Mid-term Newsletter Maikaal Cotton Research Project



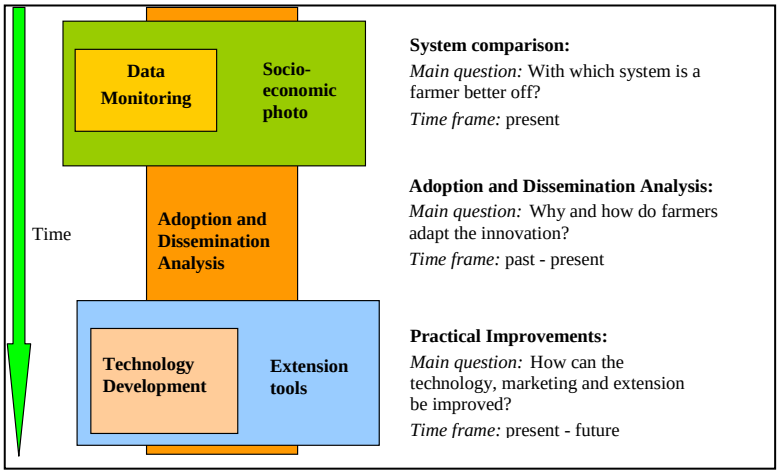

Maikaal bioRe	**Maikaal bioRe (India) Ltd., Bheelgaon, Madhya Pradesh, India**
FiBL	**Research Institute for Organic Agriculture, Switzerland**
IWMI	**International Water Management Institute, Anand, India**

A project supported by the Swiss Development Cooperation (SDC) and the World Wide Fund for Nature (WWF)

Introduction

The Maikaal Cotton Research Project is already mid way of its planned three years duration (August 2002 to August 2005). A considerable number of planned activities have been completed or are still going on. This Newsletter provides a brief overview on the present status and achievements of the Research Project, and an outlook on the future activities.

An overview on the entire project is provided in Figure 1.



Overview: Who is Who in the Research Team?

Who	Organisation	Role in the Research Team
Frank Eyhorn	FiBL	Project Coordinator; Organic Farming parts of the project; Agronomic Data Monitoring,
Tushaar Shah, Vaibhav Bhamoriya, Shilp Verma	IWMI	Micro irrigation parts of the project; Socio-Economic Photo
Mahesh Ramakrishnan	Maikaal bioRe	Field Research Coordinator
Lokendra	Maikaal bioRe	Assistant of the Field Research Coordinator
Raj Rupesh Pandit	Maikaal bioRe	Translation, field research
Raguvir	Maikaal bioRe	Plot trials measurements, field work
Sharat	Maikaal bioRe	Supervision of plot trials
Field assistants	Maikaal bioRe	Part-timers assisting the farmers in the record keeping for the agronomic data monitoring
Students of IRMA	IRMA, IWMI	Studies on micro-irrigation dissemination and supply chains
Christa Schwaller	University of Fribourg (CH)	Student involved in Adoption and Dissemination Analysis

Agronomic Data Monitoring

The Agronomic Data Monitoring (ADM) under the guidance of FiBL aims on comparing the economic performance of organic and conventional cotton growers in the Maikaal region. For this, sixty organic (bioRe) and sixty conventional farmers were randomly selected in 10 villages. In an initial interview, the farm profiles of the selected farmers were compiled. The farmers got instructed in keeping records on the inputs and outputs of their cotton farming with the help of forms in the local language (Nimari).

Detailed input-output data were collected on the cotton fields of the Kharif season 2003, and data collection is going on for the Rabi crop of the same fields. All cotton fields of the sample farmers have been measured accurately by the field research team, and on each field a representative soil sample has been taken (see chapter below).

In 2003 some organic farmers within the sample have been defaulted due to application of fertilizers. As far as possible these drop-out were replaced by farmers of the same village. Although this situation makes the processing of the data more difficult, it should still be possible to receive statistically valid results.

Outlook:

The record keeping of the ADM farmers is closely supported and monitored by a number of field assistants in the respective villages. Mahesh Ramakrishnan will visit all ADM farmers by end of February and cross-check the data. Based on the results, it will be decided which data will be monitored in Kharif 2004.

Socio-Economic Photo

The Socio Economic Photo (SEP) under the guidance of IWMI tries to map the existing socio-economic scenario of the Nimar Valley. The socio-economic scenario is to be analysed for the following objectives:

a) Identifying the impacts of the Maikaal project on the livelihoods and quality of life of the people of the region.
b) Profiling of adopters of the two technologies, viz. organic agriculture and also drip irrigation technologies
c) Mapping the socio-economic situation of the Nimar valley to aid in identifying and developing sustainable livelihood patterns for the cotton farming society.

