Luzon Agricultural Research & Extension Center (LAREC)

PRODUCTION TECHNOLOGY AND CROP MANAGEMENT (PTCM)

PTCM implemented 47 R and D projects of which 10 were completed, 16 were on-going and 13 were new/laid-out.

- 10 clones passed the selection criteria in the 2011 Preliminary Yield test. Recommended to undergo further testing in the Ecological Test/National Cooperative Test are Phil 11-14-0133, Phil 11-14-0237, Phil 11-159-1683, Phil 11-62-0449, Phil 11-53-0813, Phil-11-74-0827, Phil 11-117-1097, Phil 11-80-1075, Phil 11-81-1051 and Phil 11-80-1077.

- All 30 Phil 2010 series test clones passed the screening for resistance to smut; 9 were very highly resistant, 7 were highly resistant, were 12 intermediate resistant and 2 were intermediate average.

- All 10 Phil 2010 series test clones passed the screening for resistance to downy mildew; 5 were very highly resistant, 5 were highly resistant.

- In the ''Performance of selected Phil 2008 series in three mill districts in Luzon'' (2008 Ecological Test), Phil 2008-0553, Phil 2008-0909, and Phil 2008-1253 are recommended for further evaluation by the Variety Committee. The three varieties had more gains and evens with lesser losses in tonnage, sucrose content and sugar yield than the other test varieties against the control varieties and passed the selection criteria for resistance to smut and downy mildew.

- No significant differences were observed in the three yield parameters of Phil 99-1793 using three degrees of farm mechanization in the plant cane. In the first ratoon tractor+manual harvesting significantly outyielded carabao + manual in tonnage and comparable with the carabao+manual+tractor. In sugar content and sugar yield all three degrees of mechanization were comparable. Highest average ROI of 1.52 for the two cropping seasons was given by carabao+manual+tractor indicating that that the use of carabao+ manual+tractor in the culture of Phil 99-1793 is the most efficient and effective combination.

- The percent N contents of sand, sandy loam, clay, clay loam and loam texture soil samples based on analysis of organic matter content were significantly lower compared with those obtained from using the N analyzer. Comparable percent N content were obtained on loamy sand and silt loam/silt clay loam.

- Mixed planting gave more millable stalks, higher cane tonnage and sugar yields than single planting in the plant and ratoon crops. Only Phil 7544 in single planting was infected by downy mildew in the ratoon cane with 2.31 % infection.

- Tonnage of Phil 99-1793 in the plant cane was not affected by irrigation and different levels of compost fertilization. Means of irrigated canes was significantly higher than non-irrigated canes while means from 75% to 125% levels of fertilization were significantly higher than the other treatment means. In the ratoon, it was affected by irrigation and levels of fertilization. Compost fertilized plots were significantly higher than unfertilized plots in both irrigated and non-irrigated treatments. LKg/TC was not affected by both irrigation and levels of fertilization in both plant and ratoon cane. LKg/Ha was significantly affected by irrigation and levels of fertilization in both plant and ratoon cane. Compost fertilized plots were significantly higher than unfertilized plots in both irrigated and non-irrigated treatments.

- In the plant culture of Phil 99-1793 in soils fertilized purely with composted chicken manure the most profitable intercrop is peanut. If intercropping is to be continued in the ratoon, Phil 99-1793

intercropped with mung bean is the most profitable. However, a choice between mung bean or peanut is recommended since on the average there is only minimal difference in profits.

- The 50% Moisture Allowable Deficit (MAD) of the soil was the level which gave higher cane yield (TC/Ha) and sugar yield (LKg/Ha) of Phil 00-2569 for both the drip and furrow irrigation. This level was also used in the convergence project with the Philippine Nuclear Research Institute.

- Soils Laboratory analyzed 813 soil samples, 311 from sugarcane planters, 399 from Block farm planters, 103 from Government & private entities and researchers and 751 cane juice samples, 139 from planters/other clientele and 612 from SRA researchers.

