



BAR DIGEST

Research and Development

Official quarterly publication of the Bureau of Agricultural Research

Volume 19 Issue No. 2

April - June 2017

Sustaining adlay-based agri-enterprises in Northern Mindanao



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

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

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

For inquiries, please contact:
Applied Communication Division
Bureau of Agricultural Research
Department of Agriculture
RDMIC Bldg., Visayas Ave. cor. Elliptical Rd.,
Diliman, Quezon City, PHILIPPINES 1104
Trunklines: 461-2900, 461-2800
Local Nos: 1136, 1143, 1138
Fax: 927-5691
Email: acd@bar.gov.ph

PRODUCTION TEAM

Editor: Rita T. dela Cruz

Contributing Editors: Ma. Eloisa H. Aquino, Daryl Lou A. Battad, Anne Camille B. Brion, Diana Rose A. de Leon, Ephraim John J. Gestupa, and Victoriano B. Guiam, Patrick Raymund A. Lesaca

Contributing Writers: Victoriano B. Guiam, Patrick Raymund A. Lesaca, Jovita Datuin, Jonabelle Infante, Ma. Victoria Gazmin, Sherwin Jan Navarro, Quian Ibarra, Marry Joy Flores, Mae Odimyrl Morales, Berdeneth Pacio, Alicia Hayudini, Anecita Troza
Layout: Diana Rose A. de Leon

Print Manager: Ricardo G. Bernardo

Circulation: Lyn D. Pardilla and Lino Norman D. Reyes

Advisers:

Dr. Nicomedes P. Eleazar, CESO IV, BAR Director

Dr. Teodoro S. Solsoloy, BAR Assistant Director

Ms. Julia A. Lapitan, BAR Applied Communication Division Head

Photos are produced and owned by BAR unless otherwise stated.



www.bar.gov.ph



@DABAROfficial



@DABAROfficial



@Bureau of Agricultural Research

ISSN 1655-3934

© Bureau of Agricultural Research 2017

This magazine is copyrighted by the Department of Agriculture-Bureau of Agricultural Research. No parts of this publication may be reproduced and distributed without the permission from the management and proper attributions from its original source.





4 *R&D Notes: Leveling up: From subsistence to intensive farming*

Tapping researchers and R&D institutions for agri-fishery growth

6

7 *Jovimin balls for healthier goats*

Chemical-free biodewormer for small ruminant animals developed

10

12 *Conserving and utilizing native animals through R&D*

Sustaining the bright prospect of Bohol's ubi kinampay

16

18 *Crossbreeding of native chicken gets promising results*

Sustaining adlay-based agri-enterprises in Northern Mindanao

21

24 *Resource-efficient rice production technologies for increased income*

SSNM brings hope to corn farmers in Caraga

28



Leveling up:

R&D Notes

From subsistence to intensive farming

Dr. Nicomedes P. Eleazar, CESO IV



One are the days of the narrow approach wherein research was confined to the development of established farming practices. With the coming of integrative and sustainable concepts that look further into the interactions and interrelations of the various elements of the farm, the trend is for agricultural research to develop more innovative alternatives that can help level up farmers from traditional to a holistic fashion; from subsistence to intensive farming.

It is also becoming a norm to use participative research that involves the producers in the research process. This helps ensure that research efforts are consistent with the requirements of the stakeholders. After all, it is the producer who knows firsthand what the problems are. Research primarily exists to provide technological backstopping in search for solutions.

Such changes have set the stage for the emergence of fresh insights and outcomes of research that lead to more effective, efficient, and relevant information and technology options for farmers and fisherfolk. This issue of the **BAR R&D Digest** takes the reader to some of the products of agricultural research that have been implemented by the Department of Agriculture's Regional Field Offices (DA-RFOs), with funding support from the Bureau of Agricultural Research (BAR). Quality is undoubtedly up a cut above those of research of the past.

There is a big presence of new technologies for goats and

native chicken from DA-RFO 1, 2, 4B, and 9 among the articles.

The introduction of a mineral feed supplement in the form of balls has been made part of a package of technology for goat production that DA-RFO 1 researchers call Goat Check System. This involves improved production practices on feeding, housing, breeding, and health management.

Also for small ruminants, the Regional Animal Disease Diagnostic Laboratory of DA-RFO 2 has developed a biological dewormer against roundworms. This oral suspension is a good alternative to commercial chemical anthelmintics/dewormers as it does not pose residue problems.

In the bid to conserve our indigenous strains of poultry, DA-RFO 4B has undertaken the phenotypic characterization of mature native chicken breeders and their eggs. This study shows that there are indeed significant differences in the physical characteristics among native chicken strains – useful information for those venturing into purely native chicken production.

Meanwhile, on the spectrum for indigenous chicken, DA-RFO 9 is looking at how to address the problem of low productivity of backyard raisers in small body size and low egg production. The researchers propose to do this by upgrading local strains through cross-breeding with high-performing non-native chicken.

The use of more efficient technologies for common and

unconventional staple crops is also being pushed and is discussed by several write-ups in this issue.

Several rice production technologies for rice under various ecosystems (rainfed, lowland irrigated) that are more resource-use efficient have been developed by the International Rice Research Institute (IRRI), Philippine Rice Research Institute (PhilRice), and DA. For DA-RFO 12 these are worth promoting as these offer farmers the best management options in production. These are: use of plastic drum seeder for planting rice; use of the right and appropriate seeds (registered and certified seeds from accredited rice seed growers); application of appropriate and right quantity of fertilizers and correct time of application; and water use on an “as needed” basis.

Another technology that espouses the application of fertilizers at the right time, right source, right amount and right place is being touted by DA-RFO 13 (Caraga) to address the yield gaps of white corn in their localities. Changes in the corn farming practices of the farmers are now being seen since its introduction to farmer-cooperators.

