

Agrocel Industries Ltd
Koday, Ta: Mandvi, Kutch
Gujarat
India
370460
India

Agri Impact Assessment Study for Organic Cotton Farmers of Kutch & Surendranagar

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Dalal Mott MacDonald
501, SAKAR II
Ellisbridge
Ahmedabad 380 006
Gujarat, India
Tel: 079-26575550

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1 Introduction

1.1 About The Client

Agrocel Industries Ltd is a joint venture company of Shroff Group of companies (89%) and Gujarat Agro Industries Corporation (11%), engaged in providing agro-input services to farmers in India, through their agro-service centres spread all over India. It provides a range of services to farmers, the key services being agricultural inputs, technology support, market support, and training for both, organic and conventional crops. Agrocel has its base in Mandvi Taluka of Kutch district of Gujarat in Western India. Agrocel is in agriculture-related business working with over 20,000 farmers across India with total turnover of Rs.761.42 Lacs for the year 2002-2003.

Agrocel's **Mission** is to promote Organic cotton farming in Gujarat in general and Kutch and Surendranagar districts in particular, and as apart of this they assist farmers in Organic Cotton growing activities and provide all round support, including the market access for their Organic cotton, within and outside the country. Agrocel is also organizing manufacturing and value added processing of such organic cotton in environmentally friendly ways and market value added products in the international markets through reputed organizations like Traidcraft and Vericott U.K. Thus, Agrocel help the farmers to increase their income by bringing them into the mainstream of the economy.

1.2 Goal of Agrocel

As a part of their agriculture input supply business, Agrocel came across the sorry plight of smallholder cotton growers, particularly in Kutch and Surendranagar districts of Gujarat. This was the lot, which was struggling for survival, as they were compelled to borrow money at high interest rate, for purchasing fertilizer and costly pesticides for cultivating conventional cotton crop in their land. Agrocel came forward to support this less privileged group through their resources and innovative approach. Outcome of this was a well-conceived integrated project of Organic Cotton cultivation in these areas, specifically to support smallholder cotton growers and addressing set of their problems.

Vericott U.K. & Agrocel roped in Traidcraft Exchange, U.K, to support the fair trade & project management aspects of the initiative. The objective was to get direct market access for organic cotton cultivated by these small holders and also open new avenues by co-ordinating value added processing from this cotton fibre for high value European markets. As a part of this exercise, Agrocel co-ordinated and organized certification of their land through internationally recognised certifying agency SKAL, Netherlands.

Furthermore, with the help of Vericott U.K, Traidcraft Exchange, U.K and Agrocel was able to get funding for this project from “ SHELL FOUNDATION, U.K”, and thus this project “Straight From Cotton Fields” with 3 years initial project period, came into existence and this project successfully completed 3 years period in March, 2004.

Now, at the end of 3rd year, all the stakeholders felt the need for an Objective evaluation and review of various aspects of this project, and Agrocel approached the consultant, Dalal Mott MacDonald Pvt. Ltd, Ahmedabad, Gujarat- India for this purpose.

About The Consultant

Dalal Mott MacDonald (DMM) – incorporated earlier as Dalal Consultants and Engineers Limited – is a leading multi-disciplinary management and engineering consultancy organisation based in India, with offices nationwide.

As part of the Mott MacDonald Group, DMM is able to draw on world-class technical and managerial resources comprising over 8000 staff in more than 60 strategic centres world-wide. DMM is engaged in planning and development, touching many aspects of everyday life – from water, energy, industry, environment and transport to building, healthcare, tourism and social development. Across these sectors DMM works for national and local governments, public and private utilities, industrial and commercial companies, investors, developers, banks and financial institutions, international and bilateral funding agencies and private entrepreneurs. DMMs’ strengths enable our clients to realize their projects optimally from concept to commissioning. With 750 professionals we take care of the entire process – including providing advice on the best procurement route and the optimum approach for maintaining the project once it become operational.

2 Project Background

As indicated earlier, this SFCF (Straight From The Cotton Fields) has been implemented by Agrocel Industries Ltd, and it is an attempt to help in creating economically, environmentally and socially sustainable livelihoods for smallholder cotton farmers in Western India. The broad objectives specified at the start of the project were for addressing the problems of bankruptcy, rural-urban migration, checking the deterioration in worsening soil and water quality, crop vulnerability to pest attack and tackling the problems of adverse climatic conditions, as well as providing better market access for their agriculture produce.

Agrocel have built up relationships of trust with the farmers over a 12 years period, and they are very well placed to implement quality-farming improvements with them. Agrocel operate through their Agro service centres spread across the country, and there are 9 such centres in Gujarat.

It is worth mentioning here that when this project needed financial support to spread this concept on larger scale, Agrocel partners again helped them and Funding was tied-up with Shell Foundation U.K, an organization working for environment protection and supporting economically weaker lots in developing countries including India. This project was nicknamed “Straight from the Cotton Fields”, or shortly SFCF. This project was of 3 years duration and has successfully completed in March 2004. Now, on completion of this SFCF project, as per terms of funding agencies and provisions made in the overall project budget, “**An Impact Assessment of these Organic Cotton Farmers from Gujarat**” is to be made to measure the physical target achievement as well as intangible achievements towards the overall project objectives and purpose as desired by all stake holders to quantify the gains from this project.

2.1 Project Objectives

At the start of this project, “Overall objectives and indicators” for this project were clearly defined by Vericott & Agrocel, in consultation with their partner organization, Traidcraft Exchange, U.K, and the funding agency Shell Foundation. Apart from main objectives, details on project purpose and indicators were also clearly indicated in the proposal form. This is forming the baseline for carrying out the proposed Impact assessment study for SFCF project.

2.2 Purpose and Indicators of the Project

The contribution made by this Organic Cotton growing project will be evidenced by following Indicators and keeping in view these indicators, measurable responses will be obtained from actual beneficiaries using close ended questions.

Economic indicators –

- Stabilization of overall numbers employed
- Increasing incomes,
- Increasing value of cotton,
- Functioning market access,
- Year wise Sales figures (From Agrocel)

Environment/health indicators

- Stabilization of water /soil quality (Analysis records from Agrocel)
- Health of Farmers and Farm workers.

Social indicators

- Reduction in migration to cities (Through individual & Group discussions)
- Less indebtedness,
- Fewer suicides (Question altered as Reduced Financial hard ships).

2.3 Scope of Work

The main objectives of the study are as follows:

- Based on the secondary information regarding their member farmers to be given by Agrocel, define stratification of beneficiary farmer groups for fairly distributed sample selection purpose.
- Based on given Objectives and indicators of SFCF project, develop Quantifiable (measurable) Indicators for making objective evaluation between different stratified groups.
- Define objectives of field survey and data to be obtained from various stake holders of the project
- Undertake field survey of smallholder cotton growers (the ultimate beneficiaries) for collecting direct information, through structured questionnaire, as well as informal discussions regarding the phase-1 project.
- Make analysis of field data to clearly bring out the impact of phase-1 project, as regards defined objectives and indicators of the SFCF (Phase-1) project on beneficiary groups and in project areas.
- Provide this Impact analysis in report form to client, with salient observations emerged from this Impact Assessment study, as regards the said project.

