SUGARCANE NURSERY AND DEVELOPMENT PROGRAM
IN TARLAC MILL DISTRICT

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ABSTRACT
The adverse effect of changing weather patterns is inevitable in agriculture. This causes alteration on the overall growth habit of sugarcane crop. Thus, farmer’s productivity as well as profitability is at risk. Reduction of area planted to sugarcane is beginning to be observed during the past cropping seasons in Tarlac Mill District. Furthermore, as a general picture of the sugar industry, our capability to maintain our sufficiency in sugarcane production will be at stake especially with the full implementation of the Asean Free Trade Area (AFTA) in 2015. In order to mitigate this risk and still have a chance to increase the productivity, variety programming is the most economical approach in improving sugarcane productivity. Planting the most suited variety for a given season, specific location and agronomic characteristics that will complement the timing of all the farm activities for the whole growing period. Sugarcane varieties differ in their age of maturity due to their varying photosynthetic efficiency in response to climatic and cultural practices. The best time to plant and harvest a variety is essential in maximizing yield potential. It must be planted in the season it is most adaptable and harvested at the right age where the sucrose content and tonnage are high. With nursery establishment that is carefully planned, available planting materials at the optimum time and at the right location will augment the needs of our farmers. Through the aid of GIS, identification of the strategic locations for the nurseries can be established. Types of varieties to be planted will be based on the topography, soil type and pattern of harvest.

Keywords: sugarcane nursery, variety programming, nursery location

INTRODUCTION
The main growth phases of sugarcane can be classified into four stages; germination, tillering, stalk elongation, and ripening. The first three stages are considered as the production of simple sugars such as glucose and fructose for growth. While sucrose accumulation and storage happens during the final growth phase which is the ripening stage. This is the basic knowledge to consider in attaining the proper timing of all farm activities especially in harvesting. Cane maturity is defined as the period in sugarcane growth where it has the most sugar production. It is characterized by optimum tonnage and sugar production per ton of cane. In addition, maturity differs from one variety to the other. During an early or late harvest (improper timing of harvest) a low sugar recovery will be the outcome hence, the full potential of the variety is not realized.

Variety selection differs from the point of view of stake holders. In selecting an appropriate variety includes cane yield, juice quality, age group, suitability to the growing conditions viz., soil type, irrigation regime, ratooning potential, resistance to pests & diseases and adverse growing conditions. For farmers, timing of harvest is a basic parameter to consider. Time of harvest may vary depending on farm accessibility, soil type, and climatic condition. On the other hand some of the undesirable characteristics in selecting a variety includes lodging tendency, flowering propensity, disease susceptibility, cavity development, high fibre content, big and bulged buds which may be damaged during transportation, heavy spines on leaf sheath, presence of heavy pith, growth cracks or splits. These defects may appear as minor and insignificant, at first, but they understandably draw the growers attention when the varieties come into cultivation.

Varieties are classified as a function of whether they ripen in the early, mid or late stages; in other words, varieties are classed by when they reach the sucrose content suitable for industrial uses (i.e., at the beginning, middle or end of the season) without accounting for establishing the period of maximum sucrose content., (Caputo, 2006).

MATERIALS AND METHODS
In CY 2003-2004, GIS data from Landsat image showed that Tarlac mill district has about 19,200 ha. planted to sugarcane (PHILSURIN Project). But during the CY 2010-2011 processed data from GIS verified by GPS units reveals that the area was reduced to about 10,168.25 ha. (decreased by 47%). Reduction of the areas planted were caused mainly by shifting to other crops, no road accessibility, conversion of prime agricultural lands to residential, unavailability of planting materials, incompatible or unsynchronized milling and planting resumption, and extreme weather conditions or unfavorable weather condition. Among the observations stated above the one of the major factor considered was the unavailability of planting materials. Traditionally planters get their seed pieces by cutting the upper most stalk (about 2-3 feet in length) of the canes to be harvested and use it as their planting material. This method only cost them the labor in cutting the canes but not the seedpiece itself. This method of cane toppings posts a greater risk in the sugarcane crop cycle. If harvesting is delayed planting for other areas is also being affected (which includes area expansions) thus, timing of all activities is unsynchronized and the profitability opportunity diminishes. Another threat also to this method of seedpieces sourcing is that, if the source of cane points has been accidentally burnt then the planting will be delayed or ceased. As a result, incompatible or unsynchronized milling and planting cycle will occur.

Right time of establishment is essential in a place where there is a distinct delineation of the wet and the dry season, the month of establishment has a great influence on the expected yield chiefly because of the soil moisture factor and secondarily because of light factor. Too early establishment when there is still danger of strong rain following planting results in a lot of cane point rotting in the furrow, thus reducing the stand of cane.

Analyzing this scenario of untimely planting-harvesting activity, a great decrease on area is very significant in the areas of CAPAS, BAMBAN and Parts of CONCEPCION. About 3,000 ha. decrease in area due to several cases. But the most prominent issue is the timing of establishment, because most of these areas are in mountainous and some sandy (lahar laden) areas where moisture is very limiting. To solve the need, early establishment must be done to ensure growth at sufficient moisture. To solve this problem Nursery Establishment is encouraged.