With *adlay* production facing the challenges of unsustainable production and unquantifiable market, multi-stakeholder participation and collaboration have to be in place to institutionalize strong production-to-utilization chain. The *Adlay* Research Program of the DA-RFO 10 sees this development as key to enhancing *adlay* production, promotion

turn to page 9

TAPPING RESEARCHERS AND R&D INSTITUTIONS for agri-fishery growth

Patrick Raymund A. Lesaca

The blueprint for food security and sustainability has already been etched into the food production manuals of the Department of Agriculture (DA). The blueprint, which is anchored on Secretary Emmanuel Piñol's agenda and guided by the 10 basic foundations of a sound agriculture and fisheries program, will also serve as reference of the DA to secure the food of this generation, but more importantly, of the coming generations as well.

Among the strategic approaches listed in the said foundations, entail numerous food production and processing protocols, if the country is to meet the tenets of a food secured nation. The role of research and development (R&D), in this context, must also be highlighted.

Advancing the essential results of R&D has been the single most important advocacy of the Bureau of Agricultural Research (BAR). As pointed out by BAR Director Nicomedes P. Eleazar, "the adoption of R&D outcomes must be adopted by technology generators otherwise, research

will just remain a mere research. Making the full use of its generated and developed technologies in transforming agricultural and fisheries food-based products and technologies into a marketable reach will result to an increased food production."

As the central coordinating body for R&D of the agriculture department, BAR must see to it that every peso spent for R&D investment must be translated or yield significant outcome, and thus contribute mainly in the food value chain domain.

The bureau, in line with the DA's thrusts in making food available and affordable, increasing the income of farmers and fishers, and increasing resilience to climate change risk, require development-oriented researchers and agri-fishery research-based institutions. Furthermore, one cannot overly emphasize the DA's regional field units, the regional fisheries R&D centers, and more importantly the regional integrated agricultural research centers for these institutions have been the strongest partners of BAR in

the delivery of R&D services. Testament to this account, the bureau sees the need to highlight their respective interventions to the progress of their agri-fishery landscape.

Due recognition is accorded to all researchers and the institutions as they represent the results of their various high-impact programs, projects, and initiatives. The BAR supported R&D projects will give the farmers, fishers, and scientific community various insights on how these initiatives have been developed and later on, utilized by the farmers themselves being the direct beneficiaries of the projects.

Tapping researchers and R&D institutions can pivot the initiatives amongst technology developers to jumpstart the commercialization of technologies towards food production. Tapping further the agri-business communities and the other stakeholders may likewise benefit from these well-studied R&D projects. ###



JOVIMIN BALLS for healthier goats

Dr. Jovita M. Datuin, DA-RFO 2 | photos courtesy of DA-RFO 2

Goat is considered as one of the champion commodities of the Ilocos region and has become an important component of its agricultural system. With an increasing contribution to farming income, it is slowly drawing support and attention both from government and private sectors, putting investments to promote and expand the goat industry.

According to the Philippine Statistics Authority (PSA, 2010), the economic importance of goat raising can be translated to its contribution to the country's livestock enterprise, providing livelihood to 1.34 million Filipinos. Slaughter goats, for instance, are priced at Php150-200 per liveweight kilo and are highly sellable making it an immediate source of cash especially at times when main crops are affected by adverse weather conditions due

to climate change.

Additionally, goat's meat, or chevon has built quite a reputation as a healthy meat making goat raising even more popular. Health buffs are drawn into consuming chevon because it is low in cholesterol and high in protein, and is found to be lower in saturated fat compared to chicken, pork, and beef. As a dairy product, goat's milk is closer to human milk, easier to digest and assimilate in the human body with even 3.8 times more calcium than a mother's milk. Other product including goat's milk soap is excellent in rejuvenating, protecting, moisturizing, and exfoliating human skin. All of these advocate opportunities for those engaged in goat-based enterprises.

Such potentials however are met with challenges especially

in terms of supply and demand. Demand and extraction rate are still greater than production thus, requiring production expansion. Mortalities and diseases remain as major problems of the goat industry, most of which is due to poor nutrition, leading to low productivity.

Given the opportunities as well as challenges in the goat industry particularly in the Ilocos region, a team of researchers led by Dr. Jovita Datuin, chief of the Research Division of the Department of Agriculture – Regional Field Office (DA-RFO) 1, has been working with partner research institutions to perfect the package of technology on goat production. Dubbed as the Goat Check System, it involves improved production practices on feeding and housing management, breeding



photo by: DDeleon

management, and health management.

One of the innovations promoted in the Goat Check System is the supplementation of Urea Molasses Mineral Block (UMMB), a block containing a mixture of urea, molasses, rice bran, vitamin-mineral premix and salt. UMMB is given to goats to provide them essential minerals and vitamins especially in the warm months of the year. But the use of UMMB technology prohibits giving the product to weanlings and pregnant does and might pose urea toxicity when consumed by animals in higher amounts. After a decade of observation, it was noted that despite the nutritional advantages of using UMMB, the farmers response registered a very low adoption, hence the opportunity to develop and innovate new products.

Equipped with expertise on animal nutrition, Dr. Datuin came up with a new product to address this issue on animal health. In 2015, she developed a feed supplement in the form of a mineral ball, improving its composition by infusing natural ingredients from indigenous sources. This was made safe for consumption of goats at all growing stages, including pregnant does.

Feeding trials were done in two goat farms in Barangays San Ramon and Cabanbanan, Manaoag, Pangasinan. Thirty experimental goats were given mineral balls for 120 days. After 90 days, initial results revealed that the goats gained weight and their overall health has improved.

Danilo Soria, one of the

cooperators in San Ramon almost gave up goat raising after losing more than 30 heads of goat due to diarrhea. Convincing him to try the mineral balls to his then sickly, emaciated, remaining 12 heads of goats, his herd then totally improved. Mr. Louie Navalta of Cabanbanan also related that his 18 heads of goats have become bigger, coats shiner, and looking much healthier after subjected to the feeding trial.

With the positive results on the effectiveness of mineral balls as feed supplement, Dr. Datuin has applied for product registration for the trade name, "Jovimin". With technical and funding support from the Bureau of Agricultural Research (BAR), it was issued with a Certificate of Registration by the Bureau of Trademarks on 8 September 2016.

