SSI

MORE WITH LESS

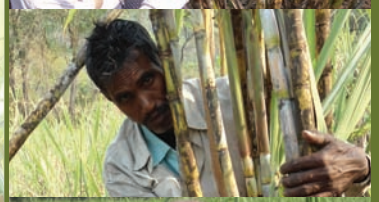
AgSri
crops • water • people

Natural Resource Management Center
NRMC, Kolkata

NABARD

Farmers
from the Field






The concept for this publication was conceived by the AgSri team: Dr. Biksham Gujja, Founder and Chairperson, AgSri; Dr. Vinod Goud, Chief Technical Officer, AgSri; Dr. US Natarajan (former scientist, Sugarcane Breeding Institute, Coimbatore); The field inputs are being provided by the AgSri staff: Krishna Kumar Bhagat (Uttar Pradesh), Prasant Mohanty (Odisha), Jagannadh Reddy (Andhra Pradesh) and the KVK Latur (Maharashtra) staff: Sachin Digrase & Sachin Kawde. Other members of the AgSri team who contributed: Dr. Padmaja Karanam, TVVV Rao, Suhasini Ramayanam and Sraban Dalai.

Thanks to NRMC (NABARD) for funding the printing of this publication.

Acknowledgments

This publication has been compiled with inputs and from the experiences of thousands of SSI farmers from different states of India. We take this opportunity to sincerely thank them. Our special thanks to Dr. Norman Uphoff and Dr. Rene S. Perez. We sincerely thank the Triveni Engineering and Industries Ltd. and Solidaridad Network for providing AgSri the resources and access to work with farmers in their fields. We thank Dr. Amrik Singh, Deputy Director, ATMA (Gurdaspur, Punjab) for his inputs.

Production and editorial team: Manisha Agarwal and Anuradha S Echambadi
Design: Akshakala and Grey Pixels
Printing: Suneetha Art Printers, Hyderabad
Photographs: AgSri field team: Uttar Pradesh, Odisha, Andhra Pradesh and Maharashtra and
Dr. Amrik Singh and Dr. Rene S. Perez

For copies, contact:

AgSri
#24, Road No.76, Jubilee Hills,
Hyderabad-500033,
Andhra Pradesh, India.
e-mail: info@agsri.com
Website: www.agsri.com

Note: The information in this publication has been produced based on our extensive SSI work in the field and inputs from the farmers and experts in the sugarcane field. However, the results in the field are subjective to local soil, geographical, climatic and other conditions. The maps included in this publication are only indicative, not accurate and to scale. Our efforts and research is ongoing and we would like to hear from you. Please share your comments, feedback and/or additional information to the address or email above.

Views expressed in this report are of those of the authors and not necessarily endorsed by the organizations they represent. AgSri, NRMC (NABARD) and their affiliated organizations are not responsible for statements made or views expressed in this publication outside their respective areas of operation or for any errors that occurred in the compilation of the publication.

Contents

Introduction

The farmers' experiences from the different states in India implementing the Sustainable Sugarcane Initiative (SSI) are presented in this book. These stories clearly demonstrate that it is possible to produce sugarcane differently with less inputs and get more yields by following the various SSI practices. The information presented here indicates that:

a) The seed material can be significantly decreased

b) Wide spacing increases the production

c) Water savings can be substantial

d) Short duration intercrops will open whole new opportunities for farmers in increasing the income and improving the soil fertility

These farmers' experiences are meant to inspire various stakeholders like investors, bankers, millers, research agencies and farmers to do more to promote these concepts. The AgSri team has a previous experience of publishing similar books on the experiences of the SRI farmers which triggered a process resulting in a major change towards large scale adoption of SRI, taken up by several state governments across the country and our hope is to be able to replicate these successes for sugarcane.

And so it is in this vein, that we expect these case studies also to help in establishing:

a) A national network for promoting SSI

b) A national level target for mills and farmer's

co-operatives, with each specifying its own targets

c) A time bound programme by which the research agencies can further refine the process suitable for each variety

d) Industry-specific agencies with a mandate to invest in the promotion of SSI and

e) Suitable training and extension activities to match the national targets. At the same time, it is also important that the millers recognize the need for investing in the process, farmers and fields, in order to get more cane and in turn, more recovery

We do hope that by 2015, more than 25% of India's sugarcane is produced in compliance with the SSI methods. This will increase the cane production and sugar recovery while saving water and improving soil fertility. SSI is going to reduce the sugarcane foot print on Planet Earth, while making the farmers' lives little better. We at AgSri hope to bring out more publications like this as we widen the horizons of our work in bringing SSI to as many sugarcane farmers across the country as possible, either directly or through proactive partnerships, in order to showcase all the pioneers and crusaders who are brave and strong enough to take a step into the darkness and came up smelling roses, tasting 'sweet' success, with SSI.

This is but the beginning...

An Industry–Farmer Partnership Benefits All

The role of sugarcane in fueling the rural economy, particularly in the Northern plains of India is well accepted. However, over the years, sugarcane has lost its place of prominence in farmers' field. Farmers today consider sugarcane as one of many alternatives. The main reason for this decline is the reduction in returns per unit area of sugarcane - in spite of an increase in cane prices - primarily due to lower yields and an increase in the input costs. Because of lower sugar recovery, factories operate at lower capacity and have less to pay farmers, which perpetuates the cycle.

The three variables affecting sustainable returns for farmers are: yield per unit area; cost of cultivation; and the price of the output. New technologies have tried to address these variables and to a certain extent gave good results but to date they could not be adequately scaled up. In the context of Uttar Pradesh, the lower yields can be attributed to:

- Narrow spacing between rows – the distance between two rows is generally 75 cm or even less
- Inadequate and imbalanced fertilizer dosage with emphasis on the use of nitrogenous fertilizer
- Over dependence on monsoons is adversely affecting the yields, especially in the case of failure or variation in the monsoon pattern
- Lower yields in ratoon crops due to improper ratoon management practices
- Irrigation methods that lead not only to a wastage of water but also create anaerobic condition in the field. Also, the high cost of irrigation affects the frequency of irrigation

Late planting of sugarcane – mostly done after the harvest of wheat in the month of April and May, thus reducing the life span of the crop and the period for tillering. Triveni Engineering and Industries Ltd., the third largest manufacturer of sugar in India, has been committed to improve the yields of sugarcane and the quality of sugarcane cultivated in its factory areas. As part of its long term strategy to work with farmers, the Industry entered into a partnership/agreement with AgSri to implement SSI

Uttar Pradesh

in the 7 mill units of six districts – Khatauli, Deoband, Sabitgarh, Chandanpur, Raninangal, Milak Narayanpur and Ramkola of Uttar Pradesh. The specific objectives of this partnership are:

- Improving the yield by at least 20%
- Improving sugar content by at least 10%
- Improving water productivity by at least 30%
- Introduce quality varieties in at least 40% of the Triveni area
- Training and monitoring

Some of the interventions to implement the above objectives include:

- Improving the yields, the most important and urgent issue
- Improving the recovery through promoting appropriate varieties
- Reducing cultivation cost
- Better land (soil), water and crop management and initiating measures to reduce the impact of low rainfall, floods and pest attacks

We present the stories of the farmers in the following pages who were able to quite successfully use SSI to turn their lives around over the last two years.

Constructing a Future with SSI

Umrao Singh

Umrao Singh is from Dariyapur Tugun village (Gangeshwari Block, Jyotiba Phule Nagar District, UP). He is 45 years old. He never went to school but always showed keen interest in learning and applying innovative methods in farming.

Umrao is comparatively new to cane cultivation. This is his 7th year of cane cultivation. There are 7 members in his family and they own about 3.3 acres of land of which around 2. 5 acres is under sugarcane.

He came to know about the SSI method last year from the cane development staff of Triveni Sugars in Chandanpur unit and decided to plant 4000 seedlings of the CoS 88230 variety with 3 x 2 feet spacing in 5 Bighas (0.83 acres) of land. Initially, there were 8 tillers per clump on an average in his plot of which 7 converted to millable canes. He applied 50 kgs NPK, 100 kgs of Urea and 50 kgs of Zinc in his plot for a better yield. He irrigated his plot 12 times at an interval of 15 days but could not do earthing up and propping-up.

After the harvest, Umrao Singh got an average yield of 45 quintals per Bigha*(270 quintals per acre) with the SSI method in comparison to 25 quintals per Bigha with the conventional method of cane cultivation. The performance of the ratoon crop was extremely satisfying and he got 90 quintals per Bigha (540 quintals per acre) from the ratoon crop. Umrao says, "This method has a huge potential and last year's yield is only a small indication of this. Its full potential is yet to be realized."

"I made a clear profit of around Rs 27000/- from my SSI plot and roughly Rs. 25000/- from selling bud chip seedlings. Thanks to this profit, today I can boast of a new home for my family."

The following table briefly compares the costs and income between the SSI and Conventional methods (5 Bighas each)

Particulars	SSI	Conventional
Land Cost	10000	10000
Seed Cost	4000	3075
Land Preparation	1250	1500
Transplantation	750	1200
Fertilizer Cost	1200	1200
Earthing up	NO	NO
Propping up	NO	NO
Irrigation	840	840
Harvesting	3000	875
TOTAL COST	21040	18690
Output (Quantity & Rate)	225 quintals (22 quintals @Rs. 260, 203 quintals @ Rs. 210)	125 quintals @ Rs. 210
Total Income	48350	26250
NET INCOME	27310	7560

The profit from SSI is almost 3.5 times more than the conventional method. Being an enterprising farmer, this year, Umrao Singh has raised 32000 seedlings with the technical support of AgSri and material support from Triveni Sugars, Chandanpur, of which he planted 2000 seedlings in his own plot and has sold the rest to other farmers as seed cane. He sold the seedlings at Rs. 1 per plant.

Today, he is mobilizing other farmers by helping them understand the benefits of SSI as against the conventional planting methods. He was able to mobilize 8 farmers to take up SSI, by sharing his experience and narrating the benefits of the SSI method. He did not stop at that but also provided seedlings to them. Looking at the performance of the bud chip plants and the success of the SSI method, he is anticipating a huge demand for bud chip raised seedlings in future.

"Farmers in the area have realized the benefits of SSI method as it saves seed and other inputs and in turn has given better yield when compared to the general planting methods. They are more inclined towards SSI, especially after seeing the performance of the ratoon crop which is like a bonus for them after getting good yields from the SSI crop plant."

