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SHE PADDLES FOR CLEAN AIR

A woman paddler in Basey, Samar disembarks after dropping off her passengers from Sotohon. She uses *banca*, a traditional paddle boat. It is environment- and user-friendly than the motor boats which are commonly used in the area. Given the advent of climate change and global warming, using paddle boat helps in minimizing carbon in the air.

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Institutionalizing local RDE partnerships for AGRIBUSINESS DEVELOPMENT



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Created by virtue of EO 116, BAR is mandated to ensure that all agricultural researches are coordinated and undertaken for maximum utility to agriculture. Further, EO 127 and 338 reinforced and expanded the roles of BAR in the central coordination and management of agriculture and fisheries R&D programs. BAR is an ISO 9001-2000 certified institution since 2006.

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PHOTOS: RDELACRUZ

a phenomenon that is uniquely personal individual. It is, in reality, social and relational in nature. When one thinks of practice, therefore, one must visualize it as a combination of personal and social experiences. This is very important in the sense that when practice is only taken as social, the role of person is denied. In the current approach of BAR, the unique contribution of the individual is taken as the stimulus that will contribute to the transformation of social practice.

In community action planning being instituted by BAR, the principle used is to begin from where the farmers are, what they have and where they want to go. As revealed in the all the papers in this issues of the Digest, making agriculture business must begin the real practice of farmers. Organizing the farmers is very critical to the success of action planning. The technologies introduced in the program are taken as enabling support that will transform farmers practice. The focal orientation of the planning activity is to improve practice complemented by innovations.

The other central feature of the papers in this issue is the attention given to institution-building. The importance given to improvements and innovations through technology transfer and commercialization is institutionalized by enhancing the current practices of farmers through organizational development. This is further strengthened through linkage and networking. Special attention is given to the role of the local government as the turnkey to the creation of a new modality of action.

A new knowledge system is being created through BAR's intervention strategies. Farmers are being made sensitive to information and therefore, a new modality of production practice as knowledge is being institutionalized.

It is, therefore, clear that BAR's intervention has finally set the right strategy for interfacing information management and knowledge management. They are not equivalent. Information stimulates the growth of knowledge as the later creates the conditions for the generation of new information. These are always complementary and are used for practice improvement and innovations.

It can be said that through this issue of the Digest and succeeding issues, the development of new management of agriculture through innovative production practices is being institutionalized to meet the challenges of agribusiness development. 🌱

In community action planning being instituted by BAR, the principle used is to begin from where the farmers are, what they have and where they want to go.

Community of Practice: Translating experience into knowledge

by Manuel F. Bonifacio, PhD

When one thinks of agricultural development, one cannot avoid encountering the idea of farmers' practice. Yet, it seems that through the years, our interventions have been directed to many things other than to practice. More often than not, interventionists have been engaged in changing it through information, education and technology (IEC). Presently, this orientation appears to have been expanded with the use of Information Communication and Technology (ICT). The major tenet being given attention is to move information faster to insure the institutionalization of innovative approaches to production.

The impact of this orientation through the years has been quite uneven. The search for the right blend of interventions is still on-going. The puzzle appears complex and the best minds of the fields of research and extension are being pooled to solve this dilemma. Yet, the solution is nowhere in sight. The light at the end of the tunnel appears not to be visible.

In the two banner programs of BAR, this matter is of great concern since the impact of research and extension must be



PHOTO: RDELACRUZ

...the very kernel of farmers' action is embedded in his overall production practices which are social psychological in nature and are historically derived.

specified and useful to agricultural action planning. BAR is very much concerned with the present predicament of action planning in agriculture since it is deeply enmeshed in methodological dilemmas.

Is there a way out of this catch22 situation? BAR's answer is a definite yes! It said that we need not look any further. The answer is staring at us everyday! We have framed our intervention strategies incorrectly. We have focused on technology and on farmers as individuals. Thus, our framework is focused on differentiating farmers as innovators or not innovators (laggards).

Yet, the very kernel of farmers' action is embedded in his overall production practices which are social psychological in nature and are historically derived. This is what is known as farmers' tradition. Hence, farmers'



PHOTO: RDELACRUZ

Looking far with CPAR

When one thinks of one of the most successful pop songs in the field of popular music, one cannot miss Paul Anka's **My Way**. To me, this song is the epitome of American rugged individualism. However, when one thinks of CPAR, one cannot but think of the value of **Our Way**. The implicit individual focus of previous approaches to agriculture proved counter-productive since, by its nature, it is a complex undertaking requiring the pooling together of different threads and weaving them for strength and beauty.

To my mind, this is what CPAR is all about. It is fully cognizant of the inherent value of the principle of synergy when the whole is greater than the sum of its parts. The set of papers in this issue of the **BAR R&D Digest** is entirely devoted to document this value orientation. It is evident in the papers how through CPAR, technologies were taken as the critical support needed to move agriculture into greater heights. The papers have amply demonstrated that technologies are indeed revolutionary in their impact.

Yet, in the design and implementation of CPAR, we are always cognizant of the gaps created in the previous application of technologies to agriculture. The use of the community-based approach was made more dramatic through the adoption of the concept and principles of partnership.

We are fully aware of the political underpinning of the concept of partnership. However, instead of being deterred by politics, we are using it to a great advantage by mobilizing the active participation and support of the local government.

We are proud to claim that the featured articles in this issue have ventured into an area where many feared to walk. The papers confronted the sensitive issue of partnership and weaving the various threads that would constitute the key to successful agribusiness development.

Ours is not a promise, but an assurance of our commitment to fully institutionalize the real meaning and contest of partnership to attain the goals of agribusiness development.



Nicomedes P. Eleazar, PhD
Director, BAR

PHOTO: RDELACRUZ

INSTITUTIONALIZING local RDE for AGRIBUSINESS development

by Marlowe U. Aquino, PhD



PHOTO: JAPITAN

People depend on agriculture for life's necessities such as food, clothing, livelihood and businesses. It is therefore essential that efforts be done to assure the sustainability of agriculture that considers a balance in its development in its various aspects. Towards this end, investments in approaches and strategies in enhancing agriculture as a business have been undertaken. However, as with many innovations, the possibility of constraints and negative effects and impacts, particularly with top-down and unilaterally designed and implemented efforts, are ever present. Development agencies, institutions and the target beneficiaries themselves have come to realize that the key to success lies in the forging of partnerships. This is a kind of partnership that integrates and institutionalizes efforts of people and the communities towards enterprise development and, eventually, agribusiness ventures.

Partnerships are becoming a popular tool to improve local governance especially in localized agribusiness development and activities. Networks of

partnerships have been set up in almost all sectors and institutions to tackle issues of economic development, employment, social cohesion and the quality of life. However, working in partnership is not an easy task. It raises a fundamental challenge: that of harmonizing public accountability and participatory democracy. For partnerships to be effective in fostering collaboration, coordination, and complementation, ways must be found to reconcile standard accountability frameworks with the use of collective strategic planning exercises involving various types of actors. It is to address this central challenge that the local RDE partnerships were scrutinized and documented for information dissemination and management.

In view of emerging challenges in global agriculture, the country is faced with issues and constraints about food production, shortages, demand and supply including its distribution. There are also the peoples' concerns on

environment and climate change, product-process-service positioning for global competitiveness, people and community transformation and reforms. There are, in addition to health issues that affect the lives and livelihood of people, communities and industries. Evidently, these call for new approaches to development in agriculture and fisheries, among others.

In response to these challenges, development-oriented institutions, scientists and researchers, development practitioners and workers have developed more people-attuned strategies that encourage people to join in the development of interventions that result to more relevant strategies, systems and processes, and which monitor and evaluate activities more rigorously in order to achieve targeted outputs and desired outcomes. All these are directed towards eliciting peoples' responsiveness and appropriate actions. As a result, a lot of present efforts now have people's involvement as a key element.

Certain areas in agriculture and fisheries development work have become



PHOTO: MAQUINO

had the same or similar activities as BSU's, project participants. It also encouraged stronger community participation in the overall potato seed production system operations.

The outline of the Cordillera PSS program was first conceptualized by the NPRCRTC of BSU and the International Potato Center (CIP) with the implementation of two projects. The first was the Potato Seed Production Project in 1991. This project sought to improve the quality of planting materials in the informal seed system (farmers producing planting materials and selling them to other farmers without benefit of certification).

The second project was on improving the potato seed technology was conducted in 2001 and completed in 2004. In this project, greenhouse production of basic materials was intensified to provide farmers with clean materials for bulking in the field.

It was in 2004-2005 that the NPRCRTC, which was assigned the national leadership in potato R&D (Team Leader of the Potato Sub-network under the Rootcrops Network of DA-BAR), proposed a network for potato seed production. This involved other agencies like BPI-BNCRDC and DA-CAR, including the local government units of Mt. Province and Benguet. A supporting

project proposal was prepared to seek financial support. The efforts were integrated and a unified Cordillera proposal was submitted to the Bureau of Agricultural Research which approved it in 2005.

The project was immediately implemented by a core team composed of staff from BSU-NPRCRTC, BPI-BNCRDC, and DA-CAR. Later on, this included representatives from the beneficiary farmer organizations/cooperatives. The NPRCRTC-BSU served as the lead implementer and maintained the strong partnership with the key players and stakeholders in the Cordillera potato industry that was really the strength of the program.

Process of Cordillera-PSS partnership

The partnership forged by the key players and stakeholders was complete and deep in depth and in scope. The beneficiaries were given the opportunity to

participate in decision-making. This mode of project implementation facilitated the implementation of activities. In addition, farmer partners in production also became partners in developing and improving technologies. The periodic core team meetings became a venue for the exchange of ideas to improve the production scheme and project implementation. The core team members belonging to the different government agencies became members of each farmer organization and or

cooperative which further strengthened the partnership.

The partnership was noted to strengthen the capacities of the group of farmers in seed production. This was supported by organizational trainings which improved the farmer organizations' credibility as a partner. It also opened opportunities for the organization to seek funding of its other activities and to further improve their facilities.

Participation was carefully cultivated through the meetings conducted by the NPRCRTC with the farmer groups especially in the discussions and problem solving activities. It also led to the development and formulation of new interventions and innovations based on the activities done which attracted more funding support from other partners for the improvement of facilities and production.

Other notable results brought about by the partnership are: project beneficiaries involvement in project management specifically in planning, implementation and monitoring and evaluation of activities; the exchange of ideas incorporating farmer's technology in the improved production schemes; organization of formal seed growers following the requirements agreed upon as accredited and certified seed growers by government and non-government agencies; and the promotion of integrated potato management through farmers' field school training that include seed production as an enterprise or agribusiness.

During the implementation of the potato seed system partnership,

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PHOTO: MAQUINO

sustainable, some farmers' groups and individuals showed renewed interest to go into formal seed potato production.