3 Approach and Methodology

3.1 The Approach

The overall approach in the study is to use an in-house team of experts who has planned and conducted the study. The emphasis was on following issues:

- Development of an effective work plan for execution of the assignment based on a clear understanding of the nature and scope of work.
- Efficient planning to select the villages / clusters of farmers for field investigation.
- Development of structured questionnaires and check lists for field investigations and collection of all relevant data through primary and secondary data collection.
- Proper generation of output tables was ensured through active interaction between data analyst and the Consultant, interpreting the output of data analysis.
- Data generated from the study have been collated, processed, interpreted and analysed so as to provide objective recommendations and observations regarding Impact of SFCF project implementation by Agrocel in their project areas.

3.2 The Methodology

The study can be put in following three stages, viz.:

- Secondary data collection from Agrocel Office at Koday, Mandvi.
- Collection of Primary data through field survey conducted in Kutch & Surendranagar districts.
- Secondary Data collation from Agrocel office and service centres, data processing, analysis and report preparation

3.3 The Field Survey

Based on the records of Agrocel about member farmers, a list of potential respondents for field survey was prepared for conducting the field survey. Required field survey was carried out for collecting relevant information / data, with approximately 66 contacts, in project area. The actual break-up of field survey contacts have been given below:

Sr.	Target Group Particulars	Approx. Contacts
1	Agrocel head office officials for farmers' base data	3
2	Agrocel Service Centers in project areas	3
3	Small holder Cotton farmers of Kutch District	
a.	Abdasa Taluka	15

b.	Mandvi Taluka	15
4	Small holder Cotton farmers of Surendranagar District	
a.	Dhangdhara Taluka main two beneficiary villages, Ramgarh and Mota Ankevalia	30
Total Samples		66

- Undertake field survey of smallholder cotton growers (the ultimate beneficiaries) for collecting direct information, through structured questionnaire, as well as informal discussions regarding the phase-1 project.
- Make analysis of field data to clearly bring out the impact of phase-1 project, as regards defined objectives and indicators of the SFCF (Phase-1) project on beneficiary groups and in project areas.
- Provide this Impact analysis in report form to client, with salient observations emerged from this impact Assessment study, as regards the said project.

3.4 Questionnaire Design

Keeping in view the objectives of the study the questionnaire was designed.

The questionnaire was framed in such a manner that it could be easily understood by the respondents (Farmers and their family members). The questionnaires were pre-coded with fixed response categories. The questionnaire was designed in a manner, which could cover all the important issues related to the study.

Major issues covered in the questionnaire were:

- Demographic details of the farmer, including his family size, Ownership of house, type of house, other facilities in house like electricity, water, Cattle Shed, Toilet, Kitchen etc.
- Land Holding particulars of the Farmer including total land and land under Organic Cotton cultivation, other crops taken as alternate or inter crops in the same land.
- Facilities available for farming such as Tractor, Well / tube well, and Electric Motor / Oil engine pump
- Increase/ Decrease in yield of Cotton and the same in terms of actual quantities and percentage
- Quality of Cotton, and visible parameters of Quality
- Price realisation in terms of percentage
- Improvement in Soil and Water quality farmers; perceptions and visible parameters
- Farmers' perception about reduction in indebt ness,
- Farmers' perception regarding checking in migration from family and Village

- Farmers' perception about reduction in financial hardships (lesser Suicides or such conditions)
- Over all determination about adoption of Organic Cotton farming
- Intention of increasing the area of Organic cotton farming from present level.

The questionnaire used for the Field Survey has been given in **Annexure-1**.

3.5 Data Entry, Processing and Report Preparation

After editing of questionnaires, the data entry was done in computer using Tailor-made software made in Oracle-SQL. Sufficient validation checks were provided for elimination of inconsistent records due to errors inflowing at field level or errors at the time of data entry.

Although the field supervisors examined the completed questionnaires in the field, the questionnaires were re-edited at DMM office. This re-examination covered checking all skip sequences and checking the information recorded in the filter questions. Computer based checks were done to clean the data and remove inconsistencies. In cases where information was missing or incorrect entries were detected, such entries were removed from the database. Finally, 59 valid questionnaires were processed for the study analysis.

The pre-coding of the questionnaires was done in a manner that facilitates generation of required output tables. The pre-coding also facilitated processing of data in different combinations like district-wise, village-wise comparisons, etc.

3.6 Limitations of the Study

Like all other such study, this study also has few limitations, which may be kept in mind while evaluating the outcome of the field survey responses and inferences derived from such responses.

A base line survey of beneficiary farmers was conducted at the start of this project, by IRFT- Mumbai. However, since at that time number of participating farmers was very small and mainly concentrated in the Kutch district, IRFT also enlarged the sample size by taking responses of non-member farmers (2 non-member for every 1 member farmer) and used these responses for overall base line study. However, responses of non-member farmers now at the end of this project is irrelevant and would be misleading for using them as reference base-line parameters for factual information emerging from current study and their comparison. It may be noted that we ensured that we took a representative sample of farmers, who were covered in the earlier baseline study and still associated with SFCF project.

Afterwards, many more farmers have been added gradually over the operation of the project during three years span and geographical distribution also enlarged from only Kutch area to cotton growing areas of adjoining Surendranagar district also.

The current strength of 620 beneficiary farmers is almost 18 times the original member numbers.

4 Survey Findings

4.1 Geographical Coverage of the Survey

According to the information provided by the client, the majority of the beneficiaries from two districts Kutch and Surendranagar. The names of villages covered with the sample size are as shown in table below:

Table 4.1: Name of the Villages covered During Survey

No.	Village	District	No. of contacts
1	BHANADA	Kutch	7
2	DON	Kutch	2
3	HARIPURA	Kutch	3
4	JAKHANIYA	Kutch	1
5	KHIRSARA	Kutch	1
6	MADANPURA	Kutch	1
7	MOTA ASAMBIYA	Kutch	3
8	MOTA GUNIYASAR	Kutch	1
9	NANI RAYAN	Kutch	1
10	NAVA VAS	Kutch	1
11	NODEVANDH	Kutch	1
12	PIYAVA	Kutch	3
13	TALWANA	Kutch	3
14	MOTA ASAMBIYA	Surendranagar	15
15	RAMGADH	Surendranagar	16
	TOTAL		59

As it can be observed from above table, we took total 28-farmer sample from Kutch district during the survey. These farmers were from two talukas of Kutch district, Mandvi and Abdasa. Rapar talukas farmers were not included in this survey as they are very recent members and has completed only 2 year of their operation.

Similarly, we surveyed 31 farmers of Surendranagar district, and all of them were from Dhangdhara Taluka villages. These farmers were not there in 1st year of operation, and were not included in earlier baseline survey conducted by IRFT-Mumbai.

