

## Sustainable sugarcane initiative

The article entitled 'A breeder's perspective on the tiller dynamics in sugarcane' by Kapur *et al.*<sup>1</sup> is commendable for critically looking at a new approach in sugarcane selection and cultivation. In this context we would like to elaborate that a method of sugarcane cultivation called sustainable sugarcane initiative (SSI) which encompasses the ideas advocated in the article<sup>1</sup>, is spreading fast throughout the country, thanks to the initial efforts of WWF-ICRISAT. A training manual in English was published in March 2009 by WWF-ICRISAT ([assets.panda.org/downloads/ssi\\_manual.pdf](http://assets.panda.org/downloads/ssi_manual.pdf)) and subsequently this has been translated into Tamil, Telugu, Oriya, Marathi, Kannada and Hindi. A number of progressive farmers from Punjab, Andhra Pradesh (AP), Karnataka, Maharashtra, Orissa, Tamil Nadu (TN) and Uttar Pradesh (UP) have been given training in SSI so far by WWF-ICRISAT at Hyderabad.

SSI as a methodology was thought of as a sequel to the successful system of rice intensification (SRI). SRI was developed by Henri de Laulanié in the 1980s in Madagascar. (Subsequently, it was found that a similar practice existed in early 1900s in TN and farmers called it 'gaja planting'; [sri-india.110mb.com/newsletter/SRI%20issue%206%20\(17-05-09\).pdf](http://sri-india.110mb.com/newsletter/SRI%20issue%206%20(17-05-09).pdf)). SRI evolved as a bottom-up approach of farm practices and by 1994, the philosophy was scientifically validated. The main principles of SRI are: low seed rate, low water requirement, transplanting young seedlings (8–12 days) at shallow depth, wider spacing (25 × 25 cm), incorporating weeds into the soil whereas weeding, replenishing nutri-

ents in the form of green manure, organic manure in place of chemical fertilizers to the extent possible and pest management without chemicals as far as possible.

SRI has been a phenomenal success in improving rice productivity throughout the world following the promotion of this philosophy by Africare in the African Sahel, Oxfam America in South East Asia and WWF in India. This approach is also now being called as 'more with less'.

After the success of SRI, WWF-ICRISAT ventured upon applying similar principles to sugarcane and SSI was launched in India encompassing the following:

- Raising nursery using single-budded chips or setts.
- Transplanting young seedlings (25–30 days old).
- Maintaining wide spacing (4 ft or more between rows and 2 ft within a row) in the main field.
- Providing sufficient moisture and avoiding inundation of water.
- Encouraging organic method of nutrient and plant protection measures.
- Practising intercropping for effective utilization of land.

The sugarcane cultivation practices followed according to the above principles are not entirely new, but SSI as a methodology is a serious attempt to adopt the already available farm practices in a synergistic way and popularize it through effective support from and involvement of sugar factories, civil society organiza-

tions, research institutions and the progressive farmers.

In a village called Thumbal, near Salem, where SSI was experimented under the auspices of WWF-ICRISAT in a particular farmer's field, the performance of Co 86032 at 12 months was as follows:

Cane yield/acre: 68 t (as opposed to 40 t under conventional method).

Single cane weight: 2 kg on an average, the maximum going up to 2.8 kg.

Cane height: 280 cm (9.5 ft) and it went up to 360 cm (12 ft).

HR brix: 21.2% on an average.

Apart from TN and AP, Maharashtra and Orissa are the more important states where SSI is vigorously being introduced in peninsular India. AgSri, a Private Limited Company (<http://www.agsri.com>), is engaged in promoting this methodology in the largest sugarcane-growing state of UP by tying up with Triveni Sugars, the largest sugar producer in the state. With initial hiccups (mainly due to very low temperature that prevails during January–February, hampering bud chip germination), a significant number of successful SSI fields has been reported during the last crop season (2010–11). For the current crop season, a fairly large number of farmers are going to adopt SSI in the area and these plots will also serve as demonstrations for other farmers to see and adopt the methodology.

In the article by Kapur *et al.*<sup>1</sup>, a valid point on the need to revisit crop geometry and the selection procedure in order to improve productivity has been made. Surely, tiller mortality is an important aspect that has to be studied by the breeders and agronomists. Ultimately, albeit the fact that higher mortality amounts to wastage, what is more important is the number of millable canes. An analysis of data in table 2 (36 entries, i.e. 18 varieties in two plant crops for the subtropics and similarly, 44 entries for the tropics) of the article<sup>1</sup>, provides information as given in Table 1.

