





PSST Sugarcane Workshop 2015

Profitable Sugarcane Production &
Procurement Strategy to Increase Sugar
Yield per unit area

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Introduction

The Sugarcane yield and sugar recovery unit per area both are most important issues in respect of cane growers as well as the sugar industry. The increase or decrease in cane yield and sugarcane recovery in per unit area. During season 2014-15 cane crushed in Pakistan 49.44 M.T and sugar production of 4.977 million tons was recorded. Though cane yield per hectare and sugar recovery % are increasing since last 10 years but yet it is not comparable with the Developed cane growing countries of the world. In this regard cane variety plays an important role and adoption of latest field management practices.



Introduction

- ◎ Sugarcane is water thirsty crop and mostly grown in tropical regions of the world with high rainfall. In Sindh province shortage of irrigation water is the main cause of low yield and sugar recovery. Where as, average rainfall (18-22 cm) per year in Sindh. This is very low in cane growing areas of Sindh. Some other major factors which are also cause of low yield and sugar recovery i.e. field are not properly leveled-non application of latest Implements - Conventional method of planting - imbalance dose of fertilizer - inadequate seed rate - poor ratoon management - poor weed management. Even than some progressive growers are getting 100-140 tons per hectare cane yield similarly some sugar mills of Sindh like Mehran, Faran, Mirpur Khas, Matiari, Al-Abbas, Ghotki, Habib, Shah murad and Abadgar Sugar Mills etc. are getting comparable sugar recovery 10.70 - 11.50%. We think and expect to improve more in future In Sha Allah.



Vision

- Cane yield Target 90 t/ha.
- Sugar recovery Target 11.50%.



Agro Climatic Zones in World

Sugarcane crop is grown in two different agro - climatic zones in the world, the Tropical and the sub-tropical, between 0-10° and 10-30° latitudes respectively. The latitudes And ripening condition in some countries are as given below:-

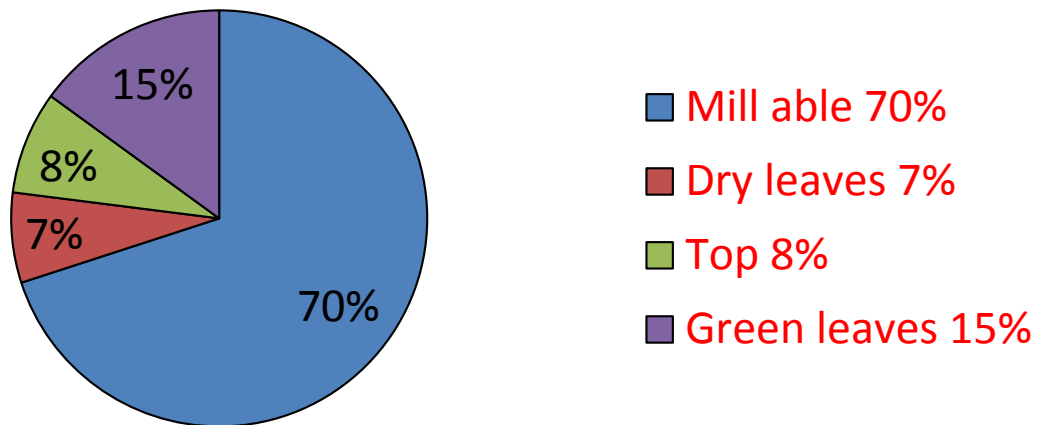
| Countries | Latitude | Growing Conditions |
|--------------------------|--------------------|-------------------------|
| USA (Louisiana, Florida) | 29° 35° N to 30° N | Tropical / sub-Tropical |
| South Africa | 28° S to 31° S | sub-Tropical |
| Pakistan | 24° N to 34° N | sub-Tropical |
| India | 8° N to 32° N | Tropical / sub-Tropical |

- The cane yield in tropical areas is higher as compared to sub-tropical regions.



