing of Carabao Milk into Dairy Products,” aimed to enhance the development of the dairy industry through the processing of milk into dairy products that will enable the municipality to generate employment, increase income, provide food security, and improve the nutrition of the people of San Pablo, Isabela.

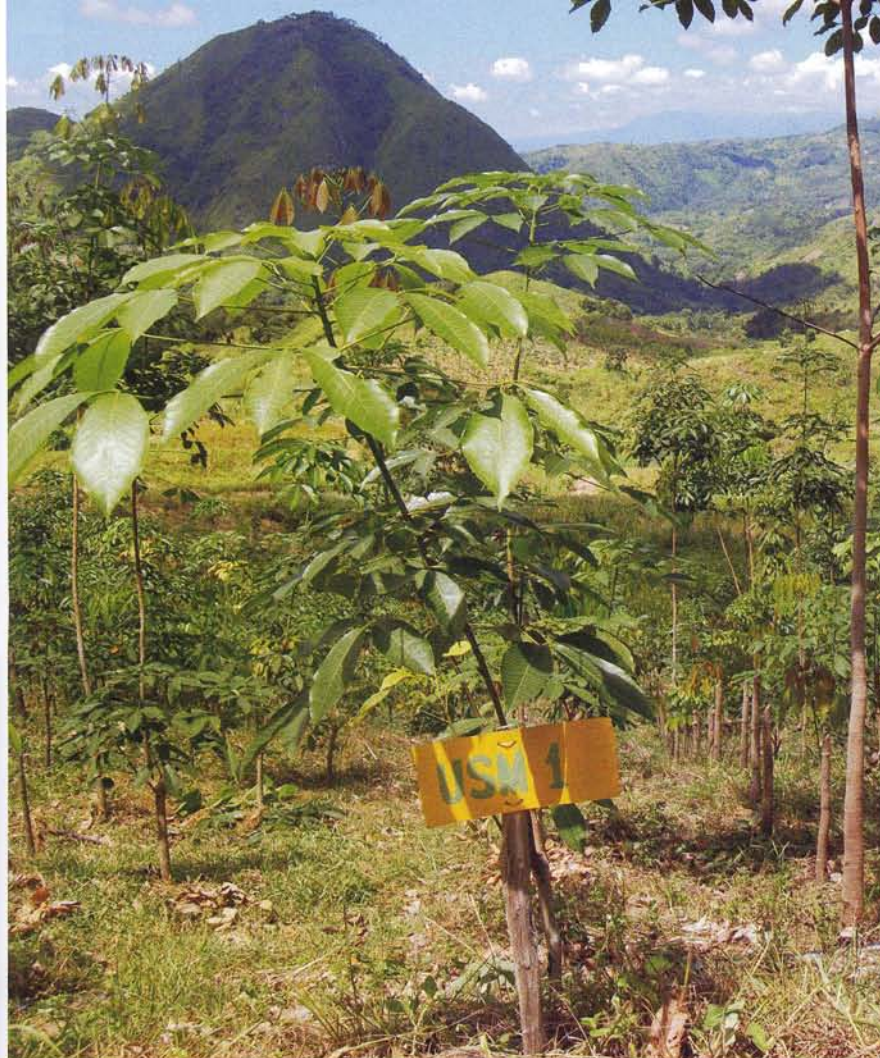
This BAR-funded project ensured that the health of the carabao population of the municipality was sustained at top health to meet the requirement for milk production—quality- and quantity-wise. The municipal local government unit (MLGU) provided trainings and seminars on proper carabao raising; processing of milk products such as pastillas, pasteurized milk, flavored milk, yogurt, and *kesong puti*, as well as good postprocessing practices; and product marketing. The program also promoted local dairy products via marketing through restaurants and other establishments within the municipality, as well as in Ilagan, Cauayan, and Tuguegarao city; and through trade fair participation for product exposure, networking and expansion. Apart from these, other

training programs on proper milk handling—collection, processing, storing, and packaging—were continuously undertaken by the proponents and the association members throughout the duration of the project.

With collaborations such as this project, the dairy product industry in San Pablo, Isabela will have the opportunity to grow and contribute, not only for its own province but possibly aid in providing more employment and increased income for the farmers, as well as help assure food security and improved nutrition in the country. ###

References:

1. Ang, P.A. 2010. *Philippines Dairy and Products Annual*. GAIN Report. USCA Foreign Agricultural Service. Retrieved from http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Dairy%20and%20Products%20Annual_Manila_Philippines_10-7-2010.pdf
2. Hernandez, M.E.E. 2006. *The Philippine Carabao Center...has gone a long way*. BAR Digest, 8 (3, July–September). Retrieved from http://www.bar.gov.ph/bardigest/2006/julsep06_featinst.asp
3. Ramirez, M.A.R. 2004. *More Pinoy Kids to Receive Milk Treat*. Research and Development Institute, Department of Science and Technology. Retrieved from <http://www.fnri.dost.gov.ph/index.php?option=content&task=view&id=237>



Promoting commercial rubber production using quality cloned varieties

| by Maria Anna M. Gumapac |

The importance of rubber in daily living is indubitable, thus, making natural rubber production a vital industry. *Hevea brasiliensis*, simply called “rubber tree,” belongs to the family *Euphorbiaceae*. It is a quick-growing plant, perennial, and attains a height of about 25–30 meters. Its bark is thick, with straight trunk, and the leaves are trifoliate with long stalks. Its sap, known as latex, is collected from the bark and is the primary source of natural rubber.

However, as with any industry, producing natural rubber is not without its problems. One in particular involves the South American Leaf Blight or SALB, caused by an ascomycete fungus. Although not typically found in Southeast Asia and Africa, it is still a potential threat for the aforementioned regions, which now account for over 98% of world rubber production.

Impact of SALB on rubber production

The dire consequences of SALB occurrence can be seen in its impact in Brazil's history in relation to rubber production. For some time, Brazil was considered a major player in rubber production. From the website of the International Institute of Synthetic Rubber Producers, Inc. (IISRP), a document likened the history of rubber in Brazil to that of the gold rush experienced in the USA. For close to 50 years—from the latter half of the 19th century up till the second decade of the 20th century—natural rubber was a significant part of the development boom in Brazil. The *Hevea* output reached 42,000 tons a year, with Brazil in the lead, dominating the global natural rubber market (IISRP). However, when the British smuggled out rubber-tree seeds to the botanical gardens in London, they developed more resistant

varieties, through grafting, that were later sent to British colonies in Asia where massive rubber plantations were established. Brazil was left unable to stand the competition.

US industrialist Henry Ford tried to come to the country's rescue with a massive project, but said Ford project succumbed to the hostile environment of the Amazon rainforest and was a huge loss. In spite the considerable investment, part of the problem lay in the successive SALB epidemics that forced the Ford Company to surrender unsuccessful plantations to the Brazilian government. From 1947 to 1983, Firestone participated in SALB resistance breeding programs and germplasm exchanges with other institutes in Latin America. From these South America breeding programs, only a few clones could be issued and recommended for large-scale planting in Latin America (Garcia, 2004).

turn to page 22

MORINGA:

by Rita T. dela Cruz

Effective galactagogue for dairy cattle



Moringa oleifera or simply “malunggay” has been popularly known for its many healthful benefits and uses. And since it is easily grown and is locally available, researchers have exhausted its potentials both as source of processed foods (cooking oil, flavoring/additives, noodles, pastries) due to its high nutritional content, and as major ingredient in cosmetic formulations and health-related use.

For human consumption, the uses of *Moringa* continue to expand and increase. Meanwhile, its effect on animals has not been fully explored more specifically as a galactagogue for dairy cattle. Galactagogue is a substance that promotes lactation in humans and animals, it could be synthetically-sourced, plant-derived, or endogenous (comes from within an organism, tissue, or cell).

What's in *Moringa*?

