

TRAINING AND SUPPORT TO

**MASTER FARMERS  
IN  
SUGARCANE CULTIVATION**

**LAKHIMPUR KHERI, UTTAR PRADESH**

A Project conducted under the aegis of the

NABARD's

'Master Farmers Programme'

**MANAVODAYA**

**INSTITUTE OF PARTICIPATORY DEVELOPMENT**

**LUCKNOW**

## **PREFACE**

The concept of Master Farmer fits well the working strategy of Manavodaya to enable a process of social and economic development through local facilitators. Facilitation is an art of motivating and sharing information with the local population with the purpose of organizing collective reflection and action on priorities set by people themselves.

This is not an easy task as most village inhabitants have become accustomed to provision of goods and services from the government free of charge. The shift in mind set from simply receiving benefits to working together for social and economic change can take years of intensive discussions in small and big groups. However with proper training and guidance, facilitators can pick up the art of communication with good results.

In this project, the principal challenge for Manavodaya was to build the capacity of Master Farmers to act as facilitators of change in their villages. Accordingly the training and support programme at Manavodaya were organized with the intention of not just imparting technical information and skills needed for enhanced agriculture yields but also for enabling them to develop a vision and attitude necessary for the purpose of collective reflection and action at local level. This necessitated a very prudent selection of master farmers for carrying this programme as per the goals mentioned .

The master farmers were also assisted in developing skills in communication with field level guidance where necessary. This is illustrated in the section dealing with communication in the report. It must be pointed out that efforts to build such skills and attitudes were as important as technical knowledge imparted through the famous Indian Institute of Sugarcane Research, Lucknow. We are grateful that Dr. M.R. Singh from the institute took special interest and pains to share his wide experience in the subject with the master farmers.

As always, NABARD has been the beacon light for promotion of new knowledge and organizational development at village level in an era where development agencies continue to follow the traditional paradigm of offering goods and services at little or no cost. In the state of Uttar Pradesh where feudal and caste equations continue to dominate the minds of people, there is need for still greater stress on awareness raising and organizational building at local level. We are grateful that the NABARD team led by Shri Partha Mitra, DDM Kheri, provided full support for the purpose.

Dr. Amla Vidyarthi  
Varun Vidyarthi  
Coordinators

## **1.0 INTRODUCTION**

Sugarcane is the principal cash crop of farmers of Lakhimpur KHERI, a district known for intensive cultivation of the crop in the country. The low and stagnant productivity of sugarcane remains one of the biggest stumbling blocks to economic progress in the district. As compared to an average yield of 100 tonnes per hectare in states like Tamil Nadu, an all-India average of 80 tonnes a hectare, UP averages close to 55 tonnes per hectare \*. A survey of farmers confirms that the yields of small and marginal farmers in Lakhimpur vary between 50 tonnes per hectare to 62.5 tonnes per hectare ( Table 1 in Annexure).

Besides, as noted by an economist , “The challenge for UP is particularly stiff as the average land holding is less than a hectare; therefore farmers have to be reached in multitudes to make any significant impact.”

### **The Master Farmers Project**

The methodology and objectives of the Master Farmers project of NABARD is well suited to meet the needs of the sugarcane farmers of Lakhimpur. As envisioned in the programme, Farmers' Clubs can play a pivotal role to improve farmers' income by facilitating information dissemination to farming community to access improved technologies, timely credit and strong market linkages through trained Master Farmers. To reach out to large number of farmers, the strategy would be to develop Master Farmers to act as mini extension workers to farming community on an ongoing basis in partnership with resource institutions. The long term objective would be to ensure that each Farmers' Club has trained Master Farmers conversant in all the three aspects of technology, credit and marketing to make the services accessible to farming community.

This can facilitate awareness building among farmers on lead crops. It is envisaged that around 20 members/ progressive farmers would be imparted field level

training by each Master Farmer. The multiplier effect would result in developing 20 trained farmers as a second tier to the Master Farmers with each Farmer' Club.

The project started in October 2011 and went through two agriculture cycles of sugarcane planting in the years 2012 and 2013 respectively. Manavodaya was fortunate to enlist the support of scientists from the Indian Institute of Sugarcane Research in the project who provided important technical guidance all through the project that also included visits to the institute during the training programmes. The methodology adopted for the project and other details of the programme are given ahead.