- Maintained 78 released Phil, VMC and PSR varieties and 323 preserved insect pests and natural enemies.

COMPLETED PROJECTS

A. Variety Improvement and Pest Management (4)

Preliminary yield test of Phil 2011 Series (P. Macamos, N. Guiyab, V. Serrano, A. Casupanan and M. Guevarra)

Thirty test clones from 2011 row test series were entered in the preliminary yield test at LAREC using RCBD to compare their agronomic performance with two check varieties, Phil 8013 and Phil 7544.

Results of the test showed that while nine clones were comparable to both check varieties in tonnage 23 were comparable in sugar content and three were comparable in sugar yield. Among the test clones only Phil 11-159-1683, Phil 159- 1657, and Phil 80-1075 were comparable to both check varieties in three yield parameters. All other test entries were either significantly lower than one or both check varieties.

The clones which are recommended to undergo ecological testing are Phil 11-14-0133, Phil 11-14-0237, Phil 11-159-1683, Phil 11-62-0449, Phil 11-53-0813, Phil-11-74-0827, Phil 11-117-1097, Phil 11-80-1075, Phil 11-81-1051 and Phil 11-80-1077. These clones were rated resistant to smut and downy mildew and were sparse flowering.

Screening of Phil 2010 series for resistance to smut (A. Casupanan, V. Serrano, N. Guiyab, P. Macamos and M. Guevarra)

Thirty clones of the 2010 series were planted and tested for their reaction to sugarcane smut in the plant and ratoon cane.

Among the thirty clones of 2010 series, nine were rated very highly resistant, namely, Phil 10-0149, Phil 10-0183, Phil 10-0427, Phil 10-0487, Phil 10-0317, Phil 10-0869, Phil 10-0105, Phil 10-0733, and Phil 10-0471. Rated highly resistant were Phil 10-0507, Phil 10-0645, Phil 10-1051, Phil 10-0073, Phil 10-0085, Phil 10-0381, and Phil 10-0353; intermediate resistant, Phil 10-0571, Phil 10-0131, Phil 10-0107, Phil 10-0077, Phil 10-0545, Phil 10-0385, Phil 10-0141, Phil 10-0519, Phil 10-0279, Phil 10-0955, Phil 10-0767, Phil 10-0185; and intermediate average, Phil 10-0243, Phil 10-0901

Screening of Phil 2009 series for resistance to downy mildew (A.Casupanan, V. Serrano, N. Guiyab, P. Macamos and M. Guevarra)

Ten clones of Phil 2009 series were screened and evaluated for resistance to sugarcane downy mildew in the plant and ratoon cane.

Among the ten clones of 2009 series, Phil 09-0037, Phil 09-1045, Phil 09-1261, Phil 09-1867, Phil 09-1969, were rated very highly resistant while Phil 09-0015, Phil 09-0081, Phil 09-0093, Phil 09-0323, and Phil 09-0919 were highly resistant

Performance of selected Phil 2008 series in three mill districts in Luzon (V. Serrano, N. Guiyab, P. Macamos A. Casupanan and M. Guevarra)

Ten promising Phil 2008 series sugarcane varieties were planted to evaluate their yield performance in three mill districts in Luzon. The experiment was laid out in RCBD with four replications.

Phil 2008-0553, Phil 2008-0909, and Phil 2008-1253 showed better performance against the check varieties compared with other test varieties on the gain-even-loss tally. The three varieties had more gains and evens with lesser losses in tonnage, sucrose content and sugar yield. In terms of yield potential Phil 2008-0553 produced 139.44 TC/Ha and 1.79 LKg/TC, Phil 2008-0909 produced 138.07 TC/Ha and 2.05 LKg/TC and Phil 2008-1253 produced 137.74 TC/Ha and 1.87 LKg/TC.

In the smut and downy mildew resistance trials, the three test varieties were also rated within the acceptable range of very highly resistant to intermediate average.

Flowering incidence, however, showed that Phil 2008-0553 is a very profuse flowerer in Pampanga. It is therefore, recommended that this variety be planted in April or May to minimize its flowering ability. These varieties are recommended for further evaluation by the variety committee.