For humans, specifically for lactating mothers, *Moringa* is a natural

galactagogue, owing to its lactation enhancing effect. The leaves of *Moringa* is highly nutritious, a powerful source of vitamins (A and C) and minerals (calcium, potassium, protein). *Moringa* has 17 times more calcium and packed with Vitamin A which helps not only increase the quantity of milk secreted by the lactating women but also improve the quality of the milk generated.

Studies have confirmed the efficacy of *Moringa* as a galactagogue. The lactation enhancing effect of *Moringa* leaves was manifested from the increase in maternal serum prolactin levels. Prolactin (PRL), also known as luteotropic hormone (LTH), is a hormone produced in the pituitary that stimulates the mammary glands to produce milk.

This seemed to have the same qualifying effect to dairy cattle. *Moringa* has great effect on the milk production of dairy animals as previous studies conducted abroad have showed.

An earlier study conducted by Sanchez, et. al and published in 2005 showed that the inclusion of *Moringa* as a protein supplement to low quality diets improved the dry matter (DM) intake and digestibility of the diet and increased milk production. Further, supplementing feeds with *Moringa* leaves and stalks could increase milk production by 43-65 percent and increase daily weight gain up to 32 percent.

Dairy as a billion business industry

Dairy farming is a profitable industry. According to the Dairy Confederation, lead organization of all dairy cooperatives, associations and processors in the Philippines, dairy is a P65-billion business in the country with milk as one of the top agricultural imports worth around \$500 million annually.

Unfortunately, the demand is greater than the supply. Local dairy



production accounts for only one percent of the country's dairy demand.

Benjamin Molina, president and chief executive officer of Hapicows@ Tropical Dairy Farm, located in a 80-hectare coconut plantation in Tiaong, Quezon, owes to the undeveloped and the lack of full support to the industry.

Molina is a former overseas Filipino worker who now ventured into the dairy milk industry. He has high hopes for the industry and looks at the importation of dairy cows as a major constraint costing the country "so much precious dollars from the national reserve" Every year, the Philippine is importing 400-500 heads of dairy cows from New Zealand. "But if the government could give us full support, we have all the technology," Molina revealed.

Moringa as source of leaf meal

Aside from the importation of cattle to sustain the supply of milk, another constraint among farmers is the increasing cost of commercial feeds. In dairy farming, feeding system is crucial. The kind of feeds given to the cattle highly determines the amount and quality of milk that they produce. Commercial feeds are still the best choice, but they are expensive.

Ruminant livestock production is dependent on natural pasture as major source of feed. The major constraint is that quantity and quality of pasture is not sufficient and sustainable especially during dry season.

To address constraint poor quality of forage, there is a need to provide protein supplements for animals to increase their total dry matter (DM) intake of diet and improve productivity.

Given the potential of *Moringa* as a natural galactagogue, Molina proposed a project titled, "Commercialization of *Moringa oleifera* Leaf Meal as a Feed Supplement for Dairy Cattle in the Philippines." The one-year project was funded by the Bureau of Agricultural Research (BAR) through its National Technology Commercialization Program (NTCP) and the National Agriculture and Fisheries Council (NAFC) through the KR2 Program Grant Assistance for Underprivileged Farmers (GAUF).

Specifically, the project sought to introduce *Moringa* as an alternative, viable, and cheap source of feed for dairy cattle; promote the intensive cultivation of *Moringa* for leaf meal production to increase milk production of dairy animals; and ultimately generate increased income for the farmers.

The project site was located in Tiaong, Quezon where Hapicows is operating a 36-hectare dairy farm.

A nursery was established using *Moringa* seeds to produce the seedlings implementing interventions including tillage, weeding, disk ploughing, harrowing, furrowing, and following

planting distances of 1x1 meter and .5x.5 meter for plots 1 and 2.

The study used 18 cows that are 2-3 years old, with more or less of the same weight, and same breed. The cows were divided into three groups, the first being the control group while the remaining two groups were supplemented with one and two kilos of *Moringa*, respectively.

Supplemented in the leaf meal are *Moringa* leaves and stalks mixed with molasses and were fed to dairy animals twice a day, morning and afternoon. The leaves were dried before feeding to animals to improve its palatability. Previous studies showed that sun drying of *Moringa* is the more efficient since it gave better results based on nutritive composition and digestibility over other methods of drying (air, oven). One ton of *malunggay* fodder using sun drying technique will yield approximately to 120-150 kilos of leaf meal.

Data gathered from the study showed that milk production of cows that were given one kilo of *Moringa* leaves and stalks produced an average of 400 ml or .4 liter of milk more than the cows that were only fed with grass and commercial feeds. ###

This article was based from the project, "Commercialization of *Moringa oleifera* Leaf Meal as a Feed Supplement for Dairy Cattle in the Philippines" implemented by Hapicows@ Tropical Dairy Farms in Brgy. Ayusan, Tiaong, Quezon.

References:

1. "Effect of feeding different levels of foliage of *Moringa oleifera* to creole dairy cows on intake, digestibility, milk production and composition" by NR Sanchez, Eva Spornody, Inger Ledin. *Livestock Science* 2005. (retrived from <http://www.moringanews.org/documents/LivestPr od.pdf>)
2. "Moringa for Lactating Mothers" retrieved from: (<http://www.moringamutual.org/index.php/benefi ts/moringa-for-improved-lactatoin>)
3. "A review of the hormone prolactin during lactation" by KM Ostrom. Department of Nutritional Sciences, University of Connecticut, Storrs. *Prog Food Nutr Sci* 1990;14 (1):1-43
4. "Milking prospects in dairy" Delfin Mallari Jr. *Philippine Daily Inquirer*. October 5, 2008. (retrieved from: <http://business.inquirer.net/money/features/view/20081005-164751/Milking-prospects-in-dairy>)

Meeting the demand for **native lechon** with **Sakwa**

by Patrick Raymund A. Lesaca

Filipinos are basically food lovers and without exaggeration one can consume four to five square-meals a day. Filipinos' love for food transcends age, culture, status and even political boundaries. Food lifestyle, so to speak, is sacred and is part of one's credo. Our appetite and cravings sometimes dictate the amount and kind of food we place on the tables.

In whatever occasion, we, Filipinos, put special premium on the food we serve. For instance, during big fiestas and other special events, the kind of chow laid on the table is determined by the importance of the occasion. For the really special ones, the

roasted. After seasoning, the pig is cooked by skewering the entire animal, entrails removed, on a large stick and cooking it in a pit filled with glowing charcoal. The pig is placed over the charcoal, and the stick or rod that it is attached to it is turned slowly in a rotisserie fashion. The pig is roasted on all sides for several hours until done. The process of cooking and basting results in a crisp pork skin which is a distinctive and delectable feature of *lechon*.

High cost of feed besetting the industry

Swine-raising is a growing and a profitable business and the commercialization of native pigs intended for *lechon* making is already creating its own niche in the domestic market. If given preferential attention by the government, swine-raising for *lechon* making can be a big boost to livestock industry in general. However, studies reveal that some hog raisers and producers cannot cope up with the increasing prices of commercial feeds. The production of native pigs can be a viable alternative for those who want to get involved in swine-raising but, cannot cope with the high price of commercial feeds and those who do not have enough capital for housing and maintenance.

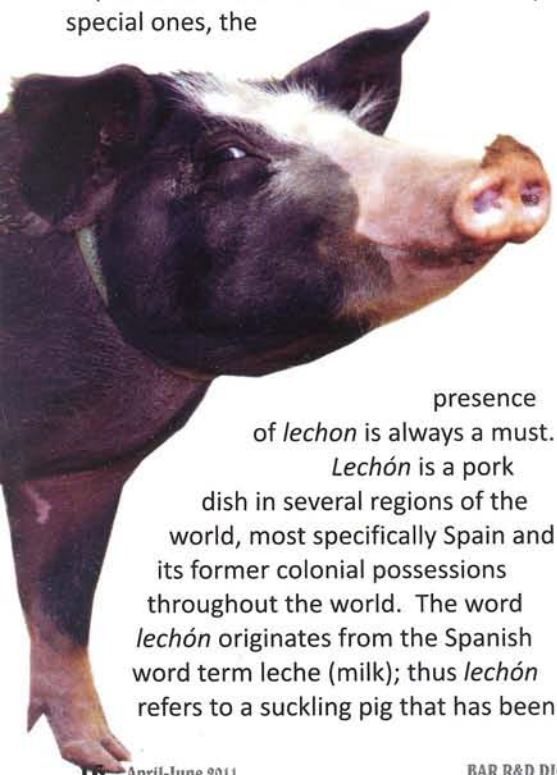
In a study conducted by Villancio, Labios, et al in 2001, they reported that the swine industry is beset with the problem of dependence on imported feed ingredients. Feed

costs account for roughly 70 percent of the total production cost. Corn and soybean oil meal are the two major ingredients in swine fattener rations. Although corn is locally produced, 20 percent is still imported --- thus making the local industry vulnerable to foreign supply and price fluctuations. Therefore, the use of alternative and low cost feed ingredient is attractive and viable option.