Through the Northern Philippines Rootcrops Research and Training Center (NPRCRTC) of the Benguet State University (BSU) and collaborating agencies like the Baguio National Crop Research and Development Center (BNCRDC) and the National Seed Quality Control Services (NSQCS) of the Bureau of Plant Industry (BPI) with the participation of farmer-partner cooperatives and associations, they formalized the revitalization of formal seed potato production in the Cordilleras.

Gains from research and development activities, including extension and training, drew interest from various sectors wanting to support and enhance the program on the Cordillera Potato Seed System. With enthusiasm and interest sky high, the Department of Agriculture *Ginintuang Masaganang Ani* High Value Commercial Crops (DA-GMA- HVCC) Program, Bureau of Agricultural Research (BAR), BSU-Land Bank of the Philippines through its Technology Promotion Center, and the Department of Agricultural Cordillera Administrative Regional Field Office and other institutions joined hands in providing technical and financial support for initial project operation that led to sustained activities.

The production of quality seed potatoes can be achieved through the use of available technologies such as the Rapid Multiplication Technique (RMT), True Potato Seed (TPS), selection of new potato varieties of the processing type, and improved seed potato production technologies.

The original project sites were in the municipalities of Atok, Bakun and Buguias in Benguet province and Bauko, Mountain Province. Upscaled and potential sites were identified in the provinces of Bukidnon, Davao, and Ilocos Norte specifically for lowland potato.



PHOTOS: MAQUINO

The unique characteristics of the Cordillera Potato Seed System (PSS) program have encouraged all key players and stakeholders to become responsive and accountable in producing quality seed potato materials to ensure the quality of processing and table potatoes in the markets. These include the establishment of community-based nurseries, ensuring the availability of local varieties for processing, table and lowland potato production, a focus on the multiplication of local potato varieties, and other related efforts geared towards developing local potato seed enterprises with the help of the local farmers, organized farmer organizations and cooperatives.

Establishment and maintenance of the local partnership

The establishment of the Cordillera PSS had its own birth pains specially in the initial identification of farmers and organizations and project sites to be involved in the process. Even with positive responses, BSU was still hard pressed with revitalizing and rehabilitating the potato industry. Its main concern was the process of starting a strategy for motivating farmers and encouraging them to participate in the overall process. It was a long and hard process but positive gains paved the way to work closely and eventually led to a sustained partnership. How did they do it? BSU had a team of dedicated and committed researchers and development workers willing to spend an extra hour or two just to convince farmers and key players of the need to improve and sustain the Cordillera potato industry through a formal seed system.

The partnership became sustainable with the involvement of other government agencies, which



PHOTO: ILAPITAN

fertile fields of study in partnerships which yield a plethora of questions begging for answers. If we deal with agriculture and fisheries development, can we capture the essence of people's partnerships or even institutional partnerships? Does the sector offer at least one concrete perspective or framework of partnership? Are partnerships engaged in all levels of interventions/program or project implementation? Are we certain we on target, on things we would like to understand? Do we know what we are looking for? Are we prepared and equipped with tools and methods of partnerships in agri-fishery development? More so, can we set standards of partnerships in agribusiness development? Is there such thing as agribusiness partnership? How are we going to do it? And finally, do we have strategies to follow and understand this? Fresh concepts, perspectives, cases and analyses on the Philippine agriculture and fisheries condition with emphasis in agribusiness, shall be the source of most of the answers.

On looking at institutionalizing local partnerships for development, we pose some ideas that lead to some common frame of understanding on the areas of partnerships, levels of application, ways to institutionalize its operation at the local level using agriculture and fisheries commodities and local organizations, and framework of implementation. These will be reinforced with practical and specific examples from the field that feature community-based initiatives and activities for people's sustained growth and development, and also the communities and the enterprises and industries that are involved.

Understanding local RDE partnerships

There are several definitions and concepts of partnership used by researchers and experts. Depending on the purpose, level, and scope, partnership could be viewed, interpreted and practiced in all forms collaboration, complementation, cooperation, and consultation. It has evolved in a way such that people's interactions and relationships have influenced the course of its contextual development. All sectors use the concept of partnership in terms of a broad area of people's involvement in specific activities that require decisions, agreements and actions.

Local partnerships are becoming popular as a tool for improving local facilitation of development activities, their coordination, and governance. These are

especially observed in communities' most needing assistance in terms of economic development, employment, social interaction and cohesion, in short, general improvement in the quality of life.

It has become a challenge to harmonize public accountability with participatory approaches especially in agriculture and fisheries development. In order to foster collaboration and cooperation, the operationalization of accountability and strategic planning exercises must be integrated to development work.

Within the context of agribusiness development, partnership is always directed towards increased productivity and profitability. People work together to attain economic benefits, and later on, social and technological gains from the initial activities. It becomes even more evident when farmers' and fisherfolk association link up with other organizations and seek support from local government units to promote farming and fishing operations.

In reality, partnership is a relationship established as an offshoot of participation, i.e., people's involvement in decision-making and the extent to which clientele participate in all aspects of planning and implementation. It is possible to see partnerships in action when seeking shared information, and assistance in the application of technologies or even in seeking financial support.

In addition, partnerships could be developed with people's participation from the ground to improve the sustainability of project interventions or business activities;



PHOTO: ILAPITAN



PHOTO: JIAPITAN

to identify strategies that are feasible, appropriate and attractive of target groups; and to empower target groups and increase their long-term problem-solving capacities. In such engagements the possibility of achieving individual or organization goals and objectives increase given the sharing of ideas and strengths towards their expected business outputs and desired outcomes. Because partnership lies in people, it also becomes an approach to addressing cooperative social responsibility.

Partnership perspective in Philippine agribusiness

Several years ago, partnership became the focus of scientists and research institutions worldwide in responding to the requirements set by funding or donor agencies in rural and community development. It became a by-word at all levels in program development and implementation. In time, people and organizations have come to use the same basic features of partnerships.

In practice, institutions working with people and communities have to direct special effort at establishing linkages and networks for effective partnership. Even international organizations like the Consultative Group of International Agricultural Research (CGIAR), have used partnerships in their theme of collaborative work between and among institutions and organizations working in agricultural research and development. This paved the way for agricultural research to set the trend in complementation, collaborative, and cooperative partnerships now also observed

among donor or funding agencies and research institutions across the globe.

Although, it is now many years since its initial acceptance, questions as to the efficiency of partnerships remain: do we know what, how, and why partnership is being done and why it is there? Within the DA's system, several interpretations and mechanisms were adopted that led to certain strategies to be implemented at the local level. These were believed to enhance and support in-depth analysis on concepts and perspectives of partnership as used by our partners in their understanding of agribusiness development in the country.

In essence, partnership starts where the people are. In the same manner, development strategy works best where the people are as the utilization and management of resource can proceed more effectively and efficiently. When agribusiness gains, whether in the production, processing, marketing or even input sub-systems, this can encourage people, particularly farmers and fishers, to develop linkages and maintain networks with associations and organizations in their work be it for research, production management, product development, marketing or service delivery.

The nature of partnerships in Philippine agribusiness comes in several forms. In terms of RDE, farmers may establish partnerships with research institutions for technical assistance from which they can obtain production management packages and information on the latest technological breakthroughs

and development. Others become farmer-cooperators and partners in collaborative projects that look into farmers' perceptions and experiences on the utilization and management of technologies as inputs to improved management systems and fine-tuning of technologies for adaptability, verification, and dissemination.

Farmers and fisherfolk may seek complementary partnership when it comes to securing of financial support and capital for the operation and management of activities in farming and or fishing to augment their resources. They continuously interact with financial institutions or lending institutions to avail of their services. Farmers may also maintain partnerships with organizations in order to get continuous services especially those provided by the government and non-government organizations, including the private sector, which enhance their capability and sustain operation from the farm to processing and up to distribution and marketing activities of farm produce.

Process of institutionalizing local partnership and effective management

One of the most challenging activities in the agriculture sector is the establishment and maintenance of good partnerships. In order to show a workable and continuous partnership just how should we institutionalize it? Before going any further, let us define the meaning of institutionalization.

Institutionalization is a process of setting a defined direction of activities, system, and strategies used in achieving the agreed vision, mission, goal and objectives of organizations and institutions. It provides guiding principles that allow the organization and or institution to be flexible, creative, and innovative yet attuned to new developments through the years.

Institutionalization sets the standard of operation and management in any field or discipline. In this case, business operations in agriculture are defined in terms of assured quality products, procedures in production and processing, and activities in distribution and marketing. Without this process, organizations, companies and or institutions are not guaranteed with sustained productivity and profitability, and at the same time, security in agricultural development and management.



PHOTO: MAQUINO

The Cordillera Potato Seed System: A collaborative partnership of GO-NGO-POs

by Marlowe U. Aquino, PhD

Working on a major commodity in the Cordilleras is always a challenge for the DA regional research center and its affiliate organizations especially if it deals with the production of planting materials required by farmers who expect their constant availability and good quality, aside from the technological and economic viability of the business. The commodity we are talking about in this case is potato, more commonly known as Irish potato, white potato or *patatas*.

Potato (*Solanum tuberosum*) was a crop introduced in the highlands the Cordillera between 1930's to 1940's by the new generation of settlers. Americans, who established the Camp John Hay Recreational Base in Baguio City. Over the years, the Americans and other nationals dictated the trend of agricultural development in the region primarily through introduced crops including their production management systems. But it was the potato that created the big business opportunity for the Cordillera farmers.

Today, on commodity development, several interventions have been introduced that include improved varieties, mechanisms of extension and promotional activities, product development,

and, recently, the development of localized potato seed system for farmers and Cordillera farming communities.

A shared vision and direction

Supported by the favorable agro-climatic conditions of Cordillera, farmers and their communities are aware that a continuous supply of quality materials to sustain their potato production operation is essential. However, the prevalence of seed and soil-borne diseases like bacterial wilt and the high importation cost of planting materials from the US and potato producing countries in Latin America were constant threats to the farmers livelihood.

It was at this point that research agencies and local government units in the region joined hands to address these concerns affecting the booming potato industry in the Cordilleras. What they did was to come up with a remarkable strategy to enhance local capacities and give support to local farmers for them to achieve the desired production system for sustained and profitable venture.

In the early 1990's, the Benguet State University (BSU) together with the International Potato Center (CIP) started working on the selection of potato varieties

for the desired processing and table quality and for seed production to address the informal seed system. BSU's research eventually developed potato varieties like *Montañosa*, *Igorota*, *Solibao* and recently *Ganza*, *Bengueta patatas*, *Gloria Kamaptengan*, and the lowland potato variety, *Raniag* which became the focus of a unified seed system that guaranteed a steady supply of quality local planting materials for the potato-growing farmers. Furthermore, BSU and its partners developed production technologies that focus on improving seed production technology, mass production of basic seed materials, and the development of new seed potato materials and other interventions for farmers' use and application.