B. <u>Production Technology and Crop Management (6)</u>

Effect of different degrees of farm mechanization on the yield of Phil 99-1793 (P. Macamos, N. Guiyab, V. Serrano A. Casupanan and M. Guevarra)

The effect of three degrees of mechanization (DM1= carabao+manual; DM2= carabao+ manual+ tractor; DM3= tractor+ manual harvesting) on yield was studied using Phil 99-1793. The experiment was laid out in RCBD with four replications.

In the plant cane, no significant differences were observed in tonnage (TC/HA), sugar content (LKg/TC) and sugar yield (LKg/Ha) of Phil 99-1793 using the three degrees of mechanization.

In the first ratoon, tractor+manual harvesting significantly outyielded carabao + manual in tonnage and comparable with the carabao+manual+tractor. In sugar content and sugar yield all three degrees of mechanization were comparable.

Economic analysis showed that highest average ROI of 1.52 for the two cropping seasons was given by carabao+manual+tractor while the lowest ROI of 1.26 was given by carabao+ manual. This means that the use of carabao+ manual+tractor in the culture of Phil 99-1793 is the most efficient and effective combination.

Percent total nitrogen content of seven soil types using Walkley-Block and Kjeldahl methods-(L.Yarte, M. Guevarra, and A. Burcer)

Soil samples collected from Tarlac, Pampanga, Batangas and Cagayan and submitted to SRA-LAREC Soils laboratory were used in the study. These samples represented seven soil types namely, sand, sandy loam, clay, clay loam, loamy sand, loam and silt loam/silt clay loam.

For each soil sample, half was analyzed for organic matter content using the Walkly-Black method while the other half was analyzed for nitrogen content using the Nitrogen analyzer.

The percent N contents of sand, sandy loam, clay, clay loam and loam texture soil samples based on analysis of organic matter content were significantly lower compared with those obtained from using the N analyzer. Comparable percent N content were obtained on loamy sand and silt loam/silt clay loam.

Cane and sugar yields as affected by single mixed variety planting (B. Manlapaz, M. Guevarra, A. Bacani and A. Burcer)

Three sugarcane varieties, Phil 7544, Phil 99-1793 and Phil 00-2569 were planted alone and in mixtures containing equal proportion of two or three varieties and were evaluated to compare cane and sugar yield and disease occurrence in mixed and single variety planting.

Among the treatments, mixed planting gave more millable stalks, higher cane tonnage and sugar yields than single planting in plant and ratoon crops.

Only Phil 7544 in single planting was infected by downy mildew in the ratoon cane with 2.31 % infection.

Cane and sugar yields under irrigated and chicken manure compost fertilized soil (B. Manlapaz, M. Guevarra, A. Bacani and A. Burcer)

The study was conducted to determine the effects of irrigation and levels of composted chicken manure fertilization on the growth and yield of Phil 99-1793 in the plant and first ratoon canes.

Treatments included with and without irrigation and five levels of compost fertilization based on N fertilizer recommendation, namely: 125%, 100%, 75%, 50% and 0%.

In the plant cane, tons cane (TC)/Ha was not affected by irrigation and different levels of compost fertilization. Means of irrigated canes was significantly higher than non-irrigated canes. Means from 75% to 125% levels of fertilization were significantly higher than the other treatment means. The LKg/TC was not affected by both irrigation and levels of fertilization. The LKg/Ha was significantly affected by irrigation and fertilization levels. Compost fertilized plots were significantly higher than unfertilized plots in both irrigated and non-irrigated plots.

In the ratoon cane, TC/Ha and LKg/Ha were both significantly affected by irrigation and levels of fertilization. Compost fertilized plots were significantly higher than unfertilized plots in both irrigated and non-irrigated treatments. The LKg/TC was not also affected by both irrigation and levels of fertilization treatments.