To explore the potentials of a local feed material and address this perennial concern, the Agricultural Systems Cluster (ASC), College of Agriculture, University of the Philippines Los Baños (UPLB) was provided funding by the Bureau of Agricultural Research for a project that explored the potentials of an indigenous plant as feed for native pig. According to the study made by the ASC, native swine production is widely practice in the municipalities of Mulanay and San Francisco in Quezon province, primarily to cater to the *lechon* de leche market of Metro Manila. The farmers prefer native pigs for their ease in management and low investment requirements. However, productivity of this enterprise can still be improved using locally available feeds of even better quality without incurring high production costs. Further studies show that the use of abundantly available alternative feed ingredients such as cassava and sweet potato, produce swine with performance comparable to those that are corn-based fed. One constraint however is that the demand for both cassava and sweet potato for human consumption drives their prices higher

presence
of *lechon* is always a must.

Lechon is a pork dish in several regions of the world, most specifically Spain and its former colonial possessions throughout the world. The word *lechon* originates from the Spanish word term leche (milk); thus *lechon* refers to a suckling pig that has been





prices. To address the situation, the use of sakwa was integrated in the feeding program of native swine and is the subject of the proposed project.

Based on the merits and the potential economic impact of the project, BAR approved and funded the project titled "Native Swine for "Lechon de Leche" Production: Improving Feed Availability through Integration of Sakwa as Feed.

Sakwa as cheap feed alternative

Sakwa is a by-product of "Gabing San Fernando" (*Yautia spp*). The plant thrives best in deep, loose, friable, and sandy loam soil with abundant organic matter and moisture. It has been found to be well-adapted in plateaus where cogon grows and can tolerate shaded conditions. The crop is resistant to adverse climatic conditions and is relatively resistant to drought. The incidence of pest and diseases is also low compared to the regular gabi. Farmers use *sakwa* as feeds for swine, particularly at the finishing stage. The sliced *sakwa* and the leaves are usually given fresh or boiled with feed concentrates.

The objectives of the project include: improving the productivity and income of livestock farmers, particularly of swine raising under coconut trees by enhancing the integration of existing coconut-based enterprise; improving nutrient availability by integrating the production of "Gabing San Fernando" as

feeds for the native swine, and introduce best management practices for native swine production (for lechon de leche) to reduce mortality and improve production.

The main proponents of this project are Dr. Mary Jean G. Bulatao and Dr. Virgilio T. Villancio of UPLB. The project is being piloted and implemented in the two municipalities in the Bondoc Peninsula: Mulanay and San Narciso.

Co-opting the farmers

Barangays Lantangan in Mulanay and Barangay San Juan in San Narciso in Quezon province are already practicing the production of native swine for *lechon de leche*. The sites were identified through the collaboration with the Municipal Agriculturist. The project was implemented for two years.

There are six farmer-partners in each site, including the boar raiser, who establish and manage native swine modules. Each farmer-partner, except the boar raiser, receives one module consisting of two ready to breed native gilts and five weanlings. The modules are given as loan to qualified households under the dispersal scheme. One upgraded boar is provided for each project site or per cluster of 5-farm households. The animals are raised either 'paddock style', wherein the animals are allowed to range in a specific area for specified lengths of time and fed with harvested and fresh chopped or cooked *sakwa*.

Part of the project design also is for the farmer-partner to set aside 1000sq.m. of land under coconut to be planted with "Gabing San Fernando" and utilize the corm or *sakwa* as swine feed. In addition, other forage feeds such as *Trichantera gigante* (madre de agua), *kangkong* and sweet potato (leaves/shoots) and selected herbal and medicinal plants were also planted within the area to support the whole swine module.

The results of the on-farm station trials showed that dried *sakwa* can be utilized as replacement for corn in the swine grower and finisher diet. The performance of animals fed with *sakwa*-based ration was comparable with those fed with corn-based commercial ration. In the end, the ingredient for ensuring success of the project lie not only having the perfect stock of native swine or well roasted *lechon* or even the abundance of *sakwa*, but in depth of commitment of the individual and the community. ###

References:

1. Suckling pig (http://en.wikipedia.org/wiki/Suckling_pig)
2. BAI look into commercial profit of raising native pigs (http://www.pig333.com/latest_swine_news/philippines-bai-look-into-commercial-profit-of-raising-native-pigs_3299)
3. Project Feasibility Study prepared by Dr. Mary Jean G. Bulatao and Dr. Virgilio T. Villancio of the Agricultural Systems Cluster (ASC), College of Agriculture, University of the Philippines, Los Baños.
4. BAR 2001 NRS Highlights. Villancio, VT, Labios, RV, et al;



Exploring the income-generating potential of **beekeeping**

by Zuellen B. Reynoso

Honey is one treat that is both healthy and delectable. Honey is a food created by bees for their own consumption come seasons when they are unable to gather nectar from flowers around. Honey is the source of energy for the workers, larvae, and queen bee alike as it is made up of simple sugars that can be converted quickly into fuel. With the domestication of the honeybee, it has also become food for humans.

Apart from its unique taste and flavor, honey is known for its energy boosting capabilities that increase

endurance of the physically active such as athletes, and is even known to prevent muscle fatigue as the simple sugars are easily absorbed by the body. Used also as a natural sweetener, honey is also believed to be a remedy for sore throat and cough. Modern uses of honey include its use in cooking dishes and in baking some variants of cakes and bread.

Honeybees create honey by sucking nectar from flowers and storing them in their abdomens in what is called as the honey stomach. Protein molecules in the honey stomach combine with the nectar to

break down the sugar into fructose and glucose. These worker bees, always females, then proceed to their colonies and either deposit the gathered nectar into cells (the hexagon-shaped compartments inside their hives) or go directly to feed the larvae or the queen through regurgitation.

Product development from beekeeping

Beekeeping, technically termed "apiculture", is a fairly simple technology that begins with selecting the proper apiary site -places closest to nectar sources. The hives can be made with wood, pottery, or straw. Some of the basic equipment include fume boards, entrance reducers, bee feeders, smokers, hive tools, and of course, coveralls for the protection of honey



gatherers. Throughout the process of honeybee management, the need for supplementary feeding and medicating should be monitored to ensure maximum productivity of bees and to produce top quality honey for harvest.

Apart from honey, beeswax is also another produce from commercial beekeeping. Beeswax is produced in the bee hive by the worker bees to build the honeycomb where the honey is stored and the nursery for the developing larvae. Beeswax is an important ingredient in some food, pharmaceutical, and cosmetic products such as candles, lip balm, and shoe polish, among others.

Royal jelly is another honeybee by-product that can be harvested during beekeeping. Created for the nutrition of larvae and the queen, and even the drones (male bees), this substance produced by the worker bees is now being used as a dietary supplement for humans. Believed to be highly beneficial to health, royal jelly contains B-complex vitamins and other minerals and enzymes that are antibiotic, anti-inflammatory, and antibacterial. Bee pollen, another known product from beekeeping which has high nutritional and medicinal value, is also harvested in the process.