The technology was disseminated in one of the technical sessions during the National Organic Agriculture Congress (NOAC) on 24 November 2016 in Laoag City, Ilocos Norte. There were 7,000 mineral balls distributed as product samples during the activity. Also, 1,000 product samples were distributed to the audience during trade fairs and investment fora in SM Rosales Pangasinan and Robinsons San Nicolas, Ilocos Norte. Walk-in farmers in Pangasinan Research and Experiment Center who have heard about the product were also provided with sample products.

It is hoped that this product will solve the problems of local goat farmer-raisers without resorting to synthetic nutrition enhancers. Continued experimentations were being

done to further improve the product particularly on its other uses as natural dewormer, as well as enhancing its shelf life and packaging. ###

For more information:

Dr. Jovita M. Datuin

Research Division Chief

City of San Fernando, La Union

email: research_darfo1@yahoo.com

mobile: +639083998946



Leveling up... from page 5

and food utilization in Northern Mindanao.

The other potentials of *ubi kinampay* other than as a staple have been the subject of product development studies of DA-RFO 7 researchers. New *ubi* possibilities that now include *ubi* powder, *ubi* flour, *ubi* chips for snacks, *ubi* spread, and *ubi* wine which are being commercialized in Bohol markets.

With the availability of more effective technologies, the transformation of traditional farmers into bonafide entrepreneurs is now a definite possibility. ###



alternative parasite control. It contains live nematophagous fungi (*Arthobotrys drechsleni*), the natural enemies of roundworms; cooked rice residue; and distilled water. Moreover, the nematophagous fungus is a natural biological control agent that reduces the dependency on drug treatments of small ruminants, hence inhibiting parasites to develop resistance to drug. The end product is safe to use for the small ruminants and environment-friendly.

The suspension takes effect in the fresh dung/feces of the animals by capturing

Parasites remain a major problem for small ruminant farmers. It can affect the growth and development of these animals causing diseases such as diarrhea, appetite and weight loss. This eventually decreases the income that can be potentially earned by farmers.

Parasites are commonly treated or controlled with the use of chemical anthelmintics/dewormer. But this can compromise the food safety in consuming the animal meat due to chemical residues. Furthermore, these parasites can

develop anthelmintic resistance or the ability of worms to survive drug treatments that are usually effective. In fact, such phenomenon is affecting 41.2 percent of commercial small ruminants in Region 2.

To address the issue, in 2007, the Regional Animal Disease Diagnostic Laboratory (RADDL) of the Cagayan Valley Integrated Laboratory (CVIAL) pioneered the development of a “chemical-free biodewormer”. It is an oral suspension dewormer against roundworms of small ruminants, which can be used as an



the infective larva before they spread in the pasture. It serves to reduce larval infection of parasitic roundworms in the pasture which can be ingested by goat and sheep when they are grazing. Based on the study conducted by RADDL, the oral suspension dewormer reduces the egg laying capacity of the adult roundworms by 29.5 percent and decreases the development of infective larvae in the pasture by 72.66 percent.

Using the chemical-free biodewormer provides opportunities to maintain effective parasitic control in an organic way; and reduces production cost by decreasing expenditure for anthelmintics or

dewormer. It is also environment-friendly and does not produce harmful residues and increases the income of small ruminant farmers.

For usage, it is advised that the suspension is given to animals at 5 ml for five consecutive days before they are released to graze in the pasture. It can be given to sheep and goat regardless of age since it is all natural. After the last administration, it can be given after one to three months depending on the result of fecalysis.

In 2016, the product was successfully registered and acquired Intellectual Property

Rights, making it the first oral suspension for small ruminants in Region 2 that is chemical-free. To date, the RADDL is on the process of mass producing the biodewormer. ###

For more information:

Jonabelle T. Infante
Science Research Analyst
San Gabriel, Tuguegarao City
email: jonabelleinfante@gmail.com
mobile: +639269694392

Ma. Victoria Z. Gazmin
Science Research Analyst
San Gabriel, Tuguegarao City
email: mariagaz0225@gmail.com
mobile: +639178168179

CHEMICAL-FREE BIODEWORMER for small ruminant animals developed

Jonabelle T. Infante and Ma. Victoria Z. Gazmin, DA-RFO 2





Conserving and utilizing **native animals** through R&D

Sherwin Jan A. Navarro, DA-RFO 4B
photos courtesy of DA-RFO 4B

In the Philippines, native chicken is commonly found in most rural household, and is an integral part of farming. Through a long process of natural selection under local conditions, the native chicken is able to survive and reproduce even with minimal material and management. However, imported and exotic broilers have more support in commercialization with institutions and companies, who are more willing to finance research to improve their meat and egg-laying performance.



Given the growing number of consumers prioritizing wellness and organic food, the government has prompted the emphasis on raising native animals. The Philippine Native Animal Development (PNAD) program was launched to address the threats to the irreversible loss of local breed of livestock and poultry. In collaboration with experts, researchers and scientists, initiatives were developed to boost the conservation and utilization of native animals.

Potential of native chicken

Native chicken (*Gallus gallus*) are fowls resulting to purebreds and indigenous stocks traced to the wild red jungle fowl of Southeast Asia. Most farmers in the country raise native chicken

in their backyard as a source of income. This is a common practice in the rural setting of the country as it only requires small space and simple management.

In the Philippines, there were few documented strains of native chickens. These include: *Banaba* from Batangas, *Bolinao* from Pangasinan, *Camarines* from Bicol, *Darag* from Iloilo/Panay, and *Paraoakan* from Palawan. These common fowl found in most rural household are usually single-combed with a yellow white, gray, and black shank color.