Intercropping peanut, mung bean and kidney bean with Phil 99-1793 in soil fertilized with composted chicken manure (N. Guiyab, V. Serrano A. Casupanan, P. Macamos and M. Guevarra)

Three leguminous crops were tested to determine their suitability in the culture of Phil 99-1793 in soils fertilized with purely composted chicken manure.

In the plant culture of Phil 99-1793 in soils fertilized purely with composted chicken manure the most profitable intercrop is peanut. If intercropping is to be continued in the ratoon, Phil 99-1793 intercropped with mung bean is the most profitable. However, a choice between mung bean or peanut is recommended since on the average there is minimal difference in profits.

As organic materials take time to react in the soil it is suggested to test for earlier application of composted chicken manure using more than the recommended amount. A wider interrow spacing should also be used to allow more cultivation in the ratoon.

Smart Water Management Strategies for Sugarcane (Plant Cane- Collaborative project with CLSU) (M. Guevarra, B. Manlapaz, A. Bacani and A. Burcer)

The 50% Moisture Allowable Deficit (MAD) of the soil was the level which gave higher cane yield (TC/Ha) and sugar yield (LKg/Ha) of Phil 00-2569 for both the drip and furrow irrigation. This level was also used in the convergence project with the Philippine Nuclear Research Institute.

La Granja Agricultural Research & Extension Center (LGAREC)

A. COMPLETED PROJECTS

1. Pollination, Sowing and Seedling Care, Phil 2015 Series

During the 2015 breeding season, flowering of parental clones and varieties was late and of short duration with peak of full emergence observed on the first week of November 2015.

Pollination work which started October 25 and ended December 4, 2015, utilized 68 female and 54 male selected parents. A total of 309 arrows from 221 biparental cross combinations were pollinated. From these, 306 arrows from 220 biparental crosses were harvested with three arrows destroyed.

The sowing of fuzz in 220 seedboxes from November 18 to December 16, 2015 resulted in the germination of seedlings in 220 biparental crosses consisting of 307 arrows. Medium to very good germination was observed in 77.27 percent of the crosses. Overcrowded seedlings in 91 biparental crosses were pricked in 359 seedboxes.

Seedlings in 575 seedboxes were given proper care and management like regular watering, fertilization, spraying of insecticides and fungicides, trimming of leaves, weeding and cultivation prior to transplanting in June and July 2016.

2. Single Seedling Plot Test, Phil 2014 Series

The 2014 hybridization work which produced a total of 43,614 seedlings from 198 bi-parental crosses were transplanted from July 18 to 22, 2015. From these, 24,565 seedlings from 198 bi-parental crosses survived in the field or a survival rate of 56.32 percent which was mainly due to the effects of poor and much delayed land preparation. All selected promising clones were recommended to the next stage, the Row Test, for further screening.

Selection in April 2016 using Phil 56-226 as control variety gave 698 promising clones from 125 bi-parental crosses. This result showed a selection percentage of 2.84 percent for seedlings and 63.13 percent for the crosses. All selected promising clones were recommended to the next stage, the Row Test, for further screening.

3. Row Test, Phil 2013 Series

Nine hundred six promising clones from the crosses in the Phil 2013 Series Single Seedling Plot test were planted in the Row Test in March 2015. From these, 306 promising clones were selected and forwarded to the next stage, the Multiplication and Disease Screening Stage.

4. Multiplication and Disease Screening

a. Phil 2012 Series

The top thirty clones were selected from Multiplication II, Phil 2012 Series as entries to the next stage, the Preliminary Yield Test, Phil 2012 Series based on their agronomic and morphological characteristics. One thousand canepoints for each clone were provided for LGAREC and LAREC Preliminary Yield Tests in preparation for the Ecological Test. Multiplication II started in August 2015 and ended in September 2016.

b. Phil 2013 Series

Three hundred six Phil 2013 Series clones selected from Row Test 2013 were multiplied (Multiplication I) and simultaneously tested for smut. Multiplication I was laid out and planted in January 2016. Care and maintenance of sugarcane plants were done based on SRA cultural practices. Two hundred four clones were selected for Multiplication II and Downy Mildew screening in August 2016 based on their agronomic and morphological characteristics. Multiplication I, Phil 2013 Series started in January 2016 and ended in November 2016.