Potentials of apiculture

In Sorsogon, beekeeping, is gaining ground as an additional source of income as it is an ideal alternative

requirements, minimal processing, ready market, and suitability to rural settings. Commercial beekeeping is a good source of income with the harvesting and selling of honey and its products, as well as breeding of bees for beginning colonies. There is also potential in the leasing of bees for crop pollination. There is much to learn in managing this agri-based industry, thus, a project titled, "Promotion of Beekeeping in the Province of Sorsogon", implemented by the Sorsogon State College, in collaboration with the Department of Agriculture – Bureau of Agricultural Research (DA-BAR), was launched in order to boost the beekeeping industry and to increase its livelihood potential.

Bee colonies are abundant and common in municipalities around and near Sorsogon. This already presents a huge potential in commercializing honeybee products. However, as little local studies have been done to develop this enterprise, issues on pests and disease control continue to hinder honeybee production in the province. The benchmarking research performed in the region aimed at establishing database information on the status of native and European breeds of honeybees. This project created further knowledge on the capabilities of the honeybees and the limitations to which the species can be subjected to with regard to pests such as moths. Such data will enable beekeepers to gather information on the proper handling and

care for these little hard workers and create improvements in the harvesting of honey and other honeybee by-product.

It has been said that in order to create one teaspoon of honey, 5,000 flower visits by the honeybees are required. Surely this presents a huge amount of work, not just for the bees, but also for the apiculturist waiting for the entire process to complete after he/she has invested time and money in the hives and other expenses in terms of the industry itself. It is true that fairly little human contribution is required in order to create this nutritious product. There is only so much we can do to ensure that honeybees are provided with the proper environment. With this benchmarking research project by the Sorsogon State College and the BAR, the results can be used to bring improvements to honeybee production and management practices in the region and this will, in the near future, bring more buzz to an already busy hive. ###

This article is based on the project proposal entitled, "Promotion of Beekeeping in the Province of Sorsogon", led by the Sorsogon State College, with DA-BAR as a funding agency.

References:

1. Barrett, Stephen. 1999. Bee Pollen, Royal Jelly, and Propolis. Retrieved from <http://www.quackwatch.org/01QuackeryRelatedTopics/DSH/bee.html>
2. Honey for Health. 2010. Retrieved from <http://www.honey-for-health.com/index.html>
3. Honey Bees and Beekeeping. Retrieved from <http://www.i4at.org/lib2/bees.htm>

Blazing the trail for pigeonpea commercialization in the Philippines

by Miko Jazmine J. Mojica



Pigeon pea, a nutritious and drought-tolerant leguminous crop popularly grown in India, has been around in the Philippines for quite some time now. However, in order to reach its full potential on the lives of many Filipinos and its benefits, not just as a source of food but also as animal feed and fuel wood, a concerted effort on its R&D, extension, and marketing is needed. Thus, a comprehensive project on accelerated pigeon pea production and utilization by the International Society for Southeast Asian Agricultural Sciences (ISSAAS) was supported by the Bureau of Agricultural Research (BAR). In this endeavor, project leader Dr. Heraldo Layaoen, vice president of the

Mariano Marcos State University (MMSU) in Region 1, spearheaded the project which is an all-encompassing study on pigeon pea commercialization. It includes various aspects from seed production, food processing, and establishment of a pilot processing plant to the establishment of market linkages for food products developed from pigeon pea.

Suitable varieties

In this project, Dr. Layaoen's team first identified the suitable varieties for local pigeon pea production based on previous studies on pigeon pea commercialization.

"Consistent with earlier results, ICPL 88039 and ICP 7035 were the best performing varieties in their respective



maturity group when grown under low input technology," said Dr. Layaoen.

The ICPL 88039 is a short-duration variety, which matures in 100-110 days. Besides being a good crop after rainfed rice, it is also an all-season variety.

On the other hand, ICP 7035 is a sweet type variety good for hilly and rolling areas. According to Dr. Layaoen, if planted in October in Northwest Luzon, a ratoon crop can be harvested before planting the wet season rice, thus making possible two harvests in one planting.

Pest management

Pigeon pea seeds proved to be highly susceptible to different kinds of pests and diseases. According to the project team, pest management is a critical factor in successful seed and grain production. Thus, it was likewise made an integral part of the project.



identified as one, if not, the most dangerous pest of the crop. "The damage brought by bean weevil starts in the field and continues up to its storage. Thus, sufficient pesticide application is needed in the production of quality seeds of pigeon pea," stated the project team.

In order to arm farmers of pigeon pea with the proper knowledge and guidance on the control measures on the pests and diseases affecting the crop, a publication titled, "Identification Handbook and Control Guide of Pigeon Pea Insect Pests and Diseases", was prepared through the project and made freely-available.

Village-level production

In the establishment of village-level production areas, the project team first trained cooperating farmers on the production technology of the crop before they were given seeds to start planting pigeon pea in their area. According to the project team, groups of farmers from three municipalities in Cagayan Valley and a group of indigenous people from Cordillera were some of the training beneficiaries from the project.

A brochure titled, "Updated Pigeon Pea Production Guide", was also prepared to serve as a quick guide of the farmers who wished to plant the crop.

For the food processing, rural women and out-of-school youth were also given trainings to learn the different food preparations and by-products of pigeon pea. The products that can be derived from pigeon pea include dahl, flour, frozen pea, and a blend of pigeon pea and sweet sorghum as coffee substitute.

"Making the availability of ready-to-cook pigeon pea grains just like how rice is marketed in local stores is the long-term objective for pigeon pea production in the country," said Dr. Layaoen.

The project team reported that some of private visitors who have

tasted the coffee-like beverage from pigeon pea and sweet sorghum blend commented that its taste is similar to cocoa.

The project team emphasized that the investment cost needed to start the food products business is low. The coffee-substitute beverage, the roaster and packaging facility would only entail minimal investments for village-level production.

Exploring collaboration

The seeds produced from the project through the Bungon Seed Producers Multipurpose Cooperative (BSPMC) was distributed to different beneficiary institutions such as local government units (LGUs), state universities and colleges (SUCs), agencies attached to the Department of Agriculture (DA) such as PhilRice, and research centers in Region 1, as well as the Department of Agrarian Reform (DAR) and individual farmers who wish to plant pigeon pea in their area.

The project team reported that PhilRice has been incorporating pigeon pea as an intercrop for rice in their Palayamanan program (a diversified farming system developed by PhilRice) while DAR is introducing it as a rotation crop of the agrarian reform communities (ARCs). Pigeon pea is also being pitched as an effective crop for soil rejuvenation and soil erosion control, and as "green" manure during fallow periods.

Moreover, the project team reported that some private entities, such as ARTECH Philippines, Venvi, and BAPAMIN Enterprises, have shown interest in using the crop as for fuel purposes or as raw material for food products. ###

For more information on pigeon pea, you may contact Dr. Heraldo Layaoen at the Mariano Marcos State University, Batac, Ilocos Norte; Tel: (077) 792 2558; Email: hlayaoen@yahoo.com.

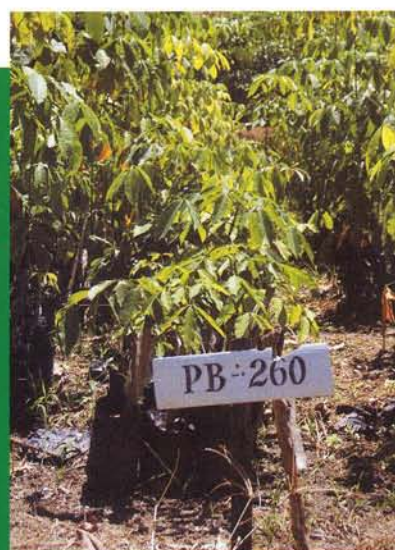


Rubber clones here and now

The Bureau of Agricultural Research (BAR) recently held a seminar series, particularly one that discussed the significance of rubber and its production in the future, including the potential of rubber clones. Part of the discussion disclosed the advantages and successes of *Hevea* breeding. Said discussion included the use and breeding of rubber clones. According to Dr. Abdul Aziz S.A. Kadir, secretary general of the International Rubber Research and Development Board (IRRDB) who was one of the presenters that focused on rubber production, yield can be increased from 400 kg/ha/year to more than 3,500 kg/ha/year with the use of new clones.