*Bigha is a traditional unit of land in several parts of India, with land purchases still being undertaken in this unit. However, it varies in size from one part of India to another. It is less than an acre (0.4 hectare), however could extend up to 3 acres. Various states and often parts within states have different sizes attributed to 1 Bigha.

SSI is the Best Ever

Lajpat Singh

A biology graduate, Lajpat Singh hails from Luhari Khurd village under Charthawal Block, Saharanpur District of Uttar Pradesh. He is 62 years old. His main occupation is agriculture and he has over 40 years of experience in sugarcane cultivation. He owns 50 Bighas (8.33 acres) of land of which 27 Bighas (4.5 acres) is under cane cultivation. There are 6 members in his family.

Last year, he purchased 1200 seedlings of the Co 0238 variety for planting in 1 Bigha (0.16 acres) of land. He tried his best to implement all the steps suggested by the Triveni factory and AgSri experts from Hyderabad. On an average, there were 8-10 tillers per clump in his plot of which about 8 millable canes were obtained at the time of harvest. Earlier, it was difficult for him to even get 4-5 millable canes with the conventional planting methods. Lajpat Singh applied Urea, DAP, MoP, NPK and micronutrients for better yield. He applied 7 irrigations within an interval of 15 days and did earthing up once and propping twice.

Lajpat Singh says, "I was quite impressed when I got an average yield of 65 quintals per Bigha (390 quintals per acre) whereas with the traditional cane cultivation method, I could hardly get 40 quintals per Bigha (240 quintals per acre). What has made me even more happier is the performance of the ratoon crop. Now I am more confident about this method and want to grow sugarcane only thorugh the SSI method."

"The neighbouring farmers used to make fun of me stating that they have never seen cane cultivation through nursery. But when I got such excellent results with this new method, the other farmers are now approaching me to know what I did to get such an impressive yield."

When asked why many farmers could not get good results with SSI, Lajpat Singh comments, "Many farmers were not showing interest and nor were they implementing the suggested steps and operations on time, thinking that this was the responsibility of the factory personnel, as the farmers had planted the seedlings on their request."

The following table briefly compares the costs and income between the SSI and Conventional methods (1 Bigha each)

Particulars	SSI	Conventional
Land Cost	4000	4000
Seed Cost	1500	1500
Land Preparation Cost	600	600
Transplantation	300	450
Fertilizer Cost	700	700
Earthing up	300	NIL
Propping up	300	300
Irrigation	450	500
Harvesting	900	600
TOTAL COST	9050	8650
Output (Quantity & Rate)	65 quintals @ Rs. 205	40 quintals @ Rs. 205
Total Income	13325	8200
NET INCOME	4275	450

Impressed and excited with the results in the 1 Bigha of land, last year, Lajpat Singh raised 28000 seedlings of the Co 0238, CoS 8436 and CoJ 64 varieties with the technical support of AgSri team and material support from Triveni Sugars, Deoband. He increased the SSI area from 1 Bigha (0.166 acres) to 12 Bighas (2 Acres) of land. A progressive and innovative farmer, Lajpat Singh also planted the bud chip plants under the paired row method with a spacing of 3 x 1.5 x 3 feet.

Lajpat Singh and his family members are very happy with SSI and have mobilized many cane farmers to take up SSI in their own fields.

"The major benefits of SSI method are - scope for selection of seed which is very important, less seed requirement, wider spacing makes intercultural operations easy. Also, proper utilization of time, less attack of pests and diseases and above all, its more profitable. I am highly convinced with the method and now want to raise 5 lakhs seedlings next year, provided materials are made available to me and the sugar factory supports me in selling them. SSI is the best ever, among all the methods tried for cane cultivation so far."

SUGGESTIONS FOR IMPROVEMENT

Increasing the size of the tray for nursery raising, improvement in the bud chipper and if possible a power operated one, training for farmers and visit of farmers to the successful SSI farmers' plot.

Suggestions for Success

Baljinder Singh

"It allows selection of disease-free plants and therefore gives better yield in comparison to traditional planting methods."

Baljinder Singh is from the Naipura village (Jansath Block, Muzaffarnagar District, Uttar Pradesh). He is 65 years old and holds an MA degree in Economics. There are 9 members in his family and agriculture is his main occupation. He is one of the big farmers in the area and has over 35 years of experience in cane cultivation and with 8 acres of land invested in sugarcane cultivation.

A progressive farmer, he is always eager to experiment with new methods of cultivation. Last year, he was approached by the Triveni Sugars Unit of Khatauli to take up SSI in his field on trial basis. He purchased 15000 seedlings of the Co 0238 variety from the factory and planted the same in 2.5 acres of land with 5 x 2 feet spacing. Trained by the factory staff and AgSri experts, he followed all the steps suggested as part of this new SSI method. He got on an average 12 tillers in each clump of which an average 8 survived as millable canes. He applied DAP, Urea and Zinc in the field to get better results and did earthing up and propping twice. He applied 12 irrigations at an interval of 10-15 days.

Baljinder got an average yield of 500 quintals per acre. He gives the credit to his hard work and the SSI method. Since the quality of the cane was very good, he sold it as seed cane to other farmers at a premium rate of Rs. 250 per quintal, in comparison to the general rate of Rs. 205 per quintal. He also took a ratoon crop and got an average yield of 90 quintals per Bigha (540 quintals per acre) with the ratoon crop. Excited with the results, he is now raising seedlings in his own nursery with the technical support of the AgSri staff and materials from Triveni Sugars. In addition to this, he also purchased 25000 seedlings from the factory last year for planting in 3.5 acres of his land.

Baljinder finds the SSI method better than the conventional cane cultivating methods because, "It requires less seed, tillers and millable canes are more, the canes are healthy and taller as a result of which cane weight is more, there is less incidence of pest and disease and it allows selection of disease-free plants from the start."

Last year, Baljinder Singh mobilized 5 farmers to adopt SSI in their respective fields.

"If we want to promote a new method effectively among farmers, we have to ensure proper training for farmers and timely and easy availability of the resources/equipment. As labour availability is also an issue, it would be of great support to have a mechanical bud chipper."

The following table briefly compares the costs and income between the SSI and Conventional methods (2.5 acres each)

Particulars	SSI	Conventional
Land Cost	45000	45000
Seed Cost	15000	15375
Land Preparation	4500	4500
Transplantation	3000	6500
Fertilizer Cost	8965	8965
Earthing up	4500	2250
Propping up	4500	4500
Irrigation	4000	3000
Harvesting	18000	14625
TOTAL COST	107465	104715
Output (Quantity & Rate)	1200 quintals @ Rs. 250 per quintals	975 quintals @ Rs. 205 per quintals
Total Income	300000	199875
NET INCOME	192535	95160

'More' Confidence in SSI

Chandrapal Singh

"I got an average yield of 100 quintals per Bigha with the ratoon crop."

Chandrapal Singh from Devrala village, Khurja Tehsil (Bulandshahar District) in Uttar Pradesh is one among the progressive farmers who adopted the SSI method. He is 50 years old and has passed Matriculation. There are 7 members in his family. His main occupation is agriculture and he has over 25 years of farming experience. He owns 32 Bighas (5.33 acres) of land of which about 21 Bighas (3.5 acres) is under cane cultivation.

Chandrapal came to know about the SSI method when he attended a meeting called by Triveni Sugars, Sabitgarh. Impressed with the success stories and after watching the videos showcasing successful SSI cases from different parts of the country, he was motivated to try SSI in his field. He purchased and planted around 3400 seedlings of the CoS 0238 variety, raised through the bud chip method ,in the 4 Bighas (0.66 acres) of his land. He got around 10-12 tillers per clump during the initial stages and 8-10 millable canes during harvest. He did earthing up twice and provided 15 irrigations in his SSI plot (initially at an interval of 6-7 days and later at an interval of 15-20 days). He applied 100 kgs of DAP, 150 kgs of Urea and 50 kgs of MoP, 5 kgs Zinc and 8 kgs of Sulphur.

He along with his family members tried their best to get a good yield using the SSI method. He got an average yield of 340 quintals in 4 Bighas (0.66 acres) with 4 X 2 feet spacing whereas he got a yield of 220 quintals in 4 Bighas (0.66 acres) through the conventional method with a spacing of 2 feet x ½ feet in his adjacent field. In addition to this, the SSI cane was sold at a premium rate of Rs. 300 per quintal for seed purpose (the general rate of cane sold at the factory is Rs. 205 per quintal).

Chandrapal utilized the additional income he got from his SSI crop for the education of his children and other household expenditures. He also took the ratoon of the SSI crop and got an an average yield of 100 quintals per Bigha with the ratoon crop.

Happy with the results, Chandrapal raised 17500 seedlings in his own nursery with the technical support of AgSri team and material support from Triveni Sugars (Sabitgarh) and planted them in 2 acres (12 Bighas) of land.

When asked why some farmers have failed to get good results with SSI in the same location, Chandrapal says, "It calls for proper adoption and timely implementation of all the suggested practices such as early transplantation and above all confidence in the method." He adds, "SSI also calls for involvement of family members, if you want to get the best results." Chandrapal is now a model farmer for the nearby villagers.

He enlists the key advantages of SSI method experienced by him as, "This method saves seed cane, water and fertilizer and therefore the input costs are less. It is easy to take up intercultural operations and wider spacing allows for cultivation of intercrops. Adding to these, yields are substantially high for both plant as well as ratoon in comparison to the conventional planting methods."

He suggests that involvement of family is very important for SSI plantation and one should not rely only on hired labour for better results. He observes that farmers often inquire with him about the practices he followed to get such good yields with the SSI crop. He is proud to share his experiences with the AgSri team as well as other farmers.

He concludes by saying, "I want to thank the team, which conceptualized, designed and brought into practice the SSI method and I appeal to other farmers to adopt this method if they really want to get 'More with Less'."

"The neighboring farmers used to comment that I have gone mad and that I was breaking my head on this method. Now, the same farmers are approaching me with a request to buy canes raised through the SSI method for seed. Also those farmers who uprooted their SSI plants are repenting now seeing the exceptional crop stand of other ratoons."

