

ARTICLES RELATING TO THE REGIONAL VARIETAL IMPROVEMENT IN SOUTHEAST ASIA

lifted from various issues of PHILSURIN UPDATE (official newsletter of PHILSURIN)

PHILSURIN signs MOU on variety improvement

December 2000

PHILSURIN signed a Memorandum of Understanding (MOU) on sugar variety improvement with sugar research agencies in Southeast Asia) on November 13, 2000 in Makati City, Philippines.

With its designation as Project Executing Agency (PEA), Philsurin has been recognized as the leader of sugar research and development in the region.

The cooperating research institutions are the Thailand Office of Cane and Sugar Board (OCSB), Indonesian Sugar Research Institute (ISRI), Bangladesh Sugarcane Research Institute (BSRI), and the Malaysian Marditech Corporation SDN.BHD.

The project aims to increase and help stabilize the productivity of sugarcane in the Southeast Asia and Pacific region through a concerted regional effort on genetic enhancement, variety improvement, dissemination, and exchange of improved sugarcane varieties and other genetic materials. The sustainability of sugarcane improvement shall be ensured through a collaborative network for exchange, testing/evaluation, and dissemination of improved varieties; their systematic improvement through conventional and biotechnology-assisted breeding; and increased national capabilities to absorb, adopt and utilize new and emerging bio- and information technologies for sugarcane breeding applications. Specific results expected are the accelerated development, introduction, dissemination, and

adoption of improved sugarcane varieties with increased productivity potential and resistance to major diseases and pests; core national collections/pools of elite sugarcane varieties that are freely available to participating member countries and accessible to other sugar producing countries; and increased capability to undertake and sustain national and regional efforts on sugarcane breeding and biotechnology. Immediate beneficiaries are the national sugarcane programs in participating countries of the region with spillover benefits to national sugarcane programs in Latin America and Africa through availability of improved varieties. The ultimate beneficiaries are all sugar producers and consumers. The estimated total cost of the project is US\$ 2.104 M. The Common Fund for Commodities (CFC) will provide a grant of US\$ 1.422 M while the rest will be counterpart contributions of participating countries.

Project duration is five years under the supervision of the International Sugar Organization (ISO) and the Common Fund for Commodities (CFC).

CFC funds project

December 2000

The Common Fund for Commodities (CFC), an institution of the United Nations will fund the regional sugar varietal improvement project.

CFC forms a partnership with 104 member states plus the European Community, the Organization of African Unity/African Economic Community (OAU/AEC) and the Common Market for Eastern and Southern Africa (COMESA). Its membership is open to all members of the UN, or any of its specialized agencies.

The Fund's mandate is to enhance the socioeconomic development of commodity producers and contribute to the development of society as a whole. In line with its market-oriented approach, the Fund concentrates on commodity development projects financed from its resources (capital subscription by member countries, voluntary contributions and interest earned). Through cooperation with other development institutions, the private sector and government, the Fund endeavors to achieve overall efficiency and impact in commodity development.

The CFC operates under the novel approach of commodity focus instead of the traditional country focus.

Sugar research inception meeting held

December 2000

PHILSURIN hosted an inception meeting on the sugar varietal improvement project in Manila from November 13-16,2000.

Attended by representatives from participating countries, officials of CFC and ISO, and scientists from the Philippines, the meeting presented an overview of the project. All aspects of the project from administration to research were discussed.

The meeting was capped with the signing of the Memorandum of Understanding between Philsurin and the collaborating institutions.

The delegates were brought on a field trip to the Institute of Plant Breeding (IPB) at UP LosBanos for briefing and inspection of research facilities.

They planed the next day to Negros province to visit the Victorias Experiment Station of Philsurin.

The delegates were: Eltha Brown, CFC; Lindsay Jolly, ISO; Leon M. Arceo, Philsurin; Virat Tandaechanurat, OCSB; Chana Kariwat, OCSB; Mirzawan P.D. Nurtjahjo, ISRI; AH.M. Delwar Hossain, BSRI; AB.M. Mafizur Rahman, BSRI; Randy A. Hautea, ISAAA; Nicolas Alonso, SRA; George Zubiri, Philsurin/CONFED; Rodrigo Tapay, SRA; Merle Palacpac, BPI; Pio Javier, NCPC-UPLB; Santiago Ureta, CAC; Claude Schulze, Philsurin/UNIFED; Augusto Araneta, Jr., Philsurin/NFSP; Violy Villegas, UPLB-IPB; Evelyn Mae Mendoza, IPB-CA-UPLB; Ruben Villareal, SEARCA; Ramon M. Cu, Philsurin; Aurora Barredo, Philsurin, and others.

A report of the meeting prepared and presented to the Management of the Fund by Ms. Eltha Brown, associate project manager, concluded that: "Overall, the Project Inception Meeting was very well organized and was successful in meeting its objectives. The technical presentations were delivered in a very high professional standard and the activities described about the project are consistent with those outlined in the Appraisal Report. There is evidence that PHILSURIN and the participating institutes in the Philippines are equipped with the requisite skills and technical knowledge to implement the project.

PHILSURIN as the PEA was very impressive its organizational capabilities as well as its established local and international network in areas of relevance to the project.”

ISO/CFC varietal exchange begins

May 2001

High yielding varieties from Bangladesh and Indonesia have arrived in the country. They are currently under quarantine at theBPI Economic Garden in Los Banos, Laguna.

Subjected to short hot water treatment to get rid of smut and downy mildew, these varieties will be observed for the presence of diseases for a period of one-and-one half to two years before planting them in the field. Infected plants will be destroyed.

PHILSURIN is strictly applying the BSES quarantine scheme to ensure the exchange of disease-free varieties among the consortium members.

The 5 varieties from Bangladesh are erect and self-trashing. Their yield potential ranges from 80 to 100 tons per hectare. The 6 Indonesian varieties are erect and moderately self-trashing with yields of 85 to 100 tons per hectare.

Thailand has committed to exchange 7 varieties and Malaysia, 5 varieties. This month, Philsurin will start trial shipments of tissue-cultured plantlets to Thailand and Bangladesh. The Philippines has committed to exchange 10 VMC varieties with the consortium.

This is the first time that a variety exchange program has been implemented in Southeast Asia. Financed by the Common Fund for Commodities (CFC) and supervised by the International Sugar Organization (ISO), this project assures the availability and use of high-yielding varieties in the region.

PHILSURIN team visits sugar project partners

May 2001

PHILSURIN Director General Leon Arceo and Plant Breeder Jie Aro went on a 2-week swing over Southeast Asia to review on the spot the facilities and programs of the countries cooperating in the variety improvement program in the region.

The inspection was the initial step in the implementation of the CFC-funded project.

The research stations visited were the Indonesian Sugar Research Institute (ISRI), Bangladesh Sugar Research Institute (BSRI), the Thailand Office of Cane and Sugar Board (OCSB), and MARDITECH in Malaysia.

Sugarcane research facilities and breeding programs of the Philippines, Indonesia, Bangladesh, Thailand and Malaysia

May 2001

Research is indispensable to any endeavor. More so during these times when the world enters globalization and the free-market economy.

The sugar industry specifically must move forward and be competitive. In this regard, the need for regional cooperation becomes essential.

The ISO/CFC project includes the exchange of sugarcane varieties and technology in the Asia-Pacific member countries – Thailand, Indonesia, Malaysia, Bangladesh and Philippines. This report is a description of the breeding programs of the participating countries during a two-week trip from February 25-March 11, 2001 with Mr. Leon Arceo, Director-General of PHILSURIN. All the grounds have been laid for a successful cooperation on exchanges – both on sugarcane variety and technology. Even Malaysia, which has relegated the 'marginal' areas for sugarcane in favor of palm oil, has expertise to share on the aspect of technology transfer and licensing. The immediate impact of having a diverse genetic base and the ability to evaluate varietal performance across different regions would be significant and lasting.

The following are the brief description of the working Sugarcane Varietal Development Program of 4 countries.

PHILIPPINES

Location and Facilities

PHILSURIN's breeding station is located at Victorias City, in the province of Negros Occidental which is considered the sugar bowl of the country since almost 80% of the agricultural land is planted to sugarcane. The province has 10 operating mills.

The breeding station is composed of 16 staff with the senior plant breeder managing the station's activities. It has 4 sections – Breeding, Pathology, Agronomy and Micropropagation laboratory. Each section is under a head with 1-2 field assistants. The breeding section handles the first 2 years of the breeding activities – from hybridization to field selection. Testing for the different ecological test areas is the responsibility of the agronomy section while disease screening and observation is under the pathology section. The micropropagation laboratory enables the rapid dissemination of disease-free new releases. It takes 7-10 years for a release to be made. The station is under the deputy director for operations, Dr. Ramon Cu.

The station has a 1,000 germplasm collection which has been accumulated since 1967 when the center had Active exchange programs with USDA, France, South Africa, Formosa, and China. Foreign varieties account for half of the collection. A duplicate germplasm collection is planted at the Institute of Plant Breeding (IPB), University of the Philippines at Los Banos as part of PHILSURIN's germplasm preservation project.

The station is equipped with two bi-parental sheds, two polycross sheds, a greenhouse, two big tanks as rainwater reservoir, a photoperiod chamber, a fumigation chamber (for methyl bromide), a micropropagation laboratory, and a 15-hectare experimental field. The station also houses the MDDC facilities like the small-capacity Hot Water Treatment (HWT) tank for the production of RSD-free cane setts.

The Bureau of Plant Industry (BPI) is handling the quarantine activities for PHILSURIN. The quarantine facilities are located at the Los Banos Economic Garden, Laguna.