In Eastern Visayas, under the Eastern Visayas Integrated Agricultural Research Center of the Department of Agriculture- Region Field Unit 8 (EVIARC), a project was proposed and implemented with the general objective of promoting the commercial production of rubber in the Eastern Visayas region with the use of five recommended varieties: RRIM 600, PB 235, USM 1, PB 217, and PB 260. It is noteworthy to mention that USM 1 is the first rubber clone developed in the Philippines and comes from the University of Southern Mindanao (USM). It has a dry rubber yield of 2,498.15 kg/ha/year which is 18.81% higher than that of the standard RRIM 600 clone from Malaysia.

The proponents of this project noted that IRRDB had asserted that both food and horticultural crops could be intercropped between immature rubber plants with no effect on rubber growth. Another institute, the Rubber Research Institute of Vietnam, also reported that proper intercropping, either with or without the presence of cover crops, had no significant effect on the growth of immature trees. In certain cases, it was even apparent that intercropping helped rubber trees to have better growth due to better maintenance of plantations. In our country, the Philippines Industrial Crops Research Institute (PICRI) in Kabacan, Cotabato, has successfully developed rubber-based farming systems for small holders.



It is with these observations that the proponents became interested in establishing a rubber-based farming system among local farmers of six municipalities along the Pacific coast of Southern Leyte. This was created through the initiative of Southern Leyte State University (SLSU) San Juan campus—from which one of the proponents Dr. Remojo is affiliated with—including local government unit (LGU) of Hinunangan researchers and extension specialists, collaborating agencies in this project.

The project has four proponents: rubber budwood establishment, on-station adaptability trial, on-farm technology demonstrations, and capability building and enhancement.

The adaptability trials included new rubber clones and promising rubber varieties for the region, initially RRIM 600, USM 1, PB 260, and series

2000 procured from the USM. An additional two recommended rubber clones, PB 311 and PB 330, were purchased as budded seedlings. 100 seedlings each for RRIM 600, USM 1, and PB 260 in February of 2010, and another 100 seedlings each for PB 311 and PB 330 were planted in December of the same year. By April 2011, PB 260 had reached the greatest height with approximately 44–106 m, followed by RRIM 600 with 1.3–4.2 m, PB 311 with 0.9–1.95 m, PB 330 with 0.85–1.5 m, and USM 1 with 0.4–1.3 m.

The technology demonstration involved selected component technologies in rubber production and village-level rubber sheet processing including the improvement of the then rubber nursery management and plant material propagation practices as well as the harvesting and tapping methods. The on-farm techno demo on rubber production also introduced the d

next page

recommended and appropriate planting density particularly for new farms.

Promotion of commercial rubber production was to be implemented through trainings and other capability-building activities. Three orientation and appreciation seminars on rubber technology were conducted including training on rubber production nursery management technologies for members of the local association, as well as regular meetings and field consultations. The SLSU project staff initiated the packaging of a leaflet on the care and maintenance of rubber trees. Rubber organizations and groups were formed, such as the Southern Leyte Rubber Growers Associations (SLRCA) with 26 members and composed of professionals, government employees and local farmers. The Upper Bantawan High Value Crops Farmers Association was also created, with 37 members, mostly consisting of upland farmers and agrarian reform beneficiaries in St. Bernard, Southern

Leyte.

The latest progress report states that another 15 individuals have since joined aside the initial 26 members. These members come from Hinunangan, Silago, and Libagon in Southern Leyte, as well as Abuyog, Leyte and Ormoc City. A welcome development is that a private individual, Mr. Fenix, owner of New Pulp Tech based in Tacloban, has expressed interest in investing in about 1,000 ha for planting rubber intercropped with abaca in Southern Leyte. The initial arrangement states that planting materials and initial operational cost shall be provided by said investor to interested farmers, after which all produce will be bought from them by the aforementioned individual.

Although rubber latex production is already widely developed in Mindanao and in countries like India, Thailand, and China, it is considered a rare economic opportunity for the people of Eastern Visayas. With the success of this project, along with the rising demand and price for rubber, the future looks promising for the Pacific towns of Southern Leyte and the whole

region in general. ###

The article was based on the study, "Introduction of new rubber clones for adaptation and commercialization in Eastern Visayas," by Rufino B. Ayaso III of the Department of Agriculture Region 8 and Antonio A. Remojo, PhD of the Southern Leyte State University. For more information please contact Mr. Ayaso III at (053) 321-3043 or at rbayaso@yahoo.com

References:

1. International Institute of Synthetic Rubber Producers, Inc. (n.d.) Brief history and introduction of rubber. Available at: http://www.iisrp.com/WebPolymers/00Rubber_Intro.pdf
2. Garcia D., Mattos C.R.R., Gonçalves P.D.S., and Le Guen V. (2004) Selection of rubber clones for resistance to South American Leaf Blight and latex yield in the germplasm of the Michelin Plantation of Bahia (Brazil). *Journal of Rubber Research* 7(3)188-198.
3. The University of Southern Mindanao (n.d.) USM 1, a new rubber clone. Available at: http://www.usm.edu.ph/picri/index.php?option=com_content&view=article&id=132:usm-1-a-new-rubber-clone&catid=78:technologies-generated-articles&Itemid=48

Venturing..from page 31

produce to local seaweed consolidators. Based on production and income proportion, 46 percent of the projected income is obtained or derived after two-cycles.

Smiles of success

"Iyong tulong na nabigay ng BAR ay siya ring naitulong ko sa aming barangay bilang Kapitan" (The assistance that BAR provided to us is also the assistance we are extending in our barangay), said Brgy. Captain Pedro Helera, also a fisherfolk cooperator.

"Nakakakain na kami ng maayos at napag-aaral namin ang aming mga anak" (We now have enough food to eat and we could send our children to school), revealed the teary-eyed mother, Jocelyn Pueyo. The same sentiment was re-echoed by



another successful seaweed grower, Imelda Ganancial. Pueyo and Ganancial are both module team leaders and beneficiaries of the CPAR project.

After the first year of project (August 2009 – August 2010), the total production of harvested seaweeds in the cove of Panobolon reached 53.35MT amounting to gross income of P800,000. Majority of the fisherfolk in Panobolon decided to continue the seaweed culture even without government

experience was reported to the BAR Project Monitoring Team by the project proponents during a project site visit.

Since the program is still in its growing stage, aura of hope and contentment were visible in the faces of the people of Panobolon. For now, with this CPAR project, the fisherfolk are assured of a better tomorrow. They could then say and promise to their children to "sleep tight, for tomorrow they will harvest seaweeds" and never worry for their incomes are assured.



Optimizing the use of sweet sorghum for bioethanol production in Region IX

by Leila Denisse E. Padilla

There are the ubiquitous grain crops in the Philippines like rice and corn that have been thriving in the country's vast agricultural lands since time immemorial. However, there is this one crop that has been in the country for only over six years but has already come to be considered as a "smart crop". This distinguished crop is *Sorghum bicolor* L., specifically, the sweet sorghum variety.

Sweet sorghum is regarded as a "smart crop" for it can be used as forage and feed for livestock (good source of carbohydrates and protein), food for humans (processed into flour and other products and serves as an alternative to rice), fertilizer (sweet sorghum bagasse

conversion into bio-organic fertilizer), and fuel (source of bioethanol).

Among its impressive characteristics is its ability to grow in most soil types that have sufficient surface drainage and soil pH not lower than pH 6. It can also be planted after corn or rice and other major crops. These traits thus enable sweet sorghum to fit well into existing cropping schemes.

Over the years, researchers have conducted studies on sweet sorghum - investigating its nature, characteristics, adaptability, uses, and its other vital biological, physical, and economic attributes. In Ilocos Norte, a project conducted by the International



Crops Research Institute for Semi-Arid Tropics (ICRISAT) and funded by the Department of Agriculture-Bureau of Agricultural Research (DA-BAR) showed that among the most promising crops tested for production of ethanol, sweet sorghum, particularly its five varieties, ICSR 93034, ICSV 700, ICSV 93046, NTJ 2, and SPV 422, was the best.