Cane composition at Maturity

- ☉ At maturity, the standing sugarcane is composed of approximately 70% of mill able stalks, 8% cane tops, 15% green leaves and 7% dry leaves.





Causes of low Yield per unit area

- Un Levelled Fields of Sugarcane
- Improper land preparation
- Selection of the Seed
- Imbalance fertilizer use
- Use of low seed rate and late planting
- Method of planting
- Scarcity of irrigation water
- Weed Control
- Plant protection measures
- Poor Management of Ratoon Crops



Selection of the Seed

At present only some growers planted pure seed nurseries for cultivation of sugarcane. It is very important that sugarcane seed is disease free and 7-9 months of age which is very helpful for getting the maximum yield per unit area.





Planting Method

- © Method of Planting is very important for getting the maximum yield. Mostly growers do flat planting in furrows instead of deep trench planting. Due to close spacing proper inter culturing and earthing up is not possible which affects the yield negatively so space planting must be applied.





Pit Planting







**Quality Trend of Some Commercial
(Programme) Varieties)**

| Sr. # | Variety | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Season Average (14-15) | |
|---------|-----------|------|-------|-------|-------|-------|-------|------------------------|-------|
| | | Rec. | Rec. | Rec. | Rec. | Rec. | Rec. | No. Samp. Test | Rec. |
| 1 | CPF-237 | 9.96 | 10.13 | 10.49 | 11.33 | 11.87 | 12.21 | 8,153 | 11.39 |
| 2 | Thatta-10 | 9.31 | 10.10 | 10.47 | 11.35 | 11.79 | 12.18 | 1,903 | 11.46 |
| 3 | SPF-234 | 9.26 | 10.00 | 10.41 | 11.26 | 11.79 | 12.17 | 12,513 | 11.38 |
| 4 | CPF-246 | 9.81 | 10.08 | 10.48 | 11.33 | 11.80 | 12.22 | 8,578 | 11.40 |
| 5 | US-718 | 9.30 | 10.02 | 10.33 | 11.20 | 11.76 | 11.72 | 233 | 11.10 |
| 6 | US-633 | 9.42 | 10.11 | 10.41 | 11.21 | 11.67 | 12.16 | 234 | 11.23 |
| Average | | 9.51 | 10.07 | 10.43 | 11.28 | 11.78 | 12.11 | | 11.33 |



Causes of low sugar yield per unit area

- ⊙ Late planting.
- ⊙ Plantation of low sucrose varieties.
- ⊙ Imbalance and late application of Nitrogen.
- ⊙ Liberal application of water before harvesting.
- ⊙ Lodging
- ⊙ Immature crop harvesting.
- ⊙ Blind and un scheduled harvesting.
- ⊙ Poor Developmental activities by Sugar Mills.
- ⊙ Supply of un cleaned and stale cane to the Mills.
- ⊙ Un skilled harvesting labour.
- ⊙ Supply of diseased and pest infested cane to the Mills
- ⊙ Poor road infrastructure from cane field to the Mills.
- ⊙ Inefficient Mill extraction (Less Juice%) - poor sanitation programme at Mills / process house losses.