5. Smut Resistance Tests

a. Phil 2011 Series (PYT Stage, Plant Cane & Ratoon)

Thirty Phil 2011 Series clonal entries to the Preliminary Yield Test were tested against sugarcane smut. In the plant cane, 6 clones were rated very highly resistant, 2 highly resistant, 3 resistant, 4 intermediate resistant, 3 intermediate susceptible and 12 very highly susceptible to the disease. In the ratoon, 5 clones were rated very highly resistant, 1 highly resistant, 2 resistant, 4 intermediate resistant, 6 intermediate average, 3 intermediate susceptible, 5 susceptible, 3 highly susceptible and 1 very highly susceptible.

b. Phil 2013 Series at Row Test

Two hundred twenty five Phil 2013 Series clones selected from the Row Test were screened for smut. Results showed that 205 clones were very highly resistant, 9 resistant, 7 intermediate resistant, 1 intermediate average, 1 highly susceptible and 2 very highly susceptible to the disease. Clones with ratings 1-4 were recommended for further testing in the next stage of the breeding program.

6. Downy Mildew Resistance Test, Phil 2012 Series (Plant Cane & Ratoon)

One hundred eighty Phil 2012 Series clones were tested against downy mildew of sugarcane. In the plant cane, 169 clones were rated very highly resistant, 9 highly resistant, 1 resistant and 1 intermediate resistant to the disease. In the ratoon crop, 89 clones were very highly resistant, 36 highly resistant, 16 resistant, 13 intermediate resistant, 7 intermediate average, 4 intermediate susceptible, 6 susceptible, 1 highly susceptible and 8 very highly susceptible to the disease. All clones in the plant cane were recommended for further testing in the next stage.

7. Yellow Spot Resistance Test, Phil 2011 Series

Thirty Phil 2011 Series clones were rated for resistance to yellow spot disease. Five clones were very highly resistant, 13 highly resistant, 9 resistant, 2 intermediate resistant and 1 intermediate average to the disease.

8. Leaf Scorch Resistance Test, Phil 2011 Series

Thirty clones of the Phil 2011 Series were rated for resistance to leaf scorch of sugarcane. Six clones were very highly resistant, 14 highly resistant, 8 resistant, 1 intermediate resistant and 1 intermediate susceptible to the disease.

9. Preliminary Yield Test, Phil 2011 Series

Thirty Phil 2011 series clones selected from Multiplication II were planted in April 2015 to evaluate their agronomic and yield performances.

Fourteen (14) clones stood out in tonnage but were statistically comparable to the two controls, Phil 8013 and VMC 86550. Six clones were lower than the two controls while ten clones were statistically lower than Phil 8013 but comparable to VMC 86550. In LKg/TC, thirteen clones showed high sucrose content but statistically comparable to the two control varieties. Twelve clones were statistically lower than the two controls while five were statistically lower than VMC 86550. Eight clones showed high LKG/Ha but were statistically comparable to the two control varieties. Fifteen clones were low in sugar yield than the two controls while seven were statistically lower than Phil 8013.

Results of the study showed ten (10) selected promising clones recommended for further evaluation to the next stage of Sugarcane Variety Improvement Program, the Ecologic Test.

Following are the test clones selected as entries to the Ecologic Test: Phil 2011-14-0237, Phil 2011-159-1683, Phil 2011-69-0899, Phil 2011-62-0449, Phil 2011-74-0827, Phil 2011-116-1121, Phil 2011-80-1075, Phil 2011-148-1631, Phil 2011-173-1711, and Phil 2011-81-1013.