4.2 Demographic Data Derived from the Survey

4.2.1 Year of joining distribution of Member Farmers

This project started in the year 2001-02 from Kutch district and later on Surendranagar district was also included. In Kutch, originally started in Mandvi and Abdasa talukas, while in Rapar Taluka it has

started only in the last year of the project. Year wise/ District wise distribution of surveyed Farmer is given in following table 4.2.

Table 4.2 : Year of Joining Agrocel Project

Sr. No.	Year	No. of Farmers	in Percentage	% of Total
Kutch				
1	2001-02	16	57	27
2	2002-03	9	32	15
3	2003-04	3	11	5
Surendranagar				
1	2002-03	31	100	53

It is worth mentioning here that we have tried to include as many farmers as possible, who were included in earlier baseline survey conducted by IRFT, Mumbai and were member at that time and still they are part of Agrocel project. We have included 16 farmers, out of total 32 farmers, which were part of original baseline survey at the start of the project. It is also worth noting that out of total farmers originally joined in this project almost 90 % are still with Agrocel project. Farmers, who have left from this scheme, have left for their personal reasons like non-availability of irrigation sources and electric power for irrigation and inability to maintain organic cotton farming agronomy practices. Agrocel did tried to bring them back again in Organic cultivation, but due to their own limitations these members were not willing to rejoin in Organic cultivation. Since, total number of these farmers was very small it has not affected overall target of Agrocel and hence they have not persuaded the matter further.

4.2.2 Average distance from Agrocel Service centres

Providing necessary agriculture input services and support to Organic Cotton cultivators of the area was an important aspect of this SFCE project. It was imperative to have continuous interactions with farmers and educating them about various aspects of Organic cotton cultivation, providing them necessary Organic inputs like organic pest control products, Organic manures and making them aware about various aspects of harvesting, so that farmers get quality production in their farms.

Keeping in mind this aspect, details of Average distance of Agrocel service centres, from member's farm details were also collected, and the same has been tabulated here below:

Table 4.3 : Average Distance from Agrocel Service Centre

Sr. No	Distance	In Number		In Percentage		% of Total
		Kutch	Surendranagar	Kutch	Surendranagar	
1	1 km to 5 kms	5	0	18	0	8
2	6 kms to 10 kms	18	0	64	0	31

3	11 kms to 15 kms	3	16	11	52	32
4	More than 16 kms	2	15	7	48	29
	Total	28	31	100	100	100

As it can be observed from above table, majority farmers in Kutch district are within a distance of 10 Km from Agrocel service centre, because there are 3 Agro service centres operating in the district.

In case of Surendranagar, this distance is more than 15 km as there is only 1 service centre catering the needs of entire district. As number of Organic cotton cultivators increases in Surendranagar, there will need of extending agro input services for them by Agrocel. It is worth to note that Agrocel is opening two new farmers' service centres at Khintla (in Chotila Taluka) and at Sokda (in Dhangadhara Taluka)

During the field survey and interactions with farmers, they expressed the need for close interactions with Agrocel field staff and in this reference it is necessary to provide more number of Service centres near to members' villages to give efficient inputs for Organic Cotton Cultivation in those areas.

4.2.3 Family size Particulars of Member farmers

Details regarding family size are useful in indirectly deriving the member farmer's social information. In Kutch district 57 % farmers are having family size in the category of 1 to 5 members, while 36 % farmers are having 6 to 10 members, and 7 % farmers are having more than 11 members. This shows that there is highest number of nuclear families engaged in farming, however system of joint family engaged in family owned farming activities is still prevailing in Kutch.

In case of Surendranagar district also same is the case, highest number in nuclear family size, i.e. 63 %, while joint family number in 37 %.

Table 4.4 : District wise Family Size Distribution

Sr. No	Members	In Number		In Percentage		% of Total
		Kutch	Surendranagar	Kutch	Surendranagar	
1	1 to 5 members	16	21	57	68	63
2	6 to 10 members	10	9	36	29	32
3	More than 11 members	2	1	7	3	5
	Total	28	31	100	100	100

The important inference from this can be that due to conventional farming, many joint families engaged in cotton farming were compelled to go for nuclear size and some families had migrated to urban areas for employment purpose. However, still there is existence of joint families in these area indicate that such migration has been checked in subsequent period, and this has been confirmed by many respondent in latter part question about migration to urban areas.

4.2.4 Economic Status of Member Farmers

(i) Ownership of House and Type of house

It is important to note here that all respondents currently own pucca houses as against as shown in earlier baseline survey small holders did not own pucca houses at that time.

In case of Kutch all houses are located on the farm itself and hence at a distance from one place to another. In Surendranagar district all farmers are living in villages, near to their farming land and mostly in their community groups.

Table 4.5 : Ownership / Type of House

Sr. No.	District	Own House	Pucca House
1	Kutch	28	28
2	Surendranagar	31	31

Most of the respondent in Abdasa taluka were Sikh families migrated from Punjab, and they are living Pucca houses made from cement blocks as against other respondents having Pucca house made of conventional material available from that area. These Sikh families are permanently settled in the area. As of now economically they are in equal position with local farmers in the area.

(ii) Facilities available in house

As regards facilities available in their houses, all houses are having electricity and water availability. 57 % houses in Kutch and 55 % houses in Surendranagar district had Pucca cattle shed or covered space for keeping cattle. In remaining cases cattle were kept under trees in Kutch and in open in Surendranagar districts.

Almost all respondents are having toilet facilities, except in Kutch district some are not having appropriate facilities. All respondents are having Kitchen facilities in Pucca building.

Table 4.6 : Facilities Available in House

Sr. No	Facilities	In Number		In Percentage		% of Total
		Kutch	Surendranagar	Kutch	Surendranagar	
1	Electricity	28	31	100	100	100
2	Water	28	31	100	100	100
3	Cattle Shed	16	17	57	55	56
4	Toilet	25	31	89	100	95
5	Kitchen	28	31	100	100	100

As observed from above details it can be inferred that both these districts are relatively well developed districts and farmers are in good financial conditions, as compared to other backward areas of the state.

It is interesting to compare house ownership information with the details obtained during base line survey conducted by IRFT. Details obtained regarding housing facilities owned by respondents are summarized in following table 4.7 for ready reference:

Table 4.7: Percentage distribution of the farmers according to the housing facilities

Housing facilities and Characteristics	Cases (N=97)	Percentage
1 Type of House		
Bungalow	3	3.1
Kuccha House	29	29.9
Farm House	5	5.2
Pucca House	59	60.8
Cottage	1	1.0
Type of Ownership		
Ancestral	60	61.9
Owned by self	30	30.9
Rental	3	3.1
Staying Since		
Since birth	20	20.6
More than 10 years	46	47.4
More than 20 Years	7	7.2
More than 30 Years	12	12.4
More than 40 Years	8	8.2
More than 50 Years	2	2.1
Ownership of Ancestral home		
Exclusively owned by self	28	28.9
Jointly Owned	3	3.1
Owned by Parents	58	59.8

Source: IRFT Baseline study Chapter 3- Table 3

As it can be observed from above table almost 64 % farmers owned Pucca house and 30 % owned Kuchha house at the start of SFCF project. Now, 100 % farmers own Pucca house with required basic amenities like toilet, Bathroom, Kitchen etc.