Cordillera Potato Seed System Program

For the past 20 years, private sector participation in the production of seed potatoes in the Philippines was very limited to almost nil. However, because of the need to address seed-borne diseases and pest outbreaks, and the high cost of seed importations, and the need to make the potato industry self-sufficient and

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and the Department of Science and Technology (DOST), they are performing different value-adding activities related to seaweed production, said Melissa Macasaet, City Agriculturist. Improvements to the shelf life and packaging of the different seaweeds product earlier mentioned are being pursued by the DA-BFAR Inland Sea Ranching Station in collaboration with the Western Philippines University. An advantage is the fact that seaweeds don't develop molds and don't rot easily.

On a bigger scale, the production of export-quality semi-refined carageenan, dried and even raw seaweeds continues. The other MIMAROPA provinces, Cebu and Zamboanga are also into seaweed farming. Indeed, seaweed is a commodity with high potentials because of its importance to numerous industries like food and pharmaceuticals. Plastic wares, cosmetics, paper-making, textile printing, are but a few of the many uses and products derived from seaweeds.

So to those who look at seaweeds as just eye sores on beautiful beaches, think twice. Aside from its being a money-earner for the village people of Palawan, it is now seen as complimenting the aquaculture-tourism industry. To an increasing number, seaweeds have come to be regarded as a life-sustaining resource. 🌿



PHOTO: ILAPITAN

Cordillera...from page 29

contributory factors for improvement, productivity, profitability, and sustainability were identified. These include the provision of technical expertise that help guide the partnership to a common goal and vision on Cordillera potato industry, pooling of resources from all sectors and agencies, enhancement of farmers' skills as partners in potato production including seed and table potato production, development of viable innovations in the technology for seed potato production, continued linkage and networking with international and national research organizations like the International Potato Center for variety development, and involvement of farmers as partners in the management of the program.

The local partnership also led the NPRCRTC and its farmer beneficiaries to work collectively to enhance the operation of potato seed production through community-based initiatives for technology commercialization. These revolved around the process of seed production and delivery of services to farmer-partners and key players.

The local partnership also tried to control or mitigate the limiting factors in the overall implementation of the potato seed system like unfavorable weather conditions, difficulty of producing seeds to coincide with planting season especially for lowland potato production, and involvement of the partners in other projects supported by government agencies for farmers' groups which caused overlapping among the activities of the members of the groups or organizations.

Working for sustained local partnership

One of the continuing hurdles for the BSU-NPRCRTC and its partners is sustaining the production of quality seed potatoes for Cordillera farmers and other local farmers located in new and expanded areas.

An informal seed system becomes viable and gets strongly supported where efforts are directed to improving the quality of seeds produced by farmers and sold to other farmers. This involves providing clean planting materials for multiplication in farmers' fields and cleaning farmers' fields of soil-borne diseases. The BSU- NPRCRTC and its partners are keeping the instituted mechanism for formal seed production system with farmers alive and continue to seek the specialized services of agencies. These services sought include crop production and protection management, and participatory monitoring and evaluation of potato production of local government units and farmer organizations and cooperatives.

Given these developments, the BSU-NPRCRTC has institutionalized the potato festival that showcases the seed potatoes produced by farmer groups as an outcome of their technical and financial collaborative partnership. The lessons learned and experiences in potato production is now being reviewed by Benguet State University researchers and development workers for application on other vegetables for increased production, profit, and development of Cordillera agriculture.

Notes: The information shared in this feature article were derived from document analysis and personal interview with the project implementers specifically Prof. Jocelyn C. Perez, team leader of the Potato R&D Sub-network and Cordillera Potato Seed System Project.



PHOTO: RDELACRUZ

Below are some basic strategies in institutionalizing partnership for effective management in enterprise development and agribusiness venture.

- ❖ Use of community-based approach to realize programs, projects, approaches, strategies and activities anchored on local development. This strategy must be holistic, participatory, system-oriented, complementary, integrated, and practice team work;
- ❖ Provision of relevant technologies and breakthroughs from research, development, and extension (RDE) interactions at all levels of operation for farmers, local government units, and national-regional-provincial research centers/stations, financial institutions, and the educational institutions;
- ❖ In relation to RDE, all efforts must have impact on agriculture or fisheries as business. This must be supported by effective and efficient technology transfer from the research station/center to the farmers' fields and back for better feedback mechanism and analysis of lessons learned and experiences gained, and identifying the contributory and limiting factors for development;
- ❖ In adhering to agribusiness orientation, the strategies employed by organizations or institutions working on action researches must include active involvement of people and communities in the production, processing, and marketing operations;
- ❖ Continuous exchange of information and technologies is encouraged making it valuable in the production and processing management systems of farmers, fisherfolk, traders, researchers, and development workers;
- ❖ Emphasis on investment in agricultural research as a driver of economic growth. Science-based solutions to reduce poverty and hunger, sound management of natural resources, strengthened of research capacity, and expanded trade opportunities for farmers;
- ❖ Collaboration with other partners including private companies, think tanks and centers of excellence working on agricultural food, and environment issues;
- ❖ Active people's participation in action planning, program and project implementation including monitoring and evaluation; and
- ❖ Establishment and maintenance of local partnerships in order to continuously set the direction and motivation for collaborative, complementation, cooperation, and consultation for enterprise and agribusiness.

Sustaining partnership

A partnership is sustained by the active involvement of key players and stakeholders in the sharing of common development goal, objectives, programs, projects and strategies. It is done through collaborative engagements between and among organizations possessing expertise and political neutrality, and ensuring that policies are appropriate in the managing organizations. If agribusiness and rural development is the objective, cooperation should support balanced development in reducing poverty through economic growth, support agriculture-related policies,

improve infrastructure such as irrigation and farm roads, dissemination and research/development of production technologies, and strengthening of community organizations.

Specifically, RDE partnerships for enterprise development and agribusiness ventures must promote institutional reforms, particularly strengthening accountability and coherence across the national agriculture and fisheries R&D system. These need strong leadership and research people contributing valuable knowledge and expertise in the search for solutions to problems faced by the poor farmers. In

addition, these should work to increase sustainable productivity through strengthening science-for-development partnerships, protecting the environment, strengthening national R&D system through joint research, policy support, training and knowledge-edge sharing, improving policies with major impact on agriculture, food, health, the spread of new technologies and the management and conservation of natural resources. These should also continue community-based initiatives and shared value of information through proper knowledge management. Not to be forgotten are the response to emerging development challenges such as climate change and health; and addressing special needs. Last, but definitely not the least is fostering new and creative partnerships for sustained productivity and profitability.

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CVIARC:

Developing improved agri crops for better profit

by Rita T. dela Cruz

PHOTO: JAPITAN

Evolve or be extinct. This is the iron rule in the scientific world which also holds true for every successful organization. In the midst of crisis, organizations tend to shun the new, just to be safe, and maintain the status quo. A proactive institution on the other hand, will choose to adapt and explore every possible idea to overcome adversity, discover new opportunities, refocus priorities, and compete despite the difficulties.

For an institution like the Cagayan Valley Integrated Agricultural Research Center (CVIARC) this iron rule provided them with a compelling backdrop to keep track of their mission to be an effective instrument in empowering poor upland and lowland farmers and uplifting them from the bondage of sheer poverty. To do this, the Center has intensified its programs on crop improvement to continue developing new and improved varieties of agricultural crops for better yield and profit. No wonder, CVIARC is the Department of Agriculture's (DA) prime plant breeding institution in Region 2.

Creation of CVIARC

Rationalizing the establishment of one DA research station per region in the

country, CVIARC was created by virtue of Administrative Order No. 19 making it the seat of all research and development (R&D) activities in Region 2.

Located in the biggest province of the Cagayan Valley Region, Isabela, which is also home to famous protected seascapes and landscapes of exceptional biodiversity, CVIARC is composed of five stations, each according to its own focus of expertise. These are: 1) Ilagan Experiment Station in San Felipe, 2) Crop Protection Station in San Vicente, 3) Ilagan Soils Laboratory in San Felipe, 4) Soil and Water Management Station in Baligatan, and 5) Livestock Experiment Station in Upi, Gamu.

Committed to efficiently and effectively generate, develop, and promote viable technologies in agriculture for small farmers, CVIARC envisions itself becoming a dynamic and empowered center providing excellent and relevant R&D in agriculture for self-reliant and productive lowland and upland farmers.

Specifically, CVIARC is mandated to 1) harness improved genetic materials/stocks and other research results from national and international research

centers, 2) develop improved production technologies for recommendation to farmers in the regions by conducting adaptive and applied researches, 3) collaborate with central research stations for better understanding of the existing crop/animal systems to upgrade them, 4) steer existing production systems towards the direction of modern and more productive agriculture, and 5) link with downstream institutions for effective dissemination/technology transfer of agricultural technologies.

Programs and services

Since agriculture is a major industry in Region 2, developing new and high-yielding agricultural crops for increased productivity and profit is important for CVIARC. Hence, their programs on crop improvement focus on developing new varieties of open pollinated variety (OPV) corn and other upland crops (legumes and vegetables) suited to the agro-climatic conditions of the region.

Other priority programs include developing, testing, and identifying suitable production technologies for both upland



Kappaphycus



Gracilaria



Caulerpa

PHOTOS: RDELACRUZ/BERNARDO

The priced and priceless benefits from seaweeds

by Don P. Lejano

SEaweeds. To some, these are mere clumps of debris on the shorelines of pristine beaches. To others, these are but another plant that may be found in the seas and oceans. But to the people of Palawan, seaweeds mean business.

It was not very long ago when seaweed resource, which is regarded as one of the most important marine resources, was introduced as a source of livelihood to the people of Puerto Princesa City in the province of Palawan. In the past, seaweed farming in Palawan was done only in the island municipalities of Cagayancillo, Agutaya, Green Island in Roxas and in Balabac, which are way too far from the mainland. This is so because seaweed as a plant requires some seclusion.

Since the introduction of seaweed farming in mainland Palawan in 1998, farmers need not be away from their families for about two to three months, the time it takes for seaweeds to grow up to harvest. Aside from utilizing the farming area in the mainland, another benefit of this development is market proximity. Farmers can now enjoy savings from reduced transportation expenses of the goods since they could easily bring their produce to the marketplace.

Seaweed farming in Palawan, though still at the village level (as a cottage industry), has been of significant help to a number of families already. According to Mr.

Roberto R. Abrera, Bureau of Fisheries and Aquatic Resources (BFAR) RFRDC Manager for Region IV-B (MIMAROPA), Seaweed farming in itself is agribusiness. It is a family enterprise wherein the father, the mother and the children are all involved.

While waiting for the harvest time after two to three months, the fathers can busy themselves with other money-making activities for the family. And once the seaweeds are harvested, the wives and the kids can get involved in the post-harvest activities. Instead of just selling the raw materials, they are now into seaweed processing where they can develop foodstuffs out of it like pickles, noodles, candies and many others, explained Mr. Abrera.