It is evident that there is a strong relationship between the tillers and number of millable canes (NMC), and the breeder has to bank upon the number of tillers

**Table 1.** Relationship of tillers with number of millable canes and survival

	Tillers versus number of millable canes	Tillers versus survival
<b>Subtropical</b>		
Correlation	0.95*	(-) 0.44
Coefficient of determination (%)	90	19
<b>Tropical</b>		
Correlation	0.54*	(-) 0.75*
Coefficient of determination (%)	29	57

\*Significant at  $p = 0.01$ .

while exercising selection. There is a negative relationship between tillers and survival. If we are to consider survival of the tillers into millable canes as the selection criterion, we would be missing out high tillering and hence high NMC clones. This is the scenario for conventional cultivation. Whether it will hold good when a different crop geometry involving spaced planting of seedlings is adopted, is a moot point. This needs investigation and it might be that the situa-

tion may not change drastically. Surely, there will be good survival of the tillers if selection (from early clonal stages) is practised under wide spacing, in which percentage of case survival may not become an important issue.

There is an urgent need to carry out research on this planting methodology by agricultural universities and sugarcane research organizations under the Indian Council of Agricultural Research.

1. Kapur, R., Duttamajumder, S. K. and Krishna Rao, K., *Curr. Sci.*, 2011, **100**, 183–189.

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## Green economy: policy framework for sustainable development

The current scenario of economic models threatens our ability to spread prosperity and sustain our planet. Climate change, environmental degradation, unemployment, poverty, insecurity and inequality seem to feed off one another. Poverty and degradation of the environment are closely interrelated. This is especially true where people depend, for their livelihood, primarily on the natural resources base of their immediate environment. With India being a growing economy, there is resistance for sacrificing economic growth for the sake of protecting the environment in the future. The Environmental Sustainability Index (ESI) benchmarks the ability of nations to protect the environment over the next several decades. According to the World Economic Forum<sup>1</sup>, ESI of India is 45.2, which ranks the country at 101 among all nations. From the Indian perspective, where majority of the Indians lie at the bottom of the pyramid, live on less than a dollar per day and are not able to meet their basic needs, the challenge is how it can harness the energy resources so as to ensure its energy needs. Moreover, the bigger challenge is to ensure the sustainability of the energy generation for its future generations.

The green economy concept here can be a means to achieve sustainable economic and environmental development. UNEP<sup>2</sup> has defined green economy as a system of economic activities related to the production, distribution and consumption of goods and services which will result in improved human well-being over the long term, while not exposing future generations to significant envi-

ronmental risks or ecological scarcities. A green economy implies the decoupling of resource use and environmental impacts from economic growth. It is characterized by substantially increased investment in the green sector, supported by enabling policy reforms. The basic idea behind adopting green economy is that it can contribute to achieving the goal of sustainable development by generating economic sustainable wealth, facilitating jobs and using natural resources in an optimal way. Being a new style of economy adaptable to human environment and health, green economy can promote the development of productivity, and bring about changes in the production method, life style and consumption. It can call up human ecological and scientific development awareness and leave a sound base and sustainable resources and environment for the human offspring<sup>3</sup>.

Developing countries such as India, which are likely to have sectors and infrastructure that have not yet fully matured, can accelerate their economic development by bypassing inferior, less efficient and more polluting technologies and policies used by developed countries. Accelerated economic development does not necessarily mean that it would also correspond to increased greenhouse gas levels. It can be possible to maintain cleaner environment with the use of appropriate fuels and innovative technology. Therefore, government policy should be aimed at acquiring and developing advanced technologies to ensure the shift from fossil-fuel based energy to clean renewable energy. In the long term, developing countries stand to gain the

most by moving towards a more environmentally sustainable path of economic growth. However, without framing proper legislations, it will be difficult to convince developing countries to adopt the green economy concept. The reason is that the transition towards green economy involves expensive technology. These technologies are expensive because our existing methods of determining the cost of a technology do not include the actual cost of damage done to the environment. Once this is taken into account, the green technologies will no longer be expensive vis-à-vis conventional technology and it will be easier for the policy makers to convince the stakeholders to move towards green economy. The accounting of the environmental dimension can only be done once proper legislatures are devised. Bottom-up approach or decentralized energy planning can help in employing the objectives of sustainable green economy. Decentralized planning involves scaling down energy planning to sub-national or regional levels. Recent studies<sup>4</sup> show that it is possible to meet the energy requirements of all the services that are necessary to promote development and improve the quality of life in rural areas from village to district scale, by utilizing the locally available energy resources such as cattle dung, leaf litter and woody biomass feedstock from bioenergy plantation on wastelands. These types of energy extraction are self-reliant and have low carbon footprints. One of the essential principles to the green development plan is the recognition of the need to involve people in the process of development.