## **2.0 PROGRAMME DETAILS AND METHODOLOGY**

- a. Selection of Master Farmers :** Twenty farmers clubs in the district considered to be active were selected for the project. The clubs selected were promoted by local NGOs, institutions like sugar mills and those promoted by local banks.
- b. Orientation meeting at Lakhimpur KHERI :** An initial orientation meeting was held at Lakhimpur KHERI where the farmers selected were registered and the project details were discussed in the presence of the DDM and the General Manager District Cooperative Bank, KHERI
- c. Enlisting the support of Indian Institute of Sugarcane Research (IISR), a unit of CSIR, Government of India:** Several meetings were held with the scientists of IISR for finalization of training content, methodology and participation of specialists in the forthcoming training programmes on improved sugarcane cultivation.
- d. Training of the Master farmers at Manavodaya training center, Lucknow :** Three residential training programmes were held at Manavodaya Training Center, Lucknow :

The first programme was the inauguration by Shri N. Krishnan, Chief General Manager, NABARD. The highlight of the programme was the presentation on

technical aspects of sugarcane cultivation by IISR sugarcane scientists and a field visit to the IISR.



*CGM of NABARD at the inaugural training programme at Manavodaya*

## **LEARNINGS FROM THE FIRST TRAINING AT MANAVODAYA**

### **Changed cultivation techniques**

The Indian Institute of Sugarcane Research (IISR) has been promoting the “Trench method” and the “Pit Cultivation method” for effective use of water and fertilizer in sugarcane cultivation. Both these methods are a significant improvement over the traditional method of sowing whereby water and fertilizer is provided in trenches or pits rather than the entire field leading to both reduced use of the inputs and their better absorption in the crop.



### ***Demonstration of new techniques at IISR***

#### **DISTANCE BETWEEN ROWS**

Traditionally, most farmers have been planting sugarcane in rows with a gap of 2 feet. It was suggested that sugarcane crop be planted at 3 ft spaced trenches. The space between rows can be used for intercropping. This had no effect on the yield of the sugarcane.

#### **Methods of Pest Control in Sugarcane Cultivation**

**Chemical method:** The discussion quickly got off the ground with a direct question on the economics of using Coragen ( a DuPont insecticide) for treating early shoot borer problem in sugarcane. After much discussion, it was concluded by Dr. Singh that despite the cost, the pesticide turns out to be cheaper as it takes care of the Top Borer problem too for which a separate pesticide is needed otherwise.

**Biological method:** Dr. Singh also suggested an alternative biological method of pest control using Trichogramma cards which are available at all KVKs as a cheaper method. He mentioned that such cards can also be made locally with proper training. (Over 200 pest moth eggs can be destroyed by Trichogramma.)

**A mechanical method** suggested was plucking off the top of the buds affected by the shoot borers at an early stage. A master farmer said that irrigation of the field also helps in pest control. Dr Singh said that if the field is irrigated at an early stage that allows water to fill in the holes caused by the shoot borer, it kills the larva and is an effective method for controlling shoot borer.

### Light-cum-Pheromone Trap

Dr. Singh mentioned that the pheromone trap does not attract the shoot borer but several other pests particularly the white grub is controlled to a great extent. After much discussion on the pros and cons of using the trap especially the context of its security at night, the farmers agreed that it is of great value and felt that the government should give a subsidy for its purchase.



*Training in control of pests and diseases by scientists at IISR*

The second training programme for master farmers held at Manavodaya from 3-6 October, 2012 focused on credit and marketing aspects of sugarcane production. The programme included review of existing work, interaction with IISR scientist Dr. M.R. Singh, sessions on internet based Sugarcane Information System of the UP Sugarcane Development Department, government of UP by Dr. Amit Agrahari of Indian Institute of Management, Lucknow. as well as session on technical and liaison improvements by Mr. Vivek Tiwari of DSCL SUGAR, Ajbapur Mill. Prof. Agrahari gave a practical demo on the use of information given by the sugarcane mills through on line projection. Various credit schemes for farmers were discussed by Shri Awadhesh Kumar, Chief Manager Training,

State Bank of India. The programme was also attended by Mr. Partha Mitra and Mr. Partho Saha of NABARD.



*Second Training programme on marketing and credit aspects*

#### **NOTES ON THE SUGARCANE INFORMATION SYSTEM (SIS) SHARED IN TRAINING**

Dr. Amit Agrahari from IIM Lucknow gave practical tips on accessing this information system. This note gives background information about the system.



Cane farmers have always grappled with issues like-getting their cane fields surveyed, selling their produce to mills, correct and timely measurement of cane, prompt payment etc. There has been a lack of transparency at each level and illiterate farmers faced many disadvantages. Millers also suffered at times, due to these hassles many farmers had stopped cane cultivation

or sell it to the local jaggery or 'khandsari' units AT A LOWER PRICE. This also lead to shortage of cane supply for mills.

The SIS helps farmer get instantaneous updates right from the start of the cane farming season till he receives payments for his produce. The SIS informs all farmers by sending individual SMS when the mills start operations in their area and begin buying cane. Mills only buy cane in installments and according to the date allotted to an individual farmer, so that they do not have excess stock and a situation where cane is left drying in the open leading to low recovery of sugar. Earlier the information to a farmer to bring his cane on a specific date failed to reach him most of the time, leading to a situation where he used to wait for several days at the purchase centre to sell his produce. Now the farmer is informed through SMS the date of selling his produce. On the specific date cane is weighed and instantly an SMS is sent to both the farmer and mill management of the amount of cane bought and the total payment to be made to the farmer. There is also a user friendly website that provides all relevant information to every farmer registered with the mills.

