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100 years of rubber in the Philippines: Some glimpses

"Rubber is a plant that is forever." This statement was popular during the centennial celebration of the rubber industry and the first International Rubber Conference held in Davao City on 22-24 November 2005.

With the upsurge of demand for rubber and its price escalating in the world market, it is easy to understand why scientists, smallholders, researchers, private sector, government agencies, and local government units (LGUs) as well as the international delegates during these two events were all dedicated in imparting valuable knowledge and experiences in planting and marketing their most important commodity—rubber.

Getting ahead

Fifty years into rubber industry, Mr. Onofre T. Griño, president of a Filipino private corporation, recalled how rubber production developed into a significant industry since its introduction in Mindanao.

"Rubber was introduced in the Philippines in the early 1900's when the country is going through a difficult agricultural phase. The rubber manufactured as tires and shoes mostly came from Indonesia and Thailand. In the early 1920's, rubber mills were established in Basilan, but it was only in the 1950's when local private corporations embarked on setting up rubber processing plants in Mindanao. Today, large-scale rubber plantations such as Goodyear, Goodrich, and Firestone are well established in the country along with our local corporations such as the Menzi Corporation."

Mr. Julian G. Sampayan, a rubber smallholder, has an inspiring story. He started planting rubber when he was already at a retired age of 65. Unimpressed by his pursuit, he was ridiculed by the locals, saying he cannot make it. Still, he persevered and exerted his best efforts to prosper in the rubber industry. Today, at 95, he remains as one of the most successful rubber growers in the country.

The case of North Cotabato

North Cotabato in Mindanao is one of the major rubber producing provinces in the Philippines. As one of its priority crops, Governor Emmanuel F. Piñol expressed the province's commitment to expand the production of rubber. He stated that 25 million seedlings good for 50,000 hectares, are due for budding in their province.

In his speech, he announced that he was able to convince President Arroyo to recognize rubber as one of the priority crops in the country. "There are one million hectares of idle land in the country; about 500 million rubber trees can be planted in that expanse. This could mean a great deal for the country's bid to compete in the global market. There would be about $2 billion of farm earnings and P2.5 billion in local taxes per year, not to mention the thousand jobs it can generate for the locals."

He acknowledged the support

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Participants look on as Mr. Tajuddin Ismail of Malaysia demonstrates rubber tapping using stimulants during the 1st International Rubber Conference in Davao City.

IN THIS ISSUE

Expanding our horizon

by Alvin Bernardo V. Divinagracia

The famous author, Richard Bach, once said that "the more he wanted to get something done, the less he called it work."

We, at BAR, often think that enjoying our freedom of inactivity is not in our lifeblood.

After a frenzy of international engagements in the past two months, the Bureau is again swamped with commitments involving our international partners. It seems that our sphere of activities is moving beyond the shores of the country.

It was quite an honor that BAR was part of the centennial celebration of the Philippine rubber industry. Rubber is close to the Bureau's heart since its first international exposure in 1989 and its membership to the International Rubber Research and Development Board.

Rubber as we all know is an important crop in Mindanao and because it has over 50,000 uses, it is still considered as a sunshine industry even after 100 years. To cap this centennial, BAR co-hosted the 1st International Rubber Conference.

Earlier in the month, the Bureau co-organized the meeting of the Cereals and Legumes Asia Network (CLAN). Our involvement in this network resulted in the introduction of new peanut and sorghum varieties that promise more yield and income for our farmers. Also, we participated in a workshop with other Asian countries on the integration of National Agricultural Information Systems to better manage our knowledge resource.

Later, we, together with other international development agencies, co-sponsored an international conference that gathered prominent scientists and policy makers to examine the state and prospects of agriculture and rural development in Asia. Then, a group of our senior staff visited Taiwan to assess their R and D capability and strengthen partnership with our counterparts such as the Asian Vegetable Research and Development Center, Taiwan Agricultural Research Institute, and the Taiwan Livestock Research Institute. Towards the end of the month, we took a step forward in promoting pigeon pea, an important vegetable legume, with an agreement with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) to introduce high yielding varieties.

Indeed, the platform for BAR activities is expanding internationally. But these are just our tools and strategies to improve the capacity of R&D agriculture in the country, and create impact at the shortest possible time. Our commitment is to make technology work for Philippine agriculture and the Filipino people. ■

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tools are installed to enable sharing of information across R&D institutions; but the reality is often far less stunning than the promise. As the notion goes, just because information can flow, it does not mean that it will flow. There is a need for an effective structure to make the information flow and reach its intended clients.

Technology can make large-scale collaboration and information sharing possible. But changes in human behavior are needed to turn this promise into reality. We, at the R&D community know the importance of an organization-wide collaboration and investment in knowledge management tools to make that possible. This is precisely the reason why APAARI initiated this training workshop—to enhance the capability of the national agricultural information officers of NARS and help bridge the long issue of the "rural digital divide".

We often view information as a source of power and job security. This is true. But we must not forget that the people hold this kind of power and security. Knowledge management is people knowledge. It's still the human brains that process ideas into useful knowledge. Knowledge management tools remain futile without human interventions.

The electronic environment is a powerful communication tool that can be used to achieve goals and resolve issues. Also, the ability to connect to one another without the typical delays of phone-tag and setting up physical meeting space helps maintain continuity and moves projects forward quickly. The difference between information and knowledge is people. Computers store and process and distribute information/data and people turn that into knowledge. Hence, knowledge management is in part people management.