Breeding Program

The hybridization activity starts in the second week of October and lasts for a month. About two hectares are planted to the parental varieties with the proven parents planted in greater plot sizes (based on the percent selection from the prior selection records). The problem of flowering synchronization for early and late flowering is partially addressed by utilizing an area with a higher elevation and cooler temperature as tassel source. Flowering in this site normally occurs a week earlier than at the station. As such those varieties that would otherwise not flower together can be crossed. A normal breeding season utilizes about 270-350 parent varieties for 700-900 crosses.

Two types of crosses are made – bi-parentals and polycrosses. Bi-parentals make up 60% of the total crosses and the rest are polycrosses. Bi-parental crosses are set-up with 4 stalks for both the male and the female parents. They are enclosed using rectangular 6 footer cheesecloth inside a shed with a capacity of 120 set-ups. A modification for bi-parental called an area cross is done by using a single male parent against several pollen sterile parents. Another is the outside polycross, a modification of the melting pot technique. In a normal polycross there is a melting pot of all the flowering varieties, yet control is achieved by focusing on a single trait like sweetness or resistance to smut. The task of pairing for the bi-parental crosses and polycrosses, which must be done daily during the season, is sped up by utilizing a computer program that generates the optimum pairs based on the desired criteria. The criteria include parental performance of the parental varieties, disease records, and other parameters like stalk size, trashiness and sweetness. This serves as a guide for the breeder to consider.

After the list of pairs is finalized, the flowering stalks of the cane are finalized, the flowering stalks of the cane are cut in the field and brought to the station. No emasculation is done. The crosses are preserved until full bloom by using the acid solution technique (this is a concoction of strong acids like sulfuric, citric, and nitric acid). The acid solution is changed every three days to maintain its concentration until complete shattering of the male parent is achieved after two weeks. The fertilized flower, called fuzz, is harvested from the females.

After two weeks the crosses are harvested and kept in a cool room until sowing is done on the 2nd week of December. A sample of 15 grams from the harvested fuzz from each cross is sown in sterilized soil (using methyl bromide) in plastic trays. The remaining fuzz are placed in paper bags and stored in a freezer. To enhance germination, the sown fuzz are kept in a warm room (28°C) for three days after which they are brought to the nursery. The germinated fuzz are then separated and individually dibbled in plastic trays on the projected population and available area. Normally, the seedling population is 100-150 thousand.

The first multi-location test is called the preliminary yield trial (PYT) that starts on the 6th year. The entries are planted in RCB design of 6x9 m plot size, 4 replication experiment set-up. Emphasis at this stage is on the yield performance for three geographical divisions of the country – Luzon, Visayas and Mindanao. This is followed by the advance yield trial (AYT) where the emphasis is yield (palm and ratoon) performance for each of the mill districts across the country. Right now, there are 15 AYT test sites. The AYT tests are conducted with the participation of the MDDC coordinators of PHILSURIN such

that release or consideration for releases of the clones at this stage is based largely on the evaluation and recommendation of the local MDDC coordinators.

Varieties released by the station beginning from 1997 series have a prefix of PSR (PHILSURIN); while previous releases have a prefix of VMC (Victorias Milling Co.)

Diseases

The most important diseases are smut, downy mildew, leaf scorch and rust. Screening for smut, downy mildew, leaf scorch are done by artificial inoculation while rust screening is done in pots at the greenhouse. The program includes RSD diagnosis for entries at the advance tests. There is no reported case for white leaf disease, leaf scald and mosaic.

Varieties

The station has also the capacity to produce 40,000 seedlings of micropropagated seedlings per month and is the main tool, aside from the conventional cane setts, for the rapid dissemination of the new high yielding varieties across the country.

Varieties for exchange are VMC 67-611, VMC 71-238, VMC 71-39, VMC 73-229, VMC 76-16, VMC 87-599, VMC 86-550, VMC 87-95, VMC 84-524, and VMC 84-947.

INDONESIA

Location and Facilities

Breeding for higher yielding varieties is still the main task of the Indonesian Sugar Research Institute (ISRI). Other projects include research and services on production equipment, agricultural technology, processing technology, waste-treatment technology, etc. Among its frontier researches are biotechnology research on sugarcane, production of dextranase enzyme, production of Maillaerd-Reaction Products (MRP) to inhibit microbial activities, desugarization of molasses, serodiagnosis for early detection of smut disease, research on sucrose esterase surfactant in the cosmetic industry and as additive in food industry. ISRI is located at Pasuruan. It has 70 ha. Of land where the germplasm collection is planted and where experiments and selections are conducted. It has a plant breeding laboratory with facilities for sugarcane seed storage, biotechnology and tissue culture laboratories that can produce more than 200,000 plantlets per year. Cane juice and sugar analysis laboratory is available.

The institute has a total of 403 staff broken down to 9 PhD, 23 Ms, 53 Ir/BSc, 56 support staff and 262 technical laborers. ISRI is a government agency under the Ministry of Agriculture.

ISRI has total germplasm collection of 6,000 hybrid clones, 767 of which are wild native canes. These collections have been accumulated through an active germplasm exchange program with other breeding stations such as Australia, India, Barbados, Hawaii, Japan, and Mainland US. Other collections were from expedition conducted throughout the Indonesian archipelago.

The quarantine station at Puteran Island, Madura, east Java is located more than 100 km from the closest sugar plantation.

Cane crossing is conducted at Sempalwadak, Malang station, which is about 70 km away from Pasuruan with an elevation of 400 m above sea level.

Breeding Program

The crossing season begins on the month of November. Six to ten technical staff stay at the station for the duration of the crossing season. It has seven crossing houses, a laboratory, a seed dehumidifying room, structures for light interruption of spontaneum varieties, and a large shed for the crossing and emasculation activities. A two-hectare field for tassel source is at the back of the station.

The acid-solution technique also known as the Hawaiian method and marcotting are employed to prolong the life span of the cut stalk until full bloom. The marcotting method is used in approximately 40-60% of the total crossings made by ISRI. Since the 1988 crossing season, a computer was used to make a parent matching priority. This computer program generated pairing matches. Two types of crosses are made: proven crosses (good combination made with yield data) and trial crosses (pairing between parents before yield trial data is available).

Bi-parental crosses are made with 2 male x 1 female stalk enclosed with circular cheesecloth to prevent pollen contamination. In-field pairing is also done wherein the cut male stalk is placed in an acid solution-filled bamboo tube, then brought to the standing female clone and enclosed by a suspended cheese cloth to prevent contamination. For the polycrosses, a set-up of several good female clones against 1 male clone is made and is referred to as area cross. The station is capable of making up to 10,000 crosses in one season.

Emasculation with ethanol was applied to avoid selfing. The intended female flowers are soaked in 63% alcohol for 9 minutes and then washed with running water. The resulting fuzz from the crosses were then germinated and sown in sterilized soil (10 ml of formaldehyde to kg soil for 2 days) in plastic trays. The normal seedling population is 200-300 thousand seedlings.

On the sixth year of screening the entries goes to the different substation for multilocation ecological test. Seedling selections are carried out on representative locations such as Pasuruan, Comal, Jengkol, Solo, Cirebon, Medan, Pelaihari, Jatiroto, Bungamayang, Gunungmadu, and Takalar. The substations provide seeds to farmers and the millers (which own majority of the sugarcane-planted areas) at the cost of 1,000 Rupiah per kilo of cuttings. It also provides technical advice.

It takes about 9-10 years before a release can be made. Since the 80s, the releases by the station were location-specific releases. In 1965, all POJ numbers codified since 1945 were renumbered into Ps (for Pasuruan). Moreover, the release of PS number had to be approved and declared by the minister of agriculture.

To overcome the limitation of planting materials required by cane growers, a rapid multiplication method of new varieties by tissue culture is used.

A number of studies in searching for sugarcane mutants by using gamma rays irradiation have been reported. Specifically, gamma radiation was found to produce mutant clones that reduces flowering.

Another area of research conducted by the breeders is cell fusion as an alternative in cane crossing. Breeding for drought tolerance and biotechnology, specifically the transfer of the cry gene of *Bacillus thuringiensis* to sugarcane callus is also undertaken.

Diseases

The most important diseases are smut, RSD, rust scorch, mosaic, leaf scald, top rot, root rot, CSD.

Varieties

Varieties for exchange are PSGM 88-5052, PSBM 90-44, PSCO 90-2411, PS 86-10029, PS 80-1424 and PS 81-362.

BANGLADESH

Location and Facilities

The Bangladesh Sugar Research Institute (BSRI) is located at Ishurdi and has been in existence since 1945. It became a full-pledged research institute in 1951. In 1989, it was transferred from the ministry of Industry to the Ministry of Agriculture.

In Bangladesh, 60% of the growers have an average land area of 10 acres and almost half of the sugarcane grown is intended for "gur" or muscovado sugar. Aside from the breeding for higher yielding and drought/flood-tolerant cane, the institute embarks on technology transfer (SAEC) of basic sugarcane cultural practices, intercropping, small machines development and improvement in gur processing. The institute is composed of five departments: Research and Development, Plant Genetics and Breeding, Training and Extension, Soil Fertility and Pathology.

BSRI has a total of 368 scientist/technical staff, 3 regional stations, 4 service stations and 8 pre-evaluation sites. BSRI has a total of 1000 germplasm collection with 30 wild species. These are mostly exchanges from India though most of the commercial varieties have local varieties as parents.

The quarantine station takes place in November-December at the Ishurdi experimental complex. The institute has a bi-parental shed with panels of fiberglass that serve as separator for each pair of cross and a canal with flowing water to maintain the marcotted crosses. It also has eight (8) photoperiod chambers which are not currently used, as light interruption to delay flowering was more practical.

Most if not all pairings are bi-parentals. Pairing of the flowering clones are based on the previous performance of the cross, the disease rating of the parents and the yield potential. The acid-solution was discarded because of the limited availability of sulfuric acid. Marcotting is instead being practiced. The station normally makes 600 crosses from 140 parents.