10. Propagation II, Phil 2011 Series

Thirty selected varieties of Phil 2011 Series were planted and propagated in SRA-LGAREC from November 2015 to August 2016 in preparation for Propagation III, the source of planting materials for the Ecologic Test in different locations nationwide. From these varieties, 10 were selected as entries to the Ecologic Test to be laid out in November 2016. The ten varieties selected and to be propagated in Propagation III are: Phil 2011-14-0237, Phil 2011-159-1683, Phil 2011-69-0899, Phil 2011-62-0449, Phil 2011-74-0827, Phil 2011-116-1121, Phil 2011-80-1075, Phil 2011-148-1631, Phil 2011-173-1711 and Phil 2011-81-1013.

11. Ecologic Test, Phil 2008 Series (Plant Cane & Ratoon)

The plant and ratoon crop performances of ten Phil 2008 series sugarcane varieties were evaluated in four mill districts in Negros and Panay Islands from November 2013 to February 2016.

Variety-mean tonnage yield in the plant cane was highest in Phil 2008-0909 (108.36 TC/ha) and lowest in Phil 2008-1307 (78.76 TC/ha) while in the ratoon crop, highest tonnage yield was with Phil 2008-1009 (89.46 TC/ha) and lowest in Phil 2008-1307 (65.10 TC/ha). Location data in plant cane revealed highest tonnage yield in La Carlota followed by Passi, Bais and Victorias with highest potential yield of 116.47 TC/ha attained by Phil 2008-1009 in Victorias. In the ratoon crop, highest tonnage yield was in Victorias followed by Bais, La Carlota and Passi with highest potential yield of 103.79 TC/ha attained by Phil 2008-1009 in Victorias.

The test varieties in the plant cane were comparable if not lower in sucrose content than the two controls. Phil 8013 had the highest variety mean LKg/TC (2.27 LKg/TC) and Phil 2008-1009 the lowest (1.80 LKg/TC). Canes were sweetest in Bais, followed by La Carlota, Passi and Victorias. In the ratoon crop, sucrose content was highest in VMC 86-550 (2.25 LKg/TC) and lowest in Phil 2008-1009 (1.76 LKg/TC). Sweetest canes were in La Carlota, followed by Passi, Victorias and Bais.

Variety-mean sugar yield in the plant cane was highest in Phil 2008-0909 (230.88 LKg/ha) and lowest in Phil 2008-0033 (165.45 LKg/ha) while in the ratoon crop, highest sugar yield was in Phil 2008-0909 (173.81 LKg/ha) and lowest in Phil 2008-0747 (138.28 LKg/ha). Sugar yield in plant cane was highest in La Carlota followed by Bais, Passi and Victorias with highest potential sugar yield of 263.94 LKg/ha attained by Phil 2008-0909 in La Carlota. In the ratoon crop, highest sugar yield was in Victorias followed by La Carlota, Bais and Passi with highest potential sugar yield of 216.25 LKg/ha attained by Phil 2008-0909 in Victorias.

Phil 2008-0161 had the tallest stalks, Phil 2008-0909 the highest in number of millable stalks produced per sqm and Phil 2008-1009 the biggest and heaviest stalks in both plant and ratoon crops.

Phil 2008-0909 was the only test variety which gained in tonnage and sugar yields in all test locations while Phil 2008-0161 surpassed the local control without incurring losses in tonnage and sugar yields in both plant and ratoon crops. These varieties are high in tonnage, medium to high in sucrose content, not flowering to sparse flowering; resistant to smut, downy mildew, leaf scorch and yellow spot. These varieties were grown in Isabela clay, Guimbala-on loam, Silay fine sandy loam and Alimodian clay soils. These varieties are recommended for further evaluation by the Variety Committee.