These native animals comprise close to 60 percent of the total chicken population of the country, and are the main source of eggs and meat for backyard farmers. Moreover, native chickens' meat and eggs are preferred by many Filipinos

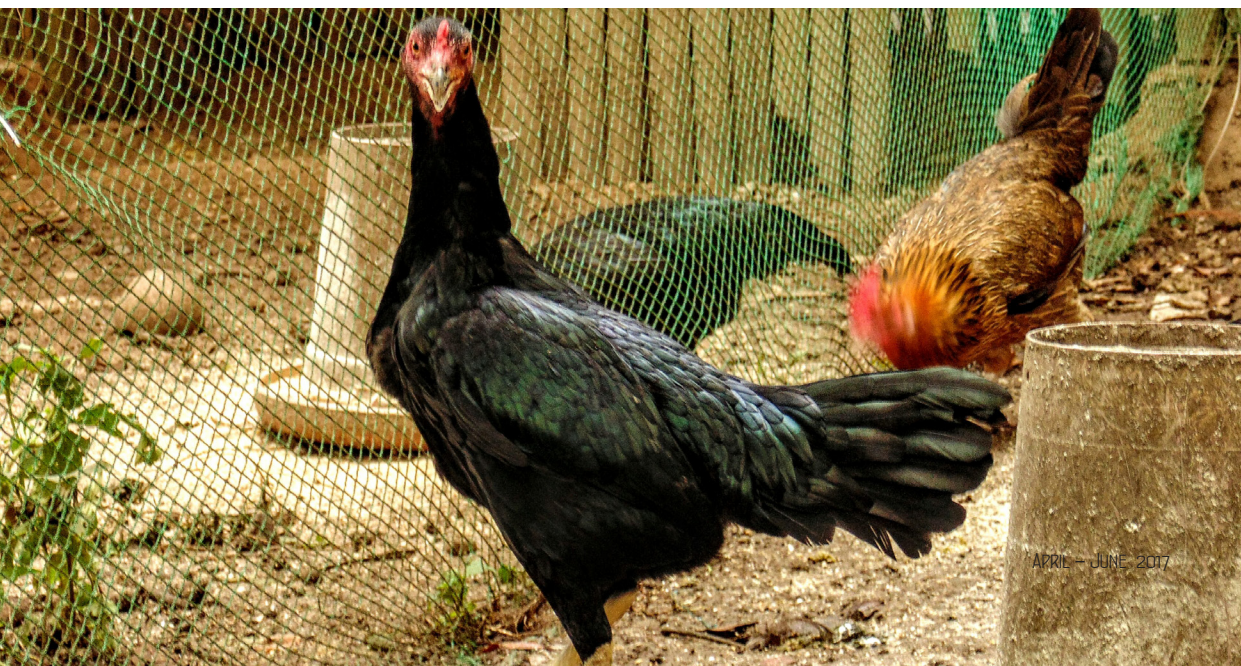
because of its taste and leanness, which are suitable to Filipino cuisines. When raising free-ranged native chicken, they can be fed with vegetation and insects. They can easily adapt to the changing climatic condition and are highly disease-resistant. These added attributes continuously charm rural folks to raise native chicken.

As the wellness trend diverts the consumers' desire from artificial to organic, the indigenous breed gets more popular in the market as the current demand for healthier food increases.

MIMAROPA's action for preservation

In accordance to the national effort to protect the indigenous strain of poultry in the region, six regions from

turn to next page





Conserving... from page 13

Luzon (CAR, 1, 2, 4A, 4B, and 5) participated in the zonal project, “Comparative Performance and Community-based Production of Native Chickens in Luzon”. Led by Romnel B. Salazar, senior science research specialist of Department of Agriculture-Regional Field Office 4B (DA-RFO 4B), a phenotypic characterization of mature breeders and eggs were accomplished. The project showed significant difference in the physical characteristics measured among the native chicken strains.

Among the activities conducted by the participating regions were: 1) establishment of Regional Native Chicken Production Centers, 2) on-station native chicken production, 3) on-farm native chicken distribution, 4) conduct of benchmarking activities on native chicken production, 5) conduct of training on native chicken production and 6) field days. The project used the four identified strains of native chicken from Luzon, and were collected and compared. These

were *Banaba*, *Bolinao*, *Camarines*, and *Paraoakan*.

Compared to the imported breeds, the native breeds have small body size, slow growth rate and unpredictable production performance. However, these disadvantages in raising native chicken can be viewed as advantages. The small body size and slow growth rate results to high-quality meat and egg products. Without the antibiotics and hormone to unnaturally accelerate growth, the market put higher price on these poultry product. The “unpredictable performance” problem of the native breed is caused by the lack of studies. Fortunately, with the government pushing for a more comprehensive and harmonized research and development programs, information and statistics are being made available for farmers to make sound business predictions and decisions.

The developments in raising the native animal are geared towards breeding and

selecting the strains with the desirable traits and using them as breeders, multiplying its number, and encouraging the animal population. These coincide to the research and development goals to improve the situation in raising animals by conserving the genes, improving the breed, and systematizing the production.

The project, lead by DA-RFO 4B, made comparative growth analysis and phenotypic characterization and comparison of the four strains of Philippine native chicken endemic in Luzon. The results showed that the *Paraoakan* native chicken exhibited the optimum values for standing height, weight, body length, and shank length. While, *Camarines* native chicken was measured to have the deepest chest girth.

Paraoakan native chicken also exhibited the fastest growth and heaviest weight as well as providing the heaviest egg weight among all native chicken strains with the largest egg volume.

The native chicken breed

Paraoakan from Palawan is said to be becoming “the choice of native chicken raisers”. The *Paraoakan* from Palawan has longer legs, bigger body, longer neck and bigger head. This native chicken endemic in the Region at first glance is black, upon closer inspection, its plumage is really reddish black, giving the body a brilliant hue. The tail feathers are black, with some white at the base of the main tail feathers. This native chicken is long legged, stands upright and has yellow shanks. It is very elegant looking and has a posture different from the ordinary rooster. It is similar to the Asiatic breed, which is also deep-bodied with long curving neck.

With proper support in research and development, farmers can harness the hidden potential of the native species. Turning the disadvantages to advantages, farmers can build a rural enterprise with the help of the unique characteristic of these native animals that fits their limited capability and capacity.

The country is no stranger to the native animal crisis, and as the problem reaches the nation’s doorstep, the government answered by spreading awareness and making effort to conserve,

sustain, and utilize indigenous species. Through collaboration with experts, researchers and scientists, the region initiates continuous development that intends to boost the conservation and utilization of native animals.

###

For more information:

Sherwin Jan A. Navarro

Research Staff

4F ATI Bldg., Elliptical Rd.,

Diliman, Quezon City

email: sherwinjnavarro@gmail.com

mobile: +639167933362



KINAMPAY



Sustaining the bright prospect OF BOHOL'S UBI KINAMPAY

Quian Ibarra, DA-RFO 7 RAFIS
photos courtesy of DA-RFO 7



The Chocolate Hills may have been the landmark that has placed Bohol in the world map, but *ubi kinampay* is well on its way to boost Bohol's international reputation for delectable sounding things.