The DA-BFAR worked closely with and provided various support to the local government units of Palawan for the intensification of seaweed production. In 2008, the province produced 444,355 metric tons, where an estimated 10,000 farmers were engaged and 5,000 hectares allotted to seaweed farming, particularly of Kappaphycus alvarezii and Eucheuma species, said Dr. Romeo C. Cabungcal, assistant provincial agriculturist. The project, Community-Based Participatory Action Research (CPAR) on Productivity Raising and Risk Minimizing Technology Applications among Seaweed Farmers in Palawan was implemented in the year 2005, through the

financial support of the Bureau of Agricultural Research. This project was conceptualized because seaweed farming, even though a promising commodity, still needed thorough study as to the culture techniques, varietal improvement, pest and disease control, among others under the growing conditions of Palawan.

Other factors on seaweed production that have been looked into in this project were typhoons, abnormal climatic changes, seedling quality and supply, and farm management. Mr. Abrera said that this CPAR project devoted resources to mitigate seaweed diseases during summertime and to introduce to the farmers the benefits of planting seaweeds in the deeper portions of the sea versus planting them close to the shore. According to Mr. Abrera, the level of salinity and temperature in the deeper portions of the sea is making it more suitable for seaweed culture.

This project therefore developed a new paradigm in the fisheries sector wherein not only is the quantity being put into consideration but the quality as well, so as to maintain the superiority of Philippine Natural Grade carrageenan in the world market. A cooperative of housewives has already been established in Puerto Princesa City. Through the initiative of the City Agriculturist's Office with the assistance of the Department of Trade and Industry (DTI)

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PHOTOS: COURTESY OF PCA

support to these farmers and the markets were guaranteed for the best produce coming from the communities they supported and monitored.

In addition, communities were very open to new developments to improve their condition, especially with financial support coming from local government units and private individuals that use their produce.

Also, the PCA is now linking with the Bureau of Agriculture and Fisheries Product Standards (BAFPS) for CSS certification as an organically produced commodity for health and wellness buffs and other nutrition conscious individuals. Once the certification is released, the product is guaranteed to gain global recognition and will boost the coconut industry as a source of livelihood of coconut growers and processors.

Expanding horizons for stronger partnership through agribusiness

The lessons learned and shared by the Linabu Coconut Planters Association in Balingasag, Misamis Oriental and the Aroman Natural Food Producers

Multipurpose Cooperative in Aroman, North Cotabato are classic examples of local partnership between a budding business coconut community and government and non-government organizations. It showed that simple farmers can establish their own linkages and networks in nurturing a simple business into a big enterprise. This kind of partnership has made farmers more aware of their social responsibility in their new business and has learned to be more accountable in the production and processing of their goods.

Cooperative partnership, as experienced in this coconut sap sugar production enterprise, together with technology application and adoption by local communities, was a powerful factor in developing the farmer groups' self-confidence to deal with pressing issues in production, processing and marketing. It also encouraged farmers to integrate and closely follow the set technology protocol for assured quality produce, and strongly supported self-reliance and empowerment of farmers as they pursued new challenges

in this coconut sap sugar agribusiness endeavor. As a result, it provided more jobs to coconut farmers, not just as producers of nuts and other products, but as entrepreneurs with a defined business.

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PHOTOS: JIAPITAN/RDELACRUZ/CVIARC

and lowland areas; and producing and maintaining superior quality germplasm of crops and animal species to support various production systems being developed by the Center.

CVIARC also provides technology/R&D services, relevant information/data, seed distribution and agricultural product sales, plant and animal health clinics, integrated laboratory analyses, training, and technical assistance.

For their technology/R&D services, CVIARC conducts technology adaptation through on farm research trials in selected areas in Isabela and other provinces in Region 2. The Center also maintains a repository of mature technologies that are ready for adoption and offers technology training to visiting farmers.

To exhibit their latest technologies developed, CVIARC has an agribusiness information center and showroom wherein visitors could visit and avail of knowhow. As an income-generating resource, CVIARC sells agricultural products through their 1) cold and storage processing center where farmers can buy quality seeds of upland crops such as corn, rice, mungbean, soybean, peanut, and other vegetables; 2) seed and plant materials nursery where farmers can buy sexually and asexually propagated fruit trees seedlings such as mango, citrus, santol, and guyabano; and 3) product talipapa also called agri store where farmers and visitors can buy seeds in small packets/retail and organically grown fresh vegetables, fruits, peanuts, glutinous corn, and other agri-based products.

According to Dr. Orlando J. Lorenzana, CVIARC manager, CVIARC was able to generate P11,849,410.27 for the last six years, averaging an annual sale of P1.5 M, out of the sale proceeds from seeds. He added that the continuous and increasing production of these varieties

has created from 2,500 to 2,700 jobs annually.

For their health clinics, CVIARC offers laboratory and visual diagnosis of insect pests and diseases of upland crops and health related problems of livestock and poultry. Likewise, integrated laboratory services include soil and leaf analyses; and production of biofertilizers and biocontrol agents.

CVIARC is continuously providing technical assistance in line with technology commercialization of improved technologies, dissemination of environment-safe pest and disease control technologies, promotion of organic fertilizer use, promotion of mechanized corn production and other farm implements, and nursery management/plant propagation.

The Center is also conducting trainings on seed production, season long training on crop production /Integrated Pest Management (IPM), postharvest and processing, mushroom culture, and production and use of bio-control agents.

Lorenzana at the helm

Behind every successful organization is a thorough and able leader who not only inspires its members to give the best of their abilities but also provides a clear vision of what the organization is trying to achieve.

The purpose of a vision is to invigorate people to strive for higher performance in their own domains, which will only work if the member themselves are seeing the relationship between their own needs and the visions of the organization.

What we have at CVIARC is the power of vision to produce better varieties of crops coupled with the thought that through crop improvement, we will improve the lives of smallhold upland and lowland farmers in the region, enthused Dr. Lorenzana.

“Developing new and high-yielding agricultural crops for increased productivity and profit is important for CVIARC. Hence, their programs on crop improvement focus on developing new varieties of open pollinated variety (OPV) corn and other upland crops (legumes and vegetables) suited to the agro-climatic conditions of the region.”



PHOTO: J. LAPITAN

The success of CVIARC in crop improvement started with simple curiosity and basic plant breeding techniques that were further enhanced through skills and new learning acquired from attending trainings through the years, both locally and abroad. The acceptance of their first released variety challenged the center's staff to develop more promising and new varieties.

Today, the crop varieties developed by CVIARC are widely distributed and grown in the Philippines and are greatly in demand in the market both as human food and livestock feed.

Among the successful varieties developed by CVIARC include the new and high-yielding OPV corn varieties, IES Glut # 2, 4, 6 & 7 (OPV deco or malagkit), IES 8906, 8910 and 8912 (OPV white flint varieties for staple food), IES Cn 4 and 5 (OPV yellow, a cheaper alternative variety for hybrid yellow). For peanuts, CVIARC developed the all-season high yielding confectionery peanuts varieties like Namnama-1, Namnama-2, and Asha which are used for food and oil. These seed varieties are registered at the National Seed Industry Council (NSIC).

These research initiatives on crop improvement paved way for CVIARC to become the leading center and the only facility of the DA Regional Field Units (RFU) that is active in plant breeding activities particularly on OPV corn.

Success in developing high-yielding confectionery varieties of peanuts has

likewise put CVIARC into an even important position being the first group in the Philippines that has worked on confectionery peanuts (jumbo-size nuts).

Excellent efforts will not go unnoticed, especially high-impact R&D activities that CVIARC has been performing for the past decades.

In 2008, the Crop Improvement Group of CVIARC composed of the triumvirate efforts of Dr. Orlando J. Lorenzana, Severino C. Tumamang, and Rose Mary G. Aquino, won the Civil Service Commission (CSC) Pagasa Award for Outstanding Work Performance (group category). The Pag-asa Award is conferred to a group of individuals for their outstanding contributions resulting from an idea or performance that directly benefited a great number of people.

CVIARC's research outputs have been recognized nationwide. According to Dr. Lorenzana, our R&D group was also instrumental in developing the productive farms of most successful DA-clients as Gawad-Saka Achievers. This contributed to the recognition of CVIARC as a grand champion in the said search at the national level in 2007, revealed the proud chief.

Farmers' level R&D initiatives

Aside from generating and developing Packages of Technologies (POTs), CVIARC went down to the farmers' level serving not only as researchers but

extension agents, the bearer of good news to the farmers in Region 2.

Motivated to work with farmers in the fields, CVIARC initiated the implementation of their projects through technology demonstration in Farmer Led-Extension (FLE), science and technology based farms with Magsasakang Siyentista, Community-based Participatory Action Research (CPAR), technology commercialization (TechCom) program, and technology upscaling.

In terms of CPAR projects, Dr. Lorenzana pointed out that most of their projects are on IPM of vegetables (pinakbet). In Region 2, there are 16 on-going CPAR projects; seven in Isabela, four in Cagayan, three in Nueva Vizcaya and one each in Batanes and Quirino province.

One of the most notable successful CPAR projects is located in Brgy. Ipil, Echague, Isabela in Region 2. The project, "Community-Based Participatory Action Research Project in the Rice-Based Farming System," introduced the rice-mungbean-rice cropping pattern to farmer-cooperators which provided them a net income of PhP68,442 per hectare against the PhP10,000 net income before the CPAR project was implemented in the area.

This was made possible with the introduction of various component technologies as production related activities. Farmer-cooperators were able

sugar granules a change in physical form from liquid to solid state. It does not require skilled labor or sophisticated equipment and is best adapted to a farm level or medium scale enterprise. However, the process is very dependent on critical factors such as pH, temperature and the extent of microbial activity of the natural yeasts in the sap. Each step in the process requires specific conditions such as neutral pH of the sap, clean materials during sap collection and cooking, and controlled temperature during the peak of transforming the sap syrup into solid sugar form. This ensures quality and proper formation of the product (Manohar, Kindipan and Sancha 2007).

The coconut sap sugar was massively promoted as a health product through the efforts of PCA Administrator Oscar G. Garin and by the Food and Nutrition Research Institute (FNRI) of the Department of Science and Technology which established the Glycemic Index of the product.

The Glycemic Index (GI) of coconut sap sugar which is very low at 35% is an indication that it can be used as natural sweetener. Foods with GI 55 and below are diabetic-friendly. This finding paved the way for the coconut sap sugar to be exported to global markets. The product was also found to be higher in other nutrient contents such as phosphorus, potassium, calcium and chlorine as compared with other forms of sugar like sugar cane muscovado.

Farmers engaged in CSS production can get an average net income of PhP 85,080.00 up to PhP 351,883.00 per hectare per year if the area is owned and if the cost of toddy is incorporated in the total cost of production. Income is PhP 23,608.00 PhP 300,220.00 if toddy is purchased from tappers with the entrepreneur acting as processor only.