(iii) Land holding and Organic certified Land of Respondents

District wise details regarding total land held by the respondent farmers and also size of certified Organic land in that total land have been collected in this survey. As observed from following table, in Kutch district approx 27.86 % land have been certified as organic cultivation areas, while in Surendranagar district this percentage level is 55 % of the total land held by the respondents.

Table 4.8 : Land Holding and Organic Certified Land of Members

District	Total Land	Under Organic Cotton	% of Total
Kutch	667.5	186	27.86
Surendranagar	590	325	55.08

As regards distribution of size of land holding details have been summarized in following table. Kutch and Surendranagar area farmers having land holding up to 20 Acres or less falls under smallholder category, as average land fertility is lower in these districts. As observed from following table in Kutch district 78.57 % farmers are holding 20 Acres or less land and hence fall under smallholder category. Similarly in Surendranagar district also almost 74.19 % farmers are falling under small holders category.

Table 4.8 : Land Holding size wise Distribution Pattern

Sr. No	Land	Total Number of responses with size of Land holding		Total number of responses as per Size of Land holding category under Organic Cotton cultivation	
		Kutch	Surendranagar	Kutch	Surendranagar
1	< 5 acres	2	1	14	7
2	6 acres to 10 acres	7	8	13	13
3	11 acres to 20 acres	13	14	0	8
4	more than 20 acres	6	8	1	3
	Total	28	31	28	31

As observed from above table, Farmers have been clubbed as per their total land holding size in 4 different categories. Furthermore, in the same manner as per size of land holding under organic cultivation also they have been grouped.

The clear inference emerging from this is that out of 28 respondents in Kutch, 27 farmers are having land holding under Organic farming, which is size wise falling under small holding, (as due to local agro-climatic conditions of Kutch, farmers holding less than 20 acres of land is defined as small holder farmer).

Similarly in Surendranagar district also out of 31 respondents, 28 are coming under category 3, as smallholder farmers.

Thus, it is clear that majority beneficiaries of this SFCF programme run by Agrocel are falling under smallholder category.

(iv) Alternative crops taken in Organic certified land

Details given in the following table, about the alternate/ rotational crops taken after cultivating the Organic cotton crop, in Organic certified land in Kutch and Surendranagar districts is self-explanatory. However, it is worth to mention here that in Abdasa taluka of Kutch, cotton crop is stretched almost up to 9 months period or more and in remaining period land is left vacant. In many cases, farmers are leaving the land uncultivated for one season, particularly where large land holdings are available at relatively cheaper cost or on cheaper lease rents.

In Surendranagar district, due to paucity of rain and irrigation facilities, in organic land many farmers do not take second crop.

Table 4.9 : District-Wise Alternate Crops taken in Organic Certified Land

Sr. No.	District
	Kutch
1	CASTOR
2	MILLETS (Bajari)
3	GREEN GRAM
4	GREEN MEANURE
5	GROUND NUT
6	SORGHUM
7	MUSK MELON
8	MUSTARD
9	GREEN FODDER
10	RAPE SEED
11	SESAME
12	KIDNEY BEANS
13	VEGETABLES
14	WHEAT
	Surendranagar
1	CUMIN
2	SORGHUM
3	SESAME
4	WHEAT
5	MILLET (Bajari)

(v) Farming Facilities available with Members

Details regarding farming facilities available with sample respondents, also reveals about their economic conditions and resources available for farming in general and organic cultivation in particular. These details are about respondent farmers and for the total universe it may vary as regards specific components. However, it does give specific insight about district wise status of farmers' condition.

Table 4.10 : Farming Facilities available with Members

Sr. No	Farming Facilities	In Number		In Percentage		% of Total
		Kutch	Surendranagar	Kutch	Surendranagar	
1	Tractor	21	14	75	50	59
2	Tube Well	28	15	100	54	73
3	Electric Pump	28	15	100	54	73

As observed from the above details, 75 % respondents are owning tractor in Kutch district, while in Surendranagar district this figure is only 50 %. As regards tube well facilities and Electric motor/pump on tube well, 100 % farmers in Kutch district are having this facilities, while in Surendranagar district only 54 % farmers are having such facilities.

Thus, there is mark difference in economic conditions of Kutch and Surendranagar farmers, as far as the farming facilities available with them. COMMENT: perhaps the differences between the two districts can come here.

4.3 Survey findings About SFCE (Organic Cotton) Project Indicators

4.3.1 Economic Indicators

- (i) Increase in yield after adopting Organic Cotton Farming

Table 4.11 : Increase in Yield after Adopting Organic Cotton Farming

Sr. No	Increase	In Number		In Percentage		% of Total
		Kutch	Surendranagar	Kutch	Surendranagar	
1	Yes	8	3	29	10	19
2	No	20	28	71	90	81

As regards farmers perceptions about the increase in the cotton yield after adopting organic cotton farming, in Kutch district 29 % farmers have informed that there has been increase in yield, but 71 % farmers have informed that there was no marked difference in yield. COMMENT: need explanation on why no difference with majority of farmers as explained in the case of Surendranagar.

In Surendranagar district almost 90 % farmers have replied that in last season there was no increase in cotton yield after adopting organic farming. However, they also attributed the cause of failure in increase due to adverse weather conditions for cotton growing in that area. It is also worth to mention that in Surendranagar district organic cotton farming is comparatively newer, than Kutch and in the initial period till land is fully transformed for organic cultivation there are chances of no increase in the yield or even sometimes decline in yield (negative gain).

Table 4.12 : Increase in Yield in Percentage

Sr. No	Increase in Percentage	In Number		In Percentage	
		Kutch	Surendranagar	Kutch	Surendranagar
1	10	2	0	25	0
2	15	1	0	12.5	0
3	20	3	0	37.5	0
4	25	1	0	12.5	0
5	30	1	1	12.5	33
6	Don't know	0	2	0	67
	Total responses	6	3	100	100

As regards farmers' perception about increase in yield quantification, also responses were varying vast in nature, as it can be observed from the above table.

During the field studies when it was observed that there are several incidences of decrease in yield also and hence we also recorded these particulars about decrease in the yield and this detail is given in following table no.4.13. As it can be observed from this detail, 20 % farmers told 10 % decrease in yield, 5 % told 30 %, 25 % told decrease as high as 40 % in yield, while 5 % (1) farmer told decrease of even 50 % in yield. 30 % farmers told that decrease was there, but could not quantify the decrease in exact percentage terms.