Ubi kinampay is a particular variety of the purple yam that only thrives in Bohol. Currently, Bohol is known to be the largest *ubi*-producing province in the Philippines.

When the province experienced a long drought back in the '70s, *ubi* was the only available substitute for rice, and hence it has been considered the region's alternate staple food. Figuratively, the *ubi* has earned the moniker of being a saviour during the time of famine. Since then, the *ubi* has been revered as sacred for a majority of the *Boholanos* because for several times, *ubi* has helped them

survived droughts. Other crops die during droughts but *ubi* survives. *Ubi* is also a crop that can be stored for years but still remains delectable and can easily germinate when planted.

The *ubi kinampay* in Bohol has by far, become the most expensive tuber crop in the Philippines. Aside from *Kinampay* which is famous for its deep purple color and unique sweet aroma, endemic only to the soil-type of Bohol, other popular varieties of *ubi* in Bohol are *Binato*, *Baligonhon*, *Iniling*, and *Kabus-ok*. *Ubi kinampay* is the most common among these varieties. Due to its unique aroma, taste, and color making it a good ingredient for foods and other flavourings such as ice cream, *ubi kinampay* commands a relatively higher price.

Today, with the support from the Bureau of Agricultural Research (BAR) and the Department of Agriculture Region 7, more research is being conducted to enhance the production of *ubi kinampay*. More

so, in order to tap its full potential, the research has been expanded to include product promotion, utilization and marketability and functionality. While the aforementioned areas of research has been on-going and some have already produced good results, ‘functionality’ is a new field that which if researched will fully maximize the potential of *ubi kinampay* and expand its effective utilization.

Eight years ago, BAR funded a Community-based Participatory Action Research (CPAR) on *ubi* which led to the establishment of an effective *ubi* seed production system. As a result of the project, a number of farmers engaged in the production of *ubi kinampay* significantly increased as well as the *ubi* production per hectare.

The completed project titled, “Technology Promotion, Utilization and Commercialization of *Ubi* (*Dioscorea alata* Linn) for Development in Central Visayas” was able to identify

the following technologies for commercialization, namely: *ubi* powder, yam flour, yam chips, and *ubi* wine and spread, *ubi* wine and *ubi* chippy. All these technologies from *ubi* were developed at the Bohol Experiment Station mini laboratory. Now, these technologies are already in the commercial stage with products already available in Bohol markets.

At present, DA-Research Division and BAR are continuously implementing research initiatives to sustain not only the production of *ubi kinampay*, but more importantly, its product utilization, marketing and promotion. With *ubi* at the center of an enhanced network of industry players across the region, brighter prospect of the purple yam is assured. ###

For more information:

Kathryn Ylanan

M. Velez St., Cebu City

email: kathylanan@yahoo.com

mobile: +639275096711





Crossbreeding of native chicken gets pro

Marry Joy P. Flores, *DA-RFO 9*
photos courtesy of DA-RFO 9

Native chicken plays an important contribution to the economic wellbeing of rural farming communities in the country. In spite of being inferior in terms of productivity compared with commercial chicken breeds, majority of smallhold farmers opt to raise native chicken as a source of food and additional income as it does not require special care and management. It can thrive on locally-available feedstock, resist major pests and diseases, adapt to new surroundings, and withstand climatic changes.

The demand for native chicken in the market has also

steadily increased because of its unique taste and suitability to many local dishes. Local restaurants and catering services are looking for regular and stable supply of native chicken meat in the market.

However, low productivity remains a problem for the backyard raisers due to the relatively small body size and low egg production performance of native chicken. Thus, Dr. Francisco B. Geromo of Zamboanga Peninsula Integrated Agricultural Research Center (ZAMPIARC) of the Department of Agriculture-Regional Field Office 9 (DA-RFO

9) led the conduct of a project titled, "Community-based Native Chicken Project." Funded by the Bureau of Agricultural Research (BAR), the project aimed to help in packaging and commercializing the technologies related to community-based native chicken production in Zamboanga Peninsula.

Through the project, the following interrelated studies were conducted: 1) profiling of native chicken; 2) growing and selection of upgraded breeder stocks; 3) crossbreeding of native chicken with four upgraded roosters; 4) growth



promising results

performance of upgraded chicken; 5) egg production and hatchability performance of upgraded chicken; 6) profitability assessment; 7) sensory evaluation and acceptability testing of four upgraded chickens; and 8) mass production of upgraded chickens for dispersal in the community.

Results of the project

The study elicited significant findings regarding crossbreeding of the native chicken with four upgraded roosters. It was found that the offspring (F1) of the four upgraded roosters namely

turn to next page



Crossbreeding... from page 19

Kabir, Sasso, Jolojano, and Plymouthrock crossed to native chicken has no significant difference in terms of weight. However, the Jolojano breed crossed with native chicken was found more resistant to pests and diseases with good mothering ability. All the crosses reached maturity in 4-5 months. Likewise, when the four upgraded roosters (F1) were crossed again with native chicken in the farmers' field, egg production and weight of eggs were not affected by any of the four upgraded breeds of chicken.

In terms of hatchability performance, it was observed that natural incubation gave higher percentage of hatchability as compared with those subjected in artificial incubation for four upgraded breeds crossed with native chicken, with hatchability performance ranging from 81-83 percent and 61-63 percent, respectively.

The upgraded Kabir crossed with native chicken has significantly higher weight of about 1.81 kg as compared with other upgraded chickens. The offspring of native chickens showed the lowest gain in weight of about 1.48 kg. Likewise, offspring of upgraded Kabir and native chicken was more efficient among other upgraded chickens, which required only 8.36 kg of feed in producing a kilo of meat. An on-farm study revealed that Kabir crossed with

native chicken got the highest Return on Investment (ROI) of about 17 percent and net return of Php 882.84 compared with rest of upgraded chickens and the native. Native chicken crossed with native chicken got the lowest ROI of about 0.38 percent and net return of Php 19.47. Thus, it is recommended to go for upgraded Kabir as it was found superior in terms of weight and efficiency in feed conversion.