The survey was stratified along two dimensions of farming systems (organic and chemical or conventional farming) and irrigation systems (drip, pepcee, other water saving devices and furrow irrigation systems). The centrepiece of the Socio-economic Photo is an extensive cum intensive survey of over 400 farmers of the Nimar Valley. The information collected in the survey pertains to demographic details, crop economics, adoption behaviour, impacts of adoption and also explores the various livelihood linkages of the rural farming life. The survey was carried out by five survey administrators who were trained in a workshop especially for the purpose of this survey. They were also visited while they were surveying the farmers initially.

The data is now entered and analysis shall be presented at the annual partners meet of IWMI-Tata project and also at the Stakeholder Meeting in Maikaal. The various linkages of livelihoods are essential to be understood as these interlinkages hold the key to success and failure of efforts. A draft report shall be made available by February end. There is already demand for the report from NGOs active in the area or planning to start operations in the area.

This is supplemented with certain extensive and intensive field based studies which look at aspects like labour along availability and seasonality, an unfinished gender study and a farmer flow measurement study which studies the irrigation behaviour of the farmers. An associated effort is being made to monitor the process of decision making and understand the adoption behaviour of the farmers for various decisions related to the cotton farming. This is very helpful in understanding the linkages and also the prioritisation of the various needs and alternatives respectively by the farmers.

Soil and Manure Samples

In almost 300 cotton fields of the farmers selected for the ADM, representative soil samples have been taken. This alone proved to be a difficult task due to the size of the fields to be covered and the extreme heat during the summer months. The samples were processed (crushed, sieved, weighed, packed) and sent for analysis to the laboratories of ICRISAT, Hyderabad. The analyzed parameters were:

- Texture (sand, silt, clay)
- Water retention capacity (WRC)
- Soil Organic Matter content (C-org)
- Available Phosphorus (OLS-P)
- Available Potassium (K-exch.)
- Available Zink (Zn-avail.)
- Available Boron (B-avail.)
- Salt Content (E.C.)
- pH

Nitrogen (N) and Sulphur (S) contents were not analyzed as they fluctuate considerably over the season and are difficult to analyse properly. Magnesium (Mg) and Calcium (Ca) were not analyzed as they are rarely deficient in the soils of this region.

The main aim of the soil analysis is to relate the crop yields to the soil condition of the specific field, and to evaluate for differences in soil fertility status between organic and conventionally farmed fields. As an added benefit, the participating farmers will receive the results of the soil analysis together with a recommendation for management (application of manures resp. fertilizers). The results will be explained to the farmers by Mahesh Ramakrishnan, and in case of the organic farmers the Maikaal Extension Team will be involved, too.

To find out the actual nutrient contents of the organic manures used in organic cotton farming, samples of the following manures got analyzed for their nutrient contents (N, P, K, Mg, Ca):

- Farm yard manure (FYM) of 4 farms
- Compost of 2 farms
- Vermi-compost of 3 farms
- De-oiled Cake of Castor (DOC)
- Vermi-wash
- Cow dung slurry
- Sugar cane by-products: press mud, bagasse, ash

The lessons learned through the soil analysis and data monitoring will be feed into the Package of Practice for Organic Cotton (see chapter below). In addition, Frank Eyhorn will conduct a soil seminar for the Maikaal Extension Team in February 2004.

Drip Irrigation Studies

There are two different studies aiming to compare the different irrigation systems (viz. drip, easy drip, Pepcee and furrow irrigation) being adopted by the farmers in the area. The farmer flow measurement study is one such exercise aimed at comparing the irrigation techniques using the water productivity data of the different irrigation systems. This shall give a clear indication as to how much water is applied and required under which irrigation system based farming and go beyond to suggest changes in irrigation practices to enhance productivity. The basic parameters for comparison are as follows:

a) water productivity
b) requirement of power (electricity)
c) productivity

The plant growth parameter of leaf area index is being monitored simultaneously and also weather data is being collected. The purpose of collecting this additional data is to feed this into the one dimensional SWAP (soil water application) model in order to run simulations of productivity at different input levels. These simulations are aimed to generate information on which parameters can contribute to the growth and sustainability of farming in the Nimar Valley. This model can take care of interlinkages which is usually difficult to integrate in other modelling techniques. Similar data is being generated in the experimental farm through the plot trials as well.