The following table briefly compares the costs and income between the SSI and Conventional methods (4 Bighas each)

Particulars	SSI	Conventional
Land Cost	12000	12000
Seed Cost	3200	4800
Land Preparation	2000	2000
Transplantation	800	2400
Fertilizer Cost	3380	3380
Earthing up	2500	0
Propping up	0	2000
Irrigation	1500	2000
Harvesting	6000	10000
TOTAL COST	31380	38580
Output (Quantity & Rate)	340 quintal @ Rs. 300	240 quintal @ Rs. 205
Total Income	102000	49200
NET INCOME	70620	10620

Double Bonus

Rajkumar Singh

"This method is really good! It saves seed, requires less inputs. The cane is healthy and the yields are good."

Rajkumar Singh hails from Lodipurnayak village (Swar Block, Rampur District, Uttar Pradesh). He is 60 years old and has studied up to the 8th Standard. There are 8 members in his family. His main occupation is agriculture and he owns 5 acres of land of which about 2.5 acres is under cane cultivation. Rajkumar has long been keen to apply new and innovating practices in farming.

Rajkumar came to know about the SSI method from the Cane Development officer of Triveni Sugars, Milak Narainpur. Being a progressive farmer, he decided to purchase and plant 15000 seedlings of the CoS 88230 variety, raised through

the bud chip method in 1 ha (2.47 acres) of his land. He followed 4 x 2 feet spacing. Initially there were 6 tillers per plant of which 5 millable canes were obtained at the time of harvest. Though the number of millable canes were less, the girth of the cane was very good. He applied 150 kgs of NPK, 150 kgs of Urea, 20 kgs of growth promoter, "Sugarcane Special" and 20 kgs of micro-nutrients. He did earthing up once but could not do propping. Rajkumar is impressed with the SSI method as he got an average yield of 60 quintal per Bigha (360 quintals per acre) when compared to the 35-40 quintals (210 -240 quintals per acre) per Bigha through the conventional method. He says, "Initially the field was looking a little empty with the wider spacing, but after some time there was very good tillering and growth in the SSI plants."

Rajkumar utilized the extra income from his SSI harvest for his daughter's marriage. The performance of the ratoon crop was exceptionally good. His delight is easily discernible when Rajkumar asserts, "I got an harvest of 90 quintals per Bigha (540 quintals per acre) from the ratoon crop. The average number of millable canes per clump was 15 and the girth of the cane was almost double in comparison to the conventional method."

Last year Rajkumar could not raise his own seedlings due to certain prior family commitments. However, he is most willing to take up SSI in the seasons to come. When asked why other farmers have failed to get a better yield with SSI last year, he explains, "Initially, neither were the farmers familiar with the technology nor the factory staff supporting them were confident enough to guide them. This resulted in the farmers not taking up all the practices on time". Today, he is encouraging other farmers in his area to adopt SSI. He is confident that in the years to come, majority of the farmers will switch to SSI.

The following table briefly compares the costs and income between the SSI and Conventional methods (1.0 ha each)

Particulars	SSI	Conventional
Land Cost	5000	5000
Seed Cost	13000	15750
Land Preparation	6300	4200
Transplantation	3000	4500
Fertilizer Cost	3740	4480
Earthing up	2250	NO
Propping up	NO	NO
Irrigation	4800	6000
Harvesting	13500	11250
TOTAL COST	51590	51180
Output (Quantity & Rate)	900 quintals @ Rs. 210	750 quintals @ Rs. 210
Total Income	189000	157500
NET INCOME	137410	106320

Wider Acceptance

Nanhe Singh

Nanhe Singh hails from Kamalpuri village (Thakurdwara Block, Muradabad District) under the Triveni Sugars Factory, Raninangal. He is 48 years old and has completed Under-Graduation. There are 5 members in his family. His main occupation is agriculture and he has over 30 years of experience in cane cultivation. He along with his 5 brothers owns 25 acres of agriculture land, of which about 12 acres are under cane cultivation.

Initially Nanhe was approached by the development staff of Triveni Sugars in Raninangal to take up SSI planting in his field. He planted 8000 seedlings in 1 acre of land with 4 x 2 feet spacing of the CoS 88230 variety in the spring planting season, 2010. There were 8 tillers per clump in the beginning, of which 6 turned out to be millable canes at the time of harvest.

He irrigated his plot 8 times at an interval of 10-15 days. He applied 100 kgs of DAP, 100 kgs of Urea and 50 kgs of MoP in his field and did light and heavy earthing up. His SSI field yielded an average of 55 quintals per Bigha (330 quintals per acre) whereas with the conventional method, he got an average yield of 35 quintals per Bigha (210 quintals per acre).

"I am confident that many farmers will come forward to take up SSI as they have already witnessed the results, especially the performance of the SSI ratoon crop."

As can be seen the table, Nanhe was able to get almost 4 times income from the SSI crop when compared to the conventional planting. He purchased a tractor last year with this additional income. From the ratoon crop, he got an average yield of 90 quintals per Bigha (540 quintals per acre). He is growing Peppermint as intercrop with the ratoon crop. He also raised 2500 seedlings of the CoS 88230 variety for gap-filling in his field through the bud chip method with the technical support of AgSri and material support from Triveni.

He says, "This method saves good amount of seed material, fertilizers, water and at the same time significantly improves the yield in comparison to the general planting methods." However, he is of the view that more initial care is required in the case of bud chip method, at least untill the root-system develops.

He is confident that many farmers will come forward to adopt SSI as they have already witnessed the results, especially the performance of the SSI ratoon crop. He has already motivated one farmer, Shri Uday Raj of Baijnathpur village, to take up SSI last year. Many farmers have been approaching him after seeing his exceptional ratoon crop stand. He feels proud in sharing the details about the SSI methodology practiced. He says, "I would like to suggest the AgSri team that in order to reach out to other farmers, exposure visits of the farmers should be organized to the fields of successful SSI farmers."

"You can maintain the desired spacing very well with this method and therefore, cultivate a suitable intercrop as well; also it is quite easy to take up intercultural operations due to uniform spacing."

The following table briefly compares the costs and income between the SSI and Conventional methods (1.0 acre each)

Particulars	SSI	Conventional
Land Cost	12000	12000
Seed Cost	6000	6300
Land Preparation	3600	3600
Transplantation	1125	1350
Fertilizer Cost	1305	1493
Earthing up	2400	1200
Propping up	NO	NO
Irrigation	1050	1800
Harvesting	6600	5250
TOTAL COST	34080	32993
Output (Quantity & Rate)	330 quintals @ Rs. 235	210 quintals @ Rs. 210
Total Income	77550	44100
NET INCOME	43470	11107.5

Reaping More from SSI

Rampal Singh

"The ratoon crop of last year's SSI plant has been exceptionally good in my field and I am expecting, on an average, at least 1.5 times a yield of what I got with the crop last year."

Rampal Singh is from Chakmawana village (Swar Block, Rampur District, Uttar Pradesh). He is 60 years old and holds a Graduate Degree. There are 20 members in his family. His main source of income is agriculture and he has 47 years of farming experience. He owns 16 acres of land of which about 5.5. acres is under cane cultivation. He is also an active member of the Bhartiya Kisaan Sangh (BKS), which is a farmer's organization working for the upliftment of farmers in India. Last year, he purchased 5600 seedlings of the CoS 88230 variety from the factory

and planted them in 1 acre of land with 4 x 2 feet spacing. There were 8-10 tillers per clump initially, of which about 8 millable canes were obtained during the harvest. He applied 50 kgs DAP, 50 Kgs NPK, 150 kgs of Urea and 50 kgs of MoP in his plot and applied 10 irrigations at an interval of 8-10 days. He did earthing up once and propping once. He got an average yield of 60 quintals per Bigha (360 quintals per acre) with the SSI method.

As the table shows, there is a remarkable difference in the net income from the SSI and conventional methods. Rampal used the additional income from SSI for establishing a Junior College (a college for children who have passed their 10th class) in the area.

Rampal remarks very confidently, "So far among all the cane cultivation methods I have ever seen and experienced, SSI is the best". He validates his statement by adding, "In SSI, the yield is better, input requirements are less, crop quality is very good and above all, the performance of the ratoon crop is exceptional." This year he raised 2500 seedlings of the CoS 88230 variety with the technical support of the AgSri team and material support from Triveni Sugars, Milak Narainpur. Being an active member of the Kisaan Sangh, Rampal is doing his bit to motivate other farmers to adopt the SSI method of cane cultivation. Last year, he motivated 4 farmers to come forward to take up cane cultivation through SSI during the spring planting season. He suggests, "In order to let farmers know about SSI and the benefits from this method, farmer exchange programmes have to be organized wherein selected farmer of the area could be taken to Western and Southern India to personally see, understand and experience the methods which are already popular there."

"The wider spacing in SSI allowed me to grow Capsicum (Shimla Mirch) as an intercrop. I got 40 quintals of Capsicum in my cane field which I sold at the rate of Rs. 750 per quintal and got Rs. 30000 from the entire harvest. Additionally, the ratoon crop of the SSI plant has been exceptionally good in my field."

The following table briefly compares the costs and income between the SSI and Conventional methods (1.0 acre each)

Particulars	SSI	Conventional
Land Cost	15000	15000
Seed Cost	5200	5250
Land Preparation	3600	3600
Transplantation	900	1500
Fertilizer Cost	1970	1220
Earthing up	1200	NO
Propping up	900	900
Irrigation	2400	2880
Harvesting	5400	4500
TOTAL COST	36570	34850
Output (Quantity & Rate)	360 quintals @ Rs. 210	300 quintals @ Rs. 210
Income from Cane	75600	63000
Income from intercrop	30000	0
Total Income	105600	63000
NET INCOME	69030	28150

Double Impact

Shiv Kumar Tyagi

"I carried out all the practices suggested in this method on time which is why I could get a very good yield of 70 quintals per Bigha (420 quintals/acre), whereas in another part of my field, with the conventional method, I got an yield of 40 quintals per Bigha (240 quintals per acre)."

Shiv Kumar Tyagi hails from Bachitti village (Nagal Block) under Saharanpur District of Uttar Pradesh. He is 50 years old and is a graduate. There are 6 members in his family. His main occupation is agriculture and he has over 30 years of experience in cane cultivation. He owns 4 acres of land, of which about 3.5 acres is under cane cultivation.