The system claims that the sugarcane farmers have benefited from SIS system in two main ways: First, they are able to access market information from sugar mills and societies without having to waste time or make numerous travels to the offices. Instead, they are updated on market information detail via SMS or websites. Second, they have benefited monetarily through increased quantity of sale of sugarcane to sugar mills, higher weight of supply due to fresh sugarcane, and increase in area under sugarcane.

#### **BASIC INFORMATION ON SUGARCANE PURCHASE BY MILLS**

- 1. Sugarcane survey demonstration:** The Sugarcane survey conducted village-wise is called sugarcane survey demonstration. A farmer can lodge complaints regarding his cane area and sugarcane variety to the department based on the survey.
- 2. Pre-calendar:** The quantity and price of sugarcane prescribed by sugar mills to farmers is based on a schedule known as pre-calendar.
- 3. Satta:** The bonded quantity of suppliable sugarcane by a farmer, as per UP cane policy is called satta.
- 4. Calendar:** At the start of crushing season, issuance of supply tickets on the basis of total satta as per fortnight and column is called calendar.
- 5. Purchi (supply ticket):** To fulfil the day to day crushing need of a factory, the concerned society is issued the proportional supply tickets to their members from the calendar are called Purchi.
- 6. Weighment:** The net weight of sugarcane supplied by sugarcane farmers on the basis of supply ticket is called weighment.
- 7. Payment:** The cane price made for sugarcane weighed, on issued supply ticket to the cane grower at the rate (per quintal) announced by the state government.

The 3rd Training Programme for Master farmers focused on improved methods in production of Gur at the IISR Gur Production unit.



It also included practical demonstration of manufacture of improved vinegar. A review of the entire programme and detailed discussions on future activities was also held.



### e. Local camps at village level by the Master Farmers in Lakhimpur KHERI

In accordance with the programme design, two rounds of village camps were organized in different project villages after the first training programme on technical issues at Manavodaya, Lucknow. In the first round of the camps, the focus was on enabling the Master Farmers to set up village level meetings and introduce the subject to the local participant farmers. It was observed during the process that most master farmers were not taking initiative to share information with the villagers themselves.

Encouraging the master farmers to take a more active role in discussing issues with other farmers and taking notes of the problems has been a challenge for Manavodaya as they had so far been accustomed to physical arrangement of meetings and not attempting to “learn and share” themselves. A new format for meetings where the master farmer had to organize smaller meetings in poor localities of the village and speak to farmers themselves was found to be useful.



*Village Kaladund*



*Village Penura*

In the second round therefore, the formal visits by outsiders was done away with and the master farmers were enabled to share information on their own in the presence of a Manavodaya facilitator, who kept a record of the discussions including the problems and the achievements presented

during the meetings. This format of meetings proved to be useful in bringing out the real achievements and challenges.

#### **TYPICAL PROBLEMS OF A SMALL HOLDING CANE FARMER**

##### **Summarised from local camps in different villages**

Most of the problems cited below are particularly **critical** to the small farmer as the larger farmers are able to get them done through influence and resources.

- ❖ New improved varieties of sugarcane seeds are not available from mills or Agriculture Research Stations. Old varieties get low prices from mills.
- ❖ Delays in distribution of **Parchis for** earmarking crop areas for mill purchase leading to delays in cultivation
- ❖ Unavailability or delays in availability of tractors, mechanical planting machines for sugarcane planting and sprayers application of fertilizers and pesticides
- ❖ Cooperative societies are unable to provide fertilizers like DAP, Urea, NPK and Zinc **on time** forcing the farmers to buy adulterated supplies from the market
- ❖ Widespread infestation of termites (deemak) in soil for which no permanent solution has been found. Crops are also affected by other pests and diseases that seriously affect production.
- ❖ Shortage of labour during peak cultivation and harvesting season due to migration to cities.
- ❖ Crops are destroyed by Blue Bulls (Neelguy) and pigs in many areas. No suitable solution has been found despite complaints to high authorities.
- ❖ There are changes in the course of the river Ghagara that affects the land and crops of a large number of farmers. **The crop insurance is nearly NIL. Bankers, Farmers are to be sensitized & AICI to ensure timely crop cutting exercise & payment of compensation**
- ❖ Severe delays in payments for sugarcane supplied to the mills extending to the next year seriously affecting the cash availability to farmers.

❖ **Bullock carts / Trolleys** loaded with cane kept standing for days outside the mills. Brokers/intermediaries take advantage by purchasing at lower prices.