Operationalizing the cooperative partnership

After the implementation of the PCA-COGENT project, which was partly funded by the Bureau of Agricultural Research (BAR) and which had gained recognition and generated significant findings, the PCA decided to conduct massive technology transfer of the coconut sap sugar technology to other major coconut growing areas in the Philippines.

PCA researchers expanded its scope in the provinces of Davao, General Santos, Zamboanga, South and North Cotabato, Bicol and now in Southern



PHOTOS: COURTESY OF PCA

Tagalog. However, production areas established in Luzon were limited because of economic considerations. Based on financial analysis, CSS production is not economically viable if tall coconut varieties, which are common in Luzon coconut areas, are used as the cost of harvesting sap increases with tree height. Through the expansion and application of the CSS technology, these expansion areas were accredited and certified as sources of quality natural coconut sap sugar for local and international markets.

The coconut sap sugar technology was shared through capability building activities, such as seminars and trainings, to encourage more coconut farmers to venture into CSS production and include it as part of their existing coconut enterprise.

Strategic planning for coconut communities was done particularly in the selection of project sites and farmer-cooperators. It was later expanded after initial results indicated that the introduction

of the technology was causing positive community interactions and social changes.

Cooperative partnership gained momentum as PCA and the communities underwent social preparation enabling them to be socially, economically and technically equipped based on the factors for effective and efficient transfer of coconut sap sugar technology.

PCA's role was more of facilitating and coordinating as it focused on making sure that the participatory approach and strategies were used in the whole process. Farmer-cooperators regularly touched base with the technical staff to ensure that the required outputs and outcomes will be attained to their fullest. As a guarantee, the coconut communities strictly followed every recommended step in the preparation of the coconut sap sugar, packaging and even its promotion.

Communities simply responded to the needs of the people and the market. For that, PCA ensured their constant

Cooperative partnership gained momentum as PCA and the communities underwent social preparation enabling them to be socially, economically and technically equipped based on the factors for effective and efficient transfer of coconut sap sugar technology.

RURAL COOPERATIVE PARTNERSHIP

exploits potential of **coconut sap sugar** production

by Marlowe U. Aquino, PhD

The story of an innovative lady coconut farmer stirred the Philippine Coconut Authority (PCA) to enter into a collaboration on the operation and enhancement of coconut sap sugar (CSS) production and marketing in a pilot research site in Balingasag, Misamis Oriental. This effort, which was later on privatized by Spythe Global, became a booming enterprise. After several months, the PCA again supported a new farmer's group which had the business skills and intrepid spirit to discover the profit potential of making sugar out of coconut toddy. Today, this enterprise is now touted as the new agribusiness with the possibility of making it a dollar earner.

A women's group in Aroman established the Aroman Natural Food Producers Multipurpose Cooperative in North Cotabato. This women's group was organized by the incumbent mayor of Carmen, North Cotabato. With support from the PCA and the local government, the cooperative applied their coconut sap sugar for Organic Certification with the support of a US-based Filipina, Dr. Evelyn Tablan, a natural medicine practitioner, who assisted the group in marketing the product in the US as an ingredient for a nutrient supplement.

Through the years, the Philippine Coconut Authority's programs were implemented with the view to encourage product diversification of coconut, which previously was solely on copra production, for farmers' increased productivity and income. PCA's involvement in the regional program on coconut development with the International Coconut Genetic Resources Network (COGENT) of Bioversity International, particularly the Poverty Reduction Project, paved the way for alternative livelihood using coconut products and by-products. It was the COGENT-PCA collaborative project that supported and identified the use of coconut toddy/sap for village-level sugar production.

Actually, coconut sugar production technology has been known in some coconut producing countries like Thailand and Indonesia for over a decade. In 1996, it was introduced in the Philippines but it gained



PHOTO: PCA

popularity only in 2004 (Ticzon, et al 1997). In the same year, the technology gained momentum as a commercially viable technology and became a small-scale enterprise expanding into an agribusiness (Manohar and Andres 2005; Manohar 2005).

Coconut sap sugar (CSS) production now has a niche market and presently is in high demand locally and globally as more and more of its health benefits are discovered by the scientific community. This has led to the establishment of cooperative partnerships of village-level producers and enterprises with the PCA and local government units to enhance and support the reinvigoration of the coconut industry in the country. Since then, the PCA and its research centers have conducted massive trainings for local communities to share viable technology to foster economic growth and social development.

Characterizing the nutritious coconut sap sugar

As an income-generating enterprise for village-level production operation, the production process of coconut sap sugar was standardized and

the product characterized. The PCA-COGENT project fine-tuned the technology and developed the protocol for coconut sap sugar production. The modified and standardized protocol is based on a research undertaking by the Aroman cooperative.

Coconut sap sugar is not only the source of income of coconut farmers but it has proved to be an important addition due to the product benefits to human health. It is made from the nutritious toddy/sap (*tuba*) that oozes out from a cut made on the unopened coconut inflorescence. This sap contains 12-18% natural sugars.

Based on research conducted by Manohar (2004) in Misamis Oriental and North Cotabato, coconut trees were found to yield an average of 3 liters of sap per tree per day. Using the technology, an average of four kilos of sugar can be recovered from 24 liters of the coconut toddy/sap depending on the sugar content of the freshly dripped and collected sap.

An added advantage of the technology is its simplicity and uncomplicatedness considering that this involves only concentrating fresh sap into



Rose Mary Aquino

Orlando Lorenzana

Severino Tumamang

PHOTOS: JIAP/IAN/ROELACRZ/EAIRON

to improve their production and increase their income. Among the technologies/interventions that they adopted were integrating vegetable crops into rice production, using high quality seeds and organic fertilizers, and implementing IPM including other cultural management such as plastic mulching for vegetables.

For techcom projects, Dr. Lorenzana mentioned some notable projects specific to the peanut development program, the development and commercialization of Asha peanut, and the commercialization of OPV of high yielding corn (glutinous and flint). Two recent techcom endeavors supported by the Bureau of Agricultural Research (BAR), according to Dr. Lorenzana, are the development and improvement of Abulug pomelo variety and the improvement of Satsuma sweetness (orange).

Secret to success

"There are no secrets to success. Success is the result of perfection, hardwork, learning from failure, loyalty to those for whom you work, and persistence. For CVIARC, their success lies in both the leader and their hardworking members."

PHOTO: CVIARC



The Crop Improvement Group of CVIARC.

In 2008, the Crop Improvement Group of CVIARC composed of the triumvirate efforts of Dr. Orlando J. Lorenzana, Severino C. Tumamang, and Rose Mary G. Aquino, won the Civil Service Commission (CSC) "Pagasa Award for Outstanding Work Performance" (group category).

aquaculture enterprises, and fishing grounds.

He likewise acknowledged the role of funding institutions, such as BAR and PCARRD, which have been instrumental in enhancing their research endeavors in technology generation and commercialization.

We may have the expertise, hardwork and persistence, but without these agencies to support our initiatives, everything goes nowhere, concluded Dr. Lorenzana. 🌱

For more information on CVIARC's research endeavors and technologies developed, write or call: Department of Agriculture Region 2, Cagayan Valley Integrated Research Center, San Felipe, Ilagan, Isabela at telephone number (078) 622-0960-61 or email: cviarc_ies@yahoo.com

Reinvigorating the Philippine peanut industry through Asha

by Edmon B. Agron

PHOTO: MRAMOS

Peanut is a popular food crop in the Philippines. It finds use as a nutritious snack and as an ingredient in different Filipino dishes. It is widely consumed as boiled-in-shell peanuts and salted fried peanuts, processed as peanut butter, and as an ingredient in the manufacture of confectioneries. Peanut is ideal as a food ingredient in the culinary arts because of its aroma, flavor, and crunchy texture. Oil from peanut is also extracted for food and industrial uses.

It has excellent nutritional value as indicated by its proximate nutrient analysis - 25.67% crude protein, 20.05% carbohydrates, 47.41% crude fat, 4.39% moisture, and 2.48% ash. At 25% protein and 45% oil, peanut is an inexpensive, high protein, high-energy food for humans and livestock. It is also a high-quality, healthy vegetable oil for cooking. A concentrated food from peanut has more proteins, minerals, and vitamins than beef liver, more fat than heavy cream, and more energy than sugar. One cup of roasted peanut has the energy value of approximately 4 cups of milk, 5 cups of meat, and 7 chicken eggs. It is also a good source of vitamin A and B (PCARRD, 1978).

Based on Protein Digestibility Corrected Amino Acid Score (PDCAAS) - standard quality for protein measurement, peanut is a plant equivalent of meat and

eggs - essential for human growth and health. It is also a good source of niacin that contributes to brain health. Some studies have found out that peanut has antioxidants and resveratrol which have potential anti-aging effects and is said to help reduce cardiovascular diseases and lowers cancer risks.

Essentially, peanut has a lot of uses and functions. Aside from being an excellent food source, peanut is an income generating crop to farmers. In fact, it is one of the major field legumes grown by farmers in Luzon, Visayas, and some provinces in Mindanao.

However, although peanut production is found throughout the country, the yield is not enough to meet the increasing demand for household and industrial uses. In fact, the Philippines is import-dependent on peanut. Eighty percent of our peanuts come from China, one of the biggest peanut producing countries in the world. Rosemary Aquino, project leader on Asha peanut promotion and production of the Department of Agriculture - Cagayan Valley Integrated Agricultural Research Center (DA-CVIARC), admitted that our peanut production is very little compared to the huge demand of the industry. It is sad to admit that the industry is greatly dependent on imported peanut but it is the

reality.

In the early 1990s, Regions 1 and 2 were the leading producers of peanut in the country, accounting for 50% of the country's production. Region 2 used to maintain an average yield of 0.65 ton/ha on about 22,000 hectares planted with peanut. But due to the low yield and therefore low income in peanut, farmers shifted to corn production (hybrid yellow corn), which was heavily promoted at that time. This resulted to the sudden decrease in the national production of peanut in the country.

Aquino cited some reasons for having low yield in peanut productions in the Philippines. These are: 1) poor seed quality as planting material; 2) low level technology used; and 3) seasonality of local peanut varieties and its use as an intercrop rather than as a primary crop.

To meet the domestic demand for peanut, effective production strategies call a sustainable supply of quality seed materials and increasing the yield per unit area. She also said that introducing high yielding peanut varieties is the cheapest and easiest way to improve the industry in the country.

Bringing Asha to the Philippines

The International Crop Research Institute for the Semi-Arid Tropics

rebuild the image of the college and made it as one of the leading educational institutions in Central Luzon in agriculture and allied sciences. He was instrumental in motivating and cultivating the culture of excellence of his staff and students. He instilled the values of commitment, dedication, discipline and responsibility that bore fruit not only in outstanding achievement in academics but also in athletic and sports and socio-cultural competitions.