Last year when approached by the factory staff of Triveni Sugars, Deoband, he purchased about 6600 seedlings of the CoS 88230 Variety and planted them in 4 Bighas (0.66 acres) of land with 4x2 feet spacing. There were 10 tillers, in the beginning, for each clump in his plot from which he got an average 7 millable canes at the time of harvesting. He used DAP, Urea, MoP, NPK in his

plot for a better yield and irrigated his plot 8 times at an interval of 15 days. Additionally, he did earthing up once and propping twice.

A delighted Shiv Kumar says, "Most of the SSI cane was sold for seed purpose at an average rate of Rs. 250 per quintal in comparison to the general rate of Rs. 205 per quintal. That is not the end to the success, from the ratoon of the bud chip plants, I was able to get 100 quintals per Bigha (600 quintal per acre).

Impressed with the results, Shiv Kumar raised his own nursery with the technical support of AgSri and material support from Triveni Sugars, Deoband. He raised 20000 seedlings of the CoS 8436 and CoJ 64 varieties, of which he planted about 9000 seedlings in his own field and he gave the rest to two farmers to initiate the SSI trials in their plots. Initially he reduced the spacing to 3 x 1.5 feet but later realized that this distance is not suitable to get the target yield especially after seeing the ratoon crop.

Shiv Kumar recounts the different benefits of SSI, "Less seed is consumed, it allows care of individual plants, there is less attack of pests and diseases. I am able to plant selected healthy seedlings. Further, there is less requirement of fertilizer and other inputs and greater ease in taking up intercultural operations after the planting. Harvesting of the SSI crop is also easy and one can get better seed canes through this method. Given my previous year's experience, I have understood that SSI calls for the involvement of my family in order to get better results."

He also asserts that if he continues to get the material and technical support, he will raise 5 lakh seedlings and will sell it to the other farmers. His suggestions to get much better results with SSI are, "Planting of bud chip seedlings using paired row method to prevent lodging, early planting of 25-30 days old seedlings (before 15th March) and application of bio-fertilizers."

"Because of wider and uniform spacing, I was able to grow Black Gram as an intercrop with sugarcane. I got a harvest of 240 kgs of Black Gram, which I sold at Rs. 30 per kg. I was able to earn an additional income of about Rs. 7000/- from the intercrop with a minimal investment of Rs. 240 for seeds."

The following table briefly compares the costs and income between the SSI and Conventional methods (4 Bighas each)

Particulars	SSI	Conventional
Land Cost	12000	12000
Seed Cost	6220	4100
Land Preparation	2000	2200
Transplantation	1200	1800
Fertilizer Cost	2200	2500
Earthing up	1200	NIL
Propping up	1200	1200
Irrigation	1600	2500
Harvesting	4000	2400
COST	31620	28700
Intercrop cost	240	NIL
TOTAL COST	31860	28700
Output (Quantity & Rate)	280 quintals @ Rs. 250	160 quintals @ Rs. 205
Income from Cane	70000	32800
Income from intercrop	7200	Nil
Total Income	77200	32800
NET INCOME	45340	4100

Nayagarh's Sustainable Sugarcane Initiative

Odisha is primarily an agrarian economy contributing nearly 30% to the Net State Domestic Product (NSDP) and engaging 73% of the work force in this sector. The total cultivable land is about 40% of the total geographical area and cultivation is comparatively more in the coastal districts. Sugarcane is the second most important cash crop in Odisha, in terms of area as well as in production and is mostly grown in irrigated areas. Odisha stands eighth in sugarcane production in India.

The livelihoods of small and marginal farmers of Odisha are today in jeopardy as the freshwater systems in the state have been fast depleting in addition to the droughts induced by climate change. Also, on a day to day basis, farmers are getting displaced in the state which has not yet become very visible. From 1981 to 2001, 15% of farmers have been uprooted from their farms and the support systems for the remaining farmers are fast eroding due to various reasons.

The transfer of modern technology model adopted has created perpetual external dependency and de-skilled the farmers by replacing their traditional knowledge base. This has gradually led to an increase in costs of cultivation due to externalization of inputs. This is the experience especially where access to fertilizers, pesticides and seeds is concerned and is combined with the dependency on institutional and private money lenders for credit – leading to serious indebtedness in the rural areas – all of which have put the farmers under major threat.

The Nayagarh District is well known in Odisha State for its sugar quality. Of the total number ofcultivators (72,588) – along with the 2,08,826 agricultural labourers – 90% of the farmers are small and marginal with fragmented land holdings. About 68% of lands are under the possession of these small and marginal farmers and 71% of the population depends upon agriculture.

Sugarcane cultivation has been long-practiced in the Nayagarh District and the crop is cultivated by farmers for their own economic stability and sustenance. The produce was and to a large extent continues to be utilized either for jaggery manufacture or as supply to kandasaries in the district. Given that Nayagarh is a traditional cane growing area, some of the agronomical practices being adopted have been observed to be primitive, requiring fine-tuning for better results. In any case, the farmers in this

Odisha

region are highly knowledgeable besides being amenable and receptive to suggestions for improvement and updating of their skills.

Responding to this willingness for exploring newer methods of cultivation, AgSri initiated SSI interventions in the Nayagarh District in 2010 with financial support from Solidaridad Network and in collaboration with NIRMAN, a NGO based at Biruda village of Nayagarh District. This intervention in fact is a continuation of the work undertaken by the WWF-ICRISAT Project team in 2009.

We present here some of the success stories of the small and marginal farmers who did not take up SSI on face value but actually adopted it on a trial basis as a comparative method to the conventional and:

- Gained enormous financial profits through selling their produce and making jaggery
- Ensured food security through supplementary nutrition for themselves and their families
- Increased their incomes thus augmenting their capacities to ensure better overall health and access to much needed education for their children and most importantly
- Became empowered to come out of the clutches of money lenders and
- Began saving for their overall social, economic and environmental security - for themselves and their families

It is no wonder then that not only the farmers mentioned here but all who gained from SSI have increased their acreage using this method and are gladly switching over from the conventional methods of cultivating sugarcane.

More Profits from Less Land

Sanjib Sahu

"My costs came down by Rs. 3000/- in SSI, I got a harvest of 21 tonnes and gained 3 times greater profit of Rs. 26930/-, all this from just 0.37 acre of land."

Sanjib Sahu a marginal farmer, lives with his 6 member family in the Tipura village of the Nayagarh District of Odisha. He is 34 years old and has been practicing agriculture as his primary source of family sustenance for the last 10 years.

Sanjib usually leases land to address his family's needs for more food. He had adopted cane cultivation on his own piece of land for additional cash flow and thanks to the interventions of NIRMAN, he discovered the benefits of SSI.

The 'low-cost farming' concept of sugarcane cultivation along with possibilities of more income through intercropping attracted him to adopt these practices in his 0.37 acres with 3' X 2' spacing using the CO 6907 variety. He tended his cane field with twice each of earthing up and propping and five time irrigating with an interval of 20 days. He found up to 10 tillers at the initial stage and 6 canes per clump later. Like the other SSI farmers, Sanjib's dependence on the market for chemicals reduced and like them, he is using more natural methods of pest control.

His total expenses on the 0.37 acre of SSI farm were Rs 13530/-, a relative decrease of about Rs 3000/- over the conventional method. He harvested a total of 21 tonnes of cane from the SSI land. His net income from SSI was Rs 26930/- in comparison to Rs 9690/- from the conventional and he was extremely satisfied with the 3 times greater profit.

The following table briefly compares the costs and income between the SSI and Conventional methods

Particulars	SSI	Conventional
Land rent	4500	4500
seeds	1000	4000
Land preparation	1000	1200
Transplantation	750	450
Fertilizer	500	1200
Earthing up	480	720
Propping	600	650
Irrigation	500	1000
Harvesting	4200	2600
Total cost of cultivation	13530	16320
Total income	40460	26010
Net income	26930	9690

In addition to a highly successful SSI yield, Sanjib and his family members were able to ensure access to more vegetables for 3 months due to the intercropping. This success with SSI has made Sanjib a motivator for the other farmers to take up the SSI method of sugarcane cultivation.

Speaking about the decrease in overall expenditure, Sanjib said, "Though my transplantation costs had comparatively increased as I had to hire labour for quick planting, my expenses for seed had decreased by one-fourth and my overall investments for hiring labour, fertilizer application, irrigation, propping, etc. were comparatively lower than the conventional approach."

Growing Organically

Hurshikesha Mohanty

Hurshikesha Mohanty lives in Biradi Sahi village of Bhatasahi Gram Panchayat in the Nayagarh District of Odisha.

His village is in a small fertile valley where the soil is alluvial, mixed red and black clay and is acidic. With the traditional knowledge he inherited from his ancestors and his mother, Hurshikesha has been growing paddy, pulses like black gram and green gram, sugarcane and 2-3 varieties of vegetables. Occasionally, he cultivated fruit and leafy vegetables but mostly depended on the market for vegetables.

During one of the awareness-cum-training camps held in 2010 by NIRMAN, he learned about the SSI approach in sugarcane cultivation, a new concept of growing sugarcane with possibilities of intercropping. Impressed with the preparation of various organic manures and pest repellant solutions, he was attracted to adopt SSI. Later, while on a field training/ demonstration program, he participated in an observation-cum-practice which provided him with both theoretical as well as practical knowledge on the different components of SSI.

Earlier he feared he was wasting his piece of land and was reluctant to take up land shaping and spacing and other practices. Post-training, he became convinced enough to adopt SSI on one acre with 3' X 2' spacing.

Speaking of the cash crop which he has been cultivating for the last 10 years, Hrishikesha says,

"Profit remained around Rs 6000/- after 10 months of hard and regular labour input and intensive care and I used to spend a lot, around Rs 78850/-. My expenditures remained high - seeds, fertilizer and hired labour for land preparation, transplantation, earthing up, etc. Yet, my harvest remained around 26 tonnes per acre with a profit of about Rs 6000/-."

Post-training, he took up SSI cultivation in one acre on trial basis. He used the cane variety Co 6907. From land preparation to bud chipping, nursery raising to transplantation and manure application, each step was guided by the NIRMAN staff. He transplanted the seedlings on 02/02/2010 and did earthing up 2 times and irrigated 16 times (due to drought situation in Kharif 2010). He found up to 13 tillers in the beginning and later 6 canes per clump.