❖ **Banks charges speed money (Un-officially)** on issue of green cards through brokers.

❖ Some villages mentioned absence of connecting road to the village

Due to an absence of an institutional mechanism to resolve these issues the average farmer in most villages was initially found to be uninterested in attending village camps. A typical grouse was that the master farmer is getting all the benefits from the programme while they get nothing. It took much time and effort to make farmers realize the value of practical information **that would lead to significant** economic gains.

#### **f. Demonstration camps**

For greater effectiveness in information dissemination, the third round of camps were planned and organised as practical demonstrations of improved techniques in cultivation.

Demonstration camps were organized in the project villages in the sugarcane sowing season of March and April, 2013. The principle objective of the demo camps was to practically demonstrate the benefits of improved methods of sowing to the farmers of the village and providing opportunity to discuss real problems and alternatives at field level.

This necessitated some homework in getting together the needed equipments, inputs including seeds, fertilizers and pesticides as well as labour on the day of the demonstration. In most cases, the demonstration was carried out in the fields of the master farmer himself.

This method of communication turned out to be the best form of sharing and discussing improved techniques with local villagers. In most cases, a short meeting was held immediately after the demo for exchange of information, queries and comments.



*Demonstration camps and field discussions*



### **g. Refresher Training at Lakhimpur**

Refresher training camps served an excellent purpose of review of ongoing work, discussion on new emerging issues, problems and alternatives. It also provided an opportunity to meet with experts including IISR scientists who willingly accompanied the Manavodaya team to the camps.

The first refresher meeting was organized at Lakhimpur Kheri in the office of the DDM Shri Partha Mitra for a review of work after the first round of camps.

Here some new participants were registered and **mobile phones were distributed by DDM NABARD to all the participants with NOKIA LIFE app for receiving agriculture related information**



***First refresher camp at DDM Office LakhimpurKheri***

The second refresher training was held at the office of the Sugarcane Cooperative Society, Lakhimpur. The programme was chaired by the Chairman of Sugarcane Cooperative Society and was also attended by IISR Scientist. Apart from a useful discussions on pest management, the farmer's group also



***Views of second and third refresher camps***

signed a petition to the Dy. Cane Commissioner for subsidy on some useful agriculture implements like the multipurpose spraying machine and the Light-cum-Pheromone trap a copy of which is attached below.

रोवा में,

**श्रीमान उप गन्ना आयुक्त  
परिक्षेत्र- लखनेऊ**

महोदय

आपसे अनुरोध है कि गन्ना किसानों की समस्या(पिरोशानी)को ध्यान में रखते हुए आपको अवगत कराना है कि गन्ना किसानों को वर्षे यन्त्रों पर छूट कृषि विभाग के संपान ही दी जाती है।

अतः आपसे अनुरोध है कि अन्य कृषि यंत्रों के समान ही गन्ना किसानों को प्लार स्प्रेयर, लाइट कम फैंसोमेन टैंप भी अनुदान पर उपलब्ध कराने की व्यवस्था करने का कष्ट करें। गहान कृपा होगी

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डिप्टी के कुमार जी - 212 रूद किसान सेवा केंद्र - सिद्धपुरी, प्रो. - डिप्टी के कुमार जी

अनुदान का 5% सि. व. - 212 रूद किसान सेवा केंद्र - सिद्धपुरी, प्रो. - डिप्टी के कुमार जी

गन्ना की पैदावार में कमी के कारण किसानों को अनुदान में कमी आ रही है।

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अनुदान में 5%, 10%, 15% तक किसानों को अनुदान (डिप्टी के कुमार जी) अरुदा जी.

212 रूद किसान सेवा केंद्र (गकपा - र. रिकवा - से. वी. के. - सी. सी.) अरुदा जी.

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A review of the entire programme was done in the third refresher that also served as an occasion for **the** master farmers to discuss the future directions of the work. The master farmers have decided to form an organization to continue working on various issues that emerged during the project like organization of seed, production, sale of products, etc.

### **3.0 LEARNING AND OUTCOMES IN THE PROJECT**

#### **3.1 Initial reconsideration in the selection of Maser farmers**

The selection of master farmers was done based on existing leadership in the farmer clubs, the educational background, age and maturity of the participants as well as the initiative to attend the orientation meet at Lakhimpur. As it emerged from experience, this criterion was not enough and the rapport with the local population was found more important in determining the usefulness of the master farmer.

Therefore, in some villages it was decided to identify new master farmers who had a better rapport with people in their village. This was done in four villages with positive results. In one village Dayaratna, for example, the change from a retired school teacher to a youth belonging to a small farmer background proved to be extremely beneficial. In another village Jasmadi, the village camp did not attract many participants as the camp was being held in the compound of the rich master farmer.