For egg and chick production, it was observed that the average egg production and mean weight of eggs were significantly higher in four upgraded chickens crossed with native as compared with native crossed with native. The four upgraded chickens produced on an average 12-14 pieces of eggs at 45-47 grams, in which the upgraded Jolojano has the highest egg production at 14 pieces, while the native crossed with native has an average egg production of 11 pieces and mean weight of eggs of about 45 grams.

Evaluation was also conducted during the production of upgraded native chickens (F2) for massive distribution in support to DA dispersal program. During the test done on farmer-cooperator's farm, it was revealed that the number of egg produced by upgraded Jolojano crossed with native was noted significantly higher of about 14 percent comparable with upgraded Plymouthrock crossed

native of about 13 percent. Likewise, the same trend was noted in the mean percentage hatchability which was about 94 percent. However, weight of eggs and percent mortality were not influenced by four upgraded chickens. ROI and net return were noted highest in upgraded Jolojano crossed native of about 91 percent and Php 56,480.00 respectively.

In terms of marketing, whether it is live chicken, dressed, or cooked, both the raisers and traders preferred to sell the chicken as live. Then, the most preferred recipes for the chicken by two eatery owners surveyed in the study were the grilled and chicken stew "tinibuok".

The odor, color, taste and overall acceptability of the quality of raw meat were not influenced by the four upgraded chickens crossed with native during the sensory evaluation. Likewise, when the upgraded chickens were subjected to different menus such as oven-roasted and grilled, the consumers' preference was not also affected. ###

For more information:

Marry Joy P. Flores

Technical Assistance Section Chief
Gen. V. Alvarez St.,
Zamboanga City
email: mjoyflores.0077@gmail.com
mobile: +639163562941



Sustaining adlay-based agri-enterprises in Northern Mindanao

Mae Odimyr Morales, DA-RFO 10

As an institutional mechanism to sustain production and utilization of *adlay* as a potential staple food and commercial crop in Northern Mindanao, a multi-stakeholder cluster of development partners from the government, private sector, academe, and other institutional players have been organized for the operationalization of the *Adlay* Industry Network in Region 10. Juanita Salvani, research

division chief of Department of Agriculture-Regional Field Office 10 (DA-RFO 10) and chair of the *Adlay* National Technical Working Group (TWG), said that, the institutional mobilization and industry clustering of *adlay* hopes to develop and sustain the *adlay*-based agri-enterprises in Northern Mindanao.

Adlay is one of the most important staple cereal crops of many indigenous peoples (IPs) in the upland areas and is

characterized by its resemblance and similarity in taste with rice. It is also a crop that stands in comparable with corn.

Antonieta Tumapon, lead researcher of the DA-RFO 10 *Adlay* R&D Program, affirmed of the crop's multiple potentials with economic, social, and environmental benefits. "*Adlay* is utilized as a rice alternative, health and wellness staple crop, livelihood and income source through value-added utilization,"

turn to next page



Sustaining... from page 21

Tumapon said. Also, with its extensive root system, it is proven effective as a soil-erosion control crop in idle, sloping agricultural production areas. The increasing number of health-conscious individuals also contributed to the popularity of the crop with the currently growing favorable market acceptability towards it.

Among IP communities, *adlay* is largely consumed as a household food security crop as rice alternative which is used to make *lugaw* (porridge), *champorado* or other household recipes. Commercially, *adlay* is being used to make a few limited products.

The Adlay Research Program in Region 10 is primarily driven by the goal of enhancing *adlay* production, promotion, and food utilization in Northern Mindanao, through generating technologies that provide farmers with improved *adlay* varieties and desirable agronomic characteristics.

Aside from technology

generation on varietal development and crop protection, other components of the Adlay R&D program include seed production, on-farm commercial production, promotion and advocacy, product development, among others.

The institutional clustering of the *adlay* industry stakeholders in Region 10 complements the technology development and promotional component of the Adlay Research and Development program of the DA-RFO 10 Research Division with the support of the Bureau of

Agricultural Research (BAR). For a newly-emerging agricultural enterprise for *adlay* that is faced with the pressing challenge of unsustainable production and uncertain market, a strong production-to-utilization chain has to be institutionalized through a multi-stakeholder participation and collaboration, with emphasis on ensuring the sustained production and market for *adlay* as a staple food and commercial crop. This calls for priority attention along the areas of institutional arrangements and support services, policies,



promotion and application of new *adlay* farming technologies, capacity building of *adlay* farmers and product processors, and identification and development of markets, mainstreaming *adlay* in the development agenda of the local government units, among others.

The clustering of the Region 10 Adlay Industry Network, which took-off as a Rural Development Action Plan and Project (RDAPP) of four DA-10 Master in Public Management-Major in Rural Development

turn to page 27



Resource-efficient rice production technologies for increased income

Berdeneth V. Pacio and Alicia T. Hayudini, *DA-RFO 12*

photos courtesy of DA-RFO 12

Rice is the most important crop in the Philippines and it needs to be increased from its current levels to meet the growing population. The continuous production of irrigated rice in Asia, either as a monocrop or in rotation with other crops demonstrates the inherent sustainability of the system. However, such sustainability is now threatened by recent population growth leading to a declining arable land, water source, labor, and energy resources.

Food security is an important thrust of the Department of Agriculture, and national program such as the Food Staples Sufficiency Program (FSSP) is continuously being implemented to address farmer's income in rice production, the leading agricultural crop in Region 12.

Rice production technologies that are resource efficient have been developed by the Department of Agriculture in partnership with various research institutions including the International Rice Research

Institute (IRRI) and the Philippine Rice Research Institute (PhilRice) for various ecosystems (rainfed, lowland irrigated) offering best management practices for farmers.

Labor-saving mechanization

It is important to have a thorough land preparation as this provides good condition for optimum crop growth. Manually or mechanically, cultivation and land preparation facilitate best condition for rice production.