Adoption and Dissemination Analysis of Organic Farming

The aim of the Adoption and Dissemination Analysis (ADA) is to find out the success factors and obstacles for conversion to organic farming respectively for the use of drip irrigation technologies. The basic idea is that besides the immediate economical profitability other aspects are also taken into consideration by the farmers (e.g. risk management considerations, perceptions, previous experience, cultural aspects etc.).

These other aspects, however, can not be easily assessed by directly interviewing the farmers. Instead, indirect approaches will be utilized:

- Group discussions on the past development (time line approach)
- Confronting farmers with statements of other farmers
- Semi-structured interviews with focus groups (e.g. women, elders etc.)
- Observations

With the help of Prof. Ruedi Baumgartner, a development and livelihood expert from Switzerland, and Dr. Uma Rani, social economist at Gujarat Institute for Development Research, Ahmedabad, the methodology for the ADA has been developed and first interactions with farmers took place. This work is continued by Mrs. Christa Schwaller, Social Anthropology student from Switzerland until February 2004. In this, Christa Schwaller plans to utilize a video with statements of organic and conventional farmers to discuss the reasons for conversion and non-conversion with groups of farmers.

The insights gained in the ADA shall lead to the development of a dissemination strategy for organic cotton within and outside the Maikaal project. It shall also feed into the development of extension tools.

Adoption and Dissemination Analysis of Drip Irrigation

Adoption of Drip Irrigation is picking up at a fast pace in the Nimar Valley. At present its presence is marked only in pockets. There exists a large potential for further adoption with the existing land utilisation pattern of the valley. The Adoption and Dissemination Analysis of Drip irrigation therefore concentrates on two dimensions of adoption:

a) Furthering adoption within the valley for increasing benefits of farmers;
b) Identifying a disseminable model for replication of adoption at other places.

The Jalgaon area of Maharashtra has similar conditions but has seen a phenomenal adoption of the drip irrigation technology. While the project can learn from Jalgaon it can give to North Gujarat and Saurashtra where some agencies are trying to kick start adoption. Like the ADA for the organic cotton, this aims at understanding what pushes the farmers towards and what pushes them back from adopting drip irrigation technologies.

Two MTS (Management Traineeship Segment) studies were commissioned with students of IRMA (Institute of Rural Management, Anand) working under the guidance of IRMA professors to study two different aspects of this spread in Jalgaon, Maikaal and Saurashtra. One study looks at the adoption factors and hindrances at the farmers end whereas another study looks at the technology management aspect to increasing the benefits that can be drawn with the adoption of drip irrigation technologies. They look at the package of practices and also at the enabling environment. The first drafts of the studies shall be available in less than a week's duration and final reports shall be available by the month end.

The ADA shall be more qualitative in nature and focus on practices and communication with the farmers. Given the high initial investment nature of many drip irrigation systems it should be necessary to concentrate the ADA on enabling environment larger issues like subsidy and technological Innovation.

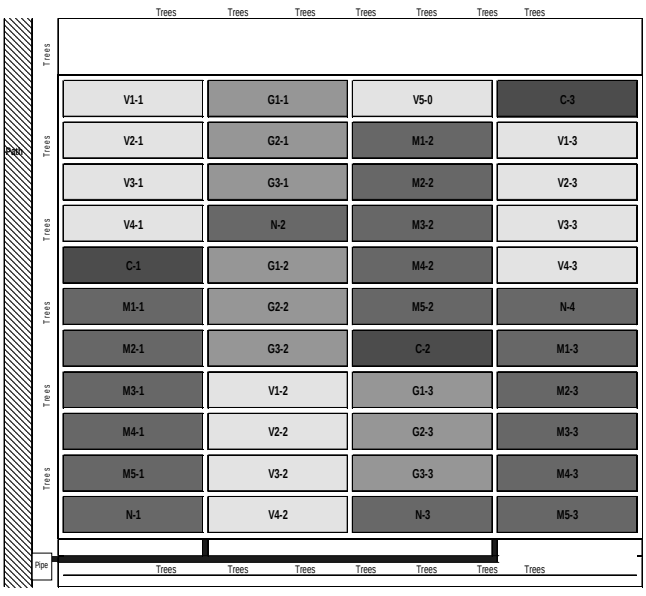
Plot Trials

One aim of the Research Project is to support the Maikaal Team to improve the technology of the organic cotton production system. In Kharif 2003, a series of plot trials have been installed and implemented within the Maikaal Experimental Farm. One set of trials is dealing with irrigation aspects, the other set with organic farming aspects.