In another village Dhongwa, the master farmer was never available on phone and did not take interest in any discussion. Here a school teacher, **who** came forward to take responsibility and was selected after discussion with other members of the farmer club. Master farmers were changed in two other villages Gokan and Kaladund due to inactivity of the master farmer, in each case with the permission of the earlier nominee and other members of the farmers' club.

#### **3.2 Communication**

We present here a brief analysis of experiences gained while implementing the project relating to methods of communication with people and strategies for their effectiveness:

a. **Selection of venue**

Our experience showed that the choice of venue can make all the difference in communication. Private houses or compounds are to be completely avoided especially if they belong to an influential person. It is best to organize the discussion at a community owned place like a school building or a big shady tree. We realized that this is not always practiced and requires conscious planning. This is highlighted by a grim experience in village Jasmadi.

The Master Farmer from this village, known to be a progressive farmer, chose to set up a meeting in his private compound that was conveniently located on the main road of the village. After we reached the village, it was observed that nobody had assembled at the site of meeting though according to him everyone had been invited. A small group assembled after sometime and a discussion was initiated, but all along it remained very dry and formal. We were a little surprised as this was a big village and the farmer was an influential person. He had also invited a representative of the local sugar mill and a local government official who came on time.

After concluding the discussion, the Manavodaya representatives requested the Master Farmer to accompany them to another part of the village where the poor lived. He excused himself on the pretext of some engagements, so they went on their own. The mill representative and the government official came along. As soon as they reached the poorer part of the village identified

by mud houses, a huge crowd assembled in no time. In fact, they celebrated our presence by distributing Gutka (a stimulant) and said that a meeting was being held in that part of the village for the first time in recent history. Soon there was a detailed discussion on the problems faced by small farmers. Change of venue itself made a huge difference in communication.



*Meeting in a temple verandah, village Kisanpur*

### **b. Sitting Arrangement**

It is normal to have meetings with sitting arrangement on the floor with Dari (local carpet) spread out for the purpose. Sometimes cots are arranged as they are more easily available in every household. Chairs and tables have now been introduced in formal meetings where there are visitors from outside, especially extension staff of various agencies including the government **line departments**.



*Paliya camp was attended by the lead bank officer of the district*

While one can argue that the manner of sitting is a matter of convenience, it is observed that the poor are more comfortable in speaking when the sitting arrangement is equitably organized. The difference in level of sitting acts as a definite communication barrier.





*Lakhimpur meeting: Use of chairs is fine if everyone gets to sit on them*

### **3.3 New Cultivation Practices**

It is significant to note that the village camps led to considerable awareness and discussion on new cultivation practices in sugarcane that have been adopted by a large number of farmers.

#### **a. Trench Method of planting**

Introduction of the “Trench method” of cultivation suggested by scientists from IISR is the most significant outcome resulting from discussions and demonstrations in camps during the project.



*Construction of Trenches in village Penura*

#### **TRENCH METHOD OF PLANTING**

Sugarcane is conventionally planted in 60-75 cm spaced single rows which leads to increased plant population per unit area but hinders various management practices necessary for good crop husbandry.

New sugarcane varieties possess a high yield potential which can be realized by 40-50 cm deep trenches in the soil. Trench planting plays an important role in establishing the plant population and cane yield. Planting cane at one meter spaced trenches increased the yield and juice quality than narrow trench spacing. Trench planting is also a convenient and efficient planting system in saving irrigation water and reducing cane lodging. This method helps in maintaining proper plant population, facilitating light penetration, air circulation and inter-tillage operations.

While several farmers have adopted the Trench method of cultivation and are satisfied with the results, farmers in some villages have reported that the method requires more labour for trench digging and is therefore unsuitable. Other disadvantages of the technique reported in the village camps are that the trench part has good moisture but the remaining part remains dry affecting the crop. A

farmer also mentioned that he cannot use the five tyne cultivator with the trench method. It was mentioned in another village that the trench method needs more supervision as it is prone to attack by animals.

Despite such claims and counter claims, farmers concluded at the Lucknow training that the trench method is definitely an improved method and should be spread widely. There were five villages that did not use the method at all due to the unavailability of trench razors and the otherwise hard soil conditions in the village. The method would spread further if credit is made available to the farmer clubs for buying mechanical trench planters and subsidy is provided for its purchase.

**b. Use of labour saving machines for land preparation :**

In most villages, demonstration was organized with the help of new labour saving machines in sugarcane cultivation. In village Gokan, for example, the Mechanical Trench Planter (MTP) machine was used as shown in the photograph. The cost of this machine, about Rs. 1,10,000, is beyond the reach of most farmers, but the mill provides the machine on a rent of Rs 1000 per day. The many sided features of the machine e.g. digging of the trench, cutting of sugarcane into small pieces before sowing, application of fertilizer and pesticides by a separate nozzle make it very useful to the farmer and reduces the labour cost of cultivation significantly.