One option to consider is planting through the use of plastic drum seeder. This method can save 30 percent of seeds over broadcast seeding. The minimum seed requirement is only 49 kgs. per hectare. Incubated seeds are evenly sown in straight rows, simple, which is low-cost and convenient to use and operate. Labor force and cost for planting is reduced, as well as the time allocated/spent in planting activities.

Best seeds for big harvest

Seed selection or choosing the right and appropriate seeds

(registered and certified seeds from accredited rice seed growers) is vital in attaining higher yield. Thereafter at harvest, seeds supply is already assured by the farmers in the community (seed banking). Various high yielding varieties are always available, especially at the nearest PhilRice Branch/Station and/or accredited seed growers. Choices can be made from high yielding, pest and diseases tolerant, and their appropriateness to each specific location.

Right amount at the right time

With the latest intervention in determining the right amount and right timing of application of fertilizers and its application, a procedure called Rice Crop Management (RCM) is now available for farmers. Various data and queries were asked and answered by the farmers and uploaded through IRRI Website for RCM and only in minutes, results were already achieved. Appropriate and right quantity of fertilizers and correct time of application were indicated in the results. The right timing and

turn to page 26





Resource-efficient... from page 24

quantity of fertilizer application was corrected for higher yield targets.

Efficient water use

Efficient water supply is one of the most important factors in a successful and sustainable rice production. Water greatly affects the rice crop and since water is continuously becoming a scarce resource, it has to be properly managed.

Water management is one of the most important factors in a successful and sustainable rice production. Water saving technology (WST) was done 21-31 days after transplanting or direct seeding. This technique

does not necessarily reduce yield despite significant reduction on irrigation water applied, because only the excess water is removed. Thus, much water is saved. This practice also provides some degree of aeration for better root anchorage and tiller development. Rice plant should receive the exact amount of water they need from tillering stage until the hardening stage.

These resource-efficient technologies for rice production offer better management options for rice farmers for a more productive, eco-friendly, and resiliency to extreme climatic variability.

From technology

demonstration trials conducted in irrigated and rainfed ecosystem, an average of 25 percent total savings can be obtained through practice of technologies on rice production. Labor and material costs were lessened and reduced. Total average production as compared with the usual farmer's practice was also dramatically increased. Return on investment (ROI) also increased compared to farmer's practice. ###

For more information:

**Berndeneth V. Pacio and
Alicia T. Hayudin**

Research Team
Carpenter Hill, Koronadal City
mobile: +63 9090855209
email: nenevpacio@gmail.com



(MPM-RD) students, is composed of specific Technical Working Group for six component areas: 1) policy development and planning; 2) capacity development; 3) agri-enterprise and agribusiness development; 4) research, production and technology transfer; 5) mechanization and infrastructure support; 6) environment and *adlay*-based ecosystem development; and knowledge management.

The cluster has also heralded its vision of improving the quality of life for *adlay* farmers, providing income diversification and alternative livelihood for rural



entrepreneurs, and realizing a food-secure and healthy communities. The Region 10 *Adlay* industry exemplifies inclusive growth for the overall benefit of stakeholders and partners in the value-chain, and upholds good governance of resources and the preservation of the social, economic, and environmental dimensions of sustainable development for the benefit of present and future generations.

Long-term impacts are expected from successful *adlay* multi-stakeholder partnership through the crafting and implementation of policy interventions for improved *adlay* production and utilization, and better household and community food security by tossing up *adlay* as a potential additional Filipino staple food and commercial crop. The cluster is also banking on the establishment and operationalization of the *Adlay* Development Center in the region.

The RDAPP is conducted in support of the *Adlay* Research and Development (R&D) Program in Region 10 which intends to maximize *adlay*'s potential and utilization as an additional staple food and alternative income source for our communities.

###

For more information:

Mae Odimyrl A. Morales

Science Research Specialist

DA RFO 10, Dalwangan, Malaybalay City

email: piano_gem@yahoo.com

mobile: +63 977-822-3397

SSNM BRINGS HOPE TO CORN FARMERS IN CARAGA

Anecita M. Troza *DA-RFO Caraga*
photos courtesy of DA-RFO Caraga



In 2010, a study on Site Specific Nutrient Management (SSNM) for white corn was initiated in Bacuag and Gigaquit in Surigao del Norte. Back then, it served as an on-farm fertilizer trial which was implemented by the Department of Agriculture's Regional Field Office-Caraga (DA-RFO Caraga) in collaboration with Surigao del Norte's Office of the Provincial Agriculture and Municipal Agriculture Office of Bacuag and Gigaquit. Supported by the Bureau of Agricultural Research (BAR), the project aimed to quantify and understand the yield potential and existing yield gaps of white corn, and to develop an approach and tools for SSNM

In general, the people of Bacuag and Gigaquit are corn eaters. They plant native corn variety locally known as *Tiniguib* during the dry season and plant it with rice during the rainy season. *Tiniguib* is an early-maturing, pest- and disease-tolerant, but low-yielding variety.

Before the project was introduced to corn farmers in the municipalities, farmers practiced a planting density lesser than the optimum number, used native corn variety, and applied zero to minimum fertilizer.

The project started with just five farmer-cooperators for the on-farm trial, and was radiated to 10 more farmers in

the succeeding cropping. Since becoming involved in the project, gradual changes in corn farming practices of the farmers were observed. Today, more than 20 farmers have adopted the technology.

According to Mr. Reynan P. Mamalis, SSNM project leader, at first, farmer-cooperators found it hard to follow the recommendations of the project, especially the planting distance. During the course of the project implementation, cooperators were taught of the advantages of the optimum population density and eventually appreciated its benefits. They were also trained on the proper management of

turn to next page



SSNM brings...from page 29

nutrients in accordance with the 4Rs (right time, right source, right amount, and right place) of the SSNM approach. Yield gaps between their practices compared to the SSNM recommendations were also presented.

“During the demonstration, we observed that there is really a big difference in terms of crop stand and yield of corn applied with basal and sidedress fertilizer as compared to our practices. Before, I just applied fertilizer only once—any kind of fertilizer which my budget allows. In this demonstration, I learned the proper way of applying fertilizer—what kind, how much amount, and when to apply the fertilizer,” shared Mr. Alfredo Larong, farmer cooperator from Brgy. Villaflor, Gigaquit. “I saw it myself that the technology demonstrated to us produced more as compared to my old practice,” he added.