Tools are only powerful if people use them, and they only use them if they believe they'll benefit from their use. Also, the knowledge to be managed derives from people—they need to willingly make that knowledge available. ■

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Philippines hosts international joint meeting on cereal and legume

The Philippines recently hosted and participated in the international joint steering committee meeting of the Cereals and Legume Asia Network (CLAN) at the Water and Resources Management Center, Central Luzon State University (CLSU), Muñoz City, Nueva Ecija, 2-5 November.

With the theme, ***Crop-Livestock Systems for Sustainable Agricultural Production***, the joint meeting aimed to review the network activities in the previous years as well as plan future R&D activities for the region. It was attended by 12 country participants from CLAN member countries namely Bangladesh, China, India, Indonesia, Iran, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, and Vietnam.

Director Nicomedes P. Eleazar of the Bureau of Agricultural Research (BAR) represented the Secretary of Agriculture, Hon. Domingo F. Panganiban as guest of honor in the program. He expressed DA's gratitude in organizing this noble activity and networking through sharing learning experiences by the member countries.

CLSU President Rodolfo Undan, welcomed the participants to the university and expressed his gratitude for holding the joint meeting at CLSU.

For his part, PCARRD Executive Director Patricio Faylon explained that the learning experiences and good memories while in the Philippines should remain with the participants even when they will have left. He said that PCARRD's investment in the collaboration is high; CLAN offers new markets for Philippine cereals and legumes which could provide additional incomes to farmers.

On the other hand, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) Director General William D. Dar lauded his staff and introduced them as the "real Einstein" of the organization. He remarked that he is the cheerleader of the group, boosting ICRISAT morale as it focuses its effort on strategic partnership. A strong proponent of broadening linkages, Dr. Dar mentioned that the CLAN's success depends mainly on the 12 countries present during the meeting because they are the ones to implement the plans in their own countries.

BAR Director Nicomedes Eleazar (3rd from right) leads the ribbon cutting ceremony during the launching of the site for sweet sorghum for the production of ethanol

Before the start of the formal ceremonies, participants visited the project on "Enhancing Adoption of ICRISAT Legume Varieties and Technologies in the Philippines", located at CLSU's Research, Extension, and Training Experimental Area. This is a collaborative project of ICRISAT, DA-BAR, CLSU, and PCARRD. The legume varieties, tested and evaluated, resulted to their adaptation to local soil and weather conditions in Regions I, II, and III.

The launching of the project on "Sweet sorghum for ethanol production in the Philippines" was held after the field visit with Director Eleazar cutting the ceremonial ribbon. Witnessing the event were Dr. Dar and Global Theme Leader Dr. CLL Gowda (ICRISAT), Exec. Dir. Patricio Faylon and Crop Research Division Director Joy Eusebio (PCARRD), and President Rodolfo Undan (CLSU), and the country representatives.

Part of the joint steering committee meeting was the signing of the Memorandum of Understanding (MoU) by DA-BAR and ICRISAT in the research project, "Introduction, Promotion and Efficient Seed Support System of ICRISAT Peanut Asha Variety in Region II, Philippines". DA-BAR will provide supplemental funds to the project to cover expenses for training, research fellowship and study visit of the project's technical personnel.

As a fitting closing to the meeting, a challenge was posed to the member countries on how they can bring in other sectors to look at farming as systems farming. According to Dr. Dar, a farmer should be able to realize his farming potentials from subsistence farming to self sufficiency and later on, toward or being a part of a market-oriented economy.

A systems approach to farming should not only look into subsistence level of farming but aim for agro-eco systems farming that involves various disciplines and commodities.

As a final word, Dr. Dar expressed hopes for CLAN and its

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BAR participates in MRDP-APL2 project assessment and preparation workshop

The Bureau of Agricultural Research's (BAR) commitment to support agricultural and rural development programs is a moral booster for strengthening research, development, and extension (RDE) in Mindanao. A project assessment and preparation workshop was conducted on 22-23 November 2005 at the Felis Beach Resort, Times Beach Road, Matina, Davao City. It was participated in by the local government units (LGUs) of the identified Mindanao Rural Development Program – Adaptable Program Loan 2 (MRDP-APL 2) areas, representatives of DA Mindanao Regional Field Units of IX, X, XII, ARMM and CARAGA, DA-ATI, NEDA, DA Central Office (Planning, Field Operations and Project Development) and DA-BAR.

DA-BAR was asked to spearhead the review of the roles and functions of DA-Regional Integrated Agricultural Research Centers (RIARCs), regional field units, Agricultural Training Institute, Bureau of Fisheries and Aquatic Resources (BFAR), Philippine Rice Research Institute (PhilRice), regional state universities and colleges in the delivery of research, extension and training services, program planning, program implementation, monitoring and evaluation, coordination and management of agricultural programs and services, revitalization of the research, training and extension, communication, and agribusiness assistance support services, commercialization and community development.

Based on these, the MRDP-APL 2 will develop programs to improve the living condition of the rural poor and indigenous peoples' communities in Mindanao through a harmonized and directed agriculture and rural development program.