Organic farming plot trials

In collaboration with the Maikaal Extension Team a number of promising cotton varieties, organic manures and green manures have been selected for testing. In order to get valid results, each variation had three repetitions spread over the test field (see figure below).

Control plots	
C	Control, no manure
N	Normal, with DOC
Variety trials	
V1	H10
V2	JK4
V3	Jawahar Tapti, less water
V4	H8, less water
V5	Jawahar Tapti, normal water
Manure trials	
M1	H8, half DOC, half vermi compost
M2	H8, no DOC, full vermi compost
M3	H8, no DOC, full compost
M4	H8, vermi-wash
M5	H8, urine + slurry
Green manure trials	
G1	H8, Nagpur mixture mulch
G2	H8, Sesbania mulch
G3	H8, Moong (harvested)



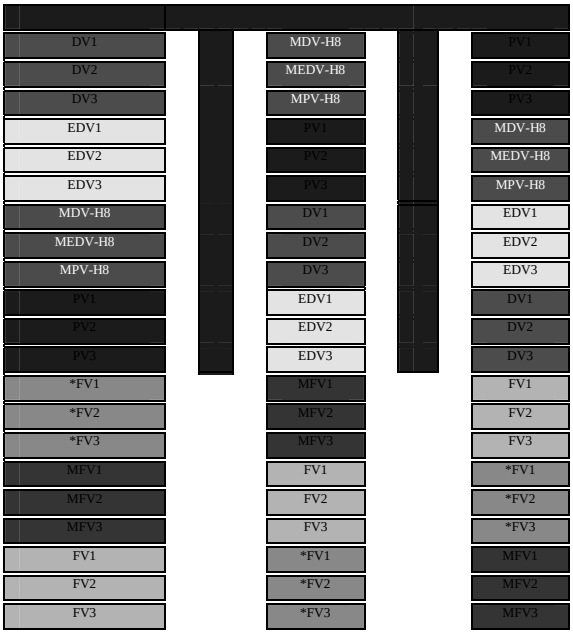
As the cotton picking is not yet completed it will take some more time until we can present first results of the plot trials. We are happy that the Maikaal team managed to implement scientific field trials in the very first attempt in a way which even attracted and impressed scientists from agricultural universities.

Outlook:

After evaluating the results of the first year it will be decided which plot trials will be implemented in Kharif 2004. The most promising varieties and treatments can be tested on-farm by interested farmers (see chapter on Participative Technology Development).

Irrigation plot trials

The irrigation plot trials compare four irrigation methodologies, two sowing plans and on four different varieties. An experiment of mulching with the regular three repetitions with black and transparent mulch has been established as well. The plan is given below:



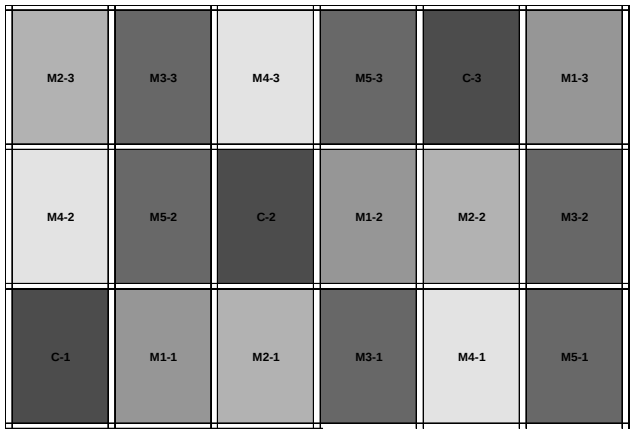
Irrigation systems	
D	Drip irrigation
ED	Easy drip irrigation
P	Pep cee irrigation
F	Furrow irrigation
Other systems	
M	Mulch
NM	Non Mulch
Varieties	
V1	H1 hybrid
V2	H8 hybrid
V3	JK4 hybrid
V4	Jawahar Tapti
Sowing	
Mo	Monsoon
Pmo	Pre Monsoon

The results of the plot trials along with the simulation result of the modelling exercise will guide the experimentation in the coming year and also the need for introducing new technologies or practices.

Organic wheat plot trials

Maikaal bioRe decided to give more attention to the crops grown in rotation with cotton, especially to wheat grown in the Rabi season. Therefore, some manure trials were set up in Rabi 2003/04 in the Maikaal Experimental Farm (see figure below). Maikaal also decided to experiment on the use of by-products of the sugar cane mills (press mud and ash) and therefore included it into the wheat plot trials.