The sex rating of the clones is based on the iodine test conducted regularly. The fuzz from the crosses are sown in July in permanent cemented flats with sterilized soil. Excess fuzz are stored in a freezer to be utilized the following year. The seedling population would be 50-60 thousand.

Diseases

The most important diseases are red rot, mosaic, smut, white leaf, RSD, top rot, leaf spot, leaf scald. There is no incidence of downy mildew.

THAILAND

Sugar is one of Thailand's major industries and as such the government has created a committee that oversees all activities in all spheres of the industry – research, extension and policy making. This committee, which is under the Ministry of Industry, is the Office of Cane and Sugar Board (OCSB). Under this umbrella is the Sugarcane Research station located at Kanchanaburi, about 100 km southwest of Bangkok. The station is composed of Pests and Diseases, Soil and Fertilizer, Cultural Practices and Sugarcane Variety Improvement departments.

The organizational structure of the station is lean. It has 12 staff, 4 are agriculture technicians and 8 are technical assistants.

The station has a total of 500 collections which it has accumulated through exchanges with the neighboring sugarcane breeding countries such as Indonesia, Philippines, and China.

Cane crossing starts from the month of November to December. The station relies on natural flowering. The breeder utilizes the records of yield, characterization and pathology data to decide the pairs to be made.

The acid-solution technique is employed in preserving the crosses, which are all bi-parentals. The flowering clones are collected early in the morning from the field and are paired according to the prior match made. The female clones are emasculated by using water vapor (50oC) for 7-10 minutes. The crosses, consisting of 3 stalks of male for every stalk of female, are then enclosed in bi-parental lantern.

The resulting fuzz from the crosses are then sown in cemented flats approximately 0.5m x 0.5m with sterilized soil (using methyl bromide). The germinated seedlings will stay at the nursery for 2 months until June where it will be transplanted to the field. The excess fuzz are stored in paper bags with fungicide (IBA) and then stored at 8oC. The station normally makes 20,000 seedlings from 100 crosses.

Diseases

The most important diseases are white leaf, smut, and red rot. There is no incidence of downy mildew.

Varieties

The varieties listed for exchanges are K76-4, K84-69, K84-200, K88-65, K88-87, K88-92, and UT1.

PHILSURIN leads sugarcane variety improvement project in Southeast Asia

October December 2004

Filipino sugarcane planters stand to benefit from a US \$2 million regional variety improvement program headed by the Philippine Sugar research Institute Foundation, Inc.

Aimed to improve and sustain market competitiveness by enhancing the productivity and quality of sugarcane, the CFC/ISO/20 Sugarcane Variety Improvement in Southeast Asia and the Pacific was endorsed by the International Sugar Organization in 2000, and is funded by the Common Fund for Commodities. The other participating countries are Indonesia, Malaysia, Thailand, and Bangladesh.

The CFC/ISO/20 project pursues its goals through regionally-coordinated germplasm collection, conservation and evaluation, biotechnology-assisted breeding, as well as the improvement of technical research capabilities at national sugarcane breeding institutions.

"The project is on track, and we will continue to work on it to ensure that all targets are met," said Leon M. Arceo, project manager and PHILSURIN director general.

At a mid-term review meeting in Kuala Lumpur in May 2003, representatives of the five countries reported that the project was moving forward, and that germplasm exchange was efficient and successful. They also reported significant improvement in Research and Development facilities. Moreover, there was an increase in the transfer of sugarcane technology to consortium members.

Philsurin conducted disease indexing from October 1 to September 30, 2003. By the end of January 2004, the variety exchange between member countries was successfully completed.

"At PHILSURIN, there are already 930 existing accessions of sugarcane that were maintained at the Institute of Plant Breeding in UP Los Banos. Some of these accessions came from the exchange of sugarcane varieties among the countries participating in the CFC/ISO/20 project," Arceo said.

Accessions from foreign countries such as Hawaii and Florida were characterized cytologically (according to their cell structure) and morphologically (according to their form and structure).

New introductions of sugarcane varieties from Bangladesh, Malaysia, Indonesia and Thailand were tested and indexed for various diseases such as leaf scald, yellow leaf syndrome, sugarcane mosaic virus, sheath rot and ratoon stunting diseases. Those that showed disease symptoms were destroyed.

"The successful germplasm exchange has enabled the members of the project to acquire new varieties that have high production potential. This will ultimately benefit sugarcane planters in the participating countries," Arceo said.

At the 2003 mid-term review, Y. Bhg. Dr. Ahmad Zamzam bin Mohamed, Deputy Director General of Malaysian Agricultural Research and Development Institute acknowledged that the project is a breakthrough in common understanding among Southeast Asian countries which will eventually result in increased sugarcane productivity in the region.

Another PHILSURIN activity for the CFC/ISO/20 project is the DNA fingerprinting of sugarcane varieties using microsatellite marker which helps the breeders determine which varieties to cross-breed. DNA fingerprinting is the process of comparing the DNA sequence of two living organisms while microsatellite markers indicate the presence of a gene of interest such as resistance for smut or downy mildew.

PHILSURIN is continuously forging partnerships here and abroad to sustain self-sufficiency in sugar.

“CFC/ISO/20 is one of the best run CFC-sugar projects”

January-August 2005

Netherlands based Common Fund for Commodities lauded member countries of the CFC/ISO/20: Sugarcane Variety Improvement in Southeast Asia and the Pacific project for a job well done.

“It is one of the best run and best implemented sugar projects,” CFC Representative and CFC/ISO/20 Associate Project Manager Eltha Brown said, noting CFC/ISO/20’s significant accomplishments and its impact on sugarcane planters and breeders across the region.

“CFC is very pleased with the project outcome,” she added. One of nine sugar development programs funded by the agency, CFC/ISO/20 was endorsed by the International Sugar Organization in 2000 to improve and sustain market competitiveness in the region by enhancing the production and quality of sugarcane.

Headed by the Philippine Sugar Research Institute Foundation, Inc., the US\$2 million regional variety improvement program sought to undertake regional cooperation and coordination in germplasm collection and conservation, the exchange of sugarcane varieties, as well as the enhancement of technical research and development capabilities of national cane breeding institutions in Bangladesh, Indonesia, Malaysia, the Philippines and Thailand.

At the performance review meeting in Surabaya, Indonesia on December 14 and 15, 2004, the consortium members all agreed that the project had achieved what it set out to accomplish. “This project is an excellent undertaking in the sense that it has been managed very efficiently, and all the people involved are very professional and committed,” ISO Senior Economist Lindsay Jolly said. He noted that “each of the institutional members has undertaken its role very seriously to bring the project to a successful end.” CFC/ISO/20 drew to a close in August 2005.

“The project has contributed heavily to the institutional strengthening of member countries,” said PHILSURIN Director General Leon Arceo. Among the program’s achievements, he reports, are expanded sugarcane genetic resources, improved research infrastructure, as well as better developed human resources. A Regional Sugarcane Biotechnology Laboratory was established in Negros to generate new technologies which will be shared with other member countries.

Also, the breeding institutions were provided with small to medium scale equipment for their research laboratories. “The undertaking also has resulted in more harmonized standards for quarantine procedure, variety trial and characterization of germplasm collection, and a vastly improved regional networking among the partners,” Arceo said.

Over 50 sugarcane varieties have been exchanged among member countries between 2001 and 2005, enabling them to acquire new varieties with high production potential. The participating countries also were given property rights to the varieties, allowing them to adopt cane varieties that are suitable to their environment.

Yield trial results show that the Malaysian variety 80-A-1867 grows well in Bangladesh, the Philippines and Thailand. "This demonstrates that there can be a universal variety suitable to conditions in many countries," Arceo said. VMC varieties from the Philippines emerged as topnotchers in Bangladesh, Indonesia, and Thailand.

The germplasm characterization component of the project is manned by sugar experts from the Institute of Plant Breeding – University of the Philippines Los Banos, CFC/ISO/20's co-implementing agency. Reynaldo Quiloy, a project leader of the germplasm component, reported that a total of 960 accessions of sugarcane are maintained at IPB. The morphological, molecular, cytogenetic, and biochemical characterization were conducted in the PHILSURIN Experiment Station in Victorias and IPB-UPLB.

"Characterization is vital to the assessment of genetic diversity, accession identification, gap filling, establishment of core collections, and the identification of duplicates in the collection," Quiloy said. All the data gathered were encoded into MS Access for database development.

Project leader Nestro Altoveros reported significant progress on CANEPOINT (Philippine Sugarcane Genetic Resources Data and Information Management System), the database which will contain all information on sugarcane, arranged for easier research, retrieval and navigation. "Already, there are 930 accessions available in the program, and over 8,100 photos in the processing stage," Altoveros said. He added that the CANEPOINT team is working to include more data such as chromosome number, DNA fingerprints, as well as profile hyperlink to the accessions. The technology was made available to all CFC-member countries.

The post-entry quarantine greenhouse of the IPB-UPLB was rehabilitated to house exchanged varieties from the member countries, IPB-UPLB University Researcher Dr. Fe dela Cuerva reported. A disease-indexing scheme was developed to ensure that exchanged varieties are free from all diseases before being planted in commercial fields. Moreover, disease indexing enables pathologists to compare the strains of foreign and local sugarcane diseases.

"The varieties undergo a thorough process of indexing of downy mildew, smut, leaf scald, mosaic and other diseases. After two years in close-quarantine, the sugarcane varieties are transferred to an open quarantine area in Guimaras, Iloilo. The varieties are monitored for other diseases over another one-year period," dela Cueva said.

PHILSURIN Crop Physiologist and Plant Breeder Dr. Norvie Manigbas reported on his ongoing study "Molecular Marker-assisted Selection in Identifying Downy Mildew and Smut Resistance Genes in Sugarcane." A modern and more efficient technique which accelerates the breeding process, marker-assisted selection results in considerable savings in research costs and losses caused by diseases. "Out of 241 primers in PHILSURIN's Biotechnology Laboratory, 162 have been screened," Manigbas said. He will continue to gather data, identify polymorphic markers, verify identified markers, and apply marker-assisted selection in the breeding program.