To evaluate the performance of the aforesaid five sweet sorghum varieties with the goal of promoting and commercializing sweet sorghum as a viable ethanol source in Region IX, a project titled, "Adaptability Test and Evaluation of Sweet Sorghum, Its Commercialization and Promotion in



Western Mindanao", was funded by DA-BAR and implemented by Western Mindanao Integrated Agricultural Research Center (DA-WESMIARC) in April 2008 in Ipil, Zamboanga Sibugay.

Production and commercialization of the "smart crop"

DA-WESMIARC researchers recommended in its progress report presented during the recently held Department of Agriculture (DA) In-House Review last 17-18 May 2011 that the variety SPV 422 be grown purposely as a source of feed, forage, food, and organic fertilizers, and as raw material for bioethanol. In the report, the proponents stated that "SPV 422 variety attained highest grain weight, good appearance score, early maturing and lower lodging score when tested as seed and ratoon crops in both the wet and dry seasons." Meanwhile, ICSV 93046 was suggested to be grown for stalk production intentionally as a source of fertilizer, forage, and bioethanol raw

stalk plant height (cm), is late maturing and has high lodging score". These were the findings and recommendations derived from the project's study 1 "Adaptability Test and Evaluation of Five Sweet Sorghum Varieties under Region IX Conditions". Also according to the progress report, the work plan schedule of the implementation of the study 2, "Evaluation of Existing and Modified Sweet Sorghum Technologies in Region IX", was accomplished after the conduct of the first study.

The towering objective of the project is to develop a program that would develop and promote sweet sorghum production technology in the region through research and development. In line with this, the project conducted planting of sweet sorghum in one site located at DA-WESMIARC last 28 April 2011. Three more sites were scheduled for sweet sorghum planting last June 2011. For the long haul, the results of this project will the technology for sweet sorghum production program in Region IX as feedstock for bioethanol production.

Sweet Sorghum = Smart Ethanol

Prior to the introduction of the sweet sorghum variety in the Philippines in 2005 by ICRISAT, sorghum was grown exclusively for grain for food and feed. Today, the dual purpose sweet sorghum varieties are already being grown and harvested for their stalks and grains for food, feed, fertilizer, and fuel in a few areas in the country. Developed by ICRISAT in India, these were introduced in the Philippines for evaluation for local production and commercialization.

A major highlight in sweet sorghum research is on exploiting the crop's potential for bioethanol production. Bioethanol is considered as the most promising and cost-effective substitute to petroleum fuels, particularly gasoline. It is clean-burning and blending it with diesel and gasoline formulations will result to lesser hazardous gas emissions. It also supplies octane enhancement to alcohol and petrol mixtures. The



domestic production of sweet sorghum thus aids in the reduction of importing expensive fossil fuels like gasoline. Aside from being costly, these also have the disadvantage of emitting harmful smoke when used in pure form as fuel for internal combustion engines.

Local production and commercialization of bioethanol production using sweet sorghum jives very well with the government's endeavour to reduce the soaring price of fossil fuels and mitigate environmental pollution as mandated by the Bio-fuel Act of 2007. This Act requires locally-produced biofuels to be admixed to specified levels with commercial fuels (such as gasoline and diesel) traded in the country in order

to lower cost and reduce unhealthy vehicle emissions.

Project activities

On the adaptability test on sweet sorghum, the project is now implementing on-station trials in three areas of Region IX, namely, DA-WESMIARC, Sanito, Ipil, Zamboanga Sibugay; Western Mindanao Horticulture Center (DA-WMHC), Siari, Sindangan, Zamboanga del Norte; and San Ramon Research and Techno-Demo Farm (DA-SRRTDF), San Ramon, Zamboanga City. This procedure is part of study 2. "We are monitoring the trials and collecting the agronomic data," explained project leader Ms. Marry Joy Porras-Flores.

The results of study 2 will be the basis for developing sweet sorghum

packages of technology (POT) that will be specific for every area in the region. Information materials, such as brochures/leaflets, on sweet sorghum POT will be produced and disseminated to farmers during agricultural activities and events. This will help fulfil DA-RFU IX's aspiration of promoting the potentials of sweet sorghum in the region.

References:

1. Flores, M. (2007). *Adaptability test and evaluation of sweet sorghum varieties, its commercialization, and promotion in Western Mindanao. Project proposal.*
2. Flores, M. (2011). *Adaptability test and evaluation of sweet sorghum varieties, its commercialization, and promotion in Western Mindanao. Progress report.*
3. malaya.com.ph/apr04/busi1.html



Sweet sorghum:

The search for best cultivar for Western Visayas

| by Diana Rose A. de Leon |

The continuous increase in the price of fossil fuels in the world market is having the effect of jeopardizing the energy security of the country. Being highly-dependent on fuel importation, the Philippines has been seeking out alternative sources of fuel. With the passage of Republic Act 9367, known as the Biofuel Act of 2006 back in 2007, our government intensified its efforts to “develop, produce, and distribute high-quality, reasonably-priced and environment-friendly” alternative fuels.

Among of the alternative fuels eyed is biofuel. It is a renewable form of energy (unlike other sources such as petroleum, coal, and nuclear fuels), which can be sourced out from plants that can produce either bio-diesel or bioethanol. Interest in the massive-scale commercialization of sources of bioethanol, which can replace gasoline up to specific levels, is gaining ground. Bioethanol is a clean burning fuel with a high octane rating. It is projected that if the country went full-scale in the implementation of 10 percent bioethanol-blended gasoline mandated

by the Biofuel Act, it will save approximately 565 million liters of gasoline per year.

Various agricultural crops had been tested and proven as potential sources of bioethanol such as corn, soybeans, cassava, sugarcane, sweet sorghum, coconut, and jatropha. But among these crops, there is one that truly stands out – sweet sorghum. The WESVIARC Initiative for Sweet Sorghum

Since its introduction in the country by the Indian-based International Crops Research Institute

for the Semi-Arid Tropics (ICRISAT) in 2005, sweet sorghum never left the center-stage as a promising crop that responds to both the food and fuel needs of the country. Aside from its use as food and fuel, it can also be utilized as feed/forage (for poultry and livestock) and fertilizer (sweet sorghum bagasse). That is why it is tagged as a “smart crop”.

The Bureau of Agricultural Research (BAR) of Department of Agriculture is the lead government agency that supports and funds research and development (R&D) endeavors on sweet sorghum. The commercial production and utilization of sweet sorghum is being promoted and strengthened in the different regions of the country with much vigor.

With this, the Western Visayas Integrated Agricultural Research Center (WESVIARC), DA-RFU 6, proposed a project titled, “Performance Evaluation of Five (5) Sweet Sorghum Cultivars as Source of Grains and Stalks for Bioethanol Fuel in Western Visayas”, that explores the potential of sweet sorghum for cultivation in the Western Visayas region. The project's main objective is to evaluate five sweet sorghum cultivars and develop appropriate production technologies, including product and by-product utilization, for the local commercialization of sweet sorghum as a source of feed and fuel. The five cultivars that will be tested in this project are ICSV 700, NTJ 2, ICSV 046, ICSR 93034, and SPV 422. The funding support given by BAR made the project possible.

Challenges to project implementation

Working on the goal of finding the sweet sorghum variety best suited for Region 6, the DA-RFU 6 - WESVIARC prepared the groundwork for the trials to begin. However, despite all the preparations done to carry out the project, unavoidable impediments hindered the implementation of the project. According to Rosemarie E. Peñaflor, Agriculturist II of WESVIARC, the seeds given to them by Dr. Heraldo L. Layaoen of Mariano Marcos State University (MMSU) were attacked by weevils (a stored-product pest) making these unfit for planting.



Another problem was the poor soil quality of the site selected (it was covered over with soil from a pond that was being constructed near the planting area). Further delay was due to the unavailability of other sites because the rest of the field was already planted for other crops.