***Use of Mechanical Trench Planter during demonstration***

A tractor operated trench razor was used in some villages and is considered a significant improvement over the traditional cultivator in the making of the trenches. Though it does limited operations, it is considered a must for reducing labour cost in trench cultivation. Farmers in most villages were in favour of buying this machine which is priced around Rs 40,000 and is more accessible to small and medium farmers.



***Improved razor for trench cultivation during demo in village Virsinghpur***

### c. Distance between rows

This was a serious topic for discussion in most villages. Most farmers have been planting sugarcane in rows with a gap between rows of 2 to 2.5 feet. They have felt that this was the optimum distance for getting good yields. In the demonstration, however, it was pointed out that a gap of 3 feet should be kept as the space between rows can be used for intercropping and it has no effect on the yield of the sugarcane. Some farmers argued that this method is not suitable from the standpoint of space for movement of the tractor. This too was ruled out during discussion and it was mentioned that the space can be changed by realigning the digger at a higher distance between rows without much problem.



### d. Pre treatment of seeds

A major shift in cultivation practices introduced during demonstration related to pre treatment of seeds. It was highlighted that the sugarcane should be pre treated with pesticides like Bavistine for control of disease, at the sowing stage itself. It was observed that most farmers were not doing **seed** pre-treatment both due to ignorance and in a hurry to finish the work.



*Pre treatment in village Penura during demonstration camp*

They were therefore making their crops susceptible to disease from the day of planting itself. It is good to learn that most farmers **present** understood this well and commented on the usefulness of this practice which they would also adopt.

**e. Method of cutting and placing sugarcane seeds in the trench**

It was useful to discuss and highlight this aspect during the demonstration as it gave confidence to the participants regarding details of the method from a practical perspective. The method of laying sugarcane cut with two eyes laid across the trench at a distance of about 8 inches was demonstrated.



*Traditional method in village Gokan*



*New method in village Karipokhar*

## f. Intercropping

Intercropping has emerged as the biggest benefit of the Master farmers programme in Lakhimpur KHERI. Intercropping was done by a few selected farmers earlier and its benefits were not clearly understood by most. Many thought that it reduces the yield of sugarcane and was not beneficial. This prejudice has been broken to a large extent and the method is gradually becoming popular in the project villages.

**The benefit of intercropping, simply stated is, increased net returns to the farmer at almost no additional cost.** The fertilizers and pesticides used for sugarcane are usually adequate for the intercrop also. **There is no need for additional irrigation either. In fact, most farmer's mention that the water requirement is cut down significantly to almost half as the field is not flooded and only the trenches are irrigated. The crops on the upper ridge of the trench get the water in their root zone.**

An estimate of the net returns from different crops for different acreage of land documented for different villages is presented in the chart below.

S.N.	Name of Farmer	Village	Total Land Holding (Acres)	Sugarcane Cultivation (Acres)	Intercrop	Additional Benefit (Rupees)
1	Sachin Kumar	Dayaratan	3.6	0.8	Peppermint	14580.00
2	Radhey Shyam	Dayaratan	2.6	0.4	Kakadi	9900.00
3	Ramesh Kumar	Dhongwa	3	0.6	Lahi & Masoor	3780.00
4	Shival Kumar	Agra	2.5	0.3	Bhindi	1400.00
5	Ram Bahadur	Agra	8	0.5	Urad	660.00
6	Bhagwandeem	Sujai Kunda	12	10	Potato	27950.00
7	Laxminarayan	Suaji Kunda	2.5	1.5	Lahi	4420.00
8	Madhav Ram	Kishanpur Ajit	1	0.6	Moongfali	4900.00

9	Nathu Singh	Kishanpur Ajit	1	0.8	Moongfali	3550.00
10	Vijay Bahadur	Kishanpur Ajit	1	0.4	Onion	4300.00
11	Motilal	Dhongwa	1.2	0.4	Bhindi	8010.00
12	B.B. Singh	Dhongwa	1.5	0.3	Matar	570.00

It is useful to note that even for a small acreage of about half an acre the farmer is reaping an additional benefit of Rs 3000 to 5,000 going up to Rs 8000 and above for vegetables like Kakadi, Bhindi and upto Rs 15000 for commercial crops like Peppermint. This is certainly good news for the small farmer and in the coming season we shall see more of intercropping in the entire project area.

In fact the change from conventional cultivation to trench method of cultivation combines well with the intercropping method. We therefore expect a major shift in cultivation practice among farmers increasing both their yield and net return from the field.

However, there are problems too. One of them being the menace of the Neelguy. (Blue Bull). Many farmers have pointed out that the increased distance between crops attracts the Neelguy. This has been reported in several villages by different farmers.