In a related concern during the MRDP – APL 2 preparation workshop, Mr. Bong Bolo, one of the senior consultants of the program, reiterated his institution's support to the technology commercialization program for Mindanao regions, which was unanimously agreed for implementation. The participants believed that technology commercialization is the new approach in enhancing and strengthening the RDE issues and concerns in program planning, implementation, monitoring and evaluation. This will be directly supported through a financial scheme to be given to the regional field units. As a requirement, the different regional field units through their regional integrated agricultural research centers (RIARCs) must prepare project proposals that focus on the priority commodities of the region with competitive advantage in the local and international markets. This could also be a zonal undertaking which would complement priority commodities present in Mindanao. These project proposals should include enterprise development and agribusiness ventures for certain municipalities. Other activities included are technology promotion such as trade fairs and exhibitions, information communication and education activities, demonstrations, and specialized trainings for technology users and stakeholders.

Furthermore, the MRDP – APL 2 adopted some of BAR's technology commercialization principles including experiences during the implementation of the MDRP-APL1. These principles are participation, complementation, partnership, linkage and networking, systems-oriented, and multi-disciplinary.

Mr. Bolo together with Dr. Evelyn Aro-Esquejo of DA-ATI and Dr. Marlowe U. Aquino met on 30 November 2005 to discuss mechanisms for the proposed activities of the MRDP-APL 2 program and to strengthen strong partnerships between the two agencies. *(Marlowe U. Aquino, Ph.D.)*

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member countries to apply systems research priorities through systems thinking and intercenter collaboration. "There is a need for all of us to enhance the science of systems thinking, to infuse new ways of doing things in farming that would lead to sustainability and human integrity through teamwork," he said.

With the DA-BAR director were technical and support staff, Dr. Santiago R. Obien, Mr. Tito Z. Arevalo (Regional Coordinator); and from the Office of the Director, Mr. Joell H. Lales (Senior Executive Assistant) and Ms. Angela E. Obnial (Communications Specialist). Experts from the crop-livestock sector from International Livestock Research Institute (ILRI) - India and -Ethiopia; International Rice Research Institute (IRRI) and PCARRD, Philippines also participated in the event.

Exhibitors and observers came from central and northern Philippines R&D institutions such as CLSU, DA-CVIARC, DA-ILIARC, Ilocos Sur Polytechnic State College, DA-Bureau of Plant Industry (DA-BPI), and Institute of Plant Breeding (IPB) at UP Los Baños. The CLAN meeting was sponsored by Asia Pacific Association of Agricultural Research Institutions (APAARI), Asian Vegetable Research and Development Center (AVRDC), International Center for Agricultural Research in the Dry Areas (ICRISAT), and International Crops Research Institute for the Semi-Arid Tropics (ICARDA). It was co-organized by DA-BAR and PCARRD and hosted by CLSU. *(Angela E. Obnial)*

Institutional cooperation for pigeon pea sealed

Dr. Joy Eusebio of PCARRD, Dr. William Dar of ICRISAT, and Dir. Nicomedes Eleazar (center) lead the MOA signing on the commercial production and utilization of pigeonpea.

The Bureau of Agricultural Research, represented by Dir. Nicomedes P. Eleazar, signed a Memorandum of Agreement (MOA) on pigeon pea commercial production and utilization with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), represented by Dir. Gen. William D. Dar, and the Philippine Council for Agriculture, Forestry, and Natural Resources Research and Development (PCARRD), represented by Dr. Joy Eusebio, 23 November at the at DA-BAR's RDMIC Conference Room, Visayas Ave., Quezon City.

The MOA, emphasized the need to reinvigorate the legumes industry in the Philippines through large scale production of suitable and high yielding pigeon pea varieties to improve productivity and income of the farmers.

BAR through its National Technology Commercialization Program (NTCP) will coordinate the identification of the National Repository, Multiplication, and Dissemination Center (NRMDC). The center will maintain the ICRISAT-bred pigeon pea varieties. BAR is tasked to coordinate with selected Regional Integrated Agricultural Research Centers (RIARCs), regional centers of the Bureau of Plant Industry (BPI), and selected state universities and colleges (SUCs) in the screening of the pigeon pea varieties. The DA-BAR will also provide financial assistance for the screening/evaluation of the germplasm materials.

PCARRD will facilitate the acquisition of pigeon pea varieties through an appropriate Material Transfer Agreement (MTA) with ICRISAT and provide institutional support to the collaborative activity. PCARRD is also tasked to regularly monitor the progress of the collaborative activity. On the other hand, ICRISAT will provide PCARRD with germplasm materials of pigeon pea for screening under an appropriate Material Transfer Agreement (MTA) and other additional information on the germplasm materials.

Through the collaboration of the three R&D institutions, the screening and identification of pigeon pea varieties that are high yielding and resistant to pests and diseases is eyed as one of the moves to stimulate new business and economic development in the legumes industry. *(Angela E. Obnial)*

PRF holds research output forum

The Philippine counterpart of the Japan Society for the Promotion of Science (JSPS) RONPAKU (PhD Dissertation) Fellows or PRF conducted a forum on scientific output of its fellows. Held at the Executive Lounge at the Department of Science and Technology in the DOST Complex, Bicutan, Taguig City, three scientific papers were presented. These papers were: "In-vitro production of embryo in water buffalo: Status and prospects" by Ms. Danilda H. Duran of the Philippine Carabao Center; "Attractant in *Mangifera indica* flower for the mango pulp weevil *(Sternochepus frigidus (Fabr))"* by Dr. Louella A. De Jesus of the Department of Agriculture- Region IV; and "Marketing Imperatives for the Abaca Fiber Industry" by Prof. Ma. Eden A. Piadozo of the University of the Philippines Los Baños.