The terminal reporting session is set for sometime in March 2006 when all data for the multi-location variety trials have been collated and analyzed. An information dissemination workshop will be conducted to share CFC/ISO/20's successes and experience with a number of African and Latin American countries.

"The ultimate beneficiaries of this project are all sugar producers and consumers," Arceo said.

Making sugar sweeter

January-August 2005

Collaboration among national sugar research and development organizations and breeding stations is materially improving the Southeast Asia and Pacific region's sugarcane profile, facilitating the efficient transfer of knowledge and technological know-how.

Backed by the International Sugar Organization and the Common Fund for Commodities, the CFC/ISO/20: Sugarcane Variety Improvement in Southeast Asia and the Pacific project was created to ensure more sweet successes for countries actively involved in the propagation of the commodity.

It was the generally low, if not stagnant sugarcane productivity in the region in the nineties that led the London-based ISO to endorse the project in 2000. The challenge was to improve the region's methods of sugar cultivation which were performed predominantly by small-scale farmers with limited resources. Hampering sugarcane productivity were the lack of appropriate technology, the underutilization of improved production technologies, outbreaks of diseases and pests, as well as marginal growing environments.

ISO, the intergovernmental body devoted to enhancing conditions prevailing in the global sugar market, saw the need for a concerted regional effort to increase productivity and ensure the long-term competitiveness of sugarcane in the region.

A partnership of 104 developed and developing nations, the CFC provided a grant of US\$1.4 million to fund CFC/ISO/20. The CFC is an institution under the United Nations that seeks to increase incomes of countries involved in commodity production, assist in expanding production where appropriate, and ensure the smooth flow of commodities from producers to end-users.

Out of five national sugar institutions from Bangladesh, Indonesia, Malaysia, the Philippines and Thailand, the Philippine Sugar Research Institute Foundation, Inc. was chosen to be the project leader.

With the supervisory body, the funding agency and the project executing agency in place, the inception meeting was held in November 2000. The partners discussed the program's objectives, components, as well as accounting policies and procedures. The signing of a Memorandum of Understanding between PHILSURIN and the collaborating institutions capped the four-day meeting.

The next five years, 2001 to 2005, saw the partners engaged in dogged work to achieve the CFC/ISO/20's goals. Year after year, significant accomplishments on various fronts – variety exchange, characterization of germplasm collection, disease indexing, DNA fingerprinting – were reported.

As the project comes to an end this year, national breeding institutions of CFC-member countries are better equipped with promising new sugarcane varieties, improved research and development facilities, advanced sugarcane biotechnologies and well-trained sugar experts.

Sugar is sweet indeed.

International sugar experts visit CFC/ISO/20 project site

January-August 2005

Representatives of the International Sugar Organization and the Common Fund for Commodities came to the Philippines to observe the accomplishments achieved under the CFC/ISO/20: Sugar Variety Improvement in Southeast Asia and the Pacific project.

In a supervision mission to the country from June 20 to 24, 2005, CFC Representative Eltha Brown and ISO Senior Economist Lindsay Jolly visited two project sites – the PHILSURIN Experiment Station in Victorias City, Negros Occidental, and the Institute of Plant Breeding in the University of the Philippines – Los Banos.

“The mission was very useful in providing first-hand observation of the work undertaken in the Philippines under the project, and confirming information provided in reports on the project,” Brown said.

Dr. Fe dela Cueva, plant pathologist and project leader for disease indexing, briefed the two on how the project’s elaborate quarantine and disease indexing procedures ensure disease-free sugarcane varieties. “It was explained that disease indexing procedures ensure disease-free sugarcane varieties. “It was explained that disease indexing is performed to minimize the introduction of new diseases or new strains of existing pathogens,” Brown stated in a report.

Sugar experts from the IPB-UPLB discussed the project’s germplasm characterization component. Characterization plays a key role in any crop improvement program because it helps to identify outstanding traits present in the germplasm.

University Researcher and CANEPOINT Project Leader Nestor Altoveros demonstrated how the innovative sugarcane database, CANEPOINT works. “One of CANEPOINT’s key features is the query tool that allows sugarcane breeders to search for a sugarcane variety with specific characteristics, and obtain immediate results,” Brown said.

In Victorias City, the two visited the CFC-funded Biotechnology Laboratory where PHILSURIN’s breeders, microbiologists and pathologists look for ways to improve sugarcane productivity. Brown and Jolly saw first-hand the advances made in breeding such as DNA fingerprinting which helps breeders to ensure that only distantly related varieties are cross-bred for excellent hybrid-vigor. “It was noted that this was the first time that DNA fingerprinting was used to identify genetic variability in sugarcane,” Brown said. The utilization of molecular markers to identify diseases in sugarcane was also discussed.

Visits to varietal trial sites in Negros also were part of Brown and Jolly’s itinerary. Hawaiian-Philippine Company Mill District Coordinator Manuel Gallego brought them to fields where he is testing sugarcane varieties from Bangladesh, Indonesia, Malaysia and Thailand. Sugarcane variety trials allow agronomists to observe agronomic characteristics, disease reactions and yield performance of exchanged varieties.

The supervision team was treated to a sneak preview of PHILSURIN’s latest opus, the development of a biofertilizer which carries microorganisms that help sugarcane increase their nutrient uptake. Microbiologist Dr. Luciolle Villegas discussed the field trials she is conducting to evaluate the effect of bacteria on sugarcane yield. With tests running over seven years and promising results, PHILSURIN will commercialize the biofertilizer in 2 to 3 years.

PHILSURIN's Geographical Information System Coordinator Jose Rojo Alisla discussed the institution's state-of-the-art GIS, a tool used to assemble, store, manipulate and display geographically-referenced information with Brown and Jolly.

They also observed PHILSURIN's sugarcane micropropagation program – an advanced multiplication technique utilizing tissue culture procedures by which the excised tissue of a plant is grown in an artificial medium in a germ-free environment. Micropropagation has greatly reduced the lag time between the introduction and the full adoption of a new variety because it enables breeders to generate hundreds of thousands of plantlets in a small laboratory space in a shorter period of time.

PHILSURIN Director General Leon Arceo took the team to several mill district coordinating councils where they were briefed on PHILSURIN's other projects such as the biological control of the sugarcane borer using *Trichogramma chilonis*, the Hot Water Treatment facility, development of small farm machinery, and soil analysis and fertilizer recommendation. A bonus treat was a trip to a small plant at HPCo which manufactures muscovado sugar.

The trip "further reinforced the successes of the project in terms of both the technical and administrative perspectives," Brown said.

Profiles of CFC-Member Countries

January-August 2005

BSRI

Accelerating Bangladesh's sugarcane R&D program

The sugar industry plays a vital role in the economy of Bangladesh, generating employment opportunities for millions of farm workers. Over 425,000 acres of land is dedicated to sugar, with 60% of the growers owning an average area of 10 acres each. Muscovado sugar or gur is planted to almost half of the sugar lands.

As with other enterprises, the country's sugar industry relies heavily on research and development to remain efficient and globally competitive. Mandated to carry out R&D for sugarcane, the Bangladesh Sugarcane Research Institute originated from the Sugar Research Station which was established under the Department of Agriculture in 1951.

The station was transferred to the Ministry of Industry in 1973. It was then upgraded as the Sugarcane Research Institute, and subsequently renamed Bangladesh Sugarcane Research and Training Institute. In 1989, it was transferred back to the Ministry of Agriculture. The Parliament of the People's Republic of Bangladesh passed the 1996 Act of Bangladesh Sugarcane Research Institute, making BSRI an autonomous national institute.

The institute's breeding program seeks to develop higher yielding and drought-tolerant varieties of sugarcane. It has released a total of 28 varieties, most outstanding of which are Isd-1/53, Isd-2/54 and Isd-5/55.

Hybridization takes place from November to December. BSRI is equipped with a biparental shed with panels of fiberglass that work as separators for each pair of crosses, as well as a canal with flowing water to maintain the marcotted crosses. The institute makes 600 crosses from 140 parents on the average.

The technology transfer of basic sugarcane cultural practices, small machines development and improvement in gur processing, and intercropping from BSRI's other tasks. The institute also has standardized fertilizer doses and management practices for sugarcane cultivation based on agro-ecological zones.

Ten departments constitute the research body, namely Agricultural Engineering, Agricultural Economics, Breeding, Agronomy and Farm Systems, Entomology, On-farm Research, Pathology, Physiology and Sugar Chemistry, Soils and Nutrition, and Training and Technology Transfer. Working to elevate the country's sugarcane R&D program are 368 scientists and technical staff.

Located at Ishurdi, the institute has 3 regional stations, 6 sub-stations, 8 pre-evaluation sites and 8 photoperiod chambers. Equipped with a small-capacity hot water treatment tank and a glass house, the quarantine stations is located at the Dhaka-based Bangladesh Research Institute.

BSRI has accumulated over 1,000 sugarcane accessions mostly from germplasm exchanges with India. Most of the commercial varieties, however, have local varieties as parents.

Project Coordinator Dr. ATM Saleh Uddin Choudhury leads BSRI's delegation to the CFC/ISO/20 project.

ISRI

Working toward self-sufficiency in Indonesia

The oldest sugarcane research institute in Asia, the Indonesian Sugar Research Institute was established in 1887 by the Indonesian Planters Association.

A government agency under the Ministry of Agriculture, ISRI is a sugarcane breeding pioneer in Asia. Two of the most enduring varieties ever developed in the region, POJ 2878 and POJ 3016, were bred in ISRI. Today, the quest for higher yielding varieties still remains to be the institute's major task.