*Master farmer Sanjay Patel of Kaladund showed his intercropped field*

### **g. Sustainable Sugarcane Initiative (SSI) method**

A new method of planting being promoted by ICRISAT and several other research bodies changes the method of planting significantly with features like

- a. Cutting of a single eye and
- b. Planting them in polybags for germination
- c. Planting the germinated sapling in place of the conventional seeds in the trenches

It is said that this method increases the yield further with better germination and minimum susceptibility to disease. This method was demonstrated in village Sujai kunda by one farmer who had made the saplings before the demonstration.



***Sugarcane sapling in polybag for plantation in village Sujai kunda***

According to IISR scientist Dr. M.R. Singh, the SSI method is useful mainly for production of new variety of seeds that are available in a limited quantity.

Otherwise the SSI method may not be popular due to the high labour cost involved.

#### **4.0 ADDITIONAL PROJECT EXPERIENCES**

##### **4.1 Sugarcane purchase by mills:**

A common complaint of small farmers pertained to non availability of purchis for delivery of sugarcane to the mills. The sugar mills usually issue purchis to different farmers for purchase of sugarcane from them at the time of harvest. The amount of sugarcane to be purchased from each farmer is decided on the basis of a survey conducted by the mill surveyors. During the meetings, it was found that while the large farmers were satisfied with such an arrangement, the small farmers had a number of grievances with the system.

In some villages, the farmers complained that they had not been issued purchis according to their produce and they had to sell the cane to the crushers at a much reduced price.

We also learnt that there were three varieties of seeds: the early variety, the normal variety and the late variety. The mills promoted the early variety as it gave better sugar yield due to the high juice content in the cane. However the farmers mentioned several difficulties in cultivating the juicy variety. The field of many poor farmers being distant from the village, it was not possible to keep a vigilance on the produce and the juicy variety was prone to attack by the Neelguy and the human chewers of cane for free. They simply could not afford to cultivate the early variety in distant fields. In such a case, the farmers suggested that the mills should apportion a fixed percentage to buying of the late hardy variety of sugarcane too.

In one village, the small farmers complained that the price given to them was reduced to the equivalent of normal (Saamanya) variety while the cane given by them to the mills was early variety.

Clearly there was a lack of incentive on part of the small farmers to plant improved varieties of cane. This was not a simple issue of ignorance of new sugarcane varieties , but a larger livelihood issue for the poor that needed coordinated dialogue and action .

#### **SMALL CONFIDENCE BUILDING ACHIEVEMENTS**

During the Kisanpur camp, several farmers showed mill purchis where it was printed on the rear of the slip that an early variety of sugarcane has been rejected by the mill and should not be sown by the sugarcane growers. The Master farmer of the village mentioned that in the Manavodaya training at Lucknow, the Indian Institute of Sugarcane research (IISR) scientists had conveyed to them that this was an improved variety and should not be rejected by the mills on technical grounds. Many farmers in the region were sowing this variety and were anxious to seek a clarification. During the camp, it was decided to send a petition to the mill mentioning the position taken by the IISR scientists. A few days later it was learnt that the mill had agreed to remove this variety from the reject list of sugarcane varieties.

#### **4.2 Blue Bulls (Neelguy)**

The issue of Neelguy was raised in many villages like Abhnapur, Gokan, Nakara, Dhongwa, Kishunwapur, Barui and Karipokhar. It was mentioned that the government has come up with a scheme to tackle the menace under the National Food Security Mission coordinated by the District Agriculture Officer at district level. Under the scheme, the affected farmers are given support for bunding and

barbed wire fencing for protection against Neelguy, but this applied to selected crops like pulses and vegetables only. It would be useful to extend the scheme to sugarcane areas as well.

**Village : Dhongwa Farmer: Motilal**

*I had intercropped bhindi with sugarcane, but had to keep awake many nights to protect it.*

**Village : Kishnawapur Farmers: Ashok Verma, Rohit**

*Leguminous pulse crops intercropped with sugarcane was destroyed by neelgaya.*

**Village : Panyora Farmer: Ramjeevan**

*Trench method gives more space for Neelgaya.*

**Village : Karipokhar Farmer: Chandra Prakash**

*Farmers fear going to the field at night due to the menace of pigs and neelgaya.*

**Village : Abhnapur** *Farmers are not able to take pulse crops (Dalhan) due to neelgaya.*

**Village : Gokan Farmer: Maniram**

*We have to sow sugarcane due to neelgaya, otherwise we can get a good crop of peanut too, but cannot cultivate it due to neelgaya.*

**Village : Kaladund Farmer: Ramkumar**

*Due to the problem of neelgaya, we cannot plant crops like bhindi, peanut and pulses. Farmers have to keep awake all night to protect their crops.*

### 4.3 Availability of Improved Seeds of sugarcane

A major issue highlighted by farmers in almost all villages is the non availability of desired seeds because of which they are forced to plant the old seeds with consequent effect on yield. Very few farmers are able to get the seed they want. Farmers continue to plant traditional varieties as the new seeds are either not available to them in time or implied taking extra effort to arrange resources for their purchase and transport. In the absence of such resources, many farmers simply resort to sowing the seeds available with them.