PRF is an organization of Filipino scholars who studied in Japan under the Joint Scientific Cooperation Program of DOST and JSPS. The newly-formed organization aims to "contribute to the development of the country, though the advancement and promotion of science and technology by consolidating and harnessing the individual expertise of its members, bridging and strengthening partnerships with Japanese institutions and other RONPAKU fellows from other countries". *(Maria Lizbeth Severa J. Baroña)*

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extended by the Department of Agriculture (DA) in promoting rubber production in the country particularly in North Cotabato and Zamboanga Sibugay. In addition, he announced that the government of France through its ambassador is willing to renew its support to the rubber expansion program of North Cotabato.

As the Philippine's dollar earner

The LGUs and the Department of Agriculture are one in saying that rubber is one of the most profitable agro-industrial crops in the Philippines and has a promising potential to be globally competitive.

"From 1991 to 1995, the rubber industry garnered 17 percent of the annual sales for agricultural products, contributing from P5.1 to P9 billion in total sales. In 1996, 40 percent of our natural rubber production was exported which raised our income from $10 million in 1986 to a whooping $34 million.

In 2000, we produced 6.6 million tons of natural rubber and by the year 2010, it is predicted that we could produce as much as 9.1 million tons", reported Dir. Nicomedes P. Eleazar of the Bureau of Agricultural Research (BAR).

Agriculture Secretary Domingo F. Panganiban, on the other hand, stated that the DA strives to increase rubber production by 10 percent annually to expand our market. It also recommends integrated farming systems approach to achieve a 10 percent yearly raise in the income of rubber smallholders.

Demand for rubber

Dr. Eugenio A. Alcala, executive director of the Philippine Rubber Board, Inc. (PRBI) and over-all chairman of the event's organizing committee, reported that there are more than 50,000 uses of rubber.

There are two kinds of rubber used in the manufacture of products: synthetic and natural rubber. Natural rubber is preferred since it is more durable, adhesive, and impermeable. The most popular product derived from natural rubber is of course automobile tires. According to Director Eleazar, 70 percent of the rubber industry supplies the tire sector.

Dr. Abdul Aziz Kadir, secretary general of the International Rubber Research and Development Board (IRRDB), Malaysia, asserted that the future is bright for the rubber industry because of its wide product range. He highlighted the market for birth control (condom), rubberwood (furniture), and the niche market for rubber-based products such as medical products (surgical gloves), foam mattresses, and even artificial flowers (roses).

Moreover, Dr. Ramli Othman of the Malaysian Rubber Board (MRB) said that there is an increasing demand for rubberwood as source of latex and timber. "We are promoting the planting of latex-timber clones in both conventional and forest rubber plantations. This will make rubber production a more competitive and attractive industry."

In the study of rubber economics presented by Dr. Hidde Smit, secretary general of the International Rubber Study Group (IRSG) based in London, he reported that the Philippine rubber industry would be soaring high in the world market by the year 2020 compared to other rubber producing countries in Asia and in other parts of the world. This is because of our high production and consumption of natural rubber.

He also asserted that we could produce as much as 250-350 million tons of rubber in the coming years. "We expect prices to remain high", said Dr. Smit when asked about the stability of the price of rubber in the world market.

According to his report, the competition would be up between the Philippines and Vietnam, which also shows a great potential in the rubber industry. On the other hand, China turns out to be the major consumer of rubber. Apparently, one-third of the world rubber production goes to the most populated country.

Strengthening alliances

Given the impressive potentials of Philippines rubber in the global market, it is surprising to note that the country is not a member of the two largest organizations on rubber in the world, the Association of Natural Rubber Producing Countries (ANPRC) and the IRSG. However, it is a member of IRRDB. DA-BAR's Director Eleazar and PRBI's Dr. Alcala sit as members of the board since 2000.

The ANRPC is an organization of the eight countries producing 80 percent of rubber in the world. These are Indonesia, India, Malaysia, Vietnam, Singapore, Sri Lanka, Papua New Guinea, and Thailand. It conducts world studies on rubber, coordinates international forum, and maintains the natural rubber statistics in the world.

The IRSG, on the other hand, provides a forum for the discussion of the world's supply and demand for rubber. Its functions extend as far as studying the marketing, shipping, distribution, and trade of rubber. At present, it comprises of 16 member countries.

Re-assess, resolve, revive

After a hundred years in the industry, rubber as a priority commodity in the country has still plenty to accomplish. Critical issues are to be addressed to sustain the supply and demand of natural rubber and get a bigger slice of the cake in the global market.

The continuous support to rubber research, development, and extension needs to be intensified. In a survey conducted by Dr. Tenny Alcala of the University of Southern Mindanao among smallholders, majority of them gave a positive response to the prospect of establishing a Philippine Rubber Research Institute.

According to her, rubber stands out as a commercial crop in the Philippines because it is highly profitable, versatile, sustainable, and environmentally friendly. However, there are still several hurdles in the growth of our rubber industry, which we need to attend to. Some of these are the low yield per hectare due to poor management practices, poor nutritional condition of trees, lack of training for proper tapping (the method of extracting rubber sap from the tree), and poor infrastructure and marketing systems.