Table 4.13 : Decrease in Yield in Percentage

Sr. No	Decrease in Percentage	In Number		In Percentage	
		Kutch	Surendranagar	Kutch	Surendranagar
1	10	4		20	0
2	25		15	0	54
3	30	1		5	0
4	40	5		25	0
5	50	1		5	0
6	90	3		15	0
7	Don't know	6	13	30	46
	Total res.	20	28	100	100

As mentioned previously, approx. 85 % farmers of total number of responses told that there was decrease in yield, and distribution of those farmers, based on decrease in yield % grouping distribution has been made in above table.

(iv) Improvement in Cotton Quality and Member's perception

Farmers' perception regarding improvement in cotton quality was obtained in field survey and this detail is summarized in following table 4.14. As it can be observed from the table in Kutch 54 %

farmers' had perception that Cotton quality has improved, while in Surendranagar district this percentage was 48 %, and overall it was 51%.

As it can be observed from following table, overall 49 % farmers had perception that there is no significant improvement in quality of cotton after adopting organic cultivation. In case of Surendranagar district this perception was as high as 52%.

Table 4.14 : Improvement in Cotton Quality

Sr.	Improvement	In Number		In Percentage		% of Total
		Kutch	Surendranagar	Kutch	Surendranagar	
No						
1	Yes	15	15	54	48	51
2	No	13	16	46	52	49

Details regarding quality improvement, was also obtained in terms farmers perception of quality, like increase in brightness of cotton, increase in Staple length of cotton fibre, increase in weight etc;. This perception is important as price realization for organic cotton is directly related with improvement quality of Organic cotton.

It is worth noting that in Kutch district almost 80 % farmers informed that there was increase in brightness (whiteness), 47 % felt that there was increase in staple length, 7 % felt that there was increase in weight of cotton after adopting organic cotton farming. This perception in Surendranagar district was different and 47 % farmers informed that there was increase in weight of cotton, 43 % felt improvement in brightness of cotton and 27 % felt increase in staple length of cotton.

Table 4.15 : Perception about the Improvement in Cotton Quality

Sr.	Quality	In Number		In Percentage		% of Total
		Kutch	Surendranagar	Kutch	Surendranagar	
1	Brightness	12	1	80	7	43
2	Staple Length	7	1	47	7	27
3	Weight	1	13	7	87	47
4	No specific perception	3		20		10

(v) Increase in Price realization of Organic Cotton

Farmers' response regarding increase in price realization for their organic cotton, in comparison to conventional cotton and BT cotton was obtained in field survey. It is worth noting here that almost 98 % farmers confirmed that there was increase in price realization, both in absolute terms as in terms of

net money being realized by these farmers. Individual percentages of Kutch and Surendranagar district have been summarized in following table 4.16.

Table 4.16 : Increase in Price Realization

Sr. No	Increase	In Number		In Percentage		% of Total
		Kutch	Surendranagar	Kutch	Surendranagar	
1	Yes	27	31	96	100	98
2	No	1	0	4	0	2

During the field survey we also tried to get details about such increase in price realization in terms of percentages increase and responses obtained are tabulated in table 4.17. Here, we have grouped the responses in percentage range indicated by them, and such numbers have been given in following table 4.17.

Table 4.17 : Increase in Price Realization in Percentage

Sr. No	Increase Percentage	In Number		In Percentage		% of Total
		Kutch	Surendranagar	Kutch	Surendranagar	
1	4%	0	15	0	48	26
2	8%	25	16	93	52	71
3	10%	2	0	7	0	3

Here, it is important to note that this increase in price realization for organic cotton is for procurement of cotton at farmers' door step by Agrocel, and hence farmer are benefited further by at least 3 to 5 % in terms of savings in their expenses of transportation and market access expenses for bringing cotton to Agricultural Produce Marketing Corporations (market places) for selling it. Furthermore, farmers are also gaining 8 % more realization as Agrocel pay them minimum this much higher price in comparison of the prevailing market prices at the time of sell of such cotton.

Farmers also get benefit of at least 5 to 7 % saving in chemical pesticide cost, as they use organic pesticides being supplied by Agrocel and also prepared by them selves from locally available materials under the guidance of Agrocel Field staff, at various service centres in this project area. Agrocel also give them 50 % discount in such farm input, compared to prevailing market prices, as they provide such input almost on no profit, no loss basis. Thus, total net realization for farmers, on and average works out at least 14 to 20 % higher, as compared to conventional cotton crop cultivated by other farmers from the area, or say which is higher by 17 % on net gain basis.

4.2.5 Health Aspect of Farmers

Farmers' response regarding improvement in their health (including their family members and farm workers working in farm) after adopting organic cotton farming was obtained during the field survey, and details regarding their responses have been summarized in following table 4.18.

Table 4.18 : Responses Regarding Improvement in Farmers' Health

Sr. No	Health Benefits	In Number		In Percentage	
		Kutch	Surendranagar	Kutch	Surendranagar
1	Yes	28	1	100	3
2	No	0	0	0	0
3	Don't Know	0	30	0	97

In Kutch district 100 % farmers felt that there was marked difference in improvement of their (farmers and labours working in field) health, and this was felt due to sharp decline in incidences of sicknesses due to use of chemical pesticides and fertilizers. However, in case of Surendranagar district only 1 farmer has responded that there was improvement in health and rest 97 % farmers have not felt clearly that there was any improvement in their health. Again here we have to note that period for which these farmers have undertaken Organic cotton farming is very short for experiencing improvement in their health, and usually such improvement in health is experienced only after taking at least 2 to 3 consecutive season of Organic cotton cultivation.

4.2.6 Perception about Soil and Water Quality improvement

As a part of main objectives of their SFCF programme, and also to measure the direct gains from adoption of Organic Cotton farming in these areas, "Improvement in Soil and Water Quality" was important objective as well as important indicator for assessment of environmental impact of adoption of Organic Cotton farming in the project areas.

(i) Soil Quality Improvement

Here, the soil quality is improving is principally in the form of improvement in soil permeability, with adoption of Organic farming, it reduces soil hardness caused by chemical fertilizers or salinity and there by allows crop roots to go deeper in soil for water and nutrients availability to plants. Improvement of soil quality is also felt when land is prepared for crop by tilling, it is less efforts and time required for good quality soft land. Such soft land also has higher capacity of retaining moisture, and when using drip irrigation it gives best results, even with less amount or irrigation water. Difference of soil quality improvement and soil fertility improvement as explained by Mr. Hasmukhbhai was in this regards and appropriate in his terms.

During the field survey, farmers' perception about improvement in soil quality was obtained. It is worth to mention here that farmers had very clear perception about the improvement in Soil quality after adoption of Organic Cotton farming. In Kutch district 86 % farmers informed that there was improvement in soil quality, while in Surendranagar district all farmers had given favourable perception about improvement in soil quality, but their experience was comparatively for shorter duration. These responses have been tabulated in following table 4.19.

Table 4.19 : Soil Quality Improvement

Sr. No	Soil Quality Improved	In Number		In Percentage		% of Total
		Kutch	Surendranagar	Kutch	Surendranagar	
1	Yes	24	31	86	100	93
2	No	4	0	14	0	7

As regards the improvement in Soil quality, farmers were asked to give precise perception of soil quality improvement, where majority of them have indicated that the soil has become soft, more permeable for water and nutrient percolation, and as a result of this over the years plant growth is improving as compared to BT cotton or Conventional cotton cultivating in the area.