ISRI Principal Sugarcane Breeder Dr. Mirzawan P.D. Nurtjahjo says he is hopeful that through CFC/ISO/20, they will be able to develop high yielding varieties that may be commercially grown in Indonesia. He added that these HYVs would help increase the country's productivity and improve the lives of sugarcane farm workers.

Located in Pasuruan, ISRI provides services related to agricultural technology, production equipment, waste treatment technology, as well as processing technology. It also conducts research on sugar processing in its own mini sugar factory.

Among key studies conducted on sugarcane were the production of dextranase enzyme, the desugarization of molasses, the production of Maillaerd-Reaction Products to inhibit microbial activities, and serodiagnosis for the early detection of smut. The institute is composed of over 400 men and women sugarcane experts manning 8 various divisions – Agronomy, Agricultural Engineering, Breeding, By-products, Plant Protection, Processing, Soil Science and Socio-economics.

Occupying 70 hectares of land, ISRI's breeding station is equipped with facilities for biotechnology, sugarcane seed storage, cane juice and sugar analysis. Its tissue culture laboratory produces more than 200,000 sugarcane plantlets annually.

Over 6,000 hybrid clones comprise the institute's rich germplasm collection, 767 of which are wild canes. The sugarcane accessions have been accumulated through an active germplasm exchange program with breeding stations in Australia, Barbados, Hawaii, India, Japan, and the United States.

ISRI has a quarantine station found at the Puteran Island in Madura, East Java, 100 kilometers away from the nearest sugarcane plantation. It has 11 experiment sub-stations. A cane crossing facility is located in Malang.

Sugar is among Indonesia's primary commodities. In 2000, the country's sugar production was 1.6 million tons, while domestic consumption was 3 million tons. Indonesia imports sugar from various countries, with Thailand as the largest supplier. Sugarcane production increased to 2.031 million tons in 2004, with consumption at 3.4 million tons.

In 2002, the government launched a productivity enhancement program to achieve self-sufficiency in sugar production by 2008. The program is aimed at upgrading outmoded sugar mills, encouraging replanting, and expanding sugarcane cultivation to the outer Java islands. The country is also working to improve farm practices and distribute more HYVs.

Project Coordinator Dr. Nurtjahjo and Deputy Project Coordinator Ir. Abdul Rasyid, MM lead Indonesia's contingent to the CFC/ISO/20 project.

MARDITECH

Bringing innovations to Malaysia's sugar industry

After having developed modern biotechnologies and other innovations for the agriculture industry, the next challenge is to bring these products and services closer to end-users.

In the case of Malaysia's sugar industry, research results reach sugar producers through Marcitech Corporation Sdn. Bhd. A wholly-owned subsidiary of the Malaysian Agricultural Research Development Institute (MARDI), Marditech was incorporated in 1992 to help accelerate the industry's uptake of research results.

While MARDI undertakes R&D in food and tropical agriculture, Marditech facilitates the transfer of technological innovation and imparts professional management experience to develop successful agro-based businesses. Its major tasks include marketing MARDI's know-how and expertise, providing a platform for integrating R&D results and industry needs, and developing capacity as an integrator for technology innovation initiatives.

Marditech links MARDI with entrepreneurs who want to invest in commercializing technologies developed by the R&D institute. Technology and innovation, business strategy, technology investment, and technology marketing are its core competencies.

To implement a variety exchange program, it brought together MARDI and Gula Padang Terap, a government-owned sugar production complex in Alor Setar. One of two sugar mills in Malaysia, Gula Padang Terap has a milling capacity of 4,500 tons cane per day.

With a pool of over 430 scientists and researchers and more than 1,000 technicians, MARDI will take charge of nursery establishment, disease screening and indexing, laboratory analysis, database management and variety evaluation. It will also provide quarantine facilities.

Varieties for exchange, harvesting, variety performance and evaluation, as well as the facilities for field trials will come from Gula Padang Terap which employs over 600 workers.

Marditech's role in the partnership involves the management of the project, the coordination of the services needed, the mobilization of funds, the procurement of goods, logistics, project accounting and auditing, and project report and evaluation.

Well-coordinated programs such as this will surely improve the productivity and competitiveness of Malaysia's sugar industry.

Project Coordinator Dr. Ali Abdul Hamid and Deputy Project Coordinator Zaritadul Addawiyah Murid lead Marditech's representatives to the CFC/ISO/20 project.

PHILSURIN

A key player in Philippine sugar's dramatic recovery

Chosen to be the project executing agency of the CFC/ISO/20: Sugarcane Variety Improvement in Southeast Asia and the Pacific project, the Philippine Sugar Research Institute Foundation, Inc. is the sugar industry's research and development arm.

PHILSURIN was formed in response to Executive Order No. 18 mandating that sugar research, development and extension activities be transferred to the private sector. The institute is funded by sugar millers' and planters' liens at P2 per 50-kilogram bag of sugar produced, as mandated by Sugar Regulatory Administration Sugar Order No. 2 Series of 1995.

The non-stock, non-profit organization works in tandem with the SRA and the Institute of Plant Breeding – University of the Philippines Los Banos to sustain the country's self-sufficiency in sugar, as well as to keep abreast of the latest thrusts in biotechnology for sugarcane breeding.

The secret behind Philippine sugar's success, PHILSURIN Director General Leon Arceo says, is the active involvement of stakeholders in the Mill District Development Councils which have undertaken the massive distribution of new high yielding sugarcane varieties. Manned by men and women coordinators who have a track record of excellence in the fields of agriculture, agronomy, plant pathology and plant physiology, MDDCs define their own problems, decide which projects to prioritize, outline methodologies and craft solutions that would best address their needs.

PHILSURIN has institutionalized a total of 26 MDDCs across Luzon, Visayas and Mindanao. The propagation and dispersal of high yielding sugarcane varieties, variety testing, disease prevention, pest

control, soil rejuvenation, publications, as well as seminars and farm tours, from the MDDCs' roster of activities.

The search for higher yielding varieties of sugarcane is the institution's most important, and most expensive activity. PHILSURIN took over the Victorias Milling Corporation Breeding Station in 1997 and funds the breeding activities, the equipment and the professional expertise of a staff of 17. Working and greenhouses, nurseries and state-of-the-art laboratories, the breeders follow a seven-year breeding cycle, evaluating earlier VMC crosses and the more current PRN (PHILSURIN) crosses.

Senior Plant Breeder Aurora Barredo says that "Our breeding program seeks to develop location-specific varieties that are high in sugar yield, erect, self-trashing and resistant to major diseases."

Between 1967 to 1997, the VMC Breeding Station released 10 high yielding sugarcane varieties. PHILSURIN released 7 high yielding sugarcane varieties including VMC 86-550, PS 2 (VMC 88-354), PS 3 (VMC 84-524) and VMC 87-599 between 1997 and 2002. In addition, the institute has recently made available to a number of milling districts 2 new HYVs: PS 4 (VMC 95-152) and PS 5 (VMC 95-09). The SRA also has registered its own 7 HYVs.

The station has a germplasm bank of 1,000 sugarcane accessions accumulated since 1967. A duplicate germplasm collection is kept at the IPB-UPLB.

Faced with the increasing prices of fertilizer, labor, as well as fuel, the Philippine sugar sector has turned to modern biotechnologies for a much-needed boost. PHILSURIN has gone beyond conventional breeding methods, conducting research in molecular marker technology that will eventually shorten the breeding cycle.

Partnerships with international research and development organizations such as the United States Department of Agriculture, the Agricultural Research Centre for International Development of France, the Bureau of Sugar Experiment Station of Australia, the Yunan Sugarcane Research Institute of China, and Mitr Phol of Thailand have helped shaped the country's R&D program. PHILSURIN is also part of the International Consortium of Sugarcane Biotechnology and the International Sugarcane Microsatellite Consortium. The Philippines further banks on its growing number of sugar experts to sustain advances made in biotechnology.

From the downturn in the 80s to the mid 90s, PHILSURIN has been material in the sugar industry's dramatic recovery. Production grew by 43.55% from 1.63 million metric tons in 1999, to 2.34 million metric ton in crop year 2003-04. The hefty increase has made the Philippines a net sugar exporter, selling its surplus to China, Japan and South Korea.

Leading the Philippines' representatives to the regional variety improvement program are CFC/ISO/20 Project Manager Leon Arceo and Deputy Director Project Manager Dr. Ramon Cu.

OCSB

Overseeing Thailand's sugar industry

Thailand began producing sugar as early as the 13th century. From a cottage industry, sugar production grew and shifted to commercial scales. In 1960, the country achieved a net sugar export status. Today, it

is one of the world's 5 largest sugar exporters, selling sugar to Africa, China, Indonesia, Japan, Korea, and Malaysia.

Established by the Cane and Sugar Act of 1984, the Office of the Cane and Sugar Board was created to regulate Thailand's sugar industry. It is an agency under the Ministry of Industry which oversees the research, extension, as well as policy making aspects of sugar.

The organization is composed of 4 major committees. The Executive Committee determines the final sugar prices and returns on sugar production and distribution. The preparation of plans for the development of sugarcane varieties, sugarcane production, the control of pests, and the registration of cane growers fall under the Cane Committee.

The Sugar Committee takes charge of production planning, determining the amount of cane to be crushed daily, the regular rate for crushing for each factory, and the types, quality and quantity of sugar that each factory will produce. The task of collecting sugarcane and sugar research development fees is the Cane and Sugar Stabilization Fund Management Committee's responsibility.

Through its various activities, the OCSB seeks to increase the country's volume and quality of sugar production, further expand the market, and provide technical know-how of Thailand's sugar workers.

The OCSB also takes charge of dividing Thailand's sugar output into 3 quotas – quota A is for domestic sales, quota B for exports under the industry's long-term contracts, and quota C for exports falling under individual export contracts.

