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CONSTRAINTS AND PRIORITIES FOR SUSTAINABLE AND HEALTHY SEED CANE PRODUCTION WITH SEED CERTIFICATION AND QUARANTINE MEASURES IN SUBTROPICAL REGION

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Abstract

Breeder seed is the most critical and important input to enhance the production potential of all agricultural crops, including sugarcane. Breeder seed production is carried out day- today in the supervision of breeders, pathologists, entomologists and agronomists at the farm of different research stations of U.P. Council of Sugarcane Research and so many renounced institutes like Sugarcane Breeding Institute (SBI) and Indian Institute of Sugarcane Research (IISR) in India varied in different agro-climatic zones from North to south like subtropical to tropical climate. The efficacy of inputs applied is largely dependent on availability and timely planting of quality seed of newly released/promising varieties having genetically pure and disease/pest free seed cane. Therefore, an assured supply and production of healthy seed cane of improved sugarcane hybrids to sugarcane growers at a reasonable price is crucial for enhancing quality seed cane production. Sugarcane Productivity is stagnant from last decade at national level in general and Uttar Pradesh in particular due to paucity of sufficient area under breeder seed to replace desirable planting area every year. As a results farmers are growing poor quality seed material and also parcticising monoculture with same age- old planting material year after year. Standard breeder seed production norms with sustainable way should be strictly fallowed namely with genetically pure seed, nurturing nursery with major and micro nutrient from time to time and rouging of off type plant as well as diseases and pests. Setts from well maintained seed nurseries are given with hot water treatment methods.

Seed certification is a process designed to secure, maintain and make available the seed of improved crop varieties to the farmers as to ensure desirable levels of genetic purity, genetic identity, physical conditions, quality and health. So after hot water treatment (at 50°c for two hours) the setts are soaked in a fungicide solution (.1% Bavistin) for 5 to 10 minutes and then planted in a well prepared and nourished field, where sugarcane was grown during the practices are followed. The field should be well manured such as FYM/ compost or rotted pressmud cake should be application @ 25 to 30 t/ha 15 days before planting. Since, every year about 231733 quintals breeder seed cane was produced by U.P. Council of Sugarcane Research, Shahjahanpur, U.P. Therefore, it is very necessary to discuss all related aspects of seed certification and quarantine in sugarcane.

Key words : Sustainable, healthy seed cane, seed certification, quarantine, subtropical region, hot water treatment, fungicide.

Preamble

Globally sugarcane is an integral part of food to provide energy. Carbohydrates such as starch, sugar and polysaccharides are essential components in the human diet (Blume, 1985). Sugar is today regarded as mass consumption item and it also accounts for a large share of the total calorie intake of an average household (Pruthi, 1995). Worldwide per capita sugar consumption reached the equivalent of an energy intake of more than 837 kj (200 kcl) daily (Hagelbery and Harris, 1976). Presently, the sugarcane crop provides the third highest quantity of human consumed plant calories (152 kcl/capita/day) following rice (533 kcl) and wheat (530 kcl) as reported by Moore *et al*. (2014). The potential for expanding sugar production in India exists and can be fully exploited if adjustments were introduced to ensure a market driven relationship between sugar and sugarcane prices (Balasaheb, 2013).

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Options towards vision 2030

A. Technological options

1. **Sound varietal planning :** Varietal planning is essential for optimum utilization of the available varietal resources for sustainable and profitable seed cane and sugar production. Proper proportion of area should kept under plant cane of early, mid - late and late maturing varieties during both autumn and spring planting season to ensure proper supply of cane of desired quantity throughout crushing season. Varietal diversification is the best insurance against large scale economic loss due to vulnerability to insect pests and diseases.
2. **Seed programme :** Good seed form a strong base for better crop growth, higher yield and quality. The normal practice is to use commercial crop of sugarcane seed purpose. Characteristics of good seed are seldom taken into consideration. Many cultivators do not care for seed quality and many of those who do, select the seed only at the sett cutting and planting stage. This is not enough. For getting good and disease free seed cane, the seed crop should be grown separately. Seed has to be in high water content and of good nutritional status.

For maintaining seed quality for a longer period a three – tier seed programme has been developed which consists of raising first seed crop with moist hot air treated seed at seed cane centers. Under three tier system of seed production and four years varietal replacement programme, prior to distribution of breeder seed-cane to cane growers for raising foundation seed nurseries, all breeder seed nurseries were thoroughly checked and certified for their genetic purity and free from diseases and insect-pests by a team of different subject matter specialists. Breeder seed-cane from such certified breeder seed nurseries were supplied to different Cane Development Council as per the allotment made by Cane Commissioner, U.P.