In line with institutional research, Aglibut sweet tamarind was presented as a commercially viable and feasible commodity especially to communities willing to be part of the cause for the Sweet Tamarind Community of Practice. Furthermore, it also led to the establishment and development of other researched crops such as tissue-cultured bananas, bamboo, jatropha, and organic *pinakbet* vegetables crops like ampalaya, eggplant, chili, okra, and string beans. Even organic fertilizer production was promoted through the mechanism developed for AST.

These activities generated external interest in PAC that led to partnerships of PAC with public and private companies in Korea, Israel, the Netherlands, the United States, United Kingdom, other Asean countries, and China like the Guangdong Chinese Academy of Agricultural Sciences in collaborative partnership with the Philippine-Chinese Chamber of Commerce, Inc. Other agencies that came in included the Commission of Higher Education, Clarkfield Economic Zone Development Authority, Department of Agriculture, Department of Science and Technology, Department of Trade and Industry and even the Department of Tourism which identified the college as a potential area for agri-tourism activities.

Aside from research partnership, the Aglibut Sampalok, the PAC created the groundwork for a business partnership to set up



PHOTOS: PAC/CDEGUZMAN

entrepreneurial initiatives with people and communities in nearby areas. PAC's extension service trained and provided technical assistance to students, enthusiasts, and interested on the growers of Aglibut Sampalok production management system involving the use of grafted seedlings. Dr. Roger Cosio coordinated the first Aglibut Sweet Tamarind technically-assisted farm in Zambales. All of these activities were stirred by the crop as it expanded its coverage while the college and its leadership stretched out their horizon.

The next step

Although Aglibut Sweet Tamarind was a factor in the creation and establishment of institutional promotion and partnership, much work remains to be done. Grafted seedlings distributed and planted in different areas around the country must be monitored and evaluated to determine its growth and production performance. There is also a need to look at the market of the produce at the same time if the produce will be processed into other value-added products. Based on these, PAC's Aglibut Sweet Tamarind Development Program shall require further support. Continuous research must be done in order to show the true value of Sweet Tamarind Community of Practice. Who knows the next time a new product comes along another partnership will be developed creating more activities, higher yields and increased profits for people engaged in agriculture and sustainable development.

Notes: The information shared in this feature article were derived from document analysis of Sweet Tamarind R&D progress reports and documents and enhanced by a personal interview with Dr. Zosimo M. Battad, professor and former president of the Pampanga Agricultural College in Magalang, Pampanga.

Institutional promotion & partnership for dev't: The case of PAC's *Aglibut Sampalok*

by Marlowe U. Aquino, PhD

Have you ever wondered if a crop commodity can set the direction of an institution towards development? Well, I believe this is a bit puzzling because it does not seem possible. Not unless strong individuals or organizations are focused on making this happen. This describes the case of the Aglibut Sweet Tamarind (AST) and the Pampanga Agricultural College (PAC) in Magalang, Pampanga.

AST or *Aglibut sampalok* has its share of stories in tandem with a budding educational administrator and the growth of an institution. Theirs is a story in partnership marked with leaps and bounds, triumphs and challenges and establishment of character. Initiated by a visionary, dynamic and action-oriented individual, Dr. Fortunato Aglibut Battad established the original tamarind scion grove at the foot of Mount Arayat with some 200 trees in 1978 where the present PAC stands.

PAC is known as a haven of educational innovativeness and creativity. Dr. FA Battad led his team spearheaded by Dr. Felomina K. Reyes to formally work on the crop particularly through research and development. Through production and crop evaluation in partnership with the Bureau of Plant Industry National Seed Industry Council (BPI-NSIC), PAC exhausted all efforts to develop the *Aglibut sampalok* into a niche commodity.

Over the years, research and development activities focused on crop's production management system and its varietal improvement. After the retirement of Dr. FABattad, his ably and equally competent son, Dr. Zosimo M. Battad, continued the groundwork when he assumed the post as president in 23 July 1999. Upon his assumption of duty, Dr. Zosimo Zing M. Battad started coordinating with the BPI-NSIC national technical working group for fruits headed by Dr. Glicerio R. Pascua of Mariano Marcos State University. Together, PAC and BPI-NSIC prepared the roadmap for the development of *Aglibut sampalok* as a viable commodity.



PHOTO: COURTESY OF PAC

Laying the groundwork

Aglibut sampalok passed through rigorous but effective and efficient research and development. Dr. ZMBattad's positive attitude and commitment helped boost crop's chances to reach its full potential. In 2001, mass propagation and establishment of nurseries including new scion grove were set-up through initial financial support coming from the Department of Agriculture-Bureau of Agricultural Research (DA-BAR) and the Spanish government. Both agencies helped drumbeat the necessary partnership of the Pampanga Agricultural College with national and international agencies. The R&D activities include pruning, fertilization, pest and disease management in lahars-laden areas of Pampanga, and product processing for increased value-adding.

In addition, PAC's sweet tamarind R&D activities received good reviews and were commended for further R&D work. The Philippine Senate Committee on

Agriculture took notice of the gains of PAC in the promotion of the crop that led to its endorsement by Senator Ramon Magsaysay, Jr and Sec. Luisito Lorenzo of the DA for mass propagation and commercialization nationwide to members of the the Association of Colleges in Agriculture in the Philippines (ACAP) and other state universities and colleges (SUCs).

It is believed that the Aglibut Sweet Tamarind can compete with the more famous Thailand Sweet Tamarind in terms of sweetness and quality. In view of this, Dr. ZM Battad created his team to work closely with other institutions wanting to push the crop into national stature. At the same time, the Magalang LGU declared through a local government resolution the municipality's adoption of the crop and declared Magalang, Pampanga as the Sweet Tamarind Capital of the Philippines. Researchers, extension and development workers worked together to create the *Aglibut sampalok* community of practice in Pampanga and Central Luzon.

Strengthening institutional partnership

Strong community participation was the key to the establishment of institutional partnership for the Aglibut Sweet Tamarind (AST). This was supported by active involvement and leadership of Dr. ZMBattad as he continued to share this brown gold with the rest of his constituents in research and the academe.

The established AST nurseries distributed grafted seedlings all over the province and the region. This prompted Dr. ZMBattad and Dr. Leopoldo Reyes to intensify the mass propagation of seedlings. Some were even transported and planted as far as Northern Luzon and Mindanao as part of the revolutionary expansion of the brown gold.

As institutional partnership strengthened and collaborative works expanded, PAC was also growing with Dr. ZMBattad's leadership. He started to

(ICRISAT), an India based, non-profit, non-political organization known worldwide for its excellent research work on legumes, has been linking to the Philippines in germplasm exchange programs and trainings as early as 1980s.

ICRISAT has provided 3302 samples of 2785 germplasm accessions to the Philippines to date. It also supplied 49 sets of trials, 708 advanced breeding lines, and 72 segregating populations to different institutions in the Philippines (ICRISAT website).

This cooperation led to the development of three peanut lines that passed the standard field testing requirements for legumes of the National Cooperative Test (NCT): The NSIC Pn 10 in 1993 with an average yield of 1.5 tons/ha, NSIC Pn 11 in 2002 - a variety with an average bean yield of 1.65 tons/ha, and NSIC Pn 12 in 2003 with an average yield of 1.62 tons/ha. These three lines were also approved for commercial release by the National Seed Industry Council (NSIC) of the Philippines.

Under this endeavor, the relationship of India through ICRISAT to the Philippines became stronger. In fact, Dr. William Dar, ICRISAT's director general, personally brought to the Philippines a packet of the best ever peanut variety from India in January 2005. This variety, named Asha peanut a Hindi word for hope, is a large-seeded and high yielding peanut variety that could bring hope to the Philippine peanut Industry as it had in India.

Consequently, a month after Dr. Dar's gesture, the President of India, Dr. APJ

Abdul Kalam symbolically, handed over the foundation seeds of Asha Peanut to President Gloria Macapagal-Arroyo at the Malacañan Palace in a ceremony in February 2005 during his official visit to the Philippines.

Boosting government-private partnership

For a better peanut industry, the Bureau of Agricultural Research (BAR), being the leading institution for research and development in agriculture and fisheries in the country, took the opportunity and funded the implementation of research and development activities on Asha peanut with field testing through its Community-based Participatory Action Research (CPAR) Program.

Since Region 2 is the leading producer of peanut in the country, DA-CVIARC was identified as the first implementer of the project. Introduction, promotion and efficient seed support system of ICRISAT ASHA peanut variety in Region 2

Part of the CPAR project is training of the staff on appropriate technologies needed in the production and implementation of the Asha project in the Philippines. BAR therefore sent two DA technical staff to ICRISAT in India for training on groundnut crop improvement, integrated pest management, and aflatoxin determination prior to the implementation of CPAR project on Asha peanut in the country. After the establishment of a demonstration farm in



PHOTO: JAPITAN

Region 2, farmers/growers, stakeholders and other peanut enthusiasts in the region were also trained to ensure common understanding on the proper management of Asha peanut production.

Techno demo and field days were also conducted to showcase the performance of Asha variety and production technologies to farmers, buyers, processors, and other peanut enthusiasts. Production guides and product catalogues, in the form of leaflets, flyers, and posters were also produced in the local dialect and distributed during the trainings. Trade fairs, exhibits, summits and research investment forums were also held. Promotion of Asha peanut through television and daily newspapers contributed to widespread awareness resulting to wider acceptance of the variety.

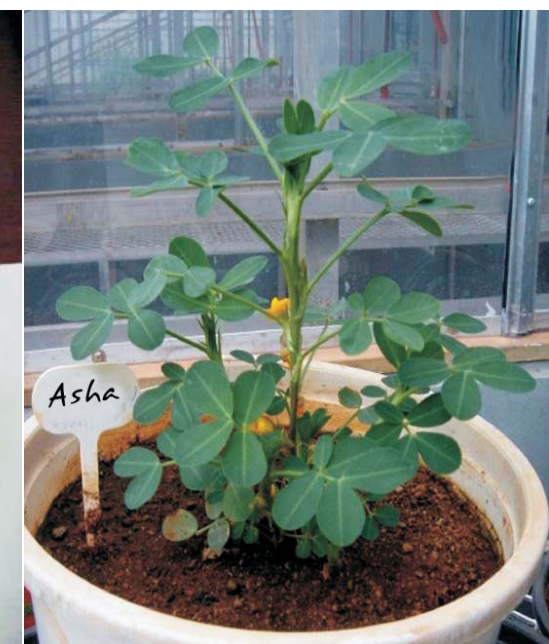


PHOTO: CVIARC

Eventually, other agencies also showed interest and helped in the promotion and production of the new peanut variety. The Department of Trade and Industry (DTI Region 2), Department of Labor and Employment (DOLE Region 2) and Department of Science and Technology (DOST Region 2) collaborated in the project through the conduct of training activities on community-based processing of Asha peanut food products and packaging, and other related livelihood. These were conducted in the different participating municipalities in the Cagayan Valley region.

The Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) and ICRISAT have enjoyed a fruitful relationship since 1975. In November 2005, BAR, PCARRD, and ICRISAT signed a Memorandum of Understanding (MOU) to support the commercialization of Asha peanut and other ICRISAT mandate crops in the Philippines.

CVIARC also noticed the willingness of the local government unit (LGUs) to support and participate in the commercial production of Asha peanut. A Memorandum of Agreement (MOA) was therefore executed between DA-CVIARC and all interested LGUs.

Motivating factors for investment

Asha peanut was found suitable to the country's climatic and agronomic condition in the series of testing and evaluation trials conducted by the National Seed Industry Council (NSIC) in eight different locations all over the country.

It is the only peanut variety released in the Philippines that has produced the highest recorded yield of 3,991 kg per hectare. It has doubled the yield of the regular peanut varieties in the country and made possible an income up to PhP 27,000 per hectare.

Asha peanut is also a 3-in-1 variety in terms of seed sizes - comprised of Class A (50% extra-large seeds; 1 seed: 1 gram); Class-B (30% large seeds; 2 seeds: 1.5 grams) and Class-C (20% medium-small seeds; 3 seeds: 1 gram). The biggest seed are same sized as cashew nuts. Aside from being large-seeded, it has a high shelling recovery of 73-79% making it ideal for confections and table food.

Asha peanut is resistant to bacterial wilt and other foliar diseases like early and late *Cercospora* leaf spot and rust. It is ideal for livestock forage due to its high fresh bio-mass and dry matter yield.

The strong promotion of the variety has motivated and attracted the interest of farmers as shown by the increase in hectareage, not only in Region 2, but in other regions as well.

Today, Asha peanut is commercially grown in various locations of the country. In Region 2 it is in DA-CVIARC, in Laguna - Bureau of Plant Industry-Los Baños National Crop Research and Development Center (BPI-LBNCRDC), in La Union - Don Mariano Marcos State University (DMMSU), in Southern Mindanao - Southern Mindanao Integrated Agricultural Research Center (SMIARC) and University of Southern Mindanao (USM), in Ilocos - Mariano Marcos State University (MMSU), and in Central Visayas - Central Visayas Integrated Agricultural Research Center (CENVIARC).

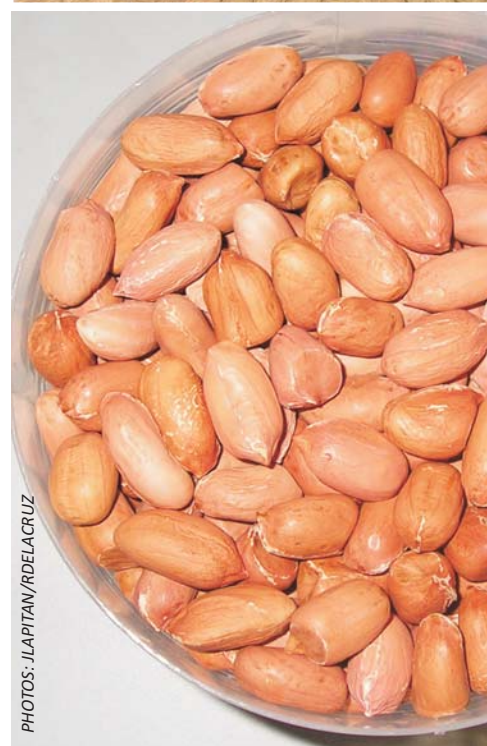
With the good qualities of Asha peanut, five major peanut processors in the Philippines, the Marigold Commodities Incorporated, Newborn Food Products Inc., Tobi Marketing, Growers Food Industries Inc., and California Manufacturing Corporation, are now accepting peanut products from the different production areas. This gives Asha peanut growers an assured market in the years to come.

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PHOTOS: J LAPITAN/RDELACRUZ

The making...from page 15

the basic knowledge and skills of the farmer-partners.

In addition to these, a technology demonstration farm was established to serve as a learning field for the farmers in the area. It was the establishment of this techno-demo farm that reinforced the sustainability of technology transfer and complemented the promotion of activities since the approach aimed to enhance human resource capability rather than mere technology promotion.

Aside from pickled garlic and garlic chips, the cooperators, through MMSU, were also able to produce garlic powder, garlic granules and garlic flakes. But it was the first two mentioned products that became the prime merchandise of the group.

The project had a good start and continued on to eventual success by carrying out other significant activities. Aside from the techno leaflets on garlic production, processing and value-adding that were massively promoted and distributed to the farmers, two radio programs devoted to garlic production were also launched. The project also persisted in capability building efforts through leadership training and trainings on improved garlic production technologies, processing, value-adding as well as packaging and labeling.

The Siwawer Garlic Products Association sought the help of the Department of Science and Technology (DOST) in having the nutritional content and properties of their products analyzed to make the product more acceptable in the market. Since then, the product labels have contained the corresponding nutritional analysis.

Now that products out of garlic could be produced, the cooperative addressed the marketing concerns next. The main goal of it all is to sell their products at a decent price. The group, therefore, never failed to join in agriculture fairs that were conducted at municipal, provincial and national levels. Through joining in these activities, not only were their products introduced, they were also able to solicit suggestions from the consumers as to how they could improve their products in the taste and packaging aspects. Bulk orders were often placed at trade fairs like these.

In addition to this marketing strategy, the coop members also let the locals in their community have a free taste of their products. Similarly, they also sent out samples of the products to their friends and relatives abroad. Gradually, through word of mouth, the pickled garlic and garlic chips of Ilocos became well-known to many. Some people were surprised to learn that the tangy and pungent Ilocos garlic now comes in the form of pickles and chips and even as powder and flakes.

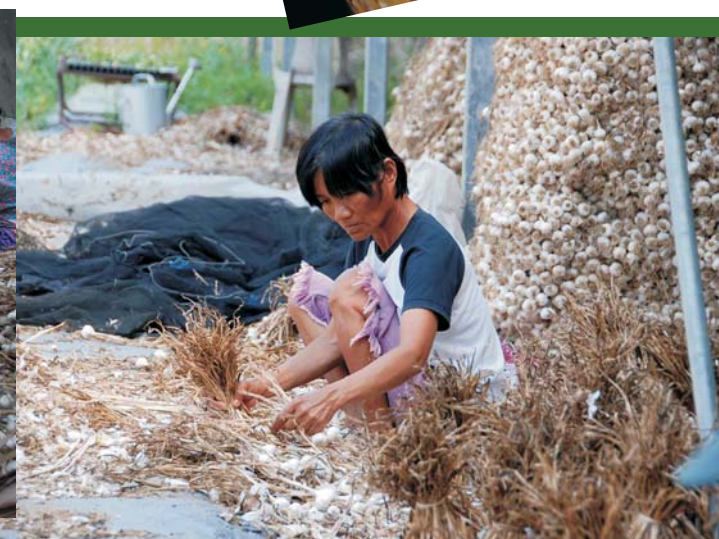
Through this Garlic Technology Commercialization Project supported by BAR, the farmer-partners in Ilocos are now empowered with appropriate crop production for high yield and they now have a well-organized and coordinated business organization with established linkages for sustainability in operations. These linkages and trade partners could eventually open doors for global market expansion. More importantly, this project can serve as a vehicle for livelihood generation and, hence, improvement in the standard of living of people. 🌱



PHOTOS: RDELACRUZ



PHOTOS: RDELACRUZ



production of sweet sorghum as a viable source of energy.

Being the focal agency for biofuels in R&D, BAR's goal is to consolidate current research and commercialization efforts on sweet sorghum, as well as provide relevant information on the adaptability of the crop and its multi-uses as food, feed and fuel (bioethanol). Accordingly, BAR has developed a framework for RDE on sweet sorghum and the plans for immediate and long-term activities for hastening sweet sorghum's full utilization in the country.

The field tests of sweet sorghum at MMSU have shown encouraging results. Five out of the eight varieties of sweet sorghum bred by ICRISAT and brought into the country for field testing have been found to thrive well under Philippine conditions. These are NTJ 02, SPV 422, ICSV 93046, CSR 93034, and ICSV 700. They were found to have high content of juice and good grain yield when tested at the experimental farms of MMSU. Also, the crop has provided bright prospects, not only as feedstock for ethanol production, but also as food and feed grain.

Following the significant initial results of the studies, the five sweet sorghum varieties were then tried in 58 other sites across the country which similarly produced encouraging results as reported at the First National Sweet Sorghum RD&E Review and Planning Conference in March 2008.

The program was subsequently implemented in several areas in the Ilocos, Cagayan Valley, Cordilleras, Central Luzon, Bicol, and some provinces in the Visayas and Mindanao.

Given the successes of MMSU in Ilocos Norte, the Bicol Integrated Agricultural Research Center (BIARC) in Camarines Sur, these R&D Centers developed their respective region-wide commercialization of sweet sorghum with funding and coordinative support from BAR. This included the development of village-level technologies on food products and the production of molasses and organic fertilizer.

Replicating the sweet success

Now in its full scale of project implementation all over the country, BAR is moving for the commercialization of sweet sorghum given its proven potential as a source of bioethanol.

Not to push out other important crops, such as corn and sugarcane which are also good sources of bio-ethanol, we must look at sweet sorghum not as competitor but as an opportunity given its potential, production- and yield-wise, stressed Dr. Dar in a recent interview at BAR.

Dar further explained that an evolutionary approach in this trying time is that while we continue the science of developing sweet sorghum for biofuel as a long-term plan, we must also look into intermediary approaches such as developing value-added food products from sweet sorghum.

From the pilot areas in the Ilocandia, the program has spread to other regions in Cagayan Valley, Cordilleras, Central Luzon, and Bicol, some provinces in the Visayas and Mindanao, and recently to Mindoro, Cotabato, and Bantayan Island.

According to Dr. Heraldo L. Layaoen of MMSU in Batac, Ilocos Norte and who is the national program coordinator for the sweet sorghum project, the area planted for sweet sorghum in the country now totals to 310 hectares in piloting mode. MMSU piloted the field trials of sweet sorghum and currently has a stock of 288 varieties of sorghum, of which 19 varieties are said to be promising for ethanol production.

Dr. Dar has encouraged BAR to double if not triple the allocation for sweet sorghum. It is important that BAR sustain its efforts on this crop and, as a long-term plan, establish an integrated Research Development and Extension (RDE) program on sweet sorghum, said Dar.