He says his expenses on seed decreased to one-third and also, investments on hiring labour, fertilizer and irrigation were comparatively lower than the conventional approach. He applied Farm Yard Manure (FYM), vermi-compost, jeevamrut, liquid manure, etc. His estimated total expenses on one acre of SSI came to Rs 54625/-. But, his real pleasure was with the harvest of 63 tonnes cane from the one acre land which gained him Rs 108800/- after selling the jaggery. His harvest remains a 'record production' among the sugarcane farmers in his area. Expressing happiness with the net profit of Rs 54000/-, Hurshikesha says, "I gained Rs 23000/- just through intercropping. I used to work harder in addition to the huge investments in the previous method of cultivation, but this time with SSI, my expenses have decreased and my harvest is comparatively higher. I can now save for my children's future". This satisfaction is now reflected in the fact that he has adopted SSI in over 3 acres.

He plans to construct a vermicompost pit to serve the organic needs for his sugarcane, paddy and vegetable crops and also prepares a mixture of neem extract, garlic paste and kerosene for use as pest repellent. His dependence on the market for chemicals, pesticides, seeds, etc. has as such reduced to a large extent.

Hurshikesha says, "I have now become a resource for farmers in my area and I also visit nearby villages to motivate the farmers to take up SSI. My SSI field has become a demonstration plot for all the nearby villagers. Seeing my success with SSI, many farmers are shifting to this new method. There are 51 farmers at present doing SSI in my area".

"I gained Rs 23000/- just through intercropping and my real pleasure was with the harvest of 63 tonnes cane from just one acre land. I can now save for my children's future."

Most of the labour required in the production process is contributed by the farmer himself and by his family members. After adopting SSI, Hurshikesha does not spend as much time on the land and manages the farm efficiently, reaping economic, environmental and social benefits. The practice of SSI through organic farming has given him and his extended family of more than 15 members both food and economic security. Further, he generates a supplementary income from the sale of vegetables that are surplus after meeting the needs of his family.

Gaining More from Less

Nabakishore Das

"Unlike other SSI farmers, though I got marginally lesser tonnage in SSI when compared to the conventional method, I was not only able to lower the cost of production but was able to make a profit out of intercrops, this after fulfilling my family's needs."

Nabakishore Das is from the Khairapati village of Biruda Gram Panchayat from Nayagarh District of Odisha. He is 45 years old and lives with his family of 7 members. He owns 4.5 acres of cultivable land and he and his family depend solely on agriculture for sustenance. He has been in this profession of cane cultivation (on 2 acres) and jaggery extraction for the last 25 years Other than paddy and green gram, he was dependent on the market for other food resources such as vegetables, etc.

"I learnt about the 'More with Less' concept of sugarcane farming and was attracted to SSI after participating in an awareness and training camp conducted by NIRMAN. The organic approach of crop cultivation, as well as the know how of preparation of various organic manures and pest-repellant solutions convinced me to adopt SSI in 1.5 acres of my field with 3' X 2' spacing using the CO 6907 variety and parallel to 1.5 acres of conventional cane cultivation".

The following table briefly compares the costs and income between the SSI and Conventional methods

Particulars	SSI	Conventional
Land rent	18000	18000
Seeds	2400	24000
Land Preparation	4500	3600
Transplantation	1440	3000
Fertilizer	4100	4500
Earthing Up	2880	6000
Propping	1500	7500
Irrigation	NIL	NIL
Harvesting	18000	25000
Total cost of cultivation	52820	91600
Total income	100000	120000
Net income	47180	28400

He undertook earthing up 2 times, propping 3 times and irrigated a total of 7 times with an interval of 15 days. He got 12 tillers initially and later 6 canes per clump. His investments on land preparation, seed, fertilizer, irrigation, hiring labour for propping, transplantation etc. were comparatively lower than the conventional approach. Nabakishore who has reaped economic, environmental and social benefits from SSI, estimated his total expenses on 1.5 acres of SSI farm to be Rs 52820/- while that of the same area of conventional farm was Rs 91600/-. He harvested a total of 52 tonnes cane from the SSI field while the production from conventional was higher at about 60 tonnes. Nabakishore also made additional income of Rs.23000 from sale of sugarcane buds to farmers for raising seedlings. "My cane production from SSI was lower than conventional because of mismanagement, otherwise I would have gained more", he quotes. However, he is happy with the lower cost of production and profits from the intercrops.

"The members of my family and I undertook most of the labour required (including for irrigation) in the entire cultivation process. After adopting SSI, I did not spend much time on the land. I managed my field more efficiently and was also able to generate a supplementary income of Rs. 5200/- from the sale of vegetables and other products that were in surplus after meeting the needs of my family."

Comparative Success

"Having cultivated cane through SSI as well as conventional methods at the same time, I am very happy to have gained an increase in my net profit of around Rs. 12000/- due to SSI."

Sadhu Barad

Sadhu Barad, from Janhipada village of Nayagarh District in Odisha, is 38 years old and has been practicing agriculture as his primary source of family income since he was 15. Along with his 2 acres of land, he usually leases a little more land for cultivation. He has been cultivating cane for the last 10 years on over an acre of his own land.

After receiving the training on SSI methods from NIRMAN in 2009, Sadhu decided to adopt SSI in half an acre with 3' X 2' spacing.

Earlier he would get Rs 20000/- to Rs 25000/- for a 10 month cane crop and his expenditure was around Rs 32100/-, which was mainly spent on seeds, fertilizer and hired labour. The harvest remained around 42-45 tonnes per acre.

After he shifted to SSI (using the CO 6907 variety), he saved on labour cost. He got up to 7 tillers initially and later 5 canes per clump.

As he cultivated sugarcane on over half an acre in each - the conventional and SSI plot - he says, "I calculated my expenses on seed to have decreased

by as much as one-fifth and my investments on hiring labour for transplantation, fertilizer application, irrigation, propping etc., were comparatively lower than the conventional approach".

The following table briefly compares the costs and income between the SSI and Conventional methods

Particulars	SSI	Conventional
Land rent	6600	6600
Seeds	1000	5000
Land Preparation	950	1200
Transplantation	450	1800
Fertilizer	700	1000
Earthing Up	2100	1800
Propping	2100	2700
Irrigation	1500	1500
Harvesting	8500	10500
Total cost of cultivation	23900	32100
Total income	51150	46500
Net income	27250	14400

Sadhu has harvested a total of 26 tonnes cane from the SSI land as against 21 tonnes in the conventional field. His net income from SSI was Rs 27250/- in comparison to Rs 14400/- from the conventional. His harvest was a little less than the other SSI farmers in the region, but he expressed his happiness at obtaining an increase in profit of Rs 11350/-. In addition, he gained Rs 2700/- from the intercropping of okra and cow-pea. Moreover, the consumption of vegetables in his family also increased.

"I applied DAP, FYM and jeevamrut and my total expenses on 0.5 acre of SSI field came to Rs 23900/-, a decrease of Rs 6700/- when compared to the conventional method. My dependence on the market for chemicals, pesticides, seeds, etc. has reduced to a great extent and like my other fellow SSI farmers, I am also preparing my own mixture of neem extract, garlic paste and kerosene for use as pest repellent".

Sugarcane Production in Andhra Pradesh

Andhra Pradesh contributes to 1/8th of sugarcane production in the country and 1.96 million hectares of land in this region is under cane cultivation. Nizamabad, Medak, West Godavari, Vishakhapatnam and Chittoor contribute to 65% of the state production and Andhra Pradesh (AP) boasts of maximum number of private sector sugar companies in India along with Tamil Nadu and Karnataka.

The Andhra Pradesh sugar industry ranks 3rd in terms of recovery and 5th in terms of cane crushing in the country. As far as production capacity is concerned, Andhra Pradesh stands at 5th position in India. The sugar industry here can be classified into two parts - organized sector, including sugar mills and unorganized sector, including manufacturers of gur (jaggery) and khandsari. The unorganized sector is often referred to as the rural industry which in this region plays a major role in the quantity of production.

Sugarcane cultivation and the sugar industry in AP are facing serious social, economic and environmental challenges. The increasing costs of cultivation, poor yields and erratic climate conditions are making sugarcane cultivation economically unviable for farmers.

Promotion of SSI in AP

Medak, a backward district in Telangana region of AP falls under the semi-arid zone. Low rainfall and sometimes the failure of monsoon affect agriculture and dependent labourers. A majority of

Andhra Pradesh

the population in this region depend on agriculture. Rice and sugarcane are two important crops grown in this district.

AgSri has taken up the promotion of SSI among sugarcane farmers of the Zaheerabad Mandal of Medak district. We present the stories and experiences of two farmers from the Zaheerabad Mandal of the Medak District, who have taken up SSI. They are not only convinced about the method but are actively adopting it for their entire cane cultivation area.

In a newspaper article on August 13, 2011, the State Government of Andhra Pradesh announced 37 SSI promotion centers to be set up to improve production and reduce labour costs.

Business Line
Business Daily from THE HINDU group of publications
Thursday, May 07, 2009

Home Page - Sugar
Agri-Biz & Commodities - Cultivation

New method to grow sugarcane with less water

Icrisat develops it based on rice intensification system.

The method is expected to increase yields by at least 20 per cent and reduce water consumption by 30 per cent and chemical inputs by 25 per cent.

K.V. Kurmanath

Hyderabad, May 6 Now, the sugarcane industry can take to drip method for cultivating the water-intensive crop, reducing input costs and also get higher yields.

Agricultural scientists have taken a cue from the SRI (System of Rice Intensification) cultivation, which caught the imagination of progressive farmers as it consumed less water and yielded more, and applied the vital principles to the sugarcane industry.

Sustainableinitiative

The method is expected to increase yields by at least 20 per cent and reduce water consumption by 30 per cent and chemical inputs by 25 per cent.

Scientists at the International Crops Research Institute for the Semi-Arid Tropics (Icrisat) and World Wide Fund for Nature (WWF) joined hands to develop SSI, or Sustainable Sugarcane Initiative.

"We have just finished the first crop using the method in different climatic zones of the country. We tied up with farmers in Punjab, Uttar Pradesh, Andhra Pradesh, Karnataka and Orissa to test the method," Dr Biksham Gujja, Team Leader for the Icrisat-WWF project, told *Business Line*.

Using the method, farmers can use a small portion of cane (bud) as seed, resulting in significant savings.