Stale cane losses in different sugarcane

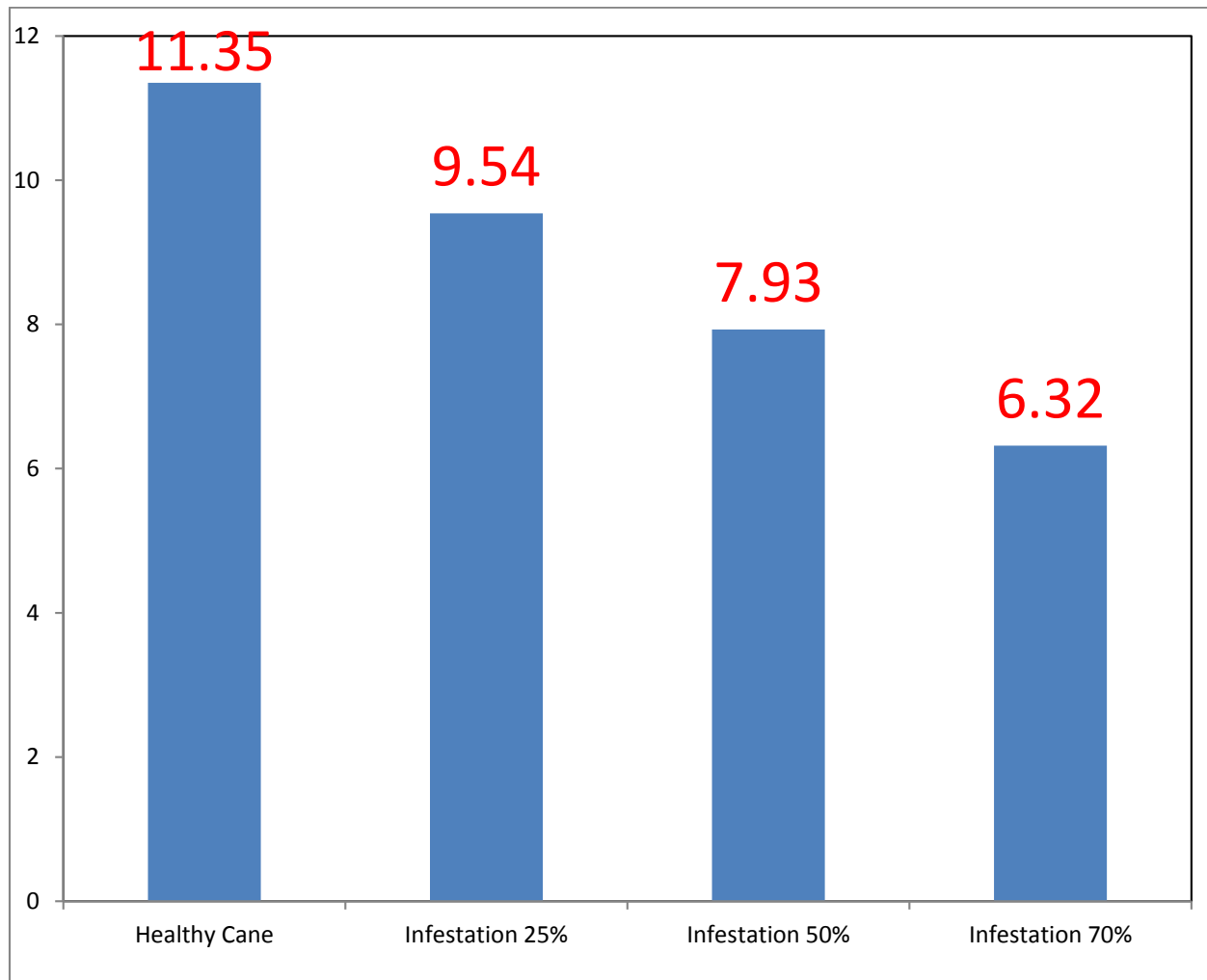
Varieties seven days after harvesting

| Sr. # | Varieties | %age Decrease in sugar Recovery |
|-------|-----------|---------------------------------|
| 1 | SPSG-26 | 5.27 |
| 2 | CP 77-400 | 4.74 |
| 3 | HSF-240 | 5.06 |
| 4 | Tritron | 5.17 |
| 5 | SPF-234 | 4.19 |
| 6 | CPF-237 | 4.27 |
| 7 | Thatta-10 | 4.21 |

- Data indicates that due to staled cane highest percentage of recovery decrease in variety SPSG-26.