Establish Location Of Nurseries Thru Mapping

With the advent of The Global Positioning System (GPS) and the Geographical Information System (GIS) land assessment and monitoring is just a few clicks away. Spatial analysis will be the basis for the strategic locations of the nurseries and also the suited variety based from the geographical features of the area. Thematic maps will be produced and evaluated to facilitate easy access of the planting materials for each area of interest. In addition, possible expansion areas can also be considered as one of the location in preparation for planting season. The following are the data needed in locating nurseries and the recommended varieties to be planted.

1. GPS generated sugarcane maps. This will give an overall view of the proximity of the plantations and will be used to locate the best area to put up nurseries.
2. Establishing pattern of harvest. Three (3) year historical milling data of each barangay to establish a trend on the time of harvest per area.
3. Clustering of areas. Combining the results of steps (1) and (2).

RESULTS AND DISCUSSION

The agronomic characteristics of the varieties to consider in variety programming such as growth and flowering habits and tonnage and sugar yields varies in each variety of sugarcane. The following are the recommended criteria of the Sugar Regulatory Administration in the varietal testing. (Cerbo et.al., 2011). High sucrose with average to high tonnage canes should be planted during wet months and should not be harvested less than 12 months. A high tonnage with average to high sucrose canes should be planted during dry months and should be harvested not to exceed 12 months. Flowering canes with high sucrose should be planted during early milling season (Sept-Dec) and should be harvested not less than 12 months. Furthermore, flowering canes with high sucrose could be planted during late milling season (Mar-Aug) provided they are fast grower and should be harvested form 10-12 months after planting. Resistant to Drought- Canes that are drought tolerant, good germinator, fast
growing and less preferred by rodents should be planted during dry months (Mar-May) and should be harvested 10-12 after planting.

Harvest or milling season is very crucial in sugarcane farming. This period is oftentimes exposed with risks for farmers, like accidental burning, immature canes at harvest, inaccessible roads, etc. If this condition will repeatedly struck our planters, optimum harvest will not be realized furthermore, a chain reaction for next ratoon crop will be expected. Among the direct benefits of having strategically located sugarcane nurseries are as follows:

**Homogeneity of variety**

Sugarcane varietal characteristic depends on the parent material used. It is important to know the qualities possessed by each cultivar. Having a nursery, the source of quality planting materials and uniformity of variety being planted is ensured. This will equate to a more even maturity feature and a guarantee on optimum sugar recovery.

**Proper timing in establishment**

In the sugarcane crop cycle, planting season (establishment) has a direct influence for the longevity of the ratoon. As we anticipate the World Trade Liberalization (2015), farmers must be both productive and cost effective. The longer the ratoon life, the better is the return for the farmers. Timely establishment is a key factor in having prolonged ratoons (up to 5th ratoons or longer). Also, like any other crop, timing of farming activities is based on weather. With the availability of planting materials, proper timing can be achieved.

As a field experience in Tarlac Mill District, canes established in November to December, when the field moisture is nearly ideal for good land preparation and the danger of soil compaction by pounding rain is minimal, better cane yield is expected. As the planting operation progresses toward January until March, yield progressively decreases due to moisture deficiency which critically affects germination and tillering. April, May, June plantings, although favored by moisture, unfavorable growing condition like excess water which could cause rotting of seed pieces. Furthermore, serious weed competition becomes a problem since cultivation cannot be performed efficiently. The table below shows the effect of month of establishment on cane yield at Hda. Luisita.

Season of planting and age at harvest are two controllable factors that can be manipulated in sugarcane growing. These are important guides to provide farmers establish their own variety programming to obtain optimum yields and returns.

**Variety Programming Potential**

Figure 1 shows the normal pattern of the sugar content (Lkg/TC) of the canes during milling exhibits a bell-shaped curve, i.e., sugar content is lower at early and late milling periods and at peak in the middle of the milling season (Figure 1). The possibility of prolonging the peak period of high Lkg/TC during the milling season may be attained through variety programming and proper post-harvest management.
CONCLUSION
One of the most economical approaches towards increasing the yield per unit area is the utilization of high yielding potential and disease resistant varieties. In as much as varieties differ in characteristics, specifically yields in TC/Ha and Lkg/TC (50kg bag of sugar per hectare) and reactions to major diseases, it is highly profitable to identify varieties that are early, medium and late maturing which is suitable to the harvest opportunity of the farm area. Presently, the planters are given a wide choice of new varieties for commercial planting and various sources to get their desired cultivar. But to narrow it down, establishment and development of nursery within the suitable areas where their farm is located, will facilitate adoption and assure a better yield performance and make profitable sugarcane farming. Establishment of clustered areas that will be benefited by the nursery and grouped the possible variety selections suited on the time of harvest will define efficiency and secure optimum returns. With this simple analysis thru the aid of mapping component, farming technology can be easily understood and transformation of our existing farming system can be improved.

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