Even though the implementation of the project was beset with problems which delayed its conduct (it was supposed to start last year, 2010), the project team persisted with the planting of sweet sorghum. A fresh batch of sweet sorghum seeds was supplied by Dr. Layaoen. To solve the problem regarding soil quality, the planting area was covered with garden soil.

Expected project outputs

The data that the project team will gather include emergence, thinning, panicle initiation, irrigation, type and rate of basal and side-dressing fertilization, type and rate of chemical inputs used, disease and pest ratings. For the agronomic characteristics, the data needed are days to 50 percent flowering stalk yield, stalk juice, stalk juice volume, grain yield, and seed size.

The results will determine which among the five sweet sorghum cultivars are suited to Region 6 and which the best source of bioethanol is. The next stage would be seed sweet

production & multiplication of the promising variety for distribution to farmers. Ms. Peñaflor said that there are already plenty of farmers who want to try planting sweet sorghum but there is a lack of suppliers of the seeds.

She added that if no other problems arise, they will start planting by September of 2011 and the project will run up to 2013. She added that if they follow their current timeline, by the end of the first cropping season (which is by 2012), they can already produce results. The data will be verified with another trial in the next cropping season.

By remaining steadfast despite the problems faced along the way of implementing the project, the project team remains determined in their endeavor to look for the sweet sorghum variety that will benefit not only the farmers but also the people of Region 6.

###

This article is based on a BAR-funded project titled, “Performance Evaluation of Five (5) Sweet Sorghum Cultivars as Source of Grains and Stalks for Bioethanol Fuel in Western Visayas”, being implemented by the Western Visayas Integrated Agricultural Research Center (WESVIARC), DA-RFU VI, Iloilo City.

For further inquiries, please contact Ms. Rosemarie E. Peñaflor, project proponent and Agriculturist II, WESVIARC. You may contact her through telephone # (033) 329-6210 or through her email address, gelmerpena@yahoo.com

Adlai: Champion crop of the Subanen

by Rita T. dela Cruz

As most of us have neither seen nor heard of a crop called *adlai*, the Subanen tribe has known it all their lives. Adlai (*Coix lacryma-jobi* L.) is their staple crop. Adlai grains are pounded, threshed, and winnowed, cooked and served it steam just like rice. The grains are also fermented and served as *pangasi* (adlai wine) to the *datu* and *timuay* (traditional leaders) during *buklog* (Subanen festival) and other special occasions including, weddings and funerals.

The Subanen people are known as the aborigines of the Island of Mindanao and considered as the first inhabitants of Pagadian City in Zamboanga del Sur. Originally, they lived along the river banks, hence the name "suba" which means "people of the river" but now they reside in the mountains, most of them as *kaingineros*. They are described as generally a conservative and shy tribe.

Although rice and corn remain as the staple crops in Zamboanga del Sur, production of crop yield is generally low (2.5 tons/ha.) due to low temperature and low solar radiation intensity prevailing in the highlands. In Midsalip, a cordial town in Zamboanga del Sur, adlai is extensively cultivated. The town's name came from a Subanen word, "Migsalip" which means "to collect" or "to gather" and as the name implies, the people here depends on nature as their source of livelihood.

Due to the farming conditions in the highlands of Midsalip—sloping terrain, lack of irrigation

water—production of rice is not suitable. This is the reason why farmers opted to grow adlai. According to Ms. Apolonia A. Mendoza, BAR coordinator for adlai, Subanen farmers preferred this crop because it produces high yield in the highlands, tolerates low pH, thrives even in poor quality soil, grows well in sloping areas, tolerates waterlogging, and it is to pest-resistant. "These good features of adlai became well-known and making adlai a widely cultivated crop in Midsalip just like other cereal crops in the area," reported Ms. Mendoza.

Adlai production practices

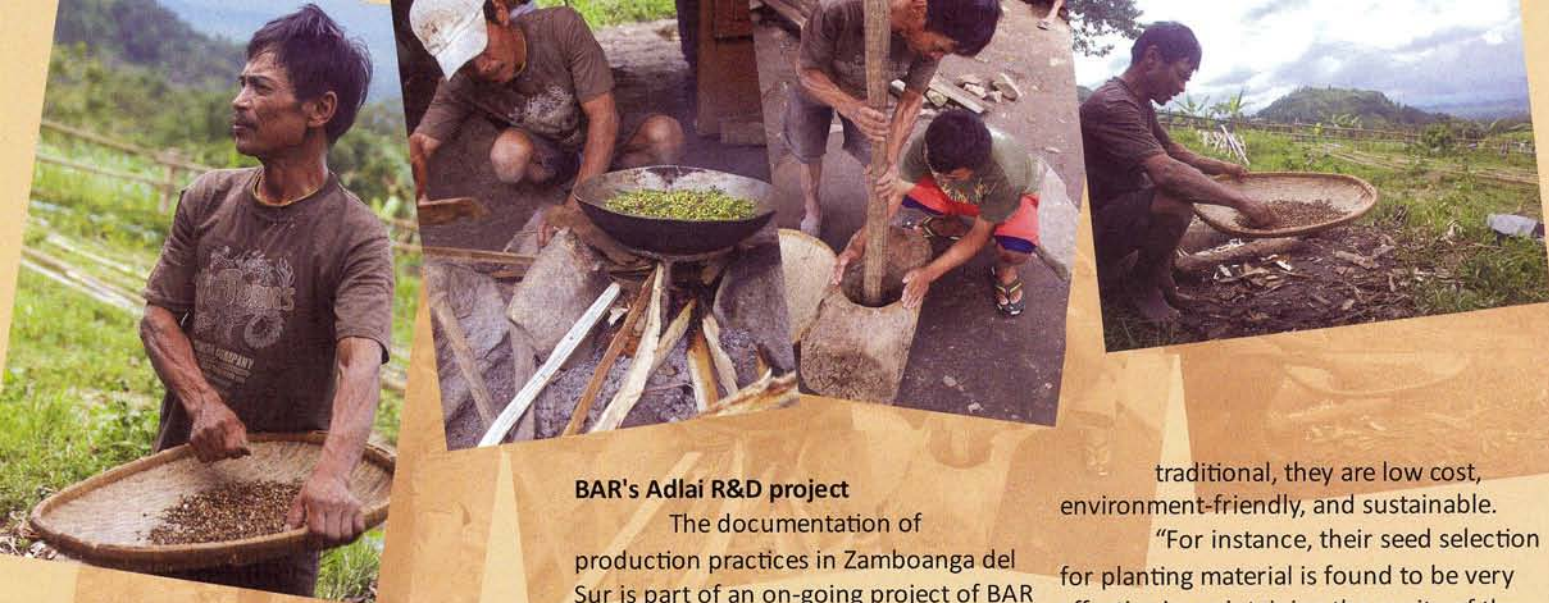
"The Subanen people have been growing adlai for as long as I could remember. When I was still a child, I saw how they plant this crop as source of food," said Terso Balides, a Subanen

farmer and spokesperson for the BAR Adlai Project.

According to the Subanen, their ancestors have been growing adlai as staple food in the highlands, the way the lowland people eat rice. They commonly grow it in kaingin areas, freely branching upright, thriving robustly even in marginalized areas.

"We, Subanen people, believe in the medicinal benefits from eating adlai. Our early ancestors lived up to 150 years old eating only adlai porridge. This is because adlai is grown organically, with no chemical fertilizers helping it to yield. Now, Subanen people live up to 60 years old only because we eat porridge made from lowland rice which is grown with chemical fertilizers," revealed Danilo Eranga, farmer leader of Subanen Tribe and member of the Tumanod Posaka salip





Subaanen Midsalip (TUPOSUMI) farmer association.