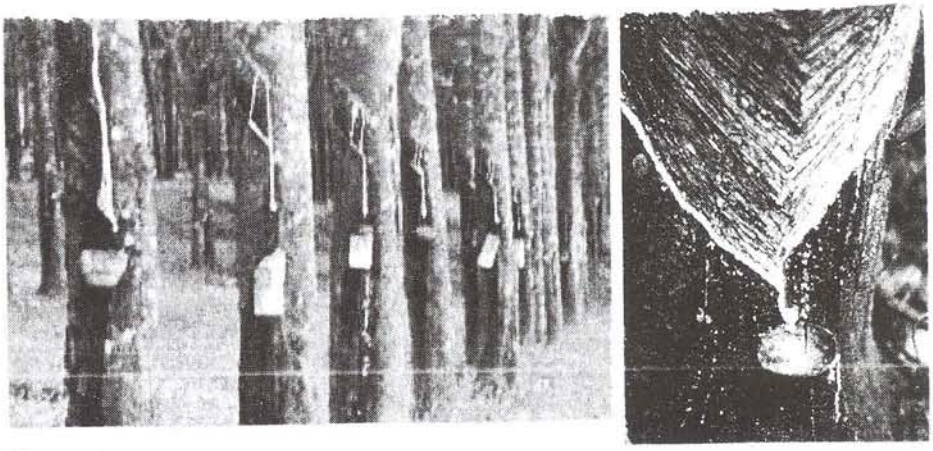
In the Philippines, 95 percent of rubber growers are smallholders. However, Dr. Tenny Alcala explains that only a fraction of these farmers receives suitable information about rubber production technologies through trainings, seminars, and meetings given by the local government and extension workers. It was also found that only a meager 2.4 percent of rubber tappers in the country are female, while in other rubber producing countries in Asia (Malaysia, Sri Lanka, Vietnam) majority of the tappers are women, who are believed to be fine tappers because of their efficiency and diligence.

In the conference, our local participants were able to mull over other options presented by other rubber producing countries such as the use of yield stimulants, recommended rubber clones, and other rubber processing technologies that can boost our own industry.

During the centennial celebration, Director Eleazar received an Outstanding Services Award under the category of Research and Development and another award for BAR under the category of Outstanding Institution/ Agency.

The conference served as an opportunity to strengthen our existing alliance with the member countries of IRRDB and open our doors to new partnerships that will give us further access to the global market. The local participants especially the LGUs expressed their eagerness to pass a resolution for the Philippines to become a member country to these organizations, as these would trigger the promotion and development of our rubber industry. *(Miko Jazmine J. Mojica)*

BAR Director Nicomedes Eleazar recieves Outstanding Service Award for an Institution/Agency from Mr. Honesto Cabacungan, chairman of Philippine Rubber Board Inc.(PRBI). Also in the picture is Dr. Eugenio Alcala, executive director of PRBI.



Rubber tapping

Visit to Taiwan: Lessons in Agricultural R&D Management

by MARLOWE U. AQUINO, Ph.D.

Our visit to the Republic of China (Taiwan) is a combination of reflection and understanding of reality especially on agricultural research and development (R&D). Taiwan agricultural R&D is a case of managing to attain efficiency. Why so? Resources (human, equipment and infrastructure), programs, and systems are properly utilized and maximized to fully attain desirable outputs and better delivery of basic services in agriculture thus, boosting the country's economic development.

DA-BAR staff at the National Plant Genetic Resources Center of TARI in Taichung, Taiwan

I was with a group of six senior staff of DA-BAR (Braulio Tamayo, Aurora Pecson, Rolando Kintana, Salve Ritual, Angel Morcozo, and Roberto Quing), for an observational study visit, 6-14 November 2005, to the Asian Vegetable Research and Development Center (AVRDC) – The World Vegetable Center, Taiwan Agricultural Research Institute (TARI), Taiwan Livestock Research Institute, Tainan District Agricultural Research and Extension Station, Fengshan Horticultural Research and Experiment Station, a privately owned and operated vegetable trading and packaging center, and a public vegetable market center.

One major factor for efficiency that we observed is a lean and trim organization where scientists/researchers, researcher-extensionists, farmers/traders, and laborers perform multiple tasks. Young and energetic staff perform the operations while the seniors provide direction and guidance. Lean as it seems, each staff follows defined responsibility supportive to the vision, mission, and goal of their agency. What binds the staff to their responsibility is the efficient management of time and respect for co-employees. We saw that every staff is doing something. We had the chance to visit the research laboratories, experimental and field sites, offices and even workstations of a company considered as strict.

A good example is the National Plant Genetic Resources Center of the TARI. The Center has only six permanent staff manning the administrative, management, and operations of programs and supported by 21 laborers. They are evenly distributed to oversee the R&D activities in the six greenhouses (measuring close to 0.7 hectare each), 15 hectares of field experiments, four laboratories with varying temperatures for short term storage (10^{0}C) of 5-10 years, medium term storage (2-9.5^{0}C) of 15-30 years, and long term storage (below 1^{0}C) of 45-50 years, and a building twice the size of DA-BAR.