In response, BAR has earmarked a PHP10-million budget for the

implementation of sweet sorghum projects. Currently, BAR is coordinating and funding 17 projects all over the country. Twelve of these projects are implemented by the the Regional Integrated Agricultural Research Centers (RIARCs) of DA. The rest are implemented by SUCs, specifically, the Central Luzon State University (CLSU), Pampanga Agricultural College (PAC), and Isabela State University (ISU) in addition to MMSU and the University of the Philippines Los Baños (UPLB) that conducted a feasibility study on sweet sorghum and cassava as viable feedstock for the production of biofuels. 🌱



FUEL



FOOD



FEED / FORAGE



FERTILIZER



PHOTOS: RDE/ACRUZ



The Ilocos region is known for its cultural heritage and pristine beaches. Situated there are the historic city of Vigan with its century-old Calle Crisologo and the white sand stretch of Pagudpud beach. But aside from these, Ilocos is also identified with the vast production of garlic also known as the Ilocos white gold.

Garlic is one of the most important commodities in the Philippines not only today, but also during the pre-Hispanic era. Since then, until now, garlic has played a major culinary role in most Filipino dishes. And, aside from this, garlic is also proven to have many health benefits.

With its agro-climatic suitability, the Ilocos region is the main producer of garlic bulbs in the Philippines with 65% of the country's average total production per year. Preferred over other varieties by local consumers because of its pungent aroma and tangy taste, the Ilocos white gold is considered a major cash crop by its growers.

But even though the Ilocos white gold has good qualities as a crop, its production is still relatively low and this compels the government to import garlic from other countries to meet the local demand. In view of this situation, the Department of Agriculture (DA), through the Bureau of Agricultural Research's (BAR) National Technology Commercialization Program (NTCP), implemented the so-called Garlic Technology Commercialization

Project. This particular project aimed to fast track the commercialization of improved garlic technologies from field production to processing and marketing. This was done in collaboration with other stakeholders towards the goal of increasing productivity in the crop eventually resulting to a boost in the farmer's income.

Under the Garlic Technology Commercialization Project, several areas of concern were covered. These included: soil type, planting schedule, variety, selection of cloves for planting, seed treatment, land preparation, crop establishment, fertilizer application, mulching, planting distance, weed control, nutrient management, insect and pest management, application of growth enhancers, irrigation, harvesting, drying, cleaning and storing.

With all these concerns addressed by the project, it immediately achieved very desirable results. Around 150 farmer cooperators were very happy with the results of this project, the most notable of which is the increased bulb size of the garlic attributed to the use of the growth hormone, GA₃ or gibberellic acid. Application of GA₃ on garlic delayed plant maturity, increased stem diameter and height, and induced bolting and flowering which resulted in increased bulb size and yield.

With the remarkable increase in garlic production, the demand of the local market was therefore met. But the Garlic Technology Commercialization Project did not stop there. It is true that, because of the increase in yield, the farmers now have increased income as well. However, there were still other ways on how they could earn more and this is through the use of different value-adding technologies.

Through the various studies conducted by the Mariano Marcos State University (MMSU), two garlic by-products were identified: pickled garlic and garlic chips as having good potential. Further researches were done by the university on how to properly process garlic into chips and pickles.

A group called the Siwawer Multipurpose Cooperative was formed to make use of these technologies. Before proceeding to enterprise development, the various stakeholders and farm-partners of this garlic project had the Department of Labor and Employment (DOLE) legalize the new group which later carried the name Siwawer Garlic Products Association. It was not easy for the group to come up with good quality garlic chips and pickled garlic at the beginning. They also had to produce information materials to widely disseminate the garlic commercialization technology and conduct trainings, as well, to enhance

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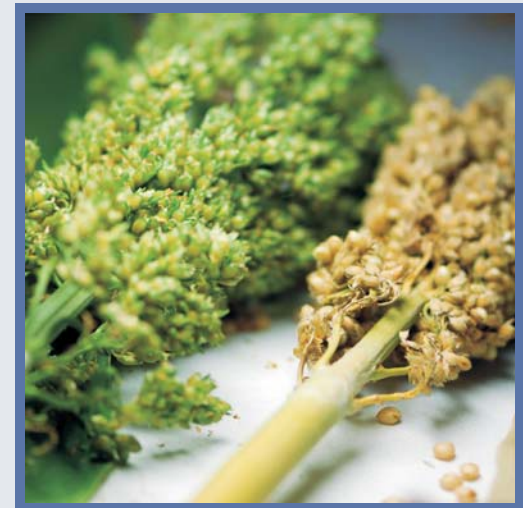
Sweet sorghum:

A smart and climate change-resilient crop

by Rita T. dela Cruz

"The livelihoods of billions of people in developing countries, particularly those in the tropics, will be severely challenged as crop yields decline due to shorter growing seasons."

- Robert Zeigler, IRRI Director General



PHOTOS: DELA CRUZ



Sorghum bicolor L.

PHOTO: PAC

Climate change threatens food crops across the world. And given the fact that most of the world's food is grown in tropical countries where people are most vulnerable to climate change, predictions for future global food production could be far worst than earlier estimated. For a tropical country like the Philippines, these are the likely odds.

With the increasing frequency of climate change-associated natural disasters such as floods and droughts, researchers in the Philippines are re-focusing their R&D efforts to look for alternative crops that are not vulnerable to climate change. The trend now is to focus more on crop resilience rather than increasing the yield.

One crop that has been in the limelight for quite awhile since its introduction into the country in 2005 is sweet sorghum, dubbed as both a *smart* and a *resilient* crop.

As a smart crop

Sweet sorghum (*Sorghum bicolor* (L.) is a plant that grows to a height of 8 to 12 feet. It looks a lot like corn but with the grain on top rather than to the side.

Although not well known to most Filipinos, sorghum is the world's fifth largest grain crop, next to rice, corn, wheat, and barley. It is grown in more than 42 million hectares (107 million acres) in 99 countries. Among the leading producers are the United States, Nigeria, India, China, and Mexico.

Essentially, sweet sorghum is being promoted as major source of bioethanol for addressing the energy problem in the country but it goes beyond that as it also

provides human food, livestock feed and forage, and organic fertilizer. Hence, the 4Fs in sweet sorghum production: Fuel, Food, Feed/Forage, Fertilizer.

We consider sweet sorghum an ideal 'smart crop' because it produces food as well as fuel. Sweet sorghum can help meet the country's fuel needs without compromising our food supply, said Dr. William Dar, director general of the India-based International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), the international R&D center that brought the crop to the Philippines.

Unlike other sources of feedstock for bioethanol, such as corn and sugarcane which compete with food supply and has a high water requirement to cultivate and grow, sweet sorghum is more productive on an annual basis and can withstand drought and has a better chance of surviving rains or storms.

Fuel. The main source of ethanol in sweet sorghum is the stalks which when crushed yields sweet juice that can be fermented and distilled to obtain bioethanol a clean burning fuel with a high octane rating. With this technology at hand, the Philippines can go all out for the 10 percent bioethanol-blended gasoline to save an estimated 565 million liters of gasoline per year. This in turn will ease the country's growing need for gasoline, a fossil-derived fuel, and lead to a great reduction in carbon emissions.

Food. The grain of sweet sorghum is a source of food. It is a promising cereal crop that could help address problems on malnutrition, dwindling food supply, and the increasing

cost of wheat flour. Its grain is higher in protein and lower in fat than corn. It can be milled into flour as the main ingredient for soups and porridge, native delicacies, meals, and appetizers. The grains can be processed and used as an alternative to rice. Likewise, the sorghum kernel can be made into pop sorghum, now becoming a popular healthy snack.

Feed/Forage. A good source of energy and protein, the grain of sorghum can also be an important ingredient of feeds for poultry and cattle. Studies show that the feed value of sorghum grain is similar to corn. Although it is lower in vitamin A, sorghum grain has even more protein and fat than corn. When compared with corn on a per pound basis, sorghum's feeding value ranges from 90% to nearly equal that for corn. The grain is highly palatable to livestock and its intake seldom limits livestock productivity. The grains have also been found to be an essential ingredient in the production of pre-conditioner feeds for fighting cocks.

The stripped leaves and crushed stalks of sweet sorghum are also good for large and small ruminants. The leaves and fibrous residue of sweet sorghum contain large quantities of protein, making it a valuable livestock feed. The fibrous residue can also be used as fuel for industrial boilers.

Fertilizer. Sweet sorghum bagasse produced from sweet sorghum can be converted into bio-organic fertilizer, which a cost-effective soil enhancer. Bagasse is the pulp or dry refuse left after the juice is extracted from sweet sorghum stalks in the process of production for sugar, ethanol production and other sweet sorghum

products. Through the introduction of the microbial inoculant, *Trichoderma harzianum*, composting time is shortened from three months to just 3-4 weeks.

A 25,000 kg of sweet sorghum bagasse can produce 125 bags of the bio-organic fertilizer which can be sold at PhP230 per bag, with a gross value of PhP28, 750.

As a climate change-resilient crop

Aside from being a smart crop, sweet sorghum has also been dubbed as the great climate crop'. Sweet sorghum is a resilient crop. It is easy to grow, and is resistant to pests and weed. It tolerates soil salinity, acidity and toxicity, and can withstand extremes of tropical weather, tolerating both heat and water logging.

Given its resiliency and adaptability to changing climates, sweet sorghum thrives even in marginal, arid lands which cannot be planted to rice, corn or sugarcane. Hence, sweet sorghum is a great solution to soil problems.

Planting sweet sorghum is cost effective too. It provides farmers profitable farming with its consistent cashflow and income in the long term. It provides better yield per hectare given its shorter crop cycle compared to crops such as sugarcane and cassava. The cost of growing sweet sorghum is four times lower than that of sugarcane, PhP 17,820 compared to PhP 44,250/ha/year according to ICRISAT.

Another positive climate change value of this crop is that it consumes less water. For one crop of 12 months, sugarcane uses 36,000 cubic meters of

water per hectare; for two crops taking only 8-9 months, sweet sorghum consumes a mere 8,000 cubic meters which is comparatively 78 percent less water.

Public-private-farmer partnership

Upon its introduction into the country by ICRISAT, the Bureau of Agricultural Research (BAR) stepped forward as the first government agency to support the commercial production and utilization of sweet sorghum. With the Mariano Marcos Memorial State University (MMSU) at the helm of implementation in Northern Luzon, varietal adaptability trials were implemented in March 2006. More than a year later, the National Economic Development Authority (NEDA) supported the establishment of barangay-based technology demonstration on sweet sorghum.

Modeled after a public-private-farmer partnership, a development program on the wide production of sweet sorghum for ethanol, food, feeds, forage, fertilizer and other by-products was implemented. The program is anchored on the recent passing of the Philippine Biofuels Law (RA 9367 or Biofuels Act of 2006) and the goal of the Department of Agriculture (DA) of maximizing productivity in the marginal, underutilized/idle areas in the regions.

Given such a priority program, BAR further intensified its initiatives to focus on biofuels R&D to develop technologies that will sustain the production of the country's domestic