Comparative Profits

Krishna

"I did late planting and got less yields when compared to the other SSI farmers, but I was still able to get a profit of Rs. 26,000/- with the SSI method, which is more than the conventional method."

Krishna is 35 years old and lives in the Hothi (K) village of Zaheerabad Mandal in the Medak District of AP. He studied up to Under-Graduation and his main occupation has been agriculture for the last 10 years.

He now owns 6 acres of land with a bore-well water facility. Having heard about the good results of the new SSI method, he underwent training in the SSI methodology. Based on what he learnt, Krishna decided to implement SSI on 1 acre of land on a trial basis. He used 5000 seedlings of Co 8014 and Co 86032 varieties per acre and planted them at a distance of 5 ft X 2 ft, using drip irrigation. He generally uses both organic (farmyard compost) and chemical fertilizers in his field and for the present fields, per acre, he used 2 tractor loads of compost, 2 quintals of vermi-compost, 2 bags of DAP, 2 bags of Urea and 2 bags of Potash. He used 10 kg of Phorate and 2 liters of chlorpyriphos for plant protection. Intercultural operations included weeding, earthing up and propping.

The tillering count recorded was 16 tillers per plant in the SSI field as compared to only about 4 to 5 tillers in the conventional field. In the SSI plot, he got about 12 millable canes per clump whereas only 2 to 3 millable canes per clump were found in the conventional field.

Speaking of the yields he got from both his fields, Krishna says, "Since I did late planting, the yields were relatively lower when compared to the SSI fields of the other farmers in my village. In the conventional field, I got 35 tonnes per acre whereas in SSI I got a relatively higher yield of about 48 tonnes per acre. I was still able to make a profit of Rs. 26,000/- with the SSI method, which is more than the conventional method."

"There are so many benefits from SSI – other than the seed rate being less, easy planting, less cultivation costs, not to mention additional tillers and a greater number of millable canes per clump. Krishna shares a couple of suggestions for greater and easier access to good quality seedlings – more number of farmers themselves should raise nurseries, the nursery must operate all over the year and more number of varieties should be used as seed material for raising the nurseries.

The following table briefly compares the costs and income between the SSI and Conventional methods

Particulars	SSI	Conventional
Land rent	4000	4000
Land preparation	2800	3500
Seed cost	5000	6000
Transplanting cost	600	1000
Fertilizers		
FYM	1500	1500
Chemical	1500	1500
Plant Protection	600	600
Intercultivation		
Earthing up	1000	2000
Propping	-	1000
Irrigation	5000	5000
Harvesting	16800	12250
Total cultivation cost	38800	38350
Gross Income/ crop value	96000	70000
Net profit per acre	57200	31650

Need for Reaching Out

Talari Manaiah

"Experts and resource persons should visit the field at least once every month or two months and guide us about the next steps, that is, until we get used to this innovative method completely"

Talari Manaiah is a sugarcane farmer from Huggelly from Zaheerabad Mandal of Medak District in AP. He is 40 years old and his main occupation has been agriculture for the last 15 years.

Manaiah has 8 acres of land with both open well and bore well water facility. He received training in the SSI methodology. After receiving training in SSI methodology, he undertook SSI in one acre on trail and followed the conventional method of cane planting in 3 acres.

Manaiah used 5000 seedlings of the Co 86032 variety and planted them at a distance of 5 ft X 2 ft. He adopted drip irrigation in his field. He generally uses both organic and chemical fertilizers and applies farm yard manure and green manure in his fields. He used 2 tractor loads of FYM, 2 bags of DAP, 4 bags of Urea and 4 bags of MoP per acre. He also used 2 litres of weedicide to control the weeds, 2 litres of chlorpyriphos and 1 litre of Roger for pest control.

The tillering count recorded was an average 12 tillers in the SSI field and about 7 tillers in the conventional field, per clump. The millable canes in the SSI plot was almost double the conventional field, recording 10 millable canes per hill in the SSI plot and only 5 millable canes in the conventional field. There was good growth all through the crop period and each cane weighed about 1.5 to 2.2 kg in the SSI field with an average cane height of about 9.5 feet. Where the conventional field yielded 38 tonnes of cane, the yield from the one acre of SSI field was 62 tonnes.

Manaiah says, "I am very glad to have learnt this new method of cane cultivation. Just as the other SSI farmers, I was able to cut down on my cultivation costs and the planting was also much easier. What makes me very satisfied as a farmer is that I was able to make almost double the profit from the SSI yield."

He further adds, "Nursery-raised bud chip sapplings should be made accessible to us farmers throughout the year and also every year."

The following table briefly compares the costs and income between the SSI and Conventional methods

Particulars	SSI	Conventional
Land rent	4000	4000
Land preparation	3800	4800
Seed cost	5000	6000
Transplanting cost	1000	-
Fertilizers	2600	3600
Plant Protection	1500	2000
Intercultivation		
Earthing up	1000	2000
Weeding	1600	4000
Propping	2000	4000
Irrigation	5000	6000
Harvesting	21700	13300
Total cultivation cost	49200	49700
Gross Income/ crop value	124000	76000
Net profit per acre	74800	26300

Initiating SSI: Regaining Productivity

Maharashtra is the second largest sugarcane state in India, both in area and production, after Uttar Pradesh. Maharashtra's sugar industry is one of the most notable and large-scale sugar manufacturing sectors in the country and has a 60-year old tradition. The State has been contributing nearly 40% of India's total sugar production. The lives of approximately 2.5 crore people in rural areas are dependent on this industry.

The establishment of sugar factories led to speedy development of basic amenities in its neighbourhood. It also led to the tradition of starting major educational complexes just next to the sugar factories. Many irrigation schemes as well as many schools, colleges, hospitals and other social welfare activities were implemented by these sugar factories. This led to social as well as educational development along with industrial progress of the State.

In 2011, sugar factories in the state have crushed 801 lakh metric tonnes of sugarcane, producing 904 lakh quintals of sugar, the highest in the history of the sugar industry in Maharashtra. The ministry has given permission for blending five per cent ethanol into diesel to sugar factories in the state.

Sugar industry in Maharashtra is highly popular in the cooperative sector, as farmers own a portion in the sugar factories. Dr. Vitthalrao Vikhe Patil established the first cooperative sugar factory in the Ahmednagar District and Dhananjayrao Gadgil, a senior expert in the cooperative sector; Vasantdada Patil and Tatyasaheb Kore, to name a few, have also been instrumental in the growth of the cooperative sector in Maharashtra. The cooperative sugar factories in the state have not just remained an industry, but they have become a movement and have led to the industrial development of the state and also gave Maharashtra many of its social and political leaders.

Sugarcane in this state is grown in drought-prone areas and it utilizes more than 60% of the total water available for irrigation in the state. This has already exerted a considerable strain on the

Maharashtra

limited water resources. The demand for water for sugarcane irrigation has led to an increase in the number of wells and had resulted in the decrease of water table. The excess use of water through flood irrigation combined with higher doses of chemical fertilizers has also resulted in degradation of land resources in most parts of the state.

The heavy requirement of water for sugarcane growing is one of the major question marks hanging over any extension of areas to sugarcane development. The allocation of such vast quantities of a

precious resource to what is actually a privileged crop has had serious negative consequences for agriculture as a whole. This has meant the development of expensive artificial irrigation projects. 60% of the water from these projects is now used to irrigate 500,000 hectares of sugarcane-growing land (which amounts to 3% of the cropped area in the state). This means that for other crops, the non-sugarcane farmers can hope to get little or no water at all. In addition, the major use of electricity goes for sugarcane irrigation.

Huge interest in the SSI methods was generated following extensive media advocacy by Agrowon, a Marathi agriculture daily of the Sakal group. Following a nine day series on the SSI practices in 2009, there was unprecedented response from various stakeholders to the news articles from across the state, The newspaper next published and distributed 80,000 Marathi-language booklets. This booklet was a translation of the English SSI manual released in 2009. This spurred further interest in SSI in Maharashtra.

SSI in Latur District

Latur is a fast growing agricultural regions in Maharashtra as Manjara river basin provides support for cultivation of diverse crops. Latur area has about 70,000 ha of sugarcane and it is expanding due to recent high price of cane coupled with good monsoon. Moreover, Latur is emerging as an important area of sugar cultivation in Marathwada region despite challenges of availability of subsurface water and fluctuating international prices. Currently 20000 hectares of land is under sugarcane cultivation with sugar mills operating both under cooperatives mechanism as well as private entities. There is a major potential to improve the quality and quantity of the sugarcane production in order to run the mills profitably while farmers get assured income.

There are five major cooperatives in the Latur District with more than 25000 farmers as members, including Manjra, Vikas and Rena cooperatives which together constitute more than 15000 farmers who are cultivating sugarcane. There are three private companies who network with sugarcane growers in the region.

In April 2011, the AgSri team held a workshop in Latur. This generated huge awareness and interest among the sugarcane farmers as well as the industry and government agencies. Some of the

farmers from the operational area of Manjara KVK, senior scientists, staff from Manjara KVK, representatives from sugarcane cooperatives as well as private mills, NABARD officials, state agricultural officers and the Media attended this workshop. The AgSri team also met the District Collector of Latur and the Dean of the Latur Agricultural University and visited farmers' fields and the sugarcane research laboratories of the Agri-Buisness School, Latur. In response to the overwhelming support from the farmers and sugarcane cooperatives in the District, AgSri and KVK (Latur) partnered together to build awareness and promote SSI in Latur. This collaboration introduced SSI to five hundred farmers under five cooperatives including private mills.

KVK Latur in Maharashtra is one of the 550 Krishi Vigyan Kendras (or Research Field Testing and Training Stations) set up by the Government of India nationwide. KVKs provide extensions services to farmers, as well as context-driven testing on new agriculture technologies which, when fine tuned for the local crops and climate, is introduced to local farmers.

AgSri, Sugarcane Farmers' Cooperatives and KVK Latur have come together on a common platform for taking forward SSI in the District.

Research and Experience Benefits

Shinde Shrikrishna

"It is important for me to get into the thick of how and why certain practices work and some do not", defines this farmer who experiments not only to increase the productivity and profits for his cane fields and himself, but strives for all the sugarcane farmers in his region to adopt the SSI practices.