The second factor we observed has to do with the high agricultural R&D investment provided by the Taiwanese government, 8.7 to 12 % of their annual budget compared to the Philippines' 0.3%. Agricultural R&D activities are focused on priority commodities with potential and comparative advantage in local and international markets. Fruits, ornamental and cutflowers, livestock and fisheries are the identified priority commodities. These are supported by farmer groups in terms of production and processing. R&D institutions provide the farmers' technology needs and are supported by extension service through partnerships and complementation of programs. Based on this observation, the RDE continuum and integration is vividly illustrated in this modernizing agricultural country.

A responsive R&D program to the country's economic development could be the other factor. Efficiency and effectiveness of R&D programs depend on the needs of its clientele. The R&D institutions respond immediately to the needs of the country to push its economy and to make sure that client satisfaction is met at high level. These are done through quick service, up-to-date information dissemination and technology utilization, and regulated and focused agricultural activities from production, marketing, processing, and development.

These realities illustrated by Taiwanese agriculture are simple but they make one think why the country is moving fast. We should know the answers by now because we have the same concerns. What we really need is a concerted effort to make our agriculture a vehicle to boost our country's development. These experiences that I shared hopefully will propel us to do our part. ■

Geographical information systems: A paradigm shift

by MIKO JAZMINE J. MOJICA

Who needs a leap?

The agriculture and fisheries sectors do. Remember how agriculture changed the primitive society? But where are we now? Would you say we are progressing, declining, or stagnant? Have we found a better way with our production, technology commercialization, or policy decision-making?

Dr. Esteban C. Godilano, an expert on space technology, suggests a paradigm shift: use GIS. Dr. Godilano is a GIS expert with an extensive experience in the application of this technology in research and development, alleviating rural poverty, providing food security, and maintaining the balance of resource use through sustainable agriculture and natural resources (ANR) management. He adopts the general definition of GIS as "a computer-based tool for mapping and analyzing geographic phenomenon that exists, and events that occur on earth. GIS technology integrates common database operations such as query and statistical analysis with the unique visualization and geographic analysis benefits offered by maps."

The relevance of GIS to ANR development

Geographical information systems or GIS is nothing new. It is widely applied in several countries as a powerful information and support system. However, like a land left unattended, this groundbreaking technology remains unexplored especially in our own agriculture and fisheries sector.

According to Dr. Godilano, spatial analysis—the study of geographic features and the relationship between them—can be applied best in agriculture. This is because scientists, researchers, farmers, and policy makers can better understand how features in a landscape interact through this technology. He asserted that GIS serves as catalyst in improving the management of agriculture through integrating spatial and tabular data derived from geographical analysis.

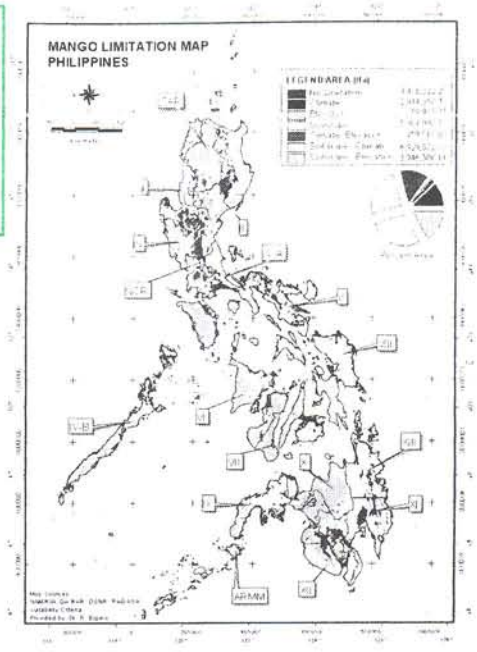
Although the technology is not yet widely utilized in the country, the Department of Agriculture through the Bureau of Agricultural Research (DA-BAR) has already recognized GIS as a core component of the Agriculture and Fisheries Research and Development Information Systems (AFRDIS).

"Policy makers in agriculture, business, transport, and other service organizations can benefit from this tool. In our case, the GIS technology can geographically target technologies developed in agriculture and fisheries wherein the biophysical, climatic, and socioeconomic databases would be integrated for effective resource allocation," says BAR Director Nicomedes P. Eleazar.

Moreover, Dr. Godilano explains one of the significant applications of GIS in agriculture, which is the plotting of crop suitability maps. "A crop suitability map identifies crop domains or farming systems based on the suitability criteria provided by experts. It can assess whether the current land use is most feasible both economically and environmentally. The output of such analysis provides a 'win-win' situation between and among competing commodities and result to an effective and efficient allocation of scarce resources," he says.

Mapping it out

Dr. Godilano reveals a disturbing information about the Philippine's land use map—it was last updated almost a decade ago. The point is, the map we continue to use is already outdated and might not correspond with the present condition of our lands. This critical issue has to be settled for accurate planning and decision-making particularly with regard to our crop production.



In the GIS training manual developed by Dr. Godilano, he used our mango industry to illustrate how crop suitability is created. He used the GIS computer softwares ArcView 3.2 and Spatial Analysts Extension in the analysis of the data gathered.

The result of the GIS analysis showed that only 3.5 million hectares of land are highly suitable for mango production. However, the analysis identified an additional 6 million hectares that can still be developed. At least 10 provinces exceeded 100,000 thousand hectares of mango production. From these provinces alone, a total of 1.8 million hectares are considered highly suitable for mango production in the country.