“The variety introduced to us, the open-pollinated variety (OPV) white corn, has good aroma. It is soft compared to what we usually planted, the *Katiguib* which is a native variety. I appreciate the effort of the DA in reaching to us and sharing with us this kind of technology demonstration,” Mrs. Jenita Larong said, wife of the farmer-cooperator. “We have learned so many things in corn farming during the course of this demonstration since 2014. Even if the project will end, we will still adopt the practices taught to us in this demonstration,” she added.

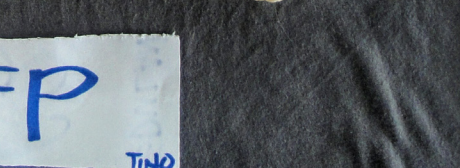
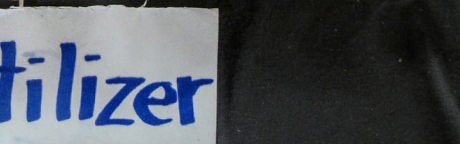
Results of the evaluation of SSNM for white corn last in July–October 2016 in the farm of Mr. Alfredo Larong revealed that OPV corn applied with 4 bags complete and 2 bags urea per

hectare as recommended by the SSNM-Nutrient Expert Software has a 32 percent yield advantage as compared to Mr. Alfredo’s old practices which is 1 bag complete mixed with ammonium sulphate applied only once at 20 DAP.

“The SSNM for white corn study taught us very different things as compared to our usual practices. First is the way the fertilizer is applied. I usually applied fertilizer only once during 15 days after planting. But through the project, we learned to apply complete fertilizer during basal and apply fertilizer again during 25-30 days after planting, this time urea with specific amounts based on the size of the area planted. Second is the planting distance. Here in Cabugao, corn farmers including myself, used the planting distance 75 cm between rows and 40-50 cm between hills with 2-3 plants per hill. The technology taught us a planting distance of 70 cm between rows and 20-25 cm between hills and maintaining only 1 plant per hill,” said Mr. Gil E. Gingo farmer-cooperator from Brgy. Cabugao, Bacuag. “With that technology demonstrated to us for more than 3 croppings, I realized that corn applied with basal has a head start compared to corn without basal. Also, there was more production because the corn population is denser as compared to our usual practice on planting distance,” he added.

Mr. Gingo’s old practice of fertilizer application for his corn field was 1 bag complete and 1 bag ammonium sulphate. The SSNM-NE recommended 4 bags complete and 2 bags urea. Results of the evaluation trial in Mr. Gingo’s farm in July–October 2016 showed that an added net benefit





of Php7,760.00 per hectare was observed following the SSNM-NE technology.

As for Mrs. Juliben S. Gingo, wife of the cooperator, she was able to learn three things from the demonstration. “One is basal which is applying fertilizer at the start; two is thinning which is uprooting the undesired plant to maintain one plant per hill; and three is OPV which stands for Open Pollinated Variety which I liked because of its good aroma and taste. I thank the DA for informing us about these things, which we also impart to our neighboring farmers. Many of them have adopted the SSNM technology since they can witness for themselves the performance of our corn,” she explained.

Meanwhile, Ms. Sally L. Oval, farmer-cooperator from Brgy. Campo, Bacuag said that, their yield during the technology demonstration almost doubled as compared to their previous corn cropping. “I think it’s because of the fertilizers applied and the variety used, plus the number of plants that we have planted. In the past, we did not apply fertilizers, we just planted, maintained, then harvested. No fertilizer application at all. We also planted corn widely spaced because we thought before that if we plant it very near, like what the technician recommends, it will not bear corn ears. To my surprise, it produced bigger corn ears plus more in number because it seems no space was unplanted,” she added.

Another farmer-cooperator in Brgy. Campo, Bacuag, Mrs. Alma Ignalig likewise shared her experience. “We have produced in this cropping more than enough for our consumption. Even now that the next cropping is approaching, we still have corn

for our food, we even sold some produced for profit,” she said. During the participatory evaluation of SSNM-NE in July-October 2016 in Mrs. Ignalig’s farm, a side by side comparison between corn applied with SSNM-NE recommendations and Mrs. Ignalig’s practice took place. She practices zero fertilization for her corn field, while SSNM-NE recommended 4 bags complete plus 2 bags urea per hectare applied in 2 splits during basal and 30 DAP. Results showed that corn applied with SSNM-NE fertilizer recommendation has a yield difference of 2.76 tons/ha as compared to corn with no application of fertilizers during the whole duration of the crop growth. This indicates that yield of white corn could be improved further by using appropriate nutrient management.

From these shared stories of corn farmers in Bacuag and Gigaquit, the SSNM technology taught them three things in general: good quality seeds, optimum population density, and proper nutrition management helped them improve their corn production. The SSNM for corn study serves as a catalyst of change in corn farming in these barangays. Change is indeed possible with a receptive attitude of farmers, accompanied by proper technical guidance and allowing the farmers to see for themselves the effectiveness of the technology through demonstrations. ###

For more information:

Anecita M. Troza

Research Staff

Capitol Site, Butuan City

email: agriculture13@yahoo.com

mobile: +63 9468168115



The Bureau of Agricultural Research (BAR), under its National Technology Commercialization Program, supported the technology enhancement and commercialization of various tilapia products of Central Luzon State University (CLSU). Through a project, the bureau was able to assist on enhancing the tilapia products of CLSU such as tilapia ice cream with tilapia praline, tilapia ice cream sansrival, and tilapia ice cream sandwich. On other hand, tilapia cookies are available in thin plain tilapia cookies, tilapia cookies with tomato jam, and tilapia hermits dipped in lemongrass-pandan chocolate. At present, CLSU is producing 5,000 units (cups and other variants) of tilapia ice cream per month. *(Photo by MEAquino)*



BUREAU OF AGRICULTURAL RESEARCH
RDMIC Bldg., cor. Elliptical Rd. Visayas Ave.
Diliman, Quezon City, Philippines 1104