Under the Cane Committee is the Central Sugarcane Agricultural Center which is divided into 4 sections - Agricultural, Angthong Sugarcane Station, General Administration, and Science. Sugarcane breeding and selection are undertaken by the Agricultural and Angthong Sugarcane Station sections.

The Central Sugarcane Agricultural Center in Kanchanaburi, and the Angthong Sugarcane Station have a total staff of over a hundred. Sugarcane Variety Improvement, Soil and Fertilizer, Cultural Practices, and Pests and Diseases form the station's various departments.

The station has a germplasm bank of 500 sugarcane accessions accumulated through variety exchange with sugarcane breeding institutions in China, Indonesia, and the Philippines.

Leading Thailand's representatives to the CFC/ISO/20 program are Project Manager Suttinee Poopaka and Deputy Project Manager Warawan Chiparoon.

CFC Training Program boosts SE Asian scientists' know-how

January-August 2005

At the core of every successful project is a human resource base well equipped with the necessary knowledge, skills and tools to perform efficiently. With this in mind, implementers of the CFC/ISO/20: Sugar Variety Improvement in Southeast Asia and the Pacific project conducted a series of training seminars to upgrade the research and development capabilities of the region's scientists and breeders.

Germplasm Characterization

Sixteen sugarcane experts from Bangladesh, Indonesia, the Philippines, and Thailand underwent intensive training on sugarcane genetic resources at the Institute of Plant Breeding – University of the Philippines Los Banos from April 11 to 15, 2005.

The training sought to enhance the participants' skills in 2 areas – the characterization of sugarcane germplasm, the documentation and management of information on plant genetic resources.

CFC/ISO/20 project leader PHILSURIN tapped sugar experts from IPB-UPLB to introduce 8 of the participants to the characterization of plant genetic resources, the standardization of sampling procedures for the characterization of sugarcane germplasm, as well as other various other characterization techniques.

"the Philippines has the most thorough and most complete characterization process," CFC/ISO/20 Project Manager and PHILSURIN Director General Leon M. Arceo said. "Through this training, we gave representatives of the participating countries a model of what to include in their characterization," he added.

In recent years, PHILSURIN has gone beyond the traditional method of characterizing germplasm collection which is based on the physical attributes of a plant. The institution has explored the use of molecular markers, which are more accurate and less affected by the environment, as early as 2002. To date, the Philippines is the only country using the DNA fingerprinting method that identifies genetic similarities and differences between organisms using genetic markers.

The other 8 participants attended the training on documentation and information management, which underscored the importance of having a well-managed sugarcane database system. The trainees were trained to use CANEPOINT.

The world's most comprehensive and most complete sugarcane database system, CANEPOINT was developed by PHILSURIN in tandem with IPB-UPLB. "We want CANEPOINT to be a model for other countries and other crops, too. If all sugar-producing countries such as Thailand, Malaysia and Bangladesh will have an information management system similar to CANEPOINT, the distribution and exchange of sugarcane information and material will be easier," Arceo said.

As a final exercise, the trainees performed the actual characterization of sugarcane varieties on the field using a standardized set of sugarcane descriptors developed by PHILSURIN and IPB.

Micropropagation

PHILSURIN sent Tissue Culture Specialists Jocelyn Almedilla and Ma. Angelita Rebadomia to Bangladesh in May 2004 to conduct a training program on micropropagation for which the institution has a special capability.

Held at the Bangladesh Sugarcane Institute, the 14 day training sought to give participants a clear understanding of tissue culture's role as a propagation tool. It also aimed to share knowledge, skills and basic techniques in explants excision, separation of plantlets, and rooting with CFC-member countries.

Eight sugarcane researchers participated in lectures on Overview and Application of Sugarcane Micropropagation, Laboratory Requirements, General Techniques and Procedures, and Micropropagation Stages and Procedures, Laboratory Procedures: Dos and Don'ts.

Laboratory activities such as stock solutions preparation, media preparation, separation of plantlets, disinfection of spindles, and explants excision for shoot tip and meristem culture allowed the trainees to apply what they have learned.

The group also visited a breeding nursery, a photoperiod facility, a trichogramma laboratory, variety trial sites, and a quarantine station.

DNA Fingerprinting

In September 2003, 10 sugarcane breeders, plant pathologists, tissue culturists and crop physiologists from the consortium members participated in a 6-day training on DNA fingerprinting at the PHILSURIN Biotechnology Laboratory.

Aimed at teaching participants basic DNA fingerprinting techniques, the seminar was a combination of lectures and hands-on activities in the laboratory and on the field. The training staff led by PHILSURIN Molecular Plant Breeder Dr. Rosendo Muyco discussed topics such as General Laboratory Procedures, Practices and Safety, Morphological Characterization of Sugarcane. Preparation of laboratory reagents, DNA extraction, DNA quantification, DNA amplification, band detection, gel scoring, data input and analysis and interpretation of results formed the seminar's laboratory activities.

Dr. Giovanni Cordeiro from the Centre for Plant Conservation Genetics, Southern Cross University in Australia was invited to talk about Molecular Plant Breeding: Crop Improvement With Molecular Markers, and Assessing Genetic Diversity: Understanding Relationships in Crop Plants.

Disease Indexing

To identify important diseases of sugarcane in germplasm exchange, the training program on disease indexing of sugarcane was held at the IPB-UPLB from March 4 to 9, 2002. Eleven sugarcane researchers from the 5 member countries were invited to participate in lectures and laboratory activities on DNA extraction, nucleic-acid-based techniques (PRC/RT-PCR) and serology (DBIA and EB-ELISA).

Principal lecturer Dr. Yong-bao Pan of the United States Bureau of Agriculture discussed disease indexing using molecular techniques. There were also lectures on Important Diseases of Sugarcane, Molecular Approaches of Bacterial Disease Detection in Sugarcane, and Immunological Tools for Disease Indexing in Sugarcane.

"It was deemed necessary that all participating countries use a standard procedure to index outgoing and incoming varieties to minimize the introduction of diseases to receiving countries," Arceo said. He added that "researchers in each country should have the capability to use new techniques in disease indexing."

Representatives to various training seminars agree that the CFC/ISO/20 project has increased the transfer of sugarcane technology and know-how to consortium members through lectures and laboratory activities, efficient germplasm exchange, as well as visits to member-countries.

Exchanged varieties from CFC countries

January-August 2005

BANGLADESH	INDONESIA	MALAYSIA	PHILIPPINES	THAILAND
ISD 16	PS 80-1007	GPB 5	VMC 71-39	K 76-4
ISD 20	PS 851	GP 76-321	VMC 71-238	K 84-69
ISD 24	PS 80-1424	GP 76-3642	VMC 73-229	K 84-200
ISD 28	PS 86-10029	79-655	VMC 76-16	K 88-87
ISD 2-54	PS 81-362	80-A-1867	VMC 87-599	K 88-89
ISD 21	PSGM 88-3092	80-B-90	VMC 84-549	UT 1
ISD 25	PSBM 90-44	82-1089	VMC 87-95	K 91-216
ISD 29	PS 92-3092	82-B-24	VMC 84-524	K 91-253
ISD 30	PS 862	82-1011	VMC 86-550	K 92-80
ISD 31	PS 863	83-R310	VMC 88-354	K 92-181
	PSCO 90-2411	86-13	VMC 92-189	K 92-213

PHILSURIN leads sugarcane variety improvement project in Southeast Asia

Oct-Dec 2004

Filipino sugarcane planters stand to benefit from a US\$2-million regional variety improvement program headed by the Philippine Sugar Research Institute Foundation, Inc.

Aimed to improve and sustain market competitiveness by enhancing the productivity and quality of sugarcane, the CFC/ISO/20: Sugarcane Variety Improvement in Southeast Asia and the Pacific was endorsed by the International Sugar Organization in 2000 and is funded by the Common Fund for Commodities. The other participating countries are Indonesia, Malaysia, Thailand and Bangladesh.

The CFC/ISO/20 project pursues its goals through regionally coordinated germplasm collection, conservation and evaluation, biotechnology-assisted breeding, as well as the improvement of technical research capabilities at national sugarcane breeding institutions.

"The project is on track, and we will continue to work on it to ensure that all targets are met," said Leon M. Arceo, project manager and PHILSURIN director general.

At a mid-term review meeting held in Kuala Lumpur in May 2003, representatives of the 5 countries reported that the project was moving forward, and that germplasm exchange was efficient and successful. They also reported significant improvement in Research and Development facilities. Moreover, there was an increase in the transfer of sugarcane technology to consortium members.

PHILSURIN conducted disease indexing from October 1 to September 30, 2003. By the end of January 2004, the variety exchange between member countries was successfully completed.

"At PHILSURIN, there are already 930 existing accessions of sugarcane that were maintained at the Institute of Plant Breeding in UP Los Banos. Some of these accessions came from the exchange of sugarcane varieties among the countries participating in the CFC/ISO/20 project." Arceo said.

Accessions from foreign countries such as Hawaii and Florida were characterized cytologically (according to their cell structure) and morphologically (according to their form and structure).

New introductions of sugarcane varieties from Bangladesh, Malaysia, Indonesia and Thailand were tested and indexed for various diseases such as leaf scald, yellow leaf syndrome, sugarcane mosaic virus, sheath rot and ratoon stunting diseases. Those that showed disease symptoms were destroyed.

"The successful germplasm exchange has enabled the members of the project to acquire new varieties that have high production potential. This will ultimately benefit sugarcane planters in the participating countries," Arceo said.

At the 2003 mid-term review, Y. Bhg. Dr. Ahmad Zamzam bin Mohamed, Deputy Director General of Malaysian Agricultural Research and Development Institute acknowledged that the project is a breakthrough in common understanding among Southeast Asian countries which will eventually result in increased sugarcane productivity in the region.