12. Germplasm Collection, Characterization and Maintenance

One thousand two hundred eighty five (1,285) sugarcane accessions were maintained in the Germplasm Collection area for the year 2016. Additional eight new accessions were entries from Ecologic Test Phil 2008 series while eight accessions from the Ecotest 2007 series was found questionable and hence, removed from the collection. Furthermore, 15 accessions from the IBPGR collection did not survive due to animal grazing. Eight hundred thirteen clones/varieties were partially characterized agronomically. Tiller number, aerial roots and degree of flowering were the data gathered on the characterization to primarily provide necessary information for selection of parent materials

13. Mass Production of *Trichogramma* Strips for the Control of Borers

The mass production of *Trichogramma* as a potential biological control agent against sugarcane stem borers of the Sugar Regulatory Administration, La Granja Agricultural Research and Extension Center gave a significant impact to the sugarcane planters as well as to rice, corn and vegetable farmers not just only in the province of Negros Occidental but in Negros Oriental and Panay Region for the past years. Of the *Trichogramma* species maintained, *T. chilonis*, the egg parasitoid to stem borers of sugarcane is the most in demand by clients followed by *T. japonicum*, *T. bactrae and T. evanescens* for Lepidopterous pests of rice, corn and vegetables.

The increasing present demand of sugarcane planters and farmers is an evidence of its significance as biological control agent. T*richogramma* is an egg parasitoid that kills the pest before it can cause any damage to the plant.

From January 2016 to December 21, 2016, the project produced 33,551 strips of *Trichogramma*. A total of 25,466 strips were distributed to clients as follows: sugarcane planters – 19,835 strips, rice farmers – 1,071 strips and sugarcane researchers – 4,560 strips. The rest of the strips were used as starters.

14. Sugarcane Disease Garden as Source of Inocula for Resistance Trials

Seven varieties namely: Phil 6111, Phil 7464, Phil 7779, Phil 8839, Phil 8013, Phil 56226, VMC 86550 and mixed clones were propagated last January 2016 to augment inocula for disease resistance studies. These varieties served as resistant and susceptible checks for resistance trials to smut, downy mildew, yellow spot and leaf scorch.

15. National Cooperative Test I (NCT I)

The National Cooperative Test (NCT) is a collaborative study between SRA and UPLB. Promising sugarcane varieties will be evaluated through this project under the National Seed Industry Council (NSIC). The Sugarcane Technical Working Group (STWG) composed of members from SRA, PHILSURIN, BPI, IPB, UP La Granja, UPLB and PCARRD was organized and mandated to implement this project.

Selected varieties from the Preliminary Yield Test (PYT) of the two breeding institutions (SRA & IPB-UPLB) will be submitted to STWG for NCT consideration. These varieties will be tested in 15 locations representing unique agro-ecological zones of sugar producing regions in Luzon, Visayas and Mindanao to be divided among the three clusters: LGAREC, LAREC & UPLB (both plant and ratoon crops) for STWG evaluation.

A variety can only be released if the yield performance is significantly higher than or at least comparable with the established check varieties.

This project will replace the Ecologic Test which is the 7th Stage of the Breeding Program of SRA to be funded by SIDA.

Propagation, maintenance and distribution of planting materials for 15 locations of NCT were shouldered by SRA. These planting materials are now ready for cutback to be shipped to LAREC & UPLB as soon as NCT budget will be downloaded to the different clusters.

16. Sugarcane Genome Project 2:

"Application of Molecular Breeding Techniques in Sugarcane Improvement"

Sugar Regulatory Administration was able to select two potential sugarcane parentals namely Phil 2011-49-0809 and Phil 2011-83-1005. Phil 2011-49-0809 being a moderate tillerer with 4 average tillers, has moderate size of stalks with 2.9 cm average stalk diameter, and is very sweet with a Brix reading of 25.4. It also has a slightly above average weight per stalk of 1.2 kg, and is a very sparse flowerer. On the other hand, Phil 2011-83-1005 is a high tillering variety with an average of eight stalks per stool, having big stalks with an average stalk diameter of 3.2 cm, and is very sweet with a Brix reading of 23.6, Moreover; this variety has above average weight per stalk of 1.6 kg and has been observed to be non-flowering. Although this variety was observed to be non-flowering, with a favourable environmental condition for flowering and exceptional moisture and fertilizer stress, this variety could still flower and can be used as a parental.