Shinde Shrikrishna, his wife and 2 children live in the Suguoan village of Latur District, Maharashtra. He is 40 years old and owns 10 acres of cultivable land which is completely irrigated. For irrigation, he has 3 bores and one open well.

A diploma holder in Mechanical Engineering, Shinde was working as an instructor at a local ITI (Industrial Training Institute). He went back to agriculture 11 years back, when his father passed away.

From the beginning, the family has been cultivating sugarcane in their 11 acres of land.

Though Shinde lost Rs. 2000 initially while trying to raise bud chip seedlings in the tray, later he acquired the expertise. He raises seedlings for his own farm and has helped others with nearly 4 lakh seedlings so far. He was also instrumental in establishing 10 new nurseries.

While his favorite practice in SSI is surely the nursery raising of bud chips, Shinde strongly feels that the next best practice of SSI is the wider spacing. "It supports aeration and enhances the sunlight penetration to the plant leading to very good growth, tillering and good cane quality. I assure everyone who adopts all

the practices under SSI that it will benefit the farmers and industry immensely."

Though Shinde did not grow any intercrops, he was still able to get a harvest of 78 tonnes/acre and made a net profit of Rs. 20000 from his SSI crop from 1 acre. This highly satisfying result made Shinde expand his SSI cultivation of sugarcane from just 1 acre to 4 acres next season.

"If this technology has to scale, we want on-farm training and services support. Because, if this technology fails even with one farmer, for next 50 kms no other farmer will dare to adopt this technology and this will be the failure of the intervention and not the technology. Also, we want the seedlings to be made available at a cheaper price. Instead of the subsidy on fertilizers, the Government, Cooperatives and Industry could support the farmers with subsidy for buying nursery raised seedlings."

In the Forefront of Research and Implementation

Sugarcane cultivation and sugar industry in Tamil Nadu, like other states in India, are facing serious economic and environmental challenges. The increasing costs of cultivation and poor yields are making sugarcane cultivation economically unviable for farmers. Environmental issues like declining water table and degradation of soil pose other major threats to cane farmers and the ecosystem.

Sugarcane in Tamil Nadu is cultivated in an area of 2.5 to 3.0 lakh ha (irrigated) comprising about 2% of the total cultivable area in the state and is grown by about 5 lakh farmers.

There are 41 sugar mills in Tamil Nadu comprising 16 sugar mills in the cooperative sector, 3 sugar mills in public sector and 22 sugar mills in private sector. Presently, 38 sugar mills are functioning while 3 mills are not. In the year 2007-08, the quantity of cane crushed was 22.9 million tonnes.

Sugarcane Breeding Institute (SBI) and Tamil Nadu Agricultural University (TNAU) are two main institutions in Tamil Nadu which have done extensive research and development on sugarcane.

Following the start of SSI in Tamil Nadu, the World Bank supported TNAU-IAMWARM project collaborated with the WWF-ICRISAT project to scale up the SSI methods across the state, to reach more farmers and industry.

First National Seminar on SSI

Following massive promotion of SSI in the state, large numbers of farmers are now growing sugarcane through the SSI method.

AgSri in collaboration with National Sugarcane Breeding Institute (SBI), Coimbatore and National Resources Management Center of NABARD, Kolkata organized the first National Seminar on Sustainable Sugarcane Initiative (SSI) (www.agsri.com/media_releases.html) in August 2011. The venue of the SSI seminar was the Tamil Nadu Agricultural University. The focus of the seminar

Tamil Nadu

was to promote a dialogue on 'More with Less' approaches in agriculture in general and sugarcane production in particular.

The main objectives of the National Seminar were:

- To share and learn the experiences of SSI methodologies
- To identify the constraints and opportunities based on practical experiences in adopting SSI
- Identification of specific training needs particularly to the farmers and the Cane Development staff in the sugar mills
- To discuss required strategy, resources and institutional mechanism for scaling up of SSI activities to all sugarcane growing areas in the country
- To provide a common platform for different stakeholders for sharing experiences and evolving the best practices of SSI

THE HINDU

Online edition of India's National Newspaper
Saturday, Apr 17, 2010
ePaper | Mobile/PDA Version

Sustainable Sugarcane Initiative launched for increased productivity

Staff Reporter

— Photo: S. Siva Saravanan

COIMBATORE: The System of Rice Intensification (SRI) greatly reduces water requirement and ensures higher yield, less chaff and better resistance to lodging. Its success is tremendous and has been adopted in 19 lakh hectares of the State. Motivated by its success, the Sustainable Sugarcane Initiative (SSI) has been designed, P. Subbian, Registrar, Tamil Nadu Agricultural University, said here on Friday.

He was launching the SSI, an initiative of the International Crop Research Institute for Semi-Arid Tropics – Worldwide Fund for Nature (ICRISAT-WWF) Project, in the TN-IAMWARM project at the university.

THE HINDU • THURSDAY, AUGUST 25, 2011

Tamil Nadu to take up sustainable sugarcane initiative on 10,000 ha

Successful agricultural practices should be documented

Staff Reporter

COIMBATORE: Tamil Nadu will launch the sustainable sugarcane initiative on 10,000 ha, said R. Gnanaoli, Deputy Director, Agriculture, Government of Tamil Nadu, at the 'First National Seminar on Sustainable Sugarcane Initiative (SSI)', organised at the Tamil Nadu Agricultural University here on Wednesday.

The government had just come to know of the technology, which aimed at improving the production while reducing water consumption. Adoption of such a technology would be of great benefit to the State, which stood first in sugarcane production.

Farmers in the State cultivated the crop on 3.5 lakh ha and harvested around 325 lakh metric tonnes. The State had stood first in the country for the last 10 years. But that did not mean that all was well with regard to sugarcane cultivation.

The yield in five sugarcane cultivation districts was around 100 tonnes a hectare but in other districts it was only around 40 tonnes. This was a huge disparity, which the State Government was trying to address.

Mr. Gnanaoli also said that the government introducing the SSI was in keeping with Chief Minister Jayalalithaa's announcement to extend the SSI to one lakh ha in the next five years. The government would spend close to 25 crore to implement the initiative. He informed the gathering

ON INCREASING YIELD: *S.K. Mitra (centre), Executive Director, National Bank for Agriculture and Rural Development, releasing a book at a seminar on 'Sustainable Sugarcane Initiative' organised by NABARD, Sugarcane Breeding Institute and AgSri at Tamil Nadu Agricultural University in Coimbatore on Wednesday. Chairperson of AgSri, Hyderabad, Biksham Gujja (right) and Director of the institute Vijayan Nair (left) are in the picture.* — PHOTO: M. PERIASAMY

Under the Green Revolution, the scientists told farmers what to do. Now it was time for them to interact with the farmers and also receive

huge because they would have to increase sugarcane production without increasing the area, said Vijayan Nair, Director, Sugarcane

million tonnes in 2004-05 to 28 million tonnes 2007. The cycle would repeat itself in the future as well.

He also touched upon the

action plan for scaling up SSI, etc. would lead to increase in sugarcane production, said Biksham Gujja, Chairperson, AgSri, Hyderabad.

The seminar was attended by farmers from different states of India, research Institutes, representatives from sugar factories, food industry, government agencies, sugarcane commissioners, media and other stakeholders to strengthen efforts for mainstreaming SSI in sugarcane production.

SSI in the State

The farmers practicing the SSI methods in their fields found:

- The SSI crop was very healthy with an average of 18 tillers per clump
- The germination percentage was above 90% in trays
- The saving of water was almost 40% due to wider spacing and due to limited supply of water to the seedlings
- The intercrops help the farmers to recover investment on cane

Taking forward the implementation of scaling up of SSI, while presenting the Revised Budget for 2011-2012 on 4 August 2011 to the Legislative Assembly, Thiru O. Panneerselvam, Minister for Finance, Government of Tamil Nadu stressed on the importance of adopting newer technologies like SRI and SSI:

This Government will focus on improving the productivity of major crops like paddy, sugarcane, cotton, pulses and oil seeds and extend the area under cultivation of high value commercial and horticultural crops like vegetables, flowers and fruits. Front end technological interventions like System of Rice Intensification (SRI), Sustainable Sugarcane Initiatives (SSI) in sugarcane; ... Similarly, 14,000 acres of sugarcane will be brought under SSI cultivation this year. We intend to increase it to 2.45 lakh acres in the next two to three years to increase the productivity of sugarcane.

(From http://www.assembly.tn.gov.in/ budget / Revised_ Budget_ Speech_e_2011_2012.pdf)

From SRI to SSI

Baskaran

Baskaran is an SRI farmer from Thumbal village in the Salem district of Tamil Nadu. He is the president of SRI Farmers' Association located in Thumbal and is well known in the SRI circle of Tamil Nadu, as his success story has been covered widely by media. A sincere follower of SRI system of rice cultivation, he is identified for his innovative nature in trying new methods of agriculture. He adopted SSI practices in 2010 in his cane fields.

After visiting his field, the AGM of the development bank NABARD offered to sponsor an awareness programme on SSI. The programme was conducted at Thumbal in the Salem District with the support of the SRI Farmers' Association. Also various officers from academic institutions like TNAU visited his field and appreciated his system of cane cultivation.

Presently Baskaran is busy disseminating the SSI method to neighboring farmers. Farmers from Cuddalore and Dharmapuri districts learnt the methods from him which they adopted in their fields.

"I am sure that the SSI method will get more popular in the coming years, not only in my district, but all over Tamil Nadu. Like SRI, this will also improve the crop yields through sustainable use of natural resources and the principles of more with less."

Punjab's "Budding" Interventions

The climate of Punjab is suitable for optimum growth of sugarcane crop only during the period of July-October, after which there is a drop in temperature, inducing sugar accumulation and ripening. Sugarcane, a cash crop, is an alternative to the widely adopted wheat-paddy cropping system. The development of improved varieties and new crop production methods plus improved plant protection and cane processing technologies have played a vital role in promoting sugarcane cultivation and expansion of the sugar industry in Punjab.

During 1965-66, there were 5 sugar mills in Punjab state with crushing capacity of 4,950 tonnes of cane daily (TCD). At present, 23 sugar mills are working, of which 16 are in the cooperative sector and 7 in the private sector. Seven sugar mills in the cooperative sector had to be closed from 1995-96, due to shortage of sugarcane. The total crushing capacity of the 23 sugar mills is 57,016 TCD.