"By developing a map index of all highly suitable areas for crop production, farmers and investors could select which crop to grow in a given location," explains Dr. Godilano.

GIS as necessary development tool

"Today, the GIS technology is no longer confined to the technical experts but has become a necessity to planners, scientists, and policy makers. We believe that by using GIS and technology as planning and decision support tools, the

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BRIDGING the rural divide

by RITA T. DELA CRUZ

Participants during the training-workshop on Integrating National Agricultural Information Systems in AIT, Thailand. BAR's Julia A. Lapitan (third from right, back row) is one of the Philippine representatives.

With the advent of information revolution, describing and aiming for a community bounded by an ideal knowledge management environment has been the ultimate goal of every progress-driven country. This refers to an environment where ordinary people and not just the technical experts can have an easy access to information any time they want without the difficulty of having to use the complicated tools in gathering, organizing, and refining the data and make them useful for them. This is an environment where information is centralized and is readily available to anyone who needs it. Most of all, an environment where all employees are not only skilled in using knowledge resources but are able to creatively contribute to a common pool of knowledge for all of them to make use of.

This is the environment we want to achieve. We want to put the right information in the hands of the right people at the right time. Such scenario, considered an "ideal' environment, has not been ultimately achieved yet; the reality of it is slowly materializing with the recent training workshop on *Integrating National Agricultural Information Systems (NAIS)* held on 1-5 November 2005, Asian Institute of Technology, Thailand. Ms. Julia A. Lapitan, assistant head of the Management Information System Division (MISD) of the Bureau of Agricultural Research (BAR) was one of the Philippine representatives from the National Agricultural Research System's (NARS) information officers.

The objectives of the training workshop were to: 1) train national agricultural information officers on the principles of advanced knowledge management and identify essential components of their respective national agricultural information system (NAIS), and; 2) assist these officers in integrating NAIS with regional and global agricultural information systems. The result of the activity hopes to strengthen Asia-Pacific Agricultural Research Information System (APARIS) which is expected to serve policymakers, researchers, extension, and development professionals, and donors in the region.

Integrating national information in agriculture

Information sharing is now possible but it exists mainly among the enterprise, shared, to some extent, within teams or workgroups, but not beyond that. Then a more collaborative environment develops where individuals can choose to make information available, across organizations, which saves time, effort and resources. Then finally, the sharing of information becomes integrated and automatic. For instance, the Intramail, which has been a very valuable resource especially for organizations that stockpile valuable information everyday. Once the information is posted, it automatically becomes part of the organization's information reservoir. It gets filtered and is readily available to those who need it.

The advent of knowledge management tools has helped us in the gathering, organizing, and disseminating of information. Operation success does not mainly depend on the technology but on the adoption and application of this technology.

Knowledge management is people management

The topic of bridging people through information technology has been a common theme to entice the cooperation of information sources. This has also been the thesis of many government projects in narrowing the gap of information among institutions and agencies.

Today, in many cases, the networking infrastructure is in place and

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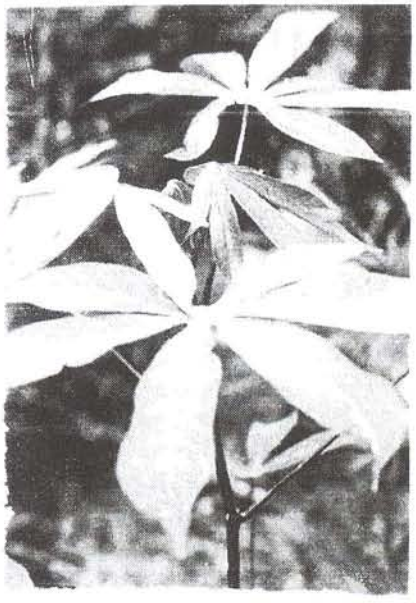
Scientists determine how cassava survives drought

by MARIA LIZBETH SEVERA J. BAROÑA



Drought may gradually suck out life from any life form denied of moisture, but not some plants' ability to fight for it.

Built-in mechanism to fight for life in times of drought has enabled some genotypes of cassava to survive. This is what researchers from the Philippines Root Crop Research and Training Center (PRCRTC), and Nagoya University Graduate School of Bioagricultural Sciences of Nagoya, Japan found.

Water shortage due to long absence of rain marginalizes some planting areas. Although cassava is known to tolerate drought, it nevertheless exhibits sensitivity to lack of water in its first three months, otherwise known as the 'establishment period'.

Stunted growth of roots and shoots of moisture-starved cassava results to low yield during normal maturity time.

The researchers cited in their study that stabilizing the productivity of cassava would entail understanding its basic ability to withstand adverse conditions like drought. This ability, they said, is important since different cassava genotypes have different ways to deal with drought.

The researchers identified five genotypes of cassava as test materials. These genotypes were: PSB Cv-19, PSB Cv-11, VC-4, Golden Yellow, and Rayong 5. Sixty-four samples for each genotype were planted within 100 cm of one another, half of which were subjected to drought condition. During the experiment, leaf water potential, stomatal resistance, and transpiration rate were measured. After 8.5 months, the root crop was harvested.

Drought and plant physiology

Across genotypes, the highest transpiration rate was during the third month of growth both for the plants subjected to drought and those under rainfed conditions. The researchers interpreted this as an adaptive plant mechanism to maintain adequate water level to avoid leaf dehydration.

