Sustainable sugarcane initiative

Improving yields and reducing ecological footprint

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Sustainable Sugarcane Initiative, SSI, an innovative set of agronomic practices, that leaves reduced ecological footprint, is catching up very fast among the sugarcane growers in India. The SSI will most likely become the standard planting method owing to its yield advantage, reduced use of water and other inputs. Coordinated efforts of various sectors will accelerate the process of upscaling SSI.

Sugarcane, after cotton, forms the second major agro-industrial crop of India. Ranking second in the world after Brazil, with a cane production of 350 million tonnes, sugarcane is grown on an area of around 5 million hectares. Besides contributing to the rural economy to the tune of Rs. 90,000 crores ($ 17 billion), sugarcane cultivation is also increasingly seen as a source of electricity and Ethanol. Considering its economic and social advantages, sugarcane is considered as the future crop of India.

But presently, sugarcane cultivation is in crisis. With low yields, varietal degeneneration, high input costs, incidence of diseases and pests, soil degradation, salinity, water logging and drought, the area under sugarcane is gradually shrinking. Also water is a major constraint, limiting the production. The water requirement of sugarcane is estimated at 1500-3000 mm, the highest among the requirements of major crops. A field study in Uttar Pradesh revealed that the quantity of water consumed for every kilo of sugar produced is around 2000 litres of water. This means a lot of demand on water and SSI can drastically bring down the water requirement of sugarcane.

Sustainable Sugarcane Initiative

'Sustainable Sugarcane Initiative' (SSI) is clearly the foremost option available right now to address many of these problems. The Sustainable Sugarcane Initiative (SSI) is an innovative set of agronomic practices that involves using less seeds, raising seedlings in a nursery, and following new planting methods, with wider plant spacing, and better water and nutrient management to increase the cane yields significantly. The principles underlying SSI are: raising nursery using single bud chips, transplanting young seedlings of age 25-30 days, maintaining wider spacing (4-6 x 2 feet) in the main field, providing sufficient moisture to plants and avoiding flooding of fields, encouraging application of organic manures, better cultural and plant protection measures, and practicing intercropping to utilize land effectively. Though such farm practices were prevalent in isolation here and there, bringing them together was first attempted in the WWF-ICRISAT project in 2009. SSI builds on the principles of SRI- System of Rice Intensification and its major success with farmers.

A happy farmer in his SSI plot

Sugarcane nursery – an innovative practice of SSI

The point of departure of SSI from traditional practice is to plant one month old seedlings, not the cane itself. Therefore, SSI also known as "Bud Chip Technology", involves removal of buds from the cane and raising nurseries. Though this was a known practise to some farmers, for more than 60 years, yet it was not promoted systematically in an integrated way. The innovative practice of SSI has been published as a manual in 1999, providing stepwise suggestions for managing the crop, entirely.

Sugarcane nursery

Positive results

The SSI crop results in robust root system, phenomenal increase in tillering and faster growth in terms of height and girth of individual canes. These factors in turn, not only provide substantially higher cane yields, but also result in higher sugar recovery. Less incidence of pests and diseases owing to faster growth and not so dense crop canopy are other advantages. The other significant benefits are: seed cane saving to the tune of 4 t/ha, water saving upto 90% during the first month due to nursery raising practice, around 30% water saving in the main field, owing to wider spacing and use of water efficient systems like drip irrigation. SSI also gives an excellent ratoon crop.

Very slow adoption of new varieties is a major problem in sugarcane. In SSI, there is a phenomenal increase in seed cane multiplication rate 1:60 to 1:80, as compared to 1:6 to 1:8 in the case of conventional crop. This enables faster spread of varieties.

The Spread

The first ever conceptualisation and experimental launching of SSI was done under WWF-ICRISAT project in Andhra Pradesh in peninsular India and in Uttar Pradesh in subtropical India. A very successful demonstration on 10 hectares in each state was done in 2009-10. Simultaneously in collaboration with two different NGOs, the methodology was demonstrated in the same year in 13 ha in Odisha, which represents the coastal sugarcane belt of India and 4 ha in Punjab. Following this very promising and more than expected outcome in these three different sugarcane growing regions, AgSri, took up the mantle of spreading SSI in India as the WWF-ICRISAT Project concluded.

Established in 2010, AgSRI is working with farmers in all sugarcane growing states of India to test, refine and promote SSI. AgSri is a social enterprise, promoting SRI and SSI among farmers in many agro ecological zones of India to improve the yields while reducing the input costs and water. So far, AgSri in collaboration with the mills and NGOs has tested SSI in UP, Odisha, Karnataka, AP and Maharashtra on an area of more than 1000 ac. The results have been extremely positive. The yield increases were quite significant in all the fields. AgSri trained thousands of farmers to adopt SSI including establishing their own small nurseries. AgSri is working on further improving the process, developing protocols, testing on varietal responses. The current version of SSI is very basic and in future many improvements are likely to come to improve the quality, reduce the costs. In short, developing standard operating procedures for nursery would greatly help in scaling up SSI. That is what currently AgSri is engaged in.

Moving ahead

Like SRI in paddy, SSI also provides a good opportunity to improve the quality and productivity of sugarcane cultivation. Sugarcane being a water intensive crop, SSI can address the issue of water crisis. SSI seems to be the only solution in meeting the growing demand for sugarcane, by improving the productivity, using less resources and reducing the input costs. This environment friendly methodology, that leaves reduced ecological foot-print, is catching up very fast in India and it has started spreading to other countries like Cuba, as well. The SSI will most likely become the standard planting method for entire sugarcane fields in India. This will take some time, but in the next decade or so, every small and medium farmer, not only in India, but also in many other countries, will be practising SSI. But this requires support from public and private sectors. One of the effective ways of upscaling SSI is through Public-Private partnership mode.

There are however, challenges in upscaling the SSI - knowledge transfer, working with public funded sugarcane research institutions and involving sugar industry in their own interest to improve the quality of recovery. In addition to operational challenges, there are some research issues as well which need to be addressed – eg., improving the quality bud-chips, introduction of appropriate tools for bud removal which will accelerate the process, storing of buds without loss of quality, reduction of costs in nursery so that farmers can pay less for each seedlings. AgSri with its limited resources, is attempting to address some of these issues.

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