In a refresher camp with IISR scientists, it was mentioned that the IISR can supply the improved seeds if the demand was made by the farmers. Besides under the seed promotion programme of IISR, seeds could be made available to the farmers together with training in the production of seeds. A list of progressive farmers must be submitted with their quantity demanded for this purpose. The master farmers gave a written demand of the various varieties of seeds needed by them.

दीर्घा किसानशिविर 21.7.2013.

क्र.सं.	नाम	ग्राम	मात्रा
1.	अशोक कुमार वर्मा	विद्युतपुर	COLK (9709) 20 क्विं
	राजेश कुमार वर्मा	काशीबाई	COLK-94184) 20 क्विं
	सत्यनारायण वर्मा	सेहवासा	COLK-94184 - 20 क्विं
4.	शंकर वर्मा	काशीबाई	COLK-9709 - 10 क्विं
5.	नारायण	गजेशपुर	COLK-94184 - 25 क्विं
6.	शंकर	गजेशपुर	COLK-94184 - 25 क्विं
7.	शंकर	गजेशपुर	COLK-94184 - 10 क्विं
8.	शंकर	गजेशपुर	COLK-94184 - 10 क्विं
9.	शंकर	गजेशपुर	COLK-94184 - 8 क्विं
10.	शंकर	गजेशपुर	COLK-94184 - 5 क्विं
11.	शंकर	गजेशपुर	COLK-94184 - 5 क्विं
12.	शंकर	गजेशपुर	COLK-94184 - 5 क्विं
13.	शंकर	गजेशपुर	COLK-94184 - 5 क्विं
14.	शंकर	गजेशपुर	COLK-94184 - 5 क्विं
15.	SUBSHRANT - Panditpur	"	CO-07023 200
			COLK-9709 (MMS) 200

The final list showed that a majority of the farmers wanted the variety Col K 94184 . One of the master farmers, Mr. Ashok Verma, mentioned that this variety is being produced by him and can be availed from his farm.



Seed production is an activity that is likely to be taken up seriously by many master farmers in the coming seasons. It has been suggested that a seed production farmer should grow seeds on at least one hectare of land and that will require 60 quintal seeds per hectare. Farmers should grow different varieties of seeds in different regions. The existing network of Master Farmers is well suited for the purpose.

## **5.0 PROFIT ANALYSIS**

Manavodaya conducted a survey of farmers for analysis of profits in sugarcane cultivation using the newly introduced Trench method of farming. In the survey, the data was collected entirely through the figures provided by the farmer based on memory of costs and no attempt has been made to normalize or rationalize the figures obtained.

For obtaining the cost of cultivation all operations mentioned by the farmers have been obtained including

- a. The input cost of seeds, fertilizers (usually DAP and NPK) and pesticides
- b. The cost of tractor used in ploughing and sowing
- c. The cost of labour in seed, fertilizer and pesticide applications
- d. The cost of seed treatment (where applicable)
- e. The cost of irrigation = No. of Irrigations x Diesel consumption per bigha x area (Bigha) x rate of diesel.
- f. The cost of fertilizers (usually Urea) and pesticides used during irrigation
- g. The cost of labour in Gudai, Bandhai, Katai and Chilai. There are variations in unit cost as some farmers have done Gudai (weeding) 2 times while some have done 4 times.
- h. The cost of transport to mill usually based on rent of Rs 15 per quintal.

The input costs and income from sale of produce are presented separately in Tables 2 and 3 ahead.

While the data presented has been collected based on memory of farmers and cannot be said to be scientifically rigorous, it is significant to note that the yield figures with the new trench method of cultivation are higher compared to the pre project figures for yields.

It is also significant to note that Potato and Dhaniya intercropped with sugarcane has produced good returns due to the intercrop. According to some farmers this could be even higher due to the favourable combination of the two crops.

It is clear, however, that the profitability has increased substantially without disturbing the yield of sugarcane. This is good news for farmers who have been struggling to obtain good returns from sugarcane.

## **6.0 CONCLUDING REMARKS**

The multiple technical interventions introduced in the project were well received at the village level and have already lead to increased net returns from land to a large number of farmers. The numbers shall keep expanding with every agriculture cycle. The demonstration camps served a very useful purpose and they should be promoted on a large scale.

However, it is clear from the discussions in different camps that the problems of small landholding farmers is complex and requires coordinated action at multiple fronts. The master farmers programme can be made more effective with increased focus on strengthening of farmers clubs, arrangements for access to credit for purchasing of new technologies and a process of coordinated action by farmers.