These details were further substantiated by obtaining Soil quality reports for respective farmers from Agrocel farmers' data records (In Kutch district). In Surendranagar district such soil testing work was under progress hence such reports were not available. However, farmers have orally confirmed positively regarding improvement in Soil quality in Surendranagar district also.

(ii) Water Quality Improvement

During the field survey, farmers' perception about improvement in Water quality was obtained. It is worth to mention here that farmers were not able to give very clear perception about the improvement in water quality after adoption of Organic Cotton farming. In Kutch district 25 % farmers informed that there was improvement in soil quality, while 36 % informed that there was no mark improvement in water quality and 39 % were unable to give their response on either side.

During our discussions with Agrocel field staff and official and also with farmers, it was found that in Kutch district most of the Organic Cotton cultivators were getting their water supply from ground water sources (Wells & Tube wells) and since majority of them were not using surface water like water from lake or check dams or canal, the question of improvement in water quality was not directly relevant for them.

Furthermore, during our discussion with Agrocel field staff it was found that, due higher exploitation of ground water (from tube wells) there is acute problem of increase in salinity in water due to seepage of seawater into ground water sources. This is serious problem through out the coastal areas of Kutch

and Gujarat and hence farmers were not able to give their response clearly about the improvement in water quality after the adoption of Organic Cotton farming as water salinity is increasing year after year due to ground water exploitation increasing.

In Surendranagar district majority farmers were not having any idea about improvement in water quality, as they were comparatively new in organic Cotton cultivation (2 years only) which is too short a period to get any clear perception about water quality improvement. Furthermore, most of farmers in Surendranagar district were having rain fed farming and no irrigation facilities available at their farms, hence they were unable to give clear perception about improvement in water quality after adoption of Organic Cotton cultivation. These responses and perception about improvement in water quality have been tabulated in following table 4.20.

Table 4.20 : Water Quality Improvement

Sr. No	Water Quality Improved	In Number		In Percentage		% of Total
		Kutch	Surendranagar	Kutch	Surendranagar	
1	Yes	7	0	25	0	12
2	No	10	3	36	10	22
3	No Idea	11	28	39	90	66

4.2.7 Perception about checking of Migration to Urban areas

During the farmers field survey, questions regarding migration of farmers from the respective areas were asked individually as well as this aspect was specifically discussed in farmers' group discussions held at two different location (each in Kutch and Surendranagar Districts). Farmers came out very clearly that after adoption of Organic cotton farming their indebt ness has reduced and this has helped them to keep their family united (Checking in Migration to Urban areas due to economic reasons).

Table 4.21 : Migration to Urban Areas

Sr. No	Migration	In Number		In Percentage		% of Total
		Kutch	Surendranagar	Kutch	Surendranagar	
1	Yes	17	17	61	55	58
2	No	5	0	18	0	8
3	For other reason	6	14	21	45	34

It was heartening to learn at few places in Kutch and Surendranagar district, that after adoption of Organic Cotton farming, since the farming activity has become sustainable, there was reverse migration to villages from urban areas, back in farming activities. Specific examples were quoted that

family members who had migrated earlier to urban areas in Diamond processing industry are reverting to rural areas for joining their family farming activities.

4.2.8 Reduction in debt after adopting Organic Farming

During the farmers survey details regarding reduction in their debt, after adoption of Organic Cotton farming were obtained by asking direct question. These responses have been tabulated in following table 4.22.

Table 4.22 : Reduction in Debt

Sr. No	Migration	In Number		In Percentage		% of Total
		Kutch	Surendranagar	Kutch	Surendranagar	
1	Yes	22	31	79	100	90
2	No	6	0	21	0	10

As observed from above table, in Kutch district 79 % farmers agreed that their was reduction in their debt, as they are not required to do borrowing for purchase of costly chemical pesticides for their cotton crop cultivation, after their adoption of Organic Cotton cultivation. They also confirmed that important organic inputs were either available from Agrocel or under the guidance of their field staff, they were preparing such inputs from locally available cheap alternatives (Like using Neem leaves and oil etc;) Similarly in Surendranagar district all farmers gave response that after adoption of organic cultivation there was reduction in their indebt-ness due to less expense in cotton cultivation and also less financial risk.

4.2.9 Reduction in Financial Hardships

The question for measuring the indicator regarding reduction in farmers' suicide cases in respective project area, was asked in modified form (at a suggestion of Traidcraft and Agrocel's representatives during pre-survey discussions, held at Ahmedabad), and the responses were obtained regarding reduction in Financial hardships of the Organic Cotton farmers, after their adopting the Organic Cotton Cultivation, were obtained, and the same are tabulated in following table 4.23.

Table 4.23 : Reduction in Financial Hardships

Sr. No	Migration	In Number		In Percentage		% of Total
		Kutch	Surendranagar	Kutch	Surendranagar	
1	Yes	27	31	96	100	98
2	No	1	0	4	0	2

As it can be observed from above table in Kutch district almost 96 % and in Surendranagar district 100 % farmers have positively responded and confirmed that after adoption of organic cultivation their

financial hardship have reduced due to reduction in borrowings for farming activities and increase in their overall realization of cotton crop. This is most encouraging aspect particularly for implementing organization like Agrocel and their field staff.

4.2.10 Market Access for Organic Cotton

Ease of market access for Organic Cotton Farmers was also one of the important economic indicators to be assessed in this impact assessment study. Farmers' response regarding this was obtained in field survey and responses have been tabulated in following table 4.24.

Table 4.24 : Market Access for Organic Cotton

Sr. No.	Description
1	Fast Selling through Agrocel at Farmers' door step
2	Easier due to Agrocel
3	Organic market is limited but quantities are readily marketable through Agrocel
4	Agrocel only for cotton
5	Other products - open market
6	Easy market access for organic cotton – 8 % premium is given by Agrocel, with assured payment
7	Fare deal in organic cotton
8	Better market access, easy to sell, sale at door step
9	Good access due to Agrocel, being sold at door step only
10	Readily saleable commodity as advance commitment by Agrocel for purchase
11	No difficulty - as Agrocel takes readily

4.2.11 Determination about Adoption of Organic Cotton farming

Though, it was not part of the main questionnaire, responses regarding farmers' commitment towards adoption of Organic Cotton cultivation, were obtained, and it is worthy of mention here that almost all farmers in Kutch and Surendranagar districts have adopted this Organic Cotton cultivation after through understanding and they are firmly committed about continuing this, even against adverse conditions like draught and reduction in yield in initial years. They have given next preference to BT Cotton cultivation and conventional cotton cultivation as against Organic Cotton cultivation. Many farmers and their families have shown strong desire to further increase the Organic Cotton cultivation areas, provided good quality water availability is there.