Another PHILSURIN activity for the CFC/ISO/20 project is the DNA fingerprinting of sugarcane varieties of sugarcane varieties using microsatellite marker which helps the breeders determine which varieties to cross-breed. DNA fingerprinting is the process of comparing the DNA sequence of 2 living organisms while microsatellite markers indicate the presence of a gene of interest such as resistance for smut or downy mildew.

PHILSURIN is continuously forging partnerships here and abroad to sustain self-sufficiency in sugar.

CFC/ISO/20 project gets excellent rating

July 2006

The 5-year CFC/ISO/20: Sugarcane Variety Improvement in Southeast Asia and the Pacific marked a sweet end after sugar experts from Bangladesh, Indonesia, Malaysia and Thailand gave it a thumbs up for meeting all targets set.

"We are very happy over the results of the evaluation because it demonstrates that CFC/ISO/20 has accomplished its objective to deliver programs that will ultimately benefit the region's sugarcane producers," PHILSURIN Director General and CFC/ISO/20 Project Manager Leon Arceo said.

Giving ratings which ranged from "very satisfied" to "satisfied", two representatives each from the 4 collaborating countries noted the program's success, expressing their satisfaction with all outcomes in a project evaluation session. The activity capped the 5-day International Sugar Development Forum and CFC/ISO/20 Project Results Dissemination Workshop hosted by PHILSURIN, the International Sugar Organization and the Common Fund for Commodities from April 24 to 28.

The verdict: all targets were met, and in many cases exceeded, including (1) a regionally-coordinated exchange of elite varieties and breeding lines of sugarcane; (2) an enhanced germplasm collection and improved sugarcane varieties adapted to participating countries' major ecological conditions; (3) the sharing and dissemination of results within and outside the region, (4) upgraded technical research capabilities of national sugarcane breeding institutions; and (5) sharing new varieties and elite breeding material with other sugar-producing countries.

Following a 5-point scale with 5.0 as the highest possible score, Bangladesh gave the project a perfect rating for all 5 objectives, followed by Indonesia at 4.6. Thailand and Malaysia ascribed scores of 4.2 and 3.6 respectively. The Philippines did not participate in the evaluation process as PHILSURIN was the Project Executing Agency. CFC Project Manager Eltha Brown and ISO Senior Economist Lindsay Jolly supervised the evaluation exercise.

"Questionnaire responses show that among 8 project components, all member countries agree that the variety exchange program is the most important," Mr. Arceo said. Between 2001 and 2004, over 56 cane varieties of diverse genetic backgrounds were shared among the 5 collaborating countries. The promising varieties are expected to help enrich the genetic base for hybridization in the region.

An enriched germplasm collection, as well as the development of human resources, ranked second in importance in the roster of project outputs. Representatives believe that the CFC/ISO/20 project has accelerated the transfer of sugarcane technology and know-how among consortium members by means of training seminars and visits to member countries.

Sharing the 3rd spot in the list of components deemed most vital by members are the exchange of ideas and experience among countries; the upgrading of research facilities; and the good relations among participating countries.

Participants were also asked to offer suggestions on how to improve similar projects. One respondent said that a study to develop cane varieties which produce high total sugar at an earlier stage must be conducted to support the bio-alcohol industry. Another representative suggested that the sustainability of post-project impact be included in the project design because sugar is a relatively long-term crop. Topping the list of member countries' project ideas are visits to more sugarcane producing countries to foster skills and the exchange of ideas.

Also highlighted in the project evaluation session is the need for a continued collaboration among participating countries. Member-countries believe that networking is key to maximizing the undertaking to come up with better varieties.

The CFC and the ISO took the opportunity to laud PHILSURIN for a job well done as project leader. "PHILSURIN has to be congratulated for being such an efficient and professional Project Executing Agency. This project will contribute to improving and sustaining the market competitiveness of the region by enhancing the productivity and quality of sugarcane and will bear fruit in many years to come," ISO Executive Director Peter Baron said.

For CFC's Ms. Brown, CFC/ISO/20 is "one of the best run and best implemented sugar projects." One of 9 sugar development programs funded by the agency, the project was endorsed by the ISO in 2000.

In sum, the US\$2 million project consolidated the resources and expertise of top sugarcane research institutions from Bangladesh, Indonesia, Malaysia, the Philippines and Thailand to increase sugarcane

productivity in the region. The program resulted in a string of accomplishments in the areas of germplasm exchange, disease indexing and quarantine, as well as biotechnologies that enhance the breeding process.

Sugar experts help identify areas for future CFC funding

July 2006

Establishing groundwork for a strategic work plan to address sugar's development, the Common Fund for Commodities invited key industry stakeholders from 16 Asian, African and Latin American countries to participate in the International Sugar Development Forum hosted by PHILSURIN on April 24.

"The forum demonstrates the need to obtain first-hand input from the key players in the design of our operational program for the commodity," CFC Managing Director Ambassador Ali Mchumo said. He added that stakeholder participation "will reduce the period between project identification and approval as there would be a clearer definition of the priority areas for CFC assistance during a given period."

The gathering was convened against the backdrop of the Netherlands-based institution's Five-Year Action Plan which focuses on reducing the economic imbalance between developed and developing countries; diversifying commodity production and trade; and improving productivity in a sustainable manner.

CFC is a financial institution created to improve structural conditions in commodity markets, enhance productivity through research and development, and heighten international competitiveness. In tandem with the International Sugar Organization, it funded the recently concluded CFC/ISO/20: Sugar Variety Improvement in Southeast Asia and the Pacific project. The 2 organizations also work together on 4 other regular sugarcane projects, as well as 4 fast track programs.

In a whole day program held at the New World Renaissance Hotel in Makati City, Ambassador Mchumo, ISO Executive Director Dr. Peter Baron, Department of Agriculture Secretary Domingo Panganiban, and PHILSURIN Chairman Bernardo Trebol each gave their welcome remarks. CFC Chief for Policy Programme Management and Evaluation Getachew Gebre Medhin presented the roles and functions of the CFC, while ISO Senior Economist Lindsay Jolly discussed new strategic initiatives in the world sugar market.

After the presentations, CFC Project Manager Eltha Brown led group discussions on recommended areas for CFC project assistance. The participants were divided into 2 working groups, the first group tasked to tackle general commodity development issues and challenges for sugar, with the second group focusing on issues and challenges faced by small-scale sugar producers.

Jamaica-based Sugar Industry Research Institute Agricultural Services Manager Trevor Falloon reported that Group One identified low productivity, managing the supply chain, and diversification due to policy change, globalization, renewable fuels, the Kyoto Protocol and oil prices, as the development issues confronting the industry. Among the interventions they recommended to address the issues raised are variety improvement, the development of projects which will promote efficiency during the harvesting process, as well as increasing the flow of technology transfer.

Companhia DeSena SARL Agronomist Charles Patrick Sweet reported Group Two's proposed projects which include increasing sugarcane productivity by propagating and distributing healthy improved

varieties for specific regions, and diversification. The group also recommended that a pilot study be made on the problem of transportation in the supply chain. Also proposed were block farming and coordination with farmers' organizations to address the issues such as land area management.

The CFC will review the recommendations gathered, and use them as basis for building a funding program. "From all indications, sugar will continue to be a commodity that occupies a key slot in the Common Fund's development agenda. We stand ready to play our part in supporting sugar to enable it to realize its full potential in the economic development of our member countries," Ambassador Mchumo said.

For his part, Dr. Baron encouraged the participants to come up with more creative sugarcane projects for future funding.

Variety exchange yields promising results

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The future looks brighter for thousands of cane growers in the Asian region who are set to reap the benefits of a large scale variety exchange program conducted among 5 key sugar producing countries.

The most important accomplishment of the 5-year CFC/ISO/20: Sugar Variety Improvement in Southeast Asia and the Pacific project is the successful exchange of 56 cane varieties of diverse genetic background among Bangladesh, Indonesia, Malaysia, the Philippines and Thailand. The region's sugarcane planters stand to benefit from the importation of new varieties which is deemed to be more cost effective than breeding.

"While it takes 8 years to breed local varieties, imported varieties may be released after only 5 years," PHILSURIN Deputy Director General and CFC/ISO/20 Deputy Project Manager Dr. Ramon M. Cu said. Aside from accelerating the development, introduction and adoption of improved sugarcane varieties, he added that bringing in sugarcane varieties from other sugarcane growing countries helps enrich the genetic base for hybridization.

CFC/ISO/20 member-countries commenced exchanging varieties in 2001. Collaborating agencies Bangladesh Sugarcane Research Institute, Indonesian Sugar Research Institute, Malaysian Agricultural Research and Development Institute, PHILSURIN, and the Office of the Cane and Sugar Board of Thailand each shared a number of varieties. These varieties underwent yield performance trials, as well as stringent pest and disease evaluation process, in several sites.

"Promising canes have been identified in each of the countries," PHILSURIN Director General and CFC/ISO/20 Project Manager Leon M. Arceo said. A notable finding, he says, is that our local varieties such as VMC 84-549, VMC 87-95 and VMC 73-299 are top yielders in Bangladesh, Indonesia and Thailand. Locally, varieties received from Thailand, Malaysia and Indonesia comprise the top 10 high-yielding cane varieties.

Also, there are varieties which registered outstanding performance in several countries. This demonstrates that there can be a universal variety suitable to conditions in many locations.

The participating countries were given property rights to the varieties, allowing them to adopt canes that are suitable to their environment. In the Philippines' case, Mr. Arceo says that PHILSURIN will be in a position to commercialize some of these varieties in a year's time.

According to Dr. Cu, the entrance of cane varieties with higher production potential is vital to further boosting CFC/ISO/20 member-countries' productivity. The Philippine experience has shown that the upward trend of productivity over the recent years was largely because old varieties were replaced by new high yielding varieties of cane. Owing to PHILSURIN's massive distribution of HYVs, the country achieved self-sufficiency in 2002.