Code	**Treatment**
C	No fertilizers, no manures
M1	DOC and Rockphosphate (100 resp. 50 kg/acre)
M2	Sugar cane press mud with ash (500 kg/acre)
M3	DOC and Rockphosphate, vermi-wash/urine spray
M4	Cow dung / urine slurry (3 sprays of 5 litre/acre)
M5	Matka khad, amruth pani



Farmer Excursion

As a remuneration and incentive for the farmers participating in the Agronomic Data Monitoring (ADM), a four days excursion was organized from 3rd to 6th December 2003 in which 101 farmers and 13 members of the Maikaal Extension Team participated. The excursion involved a visit at the Regional Cotton Research Station at Khandwa (M.P.), visits to organic cotton projects in Yavatmal and the participation in a Kissan Mela at the Central Institute for Cotton Research in Nagpur (MH).

From the excursion farmers were interested to try three cotton varieties in Maikaal region that they saw (Jawahar Tapti, Surabhi & Pratima). They also showed interest in the composting method (Liquid manure) and the contour making in the sloppy fields for preparing irrigation channels as shown by Mr. Sharma in Dorly village in Yavatmal. These innovations could be explored in field trials in the Maikaal region.

Packages of Practices

PoP Organic Cotton

In November we started preparing for the development of Package of Practices (PoP) for Organic Cotton. In collaboration with a core group of the Maikaal Extension Team, the relevant topics were identified. The structure of the PoP was defined as follows:

Package of Practices for Organic Cotton

1 Introduction
- 1.1 Why Organic Cotton?
- 1.2 Maikaal bioRe
- 1.3 Standards
- 1.4 Inspection and Certification

2 Cotton
- 2.1 Botany
- 2.2 Site Requirements
- 2.3 Varieties
- 2.4 Quality Aspects

3 Soil Management
- 3.1 Soil Properties
- 3.2 Crop Rotation
- 3.3 Green Manures & Intercrops
- 3.4 Compost

4 Crop Nutrition
- 4.1 Nutrient Requirements
- 4.2 Organic Manures
- 4.3 Mineral Fertilizers
- 4.4 Liquid Fertilizers
- 4.5 Bio-Fertilizers
- 4.6 Bio-dynamic Preparations

5 Pest and Disease Management
- 5.1 Preventing Pests and Diseases
- 5.2 Life-Cycles of Pests
- 5.3 Seed Treatment
- 5.4 Bio-Control
- 5.5 Natural Pesticides
- 5.6 Monitoring Pests and Diseases

6 Weed Management

7 Irrigation

8 Harvest and Post Harvest Operations

9 Rotation Crops

10 Crop Economy

11 Annex

The present Maikaal Operating Manual was translated into English and further available material was collected. Frank Eyhorn will now elaborate a first draft of the PoP, involving other sources of know-how and information (internet, literature, other cotton projects, experts). This draft will be discussed with the core group of the Maikaal Extension team and presented in the Stakeholder Meeting (see chapter below).

PoP Drip Irrigation

The IRMA MTS study on adoption of drip irrigation has found that most farmers adopt drip irrigation only as a coping mechanism for water scarcity. It has also observed that farmers are unable to get the maximum out of this technology. The study has helped to identify the needs of farmers which can be fulfilled with a package of practices and other dissemination material. These shall now be developed and made available to the farmers of the Nimar valley starting with the farmers of the bioRe project. This shall be made available to them by April when the farming season starts and the farmers are making their farming decisions.

Participatory Technology Development

In Kharif 2004 it is planned to take up on-farm experiments on promising organic farming and irrigation technologies with interested farmers. Inspiration for this will come from the results of the plot trials, the exposure of the ADM farmers in the farmer excursion (see chapter above) and ideas contributed by other projects during the Stakeholder Meeting. These experiments are certainly implemented on a voluntary basis: the Maikaal Research Team assists interested farmers in the implementation and evaluation of simple field trials on their farms.

Stakeholder Meeting

The second stakeholder meeting will be held on Saturday, 28th of February, 2004 within the premises of Maikaal bioRe. Its aims are:

1) To present the work done so far and seek feedback on the same
2) To present the upcoming plans and seek feedback on the same
3) To gain from the grass roots experience of practitioners in the process of making the research project more relevant for the stakeholders
4) To develop long term synergies with each other through the formation of an active Indian cotton group

The meeting shall proceed with the presentation of the work done so far followed by the plans for the work ahead. Each presentation shall be followed by a round of discussion cum feedback.

Those interested to attend the meeting should get in touch with Vaibhav Bhamoriya at v.bhamoriya@cgiar.org or at the following address:

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