Primers for smut, downy mildew and sucrose content were received only on the third week of June of the third year of implementation (2016) or almost two months before the end of the study. As a result, the assembled varieties and clones were only tested on mssCIR10 and mssCIR12, both primers for downy mildew disease. Downy mildew disease resistant control varieties were composed of highly resistant varieties and clones specifically: Phil 97-3933, Phil 8477, Phil 8829, Phil 94-0913, Phil 93-1601 and Phil 8361. On the contrary, downy mildew disease susceptible control varieties were composed of highly susceptible varieties and clones namely: VMC 86-550, Phil 89-36-0455, Phil 90-19-0085, Phil 93-118-1207 and Phil 93-236-3301. Using mssCIR10 primer, analysis of control varieties both resistant and susceptible gave a correlation value of 0.6901. When tested to forty one clones and varieties including that of the control, analysis of the primer resulted to a correlation value of 0.4970. Likewise, primer mssCIR12 also resulted to 0.8333 correlation value when tested to control varieties with established downy mildew resistance reaction. This indicates that primer mssCIR10 and mssCIR12 are highly associated to downy mildew resistance based on the results of this study and can be used for early selection of sugarcane for downy mildew resistance screening.

17. Sugarcane Genome Project 3:

"Development of New Sugarcane Varieties Using Marker-Assisted Selection"

The Sugar Regulatory Administration selected five promising sugarcane varieties namely Phil 2011-0827, Phil 2011-1097, Phil 2011-1711, Phil 2011-0169 and Phil 2011-1057. Phil 2011-0827 being a heavy tillerer with an average of eight tillers, has big stalks with 3.4 cm average stalk diameter, and is sweet with a Brix reading of 22.0. It also has a moderate stalk weight of 1.0 kg, and is a very sparse flowerer. Phil 2011-1097 is a high tillering variety with an average of seven stalks per stool, having big stalks with an average stalk diameter of 3.0 cm, and is very sweet with a Brix reading of 23.8, Moreover; this variety has slightly above average weight per stalk of 1.3 kg and has been observed to be very sparse flowering. Phil 2011-1711 is a very heavy tillering variety with 12 stalks per stool, considerably big with 3.1 cm average stalk diameter, and is sweet averaging 21.8 Brix reading. In addition, this variety weighs slightly above average with 1.1 kg per stalk and also a very sparse flowerer. Phil 2011-0169 is also a high tillering variety averaging nine stalks per stool, with average big stalks of 3 cm, and is sweet averaging 22,2 Brix reading. A heavy variety with 1.5 kg per stalk and observed to be non-flowering. Last in the list is Phil 2011-1057 with moderate to high tillering of five stalks per stool, has big stalks of 3.2 cm diameter, and is likewise sweet averaging 22.0 in Brix reading. Likewise, it is a heavy variety averaging 1.6 kg per stalk and was observed to be non-flowering.

Primers for smut, downy mildew and sucrose content were received only on the third week of June of the third year of implementation (2016) or almost two months before the end of the study. As a result, the assembled varieties and clones were only tested on mssCIR10 and mssCIR12, both primers for downy mildew disease. Downy mildew disease resistant control varieties were composed of highly resistant varieties and clones specifically: Phil 97-3933, Phil 8477, Phil 8829, Phil 94-0913, Phil 93-1601 and Phil 8361. On the contrary, downy mildew disease susceptible control varieties were composed of highly susceptible varieties and clones namely: VMC 86-550, Phil 89-36-0455, Phil 90-19-0085, Phil 93-118-1207 and Phil 93-236-3301. Using mssCIR10 primer, analysis of control varieties both resistant and susceptible gave a correlation value of 0.8333. When tested to forty one clones and varieties including that of the control, analysis of the primer resulted to a correlation value of 0.61546. Likewise, primer mssCIR12 also resulted to 0.8333 correlation value when tested to control varieties with established downy mildew

resistance reaction. This indicates that primer mssCIR10 and mssCIR12 are highly associated to downy mildew resistance based on the results of this study and can be used for early selection of sugarcane for downy mildew resistance.