3. **Improved panting methods :** Different method are adopted for planting of sugarcane crop in India. These planting methods generally differ on the basis of planting material used and nature of earth work. In general flat planting is extensively followed in north India while in tropical parts of the country, ridge and furrow method is most common which require huge quantity (6-7 tonnes cane stalks/ha) of planting material. To have greater seed economy, spaced transplanting method may be adopted. For achieving very high yield, ring pit method is to be preferred. In this method planting of sugarcane setts is done in circular pits of 45 cm depth and 90 cm diameter.
4. **Balanced manuring :** Balanced use of plant nutrients is essential for sustaining productivity of crop and soil. In addition to macronutrients, use of micronutrients is also essential for healthy growth and development of sugarcane crop nursery. Reports on deficiencies of micronutrients in sugarcane are more frequent for the last 3-4 decades in India. This may be due to the intensive cropping of high yielding varieties, monoculture of sugarcane, lack of organic matter addition and use of high analysis fertilizers.
5. **Integrated nutrient management (INM) :** The results of large number of experiments with manures and fertilizers on sugarcane conducted under AICRP on sugarcane and other institutional trials in India conclusively proved that neither the chemical fertilizers alone nor the organic sources exclusively can achieve the production sustainability of soil as well as crop under intensive cropping systems where the nutrient turn – over in the soil – plant tem is faster and large (Yadav *et al*., 2018). The different component of INM in sugarcane include organic manures, crop residues, legumes, sugar factory by products/ effluents and bio–fertilizers in addition to chemical fertilizers.
6. **Bio – fertilizers :** Biofertilizers where used through seed or soil inoculation make available substantial quantities of nutrients to sugarcane crop at very low cost. In addition to increased nutrients availability the micro organics are also known to produce growth promoting substances which favour better growth of sugarcane plants. Nitrogen saving to the extent of 25-100 kg/ha has been reported in investigation carried out at different location of India using culture containing *Azotobacter*, *Azospirillum* or *Acetobacter*.
7. **Efficient water management :** Water is essential input in sugarcane production. It is to be managed so judiciously that maximum benefit is obtained with minimum harm to plant and soil. Water management is sugarcane includes water application through irrigation during non – rainy season and disposal of excess water. If any, during rainy season. For water saving drip

irrigation, application of water in sip – furrow and trash mulching may be adopted effectively.

8. **Managing crop under adverse conditions:-** Growing of sugarcane crop nursery successfully under adverse agro-ecological condition like delayed planting, drought water logging is essential for sustainability of sugarcane production.

B. Policy options

1. There should be announcement of remunerative price prior to commencement of planting nurseries for proper area and production with their availability.
2. Cane area should be clearly demarcated for longer period of time.
3. Factories must take up the responsibility of cane development in their factory zones.
4. Monitoring and supervision of nurseries must time to time.

Future research needs and strategies : Sugarcane seed cane programmes can be improved on the following lines.

1. Most varieties developed for sub – tropics have been tailored to adjust to environmental rhythms, rather than responsiveness could, however, be induced by breeding techniques that makes plants initiate early tillering.
2. Greater emphasis should be given to sugarcane breeding programmes to evolve red rot resistant early varieties so that they could survive in adverse situations.
3. Introduction of elite germplasm in breeding pools to improves tolerance to pests and diseases.
4. Work should be initiated to sustain high shoot density by preventing tiller mortality.
5. Agronomic practices might break the present yield ceiling and bring another revolution in cane productivity.
6. Greater emphasis should be given on biological central, integrated approach for insect, pests, diseases and weeds control etc.

References

Blume, H. (1985). *Geography of sugarcane*, Verlog. Dr. Albert Baten, Berlin, Germany.

Bolasahb, D. T. (2013). India's sugar Trade: A fresh look. Indian Gandhi Institute of development Research, Mumbai.

Hagelberg and Harris (1976). Pluralsim and uncertainity in the world sugar economy. *Food Policy*, 271-285.

Moore, P. A. and F. C. Botha (2014). *Sugarcane physiology, biochemistry and functional biology*. John widely and Sons Inc.

Pruthi, S. Q. (1995). *History of sugar industry in India*, Reliance Publishing house, New Delhi.

Yadav, S. P., S. C. Singh, Sonia Yadav, S. K. Yadav, Ajay Tiwari and B. L. Sharma (2018). Integrated nutrient management approaches for enhancing production – potential sustainability of sugarcane (*Saccharum* spp.). Plant – ratoon system in north India. Paper presented in 6th IAPSIT International Sugar Conference Thailand. Souvenir de presentation: Pp. 51.