The variety exchange component of CFC/ISO/20 gave member countries the opportunity to enhance their respective germplasm collections, and utilize the shared varieties in the national hybridization program. Moreover, it enabled them to evaluate their varieties against the existing commercial varieties of each country. "The project also enhanced quarantine regulatory support by providing the necessary facility and training quarantine personnel to detect exotic diseases using molecular techniques," Dr. Cu said.

CFC/ISO/20: A model sugarcane project

July 2006

The International Sugar Organization and the Common Fund for Commodities heaped praise on the recently concluded CFC/ISO/20: Sugarcane Variety Improvement in Southeast Asia and the Pacific project, indicating that both institutions consider the program a worthy investment.

"For us in the ISO, and I think also for our colleagues in the Common Fund, this project will be a showcase and a reference project for others to follow," ISO Executive Director Dr. Peter Baron said. He added that "this project is a shining example of the excellent and frictionless cooperation between all parties involved, demonstrating how smoothly and efficiently complex projects can be carried out and executed with success."

CFC Project Manager Eltha Brown, for her part, says the CFC is "very pleased with the project outcome." She noted the program's impact on sugarcane planters and breeders across the region.

Endorsed by the ISO in 2000, CFC/ISO/20 is one of nine sugar development programs funded by CFC. Among other projects financed by the United Nation's established agency is the promotion of cane-based alcohol as additive gasoline, sugar waste treatment, co-cropping sweet sorghum with sugarcane, and enhancing the viability of small Caribbean sugar industries to meet global challenges. Its smaller fast-track programs include a baseline study on electricity co-generation, small-scale sweetener production, a study on integrating small-scale sweetener production, a study on integrating small-scale sugar farmers into the production system, and a symposium on the challenges and opportunities for organic sugar.

After assessing project results against previously set targets, Brown found that "Overall, from a technical perspective, the project met all, and in some cases, exceeded the targets." She lauded member-countries Bangladesh, Indonesia, Malaysia, the Philippines and Thailand for successfully implementing components such as sugarcane germplasm exchange, characterization of germplasm collections, and disease quarantine and indexing. Other accomplishments include improved technologies for sugarcane breeding, research infrastructure, as well as human resources.

She also highlighted the lessons learned from the 5-year program. CFC/ISO/20, for one, proved that with appropriate planning and management tools, a project can be successfully implemented in 5 countries at different levels of development in terms of their economy in general, and the sugar industry in particular. In the developmental area, she said the project demonstrated that in defining activities, it is important to assess and address the development needs of the least advanced participants.

According to Dr. Baron, the lessons learned and results disseminated to participating countries "mean that for the thousands and thousands of cane growers, the future looks a bit brighter because of the better productivity and quality of cane brought about by the research in the project. The benefits from the project will be felt for many, many years to come."

Both the CFC and the ISO recognized the role of PHILSURIN for steering the project toward a successful completion. "The project carried out with PHILSURIN as the Project Executing Agency is another example to show that the Philippines is again taking a lead role in the region," Dr. Baron said.

Collaboration on sugar R&D to continue

July 2006

A strong consensus for continuing the collaboration in sugar research and development emerged at the recent CFC/ISO/20: Sugarcane Variety Improvement in Southeast Asia and the Pacific Project Results Dissemination Workshop.

Highly satisfied with the results of the 5-year project, representatives from member-countries Bangladesh, Indonesia, Malaysia, the Philippines and Thailand expressed their unanimous desire to pursue the exchange of sugarcane varieties, as well as other R&D activities even outside the project.

"Networking should persist because we all need this to sustain the successes achieved under the program. Moreover, this is the only way by which we can maximize the opportunities to come up with better sugarcane varieties," Philippine Sugar Research Institute Foundation, Inc. (PHILSURIN) Director General and CFC/ISO/20 Project Manager Leon M. Arceo said.

Common Fund for Commodities Project Manager Eltha Brown backed the move, highlighting the fact that linkages boost the R&D programs of participating institutions. She added that the CFC/ISO/20 project demonstrated that the efficient flow of knowledge and expertise among sugar-producing countries contribute to the institutional strengthening of all participants.

"In our case, partnerships with other sugar research organizations helped shape the entire Philippine R&D program, Mr. Arceo said.

A major component of the proposed continued collaboration is the exchange of sugarcane varieties which is recognized as a key factor in the enhancement of productivity and quality of sugarcane. Sugarcane growers across the region are the ultimate beneficiaries of these linkages.

Sugar-producing countries note lessons learned from PHILSURIN, CFC/ISO/20

July 2006

Expect more sugarcane researchers from Asia and elsewhere in the world to come to the Philippines for training on research and development in the next few years.

This after groundbreaking studies spearheaded by the Philippine Sugar Research Institute Foundation, Inc. (PHILSURIN) impressed over 30 foreign sugar experts who participated in the recent International Sugar Development Forum and CFC/ISO/20 Project Results Dissemination Workshop.

"Many of the participants, especially from African and Latin American countries, have approached me and expressed their plan to send their researchers to train here," PHILSURIN Director General and CFC/ISO/20 Project Manager Leon M. Arceo said.

Participants from sugarcane-growing countries which are not part of the CFC/ISO/20 consortium such as Brazil, India, Jamaica, Kenya, Mauritius, Mozambique, Sudan, Swaziland and Tanzania highlighted the lessons they learned from various presentations, as well as visits to the Institute of Plant Breeding in the University of the Philippines – Los Banos, the PHILSURIN Experiment Station in Victorias City, Negros Occidental, and several Mill District Development Councils.

"The tour in Negros has been an eye-opener. I have taken with me useful information for my research," Dr. Jean Claude Autrey, Director of the Mauritius Sugar Industry Research Institute said. He added that "the Forum and the Workshop have been a resounding success not only on the organizational side, but also on the scientific and technical aspects."

Dr. Autrey also mentioned that he will organize his team, and return to the Philippines soon to further study technologies such as Infracana, an automated cane analyzer he saw at the First Farmers MDDC. Sugarcane variety exchange with PHILSURIN is another project which he plans to pursue.

Like Dr. Audrey, Swaziland Sugar Association Crop Agronomist Bernardo Mfundo Shongwe is also interested in exchanging sugarcane varieties with PHILSURIN to boost his country's sugar gene bank. He also noted PHILSURIN's approach which responds to sugarcane planters' specific needs. Swaziland, he says, implements the same effective strategy.

Jamaica Sugar Industry Research Institute Agronomist Uriel Green, on the other hand, is looking forward to studying CANEPOINT (Philippine Sugarcane Genetic Resources Data and Information Management System), CFC/ISO/20's showcase project which is the first of its kind in the world. "We have been working on something similar to this, but have not really achieved something as comprehensive and complete as what PHILSURIN has developed," Mr. Green said.

Mr. Arceo welcomed the sugarcane experts' requests, saying PHILSURIN will collaborate with them on various areas of sugar research and development. "We will become the training hub for sugar-producing countries in Asia, Africa and Latin America."

CFC/ISO/20 member countries include Bangladesh, Indonesia, Malaysia, the Philippines and Thailand. Project financier Common Fund for Commodities however, felt that successful implementation of the project warrants the organization of an event that would enable the sharing of project results with a wider set of sugarcane producing countries.

"To ensure the maximum dissemination of results and accomplishments, we decided not to limit the event to CFC/ISO/20 members. We invited representatives from 16 sugar-producing countries to participate in the workshop," Mr. Arceo said. A key achievement of the CFC/ISO/20 project is the fact that it has increased the flow of sugarcane technology and know-how among participating countries.

Sugar forum delegates visit PHILSURIN experiment station

July 2006

On the Bacolod leg of the 5-day International Sugar Development Forum and the CFC/ISO/20 Project Results Dissemination Workshop, PHILSURIN shared its best kept secrets with over 30 foreign sugar experts from 16 countries.

"The secret behind Philippine sugar's success is the active involvement of stakeholders through the Mill District Development Councils. They define their own problems, decide which projects to prioritize, outline methodologies and craft solutions that would best address their needs," PHILSURIN Director General and CFC/ISO/20 Project Manager Leon M. Arceo said in a presentation on the role of MDDCs in accelerating the adoption of improved technologies.

Acknowledged as PHILSURIN's backbone, 26 MDDCs speed up the delivery of services to beneficiaries all over the country. Activities in the MDDCs, Mr. Arceo says include the propagation and dispersal of high yielding sugarcane varieties, variety testing, soil rejuvenation, disease prevention, pest control, publications, as well as seminars and farm tours for planters.

With trips to the PHILSURIN Experiment Station, the Hawaiian Philippines Company (Silay-Saravia) MDDC and First Farmers in Negros Occidental, participants observed firsthand the successes achieved by the country's research, development and extension arm funded by sugar producers.

They visited the Common Fund for Commodities-funded Biotechnology Laboratory where PHILSURIN's breeders, microbiologists and pathologists briefed them on the advances made in breeding such as DNA fingerprinting and the utilization of molecular markers.

Microbiologist Lucille Villegas treated participants to a sneak preview of PHILSURIN's latest opus, the development of a biofertilizer which carries microorganisms which help sugarcane increase their nutrient uptake. With the tests having run over eight years and showing promising results, the institute is set to commercialize the fertilizer soon.

Also part of the group's itinerary were briefings on PHILSURIN's other projects including the Hot Water Treatment facility, the development of small farm machinery, sugarcane micropropagation, the biological control of the sugarcane borer using *Trichogramma chilonis*, the Geographical Information System, as well as soil analysis and recommended applications of fertilizer.

As with researchers from Thailand, China, and Africa who toured PHILSURIN's Experiment Station in recent years, many of the forum's delegates expressed interest in adopting a number of the organization's sugar technologies.