4.2.12 Some Problems of Organic Cotton Farming

Though, it was not part of the main questionnaire, responses regarding farmers' general problems regarding adoption of Organic Cotton cultivation was also obtained. These are grouped here below to give general idea about the common problems faced by them.

FACING PROBLEMS

Sr. No.	Specific Problems
	Kutch
	Because of previous use of chemical fertilisers and pesticides on the land, in the initial two years period, farmer faced problem of reduction in crop yield.
	Water availability is a major problem, If water available, then they will ready for organic cotton
	Increase in ground water salinity was main problem faced by Kutch farmers in Mandvi and Abdasa Talukas.
	Availability of Electric power supply in rural areas is severe problem (at present)
	Not interested in BT cotton crop (farming) but compelled to undertake the same due to pressing economic reasons.
	Starting 1st year production is reduced, Survive after 2 years. Organic manure arrangement which includes Castor cake, Neem cake, well rotten compost has to be made in advance by agency like Agrocel for all seasons
	Pest control at starting for White Fly - now settle White fly
	They use organic fertilisers and pesticides for BT Cotton and start because of follow the neighbour
	They use organic fertilisers and pesticides for BT Cotton and start because of follow the neighbour
	They use organic fertilisers and pesticides for BT Cotton and start because of follow the neighbour
	Water problem - Salty Water
	Starting year faced problem
	Starting year - yield is reduced
	Starting year - yield reduced
	No specific problems, Innovative experiment adding - micro nutrient
	No problems faced, inclined to do more acreage
	Initially production has reduced to 50% level from conventional crop yield. Intend to increase area if permitted
	No problem faced, intend to increase area
	no problems faced, intend to increase more area
	Pest attacked faced in 1st year, Intends to increase more area
	Surendranagar
	No serious problems faced after adoption of Organic Cotton farming
	Yield reduced in initial years, this some time affect adversely the economy of cultivation.

5 Salient Features and Observations of Field Study

In the previous section we have discussed about the Farmers' responses regarding various aspects of this Impact Assessment study, measured through composite questionnaire and field interviews. Based on these responses from Kutch and Surendranagar districts, we are giving salient Features and Observation in this section. These are broadly grouped under following heads:

- a) Salient Feature regarding various Demographic data (details) of survey samples in Kutch and Surendranagar districts.

Furthermore, during the pre survey discussions held with Agrocel and Traidcraft representative at Ahmedabad, a broad framework for the Impact assessment study was given for reference. Based on this, we will analyse the observations derived from Field survey and relevant indicators given for impact assessment. These observations are grouped under respective category heads here below:

- b) Observations regarding Economic Indicators
- c) Observations regarding Social Indicators
- d) Observations Regarding Environmental Indicators

5.1 Salient Features From Demographic Details

In the farmers' Survey demographic details regarding their year of Joining in Organic Cotton cultivation, distance of their farm from Agrocel's service centre, Number of Family members (Family size), Ownership of house, Type of house, Facilities available at house, Total land holding and land under Organic crop (Cotton & other), details of other inter crop / alternate crop taken in Certified Organic land, and various farming facilities available at farm. Salient features regarding survey findings for all these aspects are briefly given here below:

- In Kutch district 57 % farmers are member from start of this programme, 32 % have joined in 2nd year and only 11 % are 1-year-old members. This shows clearly that farmers joining this Organic Cotton cultivation continue their association for long period. It is also important to mention here that out of 28 sample farmers, 16 farmers were also member with Agrocel when original Baseline survey was conducted at the start of this programme.

Similar observation could not be made in Surendranagar district, as those farmers are member since last 2 years only.

- As regards the average distance from Agrocel's service centre in Kutch district almost 93 % farmers are at a distance of 15 Km or less. This has become possible as Agrocel is having 3 Agro service centres; Mandvi, Kothara and Rapar in Kutch district and their activities are well established since long period. Thus, Agrocel's' service network for farmer is strong in Kutch district.

In case of Surendranagar district this percentage is 52% and nearly 48 % farmers are more than 15 km away from Agrocel's service centre. Since, Agrocel's activities are comparatively new in Surendranagar district, they have only 1 service centre at Dhangadhara, hence average distance for farmer is more, as compared to distance in Kutch district.

- In Kutch 57 % members having small family size, 36 % with medium family size and 7 % with large family size. In Surendranagar district this distribution is 68 %, 29 % and 3 % for respective family size categories.
- It is important to note here that all respondents currently own Pucca house as against as shown in earlier baseline survey small holders did not own Pucca houses at that time. In Kutch district all residential houses are located on farm itself and farmers stay with their family on farm. In case of Surendranagar district farmers stay in nearby village, and mostly in group and gathered with their community.
- It is most important to note here that basic facilities in house like Electricity, Water and Pucca Kitchen are available with all farmers (100 %) in both Kutch and Surendranagar. More than 50 % houses are having pucca cattle shed or place for animals. As regards Toile facilities in Surendranagar district all farmers are having pucca toilet facilities, while in case of Kutch district this facility is available for 89 % farmers.
- In Kutch 78.57 % farmers are falling under small holders category, while in case of Surendranagar this is 74.19 %.
- In Kutch district total land holding is higher but % under organic cultivation is only 27.86 % of total land. In case of Surendranagar district total land is less but % covered under Organic cultivation is as high as 55.08 %.

However, in both cases there is ample scope for increasing the land under organic cultivation and Agrocel must do efforts in this direction.

- In Kutch district as alternate crop or second season crop, mostly Bajara (Millet), Castor seed and Green manure crops are taken. In some cases land is also kept idle for one season. In case

of Surendranagar district Cumin, Sorghum, Green Gram, Gram, and Sesame are taken as alternate crop or inter crop.

- As regards various farming facilities available in Kutch district and Surendranagar district, there is vast difference. In Kutch almost 75 % farmers own tractor, and 100 % farmers are having water tube well for irrigation with electric pump installed on it. In case of Surendranagar district, this percentage is only 54 % and remaining land is having only rain-fed farming facilities, i.e. no irrigation is available at present.

This shows that Kutch farmers are economically stronger and are investing in farming facilities, while due to weaker economic conditions in Surendranagar farmers are unable to invest in farming facilities.

5.2 Observations for Economic Indicators

In this farmers survey attempt have been made to assess the impact of this SFCE programme on Farmers' Income, Market for their produce, Sustainable livelihood, employment generated and rotational crops taken by them in Organic certified land, Economic conditions of workers on farm, and Fair trade practices followed by Agrocel in dealing with these farmers. These details have been obtained and analysed using set of direct and indirect questions during the field survey. Important observations from this details and analysis are as follows:

- **Farmer's Income**

Only 29 % farmers in Kutch district have informed that there was increase in yield of Cotton crop after adoption of Organic Cotton farming, rest 71 % have either not perceived any marked improvement in yield or in some cases they have also experienced decrease in yield in the initial years.

Cotton crop yield has direct impact on farmers' income, and hence where there was no increase in yield of crop and yet Farmers had continued with Organic cultivation, we probed for more information and their reasons for continuing.