Stomatal resistance also increased during the stages when soil moisture was scarce. Except for the genotype Golden Yellow, the midday leaf water potential of the samples decreased during the later period of drought condition.

Drought and plant morphology

All the genotypes' leaf development was affected under the drought condition . The Golden Yellow genotype was least affected in the height parameter. It was observed that the storage roots of the plants under the drought condition were smaller and woody. This was explained in the study as a mechanism where root function shifts from storage of assimilates to serving as a main channel of water nutrients to the shoots as a response to water shortage.

Over-all observations showed decrease in total plant biomass, shoot biomass, root biomass, root-shoot ratio, total yield, harvest index, plant height, number of leaves, and total number of and lengths of adventitious leaves.

While stomatal resistance was increased by drought, leaf water potential and transpiration rate were reduced.

Genotypes Golden Yellow and Rayong 5 were found to be most tolerant of drought while Vc-4 was identified as susceptible. Genotypes that tolerate drought have longer and more adventitious roots as ways to adopt to water shortage.

Source:
Adaptability traits and mechanisms of cassava to survive under environmental stress (drought) condition. Algerico M. Mariscal, Dioscoro M. Bolatete, Jo Andreu D. Pardales, Reynaldo V. Bergantin, Demetrio V. Belmonte Jr., and Akira Yamauchi. Philippine Root Crop Research andTraining Center, Leyte State University, Baybay, Leyte and Graduate School of Bioagriculture Sciences, Nagoya University, Chikusa, Nagoya, Japan.

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Department of Agriculture could further accelerate our agriculture competitiveness, increase income, and sustain rural development," asserts Dr. Godilano.

The full utilization of this technology in our government still has a long way to go. The necessary facilities, equipment, and technical skills have to be established. But more than this, a positive attitude and work efficiency are components for success in Philippine agriculture and fisheries.

"There are new and exciting capabilities that GIS technology provides. But this tool is only as good as the craftsman using it. It is the imagination and creativity of the GIS user that makes GIS work, and not the technology itself", admonishes BAR Director Eleazar.

Sources:

1. Godilano, Esteban C. ***Implementing geographic information systems in agriculture and natural resources: A training manual****, Version 2.0. January 2005.*

2. Godilano, E.C. and Abunda, J.B. ***Map atlas: Crop suitability and investment maps in the Philippines using GIS technology***

Int'l luminaries convene to discuss agricultural and rural development in Asia

Economists, development thinkers, academicians, scholars, policymakers, and media convened for the international conference on "*Agricultural and Rural Development in Asia: Ideas, Paradigms, and Policies Three Decades After*," held on 10-11 November 2005, Mandarin Oriental Hotel, Makati City. The conference was organized and facilitated by the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA).

The activity was on offshoot of SEARCA's initiative to provide a timely and relevant venue to gather luminaries from different international groups to revisit their views on agricultural development in relation to the current situation occurring in the region. The main objective of the conference was to draw up policy lessons from the major ideas and paradigms that have influenced academic and policy thinking in agricultural and rural development for the past 30 years. In the same manner, the activity hoped to bring together an international group of acknowledged research scholars in the field of agricultural and rural development and have an exchange of ideas with policymakers from the Asian region and thereafter provide a venue for articulating policy options on emerging development issues in the region.

Highlighting the two day conference are three sessions with paper presentations on: (1) Communities and States in Agricultural Development: East Asia Compared with Africa presented by Dr. Yujiro Hayami, chairman, Foundation for Advanced Studies on International Development Studies (FASID); (2) Thinking About Agricultural Development: Fads, Fancies, Fallacies, and Frontiers presented by Dr. James Roumasset, professor of Economics, University of Hawaii; and (3) Food Security in a Globalized Setting presented by Dr. Jock R. Anderson, professor, University of New England, Armidale, Australia.

Other topics discussed during the eight parallel sessions included: a) globalization and the poverty-environment link in Asian agriculture, b) land tenure and forest resource management in Asia, c) making rural financial markets work for the poor, d) establishing efficient use of water resources, e) poverty and vulnerability in Asia, f) new directions on agricultural extension, g) from the green to the gene revolution: how will the poor fare, and h) small farmers and the rise of supermarkets. There was also a special session on Asian dryland agriculture and a panel discussion on the challenges and policy options for agricultural research in the nest 10 years.

Among the distinguished guests attending the conference were: Hon. Domingo F. Panganiban, secretary of the Philippine Department of Agriculture (DA); Dr. Emil Javier, president of the National Academy of Science and Technology (NAST); Dr. Robert Zeigler, director-general of the International Rice Research Institute (IRRI); Dr. William D. Dar, director-general of the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT); Dr. Arsenio M. Balisacan, director of SEARCA; and Dr. Edilberto C. de Jesus, director of the Southeast Asian Minister of Education Organization (SEAMEO) Secretariat.

Sponsoring the conference were: AusAID of the Australian Government, IFRI, ICRISAT, IRRI, Department of Primary Industries and Fisheries of the Queensland Government; WorldFish Center, Lapanday Foods, and DA's Bureau of Agricultural Research represented by Mr. Alvin Bernardo Divinagracia and Rita T. dela Cruz of the Management Information and Systems Division. *(Rita T. dela Cruz)*

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