In a report conducted by the Bureau of Agricultural Research (BAR) during its "Documentation on Adlai Production Practices in Zamboanga del Sur," it was found that from the 33 barangays in Midsalip, 19 are growing adlai. The documentation also showed that the Subanen are growing at least four varieties of adlai: ginampay (brown), gulian (white), pulot or tapol (red or purple - glutinous), and linay (gold). The gulian is often referred to as the "ordinary adlai" as this is the most commonly grown variety in the 19 barangays. Aside from gulian, ginampay is a popular variety due to its bigger grain size, good eating quality, and ability to produce higher yields compared to other varieties. Generally, Subanen farmers are growing 1-3 varieties of adlai in an average farm area of 100m - 2.5ha.

Adlai plant has broad, erect, and dark green leaves and with main stem diameter of 0.5 - 1 inch. It has a profuse root system that anchors and prevents the big and sturdy tillers from lodging. Usually, it is grown with cash crops like ginger, taro, squash, banana, and forest trees to ensure availability of income while waiting for the adlai grains to mature.

Farmers in Midsalip practice ratooning of adlai and usually two to three times after the main crop. The first is done in July and harvested in October while the second ratoon is done usually in December and harvested in January. The length of cut from adlai base ranges from 0.6m-1m.

BAR's Adlai R&D project

The documentation of production practices in Zamboanga del Sur is part of an on-going project of BAR in collaboration with selected Regional Field Units (RFUs) of the Department of Agriculture (DA), state universities and colleges (SUCs) and non-government organizations like Earthkeepers and MASIPAG.

Currently, the project is conducting 11 adaptability trials (station and on-farm) of adlai varieties for seed production and commercialization: 4 DA-RFUs, 5 SUCs, and 2 NGOs.

Dr. Nicomedes P. Eleazar, director of BAR, explained that "adaptability trials have been established in different regions basically to assess the performance of different adlai varieties in different locations and elevations. And so far, as initial results have been submitted to us, the nationwide trials reported significant results."

During the "Consultation Meeting on Adlai R&D Program" held in April 2011 at BAR, the need to document the adlai production and harvesting practices in adlai growing regions including Zamboanga del Sur, was identified as one researchable area that needed to be conducted to provide reliable data. "This is also to support the potentials of the adlai as staple food crop in the area, and to provide technical basis for the packaging of location specific technologies using indigenous/traditional adlai production practices," explained Ms. Mendoza.

As the result of the documentation conducted in Midsalip, it was found that although their production practices are still very

traditional, they are low cost, environment-friendly, and sustainable.

"For instance, their seed selection for planting material is found to be very effective in maintaining the purity of the seed quality, reported Ms. Mendoza. Farmers select seeds for planting materials by selecting long panicles, fuller grains from neck to head, good tiller stand and free from blackish spots or diseases. This careful seed selection is in contrast to what farmers in the lower elevation areas are doing where there is a very frequent varietal change due to varietal deterioration. In the lowlands, there is a perennial problem of seed source because of the absence of judicious seed selection.

"They also use the leaves and other adlai parts of the plants as organic fertilizer. Other production practices include, clearing only the adlai root system areas to prevent soil erosion, and non-application of pesticide to preserve the population of beneficial insects," added Ms. Mendoza.

Harvesting practices of adlai includes the traditional shredding of the panicles with their bare hands after which they are manually milled and winnowed.

The documentation of the production practices in Midsalip is critical in assessing the yield performance of different varieties of adlai growing in the area given the different elevations. This, according to Ms. Medoza will be useful in the promotion and expansion of adlai in the future. ###

For more information, please contact:
Project Monitoring & Evaluation Division(PMED)
 Bureau of Agricultural Research
 Department of Agriculture
 RDMIC Bldg., Visayas Ave., Diliman, Quezon City
 Tel Nos. 9288505, 9288624, 9200226
 locals 3111, 3126, 3129
 Email: pmed@bar.gov.ph



Venturing into the money-making seaweeds industry

by Patrick Raymund A. Lesaca

brown, and green. Red and brown algae are exclusively marine while the green are common in fresh water.

The CPAR Seaweed Culture Project started in August 2009 in collaboration with the DA-Bureau of Fisheries and

Aquatic Resource (BFAR) Region VI and the Local Government Unit (LGU) of Guimaras. BFAR-VI and the LGU conducted three-day training on seaweed culture and solar salt making. The training included lectures on the biology and culture of seaweeds. Hands-on training on seaweed planting, fish pot construction and installation of salt beds were also part of the capability building introduced to the fisherfolk of Panobolon.

The CPAR project, which is implemented for two years, hopes to uplift the living condition of the people, and establish and promote an improved production systems and technologies in rural communities for increased productivity and profitability.

One will recall, that on 11 August 2006, M/V Solar 1, an oil tanker sank in Guimaras leaving its shores with spilled 2.4 million liters of oil which contaminated 1,000 hectares of mangrove areas. The massive oil spill threatened water species and resources. At that time, environmentalists referred to the accident as the worst oil spill in the country's history and estimated the cleanup to take at least a year. In spite of this unfortunate event, fishermen pinned their hopes in livelihood projects in agriculture, fisheries, and solar-salt making to bring their lives back on track.

back on track.

The project leader is led by Ms. Remia A. Appari, manager of BFAR-VI/Regional Fisheries Research and Development Center (RFRDC). The project is implemented with the members of the Panobolon Seaweed Growers Association as the fisherfolk-partner and collaborator. The LGU of Guimaras also took part in the identification of the project site in coordination with Panobolon Barangay Captain Pedro Helera.

The project component included the distribution of 16,800 kilograms of fresh *Kappaphycus sp.* seedlings to 36 selected proponents intended for the 3.5-hectare seaweed culture area. The seaweed project is composed of 14 modules (modules 1 - 7 for year 1 and modules 8 - 14 for year 2), with an area of 2,500 sq.m. for each fisherfolk-partner. The average fisherfolk-member was composed of two to three families per module. Other materials included Polyethylene ropes, Styrofoam blocks, plastic straws, nets and other related fishing gears.

The culture period of seaweeds is from 45 to 60 days. After which, harvested seaweeds are sun-dried for two to three days under favorable conditions. Moisture content must be at least 35 percent to meet the marketable standards. During rainy season, however, seaweeds are dried using air dry method.

According to Joelyn Sentina, BFAR Reg-VI technical staff, one of the projects had already been completed during the first year of implementation. Fisherfolk-beneficiaries were able finish two-cycles and were able to sell their nt

continue to page 23

One important industry in the Island of Panay in Western Visayas is the seaweeds industry in which through a Community-based Participatory Action Research (CPAR) project funded by Bureau of Agricultural Research (BAR), is providing the impetus for growth that is slowly and increasingly gaining momentum for the sector.

Specifically, the CPAR Seaweed Culture Project, implemented in Brgy. Panobolon, Nueva Valencia in Guimaras, is reaping a huge success for the community. Panobolon is an island about 15 kilometers from the town of Nueva Valencia wherein fishing is the main source of income of the people. They also get their earnings from farming and seaweed culture which at present is the major source of livelihood of the fisherfolk of Panobolon. Tremendous social and economic impacts were observed and recorded in the lives of individual farmer and the community-based fisherfolk organizations.

CPAR project on seaweeds

Seaweeds are algae which generally thrive in the sea or brackish water. Scientist call them "benthic marine algae" which literally means, attached algae that live in the sea. Seaweeds come in three colors: red,



Corn farmers in Anlugan, Bukidnon are reaping the fruits of a CPAR project that was initiated in 2003 through the Department of Agriculture-Northern Mindanao Integrated Agricultural Research Center (DA-NOMIARC). With the increased demand for feeds for the livestock and poultry industry, the CPAR project was able to provide a major push for corn growth in the region increasing the farmer's income and encouraging them to plant more yellow corn. When asked on the difference, before and after CPAR came to their municipality, Wilma J. Reñoso, a CPAR farmer-cooperator said: "There's a big difference when CPAR was not yet here. Before, we barely harvest anything from our farm. Not unlike now, with the interventions from CPAR, our harvest from before tripled." *PHOTO BY RDELACRUZ*



BAR Research and Development
DIGEST

Bureau of Agricultural Research
RDMIC Bldg., Visayas Ave., cor. Elliptical Rd.,
Diliman, Quezon City 1104