At least 2.30 lakh ha area is required for cost-effective running of these mills but at present only 90,000 ha of area is under sugarcane. The total area under sugarcane cultivation declined in 2009-10 to 63,000 ha, from 81,000 ha the year before, with an average productivity of 59.89 tonnes per hectare. The total cane crushed by the mills during 2009-10 was 175,000 tonnes compared to 250,000 tonnes the year before.

The recovery rate from Punjab's sugarcane is about 9.5% compared to 12-13% in Southern India and this is a cause of major concern for mill owners and another main reason for the mills' lower output. Productivity in the sugar sector is currently dismal and the reasons for this are as follows:

Punjab

- Farmers are sourcing poor quality seed cane from other farmers, which results in low cane production
- Rising costs of cultivation discourage innovation
- Labour shortage
- Improper cultivation practices, like the usage of poor quality setts
- High sett rate per hectare amounting to significant component of total cost of production
- Inappropriate water and nutrient management measures
- Unbalanced use of fertilizer

To increase profitability and net output of the sector, there is a need to increase on-farm production, productivity of cane and increase the recovery rate of sugar in mills. Also, there is a need to improve the efficiency and to reduce the cost of cultivation by adopting the latest technologies; rapid multiplication and distribution of the disease-free seed of new, improved varieties of sugarcane; and to safeguard the interests of cane growers and the sugar industry overall by saving cane that can be used for seed purposes.

The summary of comparison between Conventional and SSI methods of cultivation is as follows:

Particulars	Conventional	SSI
Seeds/sets	20,000 sets with 3 buds each	13,750 plants from
Single buds	3800	4800
Weight of cane needed	87-100 qtl/ha	1.50-2.0 qtl/ha
Nursery preparation	No	Yes
Measures to maintain uniformity in plants	No grading	Grading is done during nursery
Fertilizer Urea	130 kg	225 kg
DAP	As per soil test report No	50 kg
MoP		20 kg
Planting	Sets in furrow	Plants in furrow
Spacing	1.5 x2.5 ft (25 per 100m2)	4x2ft (12.5 per 100m2)
Water requirement	More (flooding irrigation)	Less (furrow system)
Mortality among plants	High	Low
No. of tillers per plant	5-10 (125-250 per 100m2)	10-25 (125-312 per 100m2)
No. of millable canes	4-5	10-15
Accessibility to air and sunlight	Low	High
Scope for intercrop	Less	More

Benefits of SSI as observed by farmers:

- Less seed is required (up to 95% reduction), lowering the cost of production significantly
- Better germination percentage in seed material using bud chip nursery process
- Reduced plant mortality rate in the main field
- Better and less costly seed treatment is possible
- Easier transport of young seedlings to longer distances
- Intercultural operations can be carried out easily with a power weeder due to wider spacing
- More accessibility for the plants to air and sunlight, which results in stronger root systems and more millable cane
- Reduction in lodging due to earthing up and better root growth
- Increase in length and weight of individual canes (1.5-2.5 kg each)
- Higher number of millable canes (137,500 to 150,000 canes per hectare)
- Optimum utilization of land and other farm resources by intercropping
- Suitable for rapid multiplication of seed
- Better ratoon crop

Summary Data

Total area under sugarcane cultivation : 90,000 ha
Area under ratoon crop : 33,578 ha
Area under planted crop : 56,422 ha

Particulars	Conventional practice	SSI Practice	Saving(%)
Current rate of seed/ha (kg)	8,700-10,000	165-200	95
Cost of seed/ha (Rs.)	26,000-30,000	12,500	56
Seed requirement for state (tonnes)	564,220	84,633	85
Seed cost for state (Rs. crores)	169.26	25.38	85
Area for seed requirement (ha)	9,466	1,410	85

Constraints

Farmers have also identified some difficulties they encountered when using SSI methods at this stage of its development:

- Unavailability of cocopith and plastic trays at local level; there is no local supply network in place to meet the demand for such materials.
- SSI needs more attention as farmers should not just plant and ignore their crop; the increased attention pays off in higher yield, but farmers need to adjust their expectations and practices accordingly.
- Psychology and mind set: the idea of reducing inputs and getting more output is quite counter-intuitive, so there are mental adjustments that needs to be made.

Dr. Amrik Singh,
Deputy Director, ATMA,
Gurdaspur, Punjab

‘Gud’ Time in Karnataka

Karnataka is another major sugarcane growing and producing state in India. The state was the second nationwide to establish a sugar factory – the Mysore Sugar Company Ltd., Mandya being the first Sugar Factory. The India Sugars & Refineries Ltd., Hospet in Bellary was established between 1933-35 in the public sector. Karnataka has an additional claim to fame: the Kampli Co-op. Sugar Factory Ltd., in the Bellary District was established in the year 1958-59 and was the nation's first cooperative mill. Over the next few decades, the highly conducive agro-climatic conditions for sugarcane cultivation resulted in increased sugarcane production in the state and the development of greater number of sugar factories.

At present, about 41 factories are operational in the private and public sectors combined. Of this, as many as 18 are run as Cooperatives. As a result of the high productivity, around 90% of factories have work annually. During 2007-08, the state produced 387.00 lakh tonnes of cane in an area of 4.66 lakh ha, with an average productivity of 80 tonnes/ha.

The sugar industry in Karnataka can be divided into 2 groups: the unorganized sector which is comprised of producers of traditional sweeteners such as gur and khandsari and the organized sector which consists of the sugar mills. The manufacture of khandsari and gur are considered to be rural industry. Large quantities of Khandsari and gur are consumed mostly by the rural people as sources of nutrition and also as sweeteners.

Karnataka

The sugarcane growers of the state are facing myriad problems such as lack of good quality seeds, uncontrolled or faulty methods of irrigation, high cost of cultivation, soil salinity/alkalinity, labour scarcity, difficulty in addressing the problems of pests and diseases and inadequate information about modern and scientific farm management practices.

The state government in an attempt to boost Karnataka Sugar Industry has set up the Karnataka Sugar Institute (KSI). The state has also initiated, the first of its kind in the country, a jaggery park at Mandya.

About 25 farmers have taken up the Sustainable Sugarcane Initiative (SSI) with financial assistance from NABARD in the Belgaum District in 2011. Supporting the efforts to promote and scale up SSI practices in the state of Karnataka, AgSri is providing training and field visits for the farmers and NGOs from this State.

SSI "internets" its way to Cuba

Dr. Rena S. Perez

Dr. Perez graduated from Cornell University in 1958 with a B.S. degree in agriculture and a major in entomology. She has lived and worked in Cuba with her Cuban husband since 1959. She worked in the Institute of Animal Science in Havana, 1964-70 while getting a PhD in poultry science. For the next 20 years, she worked in pig production and following that until her formal retirement in 2000, she worked in animal production in the Ministry of Sugar. When she learned about SRI in that year, she began promoting the new methodology through the sugar cooperatives with which she had previously worked. For the past decade, she has served as volunteer coordinator of SRI activities in Cuba and is now trying to get the Sustainable Sugarcane Initiative (SSI) introduced and evaluated in Cuba.

Several months ago, I received from Dr. Norman Uphoff of Cornell University, an email message with an accompanying file labeled with the letters SSI. I thought it a mistake that he had meant to write SRI, not SSI, certainly an easily made keyboard mistake. The email explained how a friend in India, Dr. Biksham Gujja, an ecologist and formerly a senior advisor with the Worldwide Fund for Nature in Switzerland, was working with something called 'the Sustainable Sugarcane Initiative' (SSI).

Dr. Gujja had given leadership for SRI dissemination in India from 2004 on after sponsoring three years of scientific evaluation of SRI by leading research institutions in India. After some SRI farmers started extrapolating and adapting the new ideas to improve the production of sugarcane, he launched SSI with support from WWF and an international agricultural research center based in Hyderabad, India (the International Crop Research Institute for the Semi-Arid Topics, ICRISAT).

I read the email immediately, being struck by the report that a first on-farm trial in India had increased the farmer's cane yield from 35 to 110 t/ha. Then I hurriedly opened the file to find a training manual on Sustainable Sugarcane Initiative.

Having worked with 156 sugar mills in the cane sector (advising on animal production, as an animal nutritionist) for 17 of the 52 years that I have lived in Cuba, I couldn't believe my eyes. Cuba, which at one time had produced almost 10% of the world's production of sucrose from sugarcane, between 7 and 8 million tonnes is at present barely able to reach 1 million tonnes, from harvesting a national sugarcane crop that averages only 37 t/ha. It broke my heart.

Location map

Two months old SSI fields

I was reminded of a 1986 visit to the "La Romana" sugar mill in the Dominican Republic where I saw the incredible results from pig-fattening based on free-choice sugar cane juice and a restricted daily amount of soybean meal. From this visit, I worked with the CPA "Camillo Cienfuegos" in Bahia Honda, Cuba, to set up a similar system there.

In 2000 when Dr. Uphoff provided us with information on the methodology on SRI (now known as SICA in Cuba and elsewhere in Latin America), this same cane coop, with 16 ha dedicated to rice to feed its workers, tried out the new methods and these quickly caught on, almost doubling the CPA's yield. I will never forget that they had to double the size of their concrete rice drying area because of the yield increase with SRI.

The day after I received the file related to SSI, I forwarded it to this same coop. However, no one ever acknowledged receipt. It's the way things often happen in Cuba. That was more than three months ago.

I was scheduled to give a talk on rice on SRI in a research center at Los Palacios, in Pinar del Rio. When I arrived and didn't see many cars, so I thought: maybe I made a mistake, wrong place? Wrong day? I drove across the Sierra de los Organos (mountains) to Bahia Honda on the north coast with the objective of visiting the "Camilo Cienfuegos" cane coop, to leave them a copy of the SSI document that I had on my flash stick (Since they hadn't acknowledged having received the file, quite possibly too large for the island's digital setup, I assumed they never had received it).

When I entered the coop head office, I asked if they had ever received the file on SSI which I sent. Blanco, the Chief Economist answered: "But the first plants have been in the ground already for two months. Let's go see them!"

Rena Perez
Havana 11/11

SSI Nursery

AgSri

#24, Rd No.76, Jubilee Hills,
Hyderabad-33, Andhra Pradesh, India.
E-mail: info@agsri.com, Website: www.agsri.com

Natural Resource Management Center
NRMC, Kolkata

NABARD