Impact of borers infestation on quality
of cane





Effect of un cleaned cane on sugar

Recovery

| Sr. # | Varieties | Treatment | Rec. % | Difference |
|-------|-----------|-----------------------------|----------------|------------|
| 1 | Tritron | Clean Cane Un clean cane | 11.69 10.23 | 1.46 |
| 2 | HSF-240 | Clean Cane Un clean cane | 11.71 10.66 | 1.05 |
| 3 | SPF-234 | Clean Cane Un clean cane | 11.97 10.96 | 1.01 |
| 4 | CPF-237 | Clean Cane Un clean cane | 12.22 11.31 | 0.91 |
| 5 | CPF-246 | Clean Cane Un clean cane | 12.10 10.99 | 1.11 |
| 6 | Thatta-10 | Clean Cane Un clean cane | 12.19 11.30 | 0.89 |





Procurement Strategies for Improving sugar

Recovery

- ⦿ Selection of varieties
- ⦿ Healthy seed programmed
- ⦿ Staggered Planting
- ⦿ Optimum age at harvest.
- ⦿ Peak maturing of cane
- ⦿ Maturing analysis data based harvesting programme
- ⦿ Fresh and clean cane supply
- ⦿ Cut to Crush time
- ⦿ Skilled cane harvest labour force
- ⦿ Effective communication
- ⦿ Elimination of Middleman



Selection of Varieties

1. Selection of early maturing, high sugar varieties are an essential component of increasing sugar yield per unit area.
2. Varietal performance varies among different zones within a factory area depending upon soil type, irrigation potential etc. These factors must be studied and varieties should be appropriately selected.

Healthy seed selection programme

- © At present only some growers planted pure seed nurseries for cultivation of sugarcane. It is very important that sugarcane seed is free of disease and 7-9 months of age which is very helpful for getting the maximum yield per unit area.





Staggered Planting:-

- ⦿ Involves the requirement of quality cane at different crushing periods and planting / harvesting periods.
- ⦿ A staggered planting would help to avoid under - aged as well as over-aged cane.

Avoiding Lodging - Bud sprouting and aerial rooting.

- Lodging, bud sprouting and aerial rooting reduce cane quality directly.
- Good earthing up- deep and space planting would help control lodging significantly.
- Detracting is a sound practice which reduce bud sprouting considerably.



Lodging and Aerial shoots





New planting method to obtain quality cane

- © Method of planting is very important for getting the maximum quality yield. Deep planting-pit planting and space planting technology give better quality cane.





Peak maturing of cane

Characteristics of good quality cane

- ⦿ Should have accumulated peak sucrose content in juice.
- ⦿ Should have low level of non-sugar.
- ⦿ Should have optimum fiber content 12.5-14%.
- ⦿ Should have higher quantity of juice.
- ⦿ There should not be pith in the cane.

Pre Harvesting survey and Sampling

Pre harvest maturing survey through field cane samples analysis data helps in assessing maturity state of the crop



Age of the crop

- ② Under-aged cane will have less sucrose more reducing sugar (RS) and low purity.
- ② Over-aging leads to cane deterioration over aged cane will have more fiber, less juice, more dead and dry canes more pith which will affect sugar recovery.
- ② Optimum age for:-
 - Early maturing varieties = 10-12 months
 - Mid-late = 12.-14 //
 - Late Maturing = 13-15 //



Change Mind set

- ⦿ The time between cutting and processing should be minimized to ensure maximum sugar recovery.
- ⦿ Controlled traffic (Especially start cane lifting in evening or night).
- ⦿ Avoiding heavy machinery reflects compaction in the soil.
- ⦿ To introduce effective / green harvesting programme.
- ⦿ Harvesting of sugarcane to be monitored to the requirement of daily crushing.
- ⦿ Blind harvesting to be stopped.
- ⦿ To promote selective Block wise harvesting Programme
- ⦿ Promote half body fast trucks which are early lifting and do not require manual unloading.
- ⦿ A drying off or cut irrigation period 4-5 weeks prior to harvesting ensures an increased Sugar yield.
- ⦿ Always harvesting from ground level (special harvesting knife should be utilized).
- ⦿ Proper removal of green tops and dry trashes.
- ⦿ Elimination of middleman
- ⦿ Establishment of fully equipped cane quality testing lab: for quality assurance programme (QAP) in each Sugar Mills.
- ⦿ Staff and growers training on harvesting techniques.



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