It is very much important to note that though in the initial years there is decline in yield, in most of the cases in subsequent years the yield is getting restored to normal level, hence this is not a long-term impact.

Farmers have clearly indicated that since there was no chemical pesticides needed for Organic Cotton cultivation, overall their realization from their cotton crop is not much affected even

though their yield reduces to some extent, their net gain from per unit area remains higher than conventional cotton cultivation and even in many cases higher than BT Cotton cultivators from adjoining areas.

Furthermore, farmers are getting 8 % higher realization from Agrocel for their produce, hence they were not at direct loss even if there is minor decrease in initial years. As indicated earlier farmers are getting overall benefit of 14 to 20 % in adopting Organic cotton cultivation in association with Agrocel.

- **Market Access**

As observed in table 4.24, member farmers are not facing any problems regarding market access as Agrocel procures their produce from their doorstep.

- **Sustainable Livelihood**

Based on the survey finding it can be clearly inferred that farmers are finding this Organic Cotton cultivation as their most sustainable livelihood, as they have continued to undertake this activity as part of this SFCF programme. In fact over three years period total number of farmers covered under this programme have increased from 32 to 610, and in terms of number of families benefiting from this programme total number is 330.

In fact in Kutch and Surendranagar district many farmers have shown their inclination to increase in their Organic certified land as they have found this farming as more sustainable alternative as against conventional cotton or BT cotton cultivation.

- **Employment generation**

Employment generation is always there; when there is economically sustainable activities are under taken. As mentioned in previous paragraph Organic Cotton cultivation has already been established as sustainable economic activity in Kutch area. In Surendranagar district this process is under progress and hence impact of employment generation will be experienced in near future.

In an attempt to give optimum return of their produce to member farmers, it has been endeavour of Agrocel to get maximum value addition in farmers' produce, and this has been achieved by undertaking integrated processing of Organic Cotton by Agrocel. As a part of these activities also Agrocel is becoming instrument in employment generation in rural, backward area of Kutch and Surendranagar. The finest example of this activity is Agrocel's association with Women artisans' organization like "Shrujan" and helping them in

employment generation. During the value added processing of Organic cotton at every processing stage also direct employment generation is taking place.

- **Rotational Crop in Organic certified land**

Rotational crops undertaken in organic certified land in Kutch and Surendranagar district are as shown in Table 4.9, previously. This indicates that in Organic certified land farmer can get additional income, after taking cotton crop and also as alternate crop when land is not used for Organic cotton cultivation. This will also help in overall sustainability of organic cultivation in respective lands.

- **Economic Conditions of Farmers**

Economic condition of member farmer is reflected in responses of four different questions - demographic information, details of their house ownership, type of house, and facilities available at their house. Farming facilities available with farmers also gives reflection of their economic condition.

It is important to note that during the baseline survey conducted in Kutch at the start of survey 50 % small holders were not having Pucca house for stay, while now all respondents are owning pucca house. Almost all houses are having Electricity, water and Pucca Kitchen facilities. More than 50 % houses have pucca shed or place for animals, and nearly 86 % houses have toilet facilities.

Similarly, in Kutch district 75 % farmers are having tractor, and 100 % are having tube well with electric pump for irrigation. In Surendranagar district 50 % farmers are having tractor and 54 % have tube well with Electric pump for irrigation. Thus, it can be safely observed that Economic condition of Kutch farmers is better compared to Surendranagar district farmers.

- **Fair Trade practices followed by Agrocel**

As regards trade practices followed by Agrocel almost all farmers were satisfied and they informed that they are getting 8 % higher prices for their produce, than prevailing market price of Cotton in respective area Agriculture Produce Market Committees. This price is paid to them for procuring their produce from their doorstep. This will work out as saving of 3 to 4 % for farmer, while Agrocel has to pay additional charges for handling, transportation and Purchase cess and commission of respective APMC.

By and large Agrocel representatives are in constant touch with farmers and they procure their produce in such manner that farmer gets optimum benefit of market price increase. Agrocel also

provide organic farm inputs at 50 % discount to their members (almost on no profit, no loss basis) and also educate their members in preparing cheaper organic inputs from locally available materials. This gives 5 to 8 % additional saving to member farmers.

Thus, Agrocel is following Fair Trade practice as per their organizational policy, particularly in their dealing with member farmers.

5.3 Observations for Social Indicators

As regards Social aspects, details regarding status of Farmers' indebtedness after adoption of Organic Cotton farming, Check on migration to urban areas, Health and safety of their family members, living standards of these farmers and role of women in decision making regarding adoption of Organic cotton cultivation etc; were obtained through close ended and open ended questions and through informal interview during the field survey. Group discussions were also held at two locations, each in Kutch and Surendranagar district, for discussion about various social aspects like migration and status of health after adoption of Organic Cotton Cultivation. Many interesting findings were available from this field survey, about above mentioned social aspects of this SFCEP programme and its impact, which are as described hereafter:

- **Reduction in indebtedness**

As it can be observed from Table 4.22, almost 90 % farmers have informed that there has been reduction in their indebtedness after adoption of Organic Cotton cultivation. This they have mainly attributed to the fact that they are now not required to make debts for purchase of chemical fertilizers and costly chemical pesticides, as these have been replaced by cheaper Organic inputs and locally available organic inputs. This is important, as farmers' have also come out from vicious circle of higher interest and borrowing for paying back earlier debts, they were also compelled to sell of their produce at lower prices.

- **Reduction in Financial hardship**

Information in table 4.23 also reconfirms that there has been reduction in financial hardship almost in 98 % cases, and this attributed to reduce indebtedness after adoption of Organic cultivation as against previously practiced convention cotton cultivation.

- **Reduction in Migration from Rural Areas**

As regard check in migration from rural areas to urban areas after implementation of Organic Cotton cultivation programme in Kutch, the responses are given in Table 4.21. 58 % have

agreed that there has been check in migration after start of Organic Cotton cultivation, 8 % have not agreed that there was such check in migration, and 34 % have intimated that migration have occurred in their area due to other reasons, rather than due non-viability of Conventional Cotton cultivation in the area.

However, during the group discussion, interesting facts came out that in many case in Kutch and Surendranagar district, there was reverse migration from urban areas to rural areas, in the families where they have observed that now Organic Cotton cultivation is sustainable alternative to conventional cotton farming and they can economically better sustain even rural areas than even in high paying industry like Diamond processing.

- **Improvement in Health of Farmers**

As regards positive impact of adopting organic cotton farming on the health of farmers and their farm workers, response summary have been given in Table 4.18. In Kutch all 100 % farmers have firmly intimated that by adoption of Organic cultivation incidences of illness in their families have markedly reduced, from earlier period when they were using chemical pesticides and chemical fertilizers. Since, Organic Cotton cultivation in Surendranagar district is only one year old, farmers were unable to give their observation in very clear terms.

- **Living Standards of Farmers**

As observed during the field survey, most of these farmers are having reasonably good level of living standard, as they are owning pucca house, Owning 2 to 3 milch cattle like Cow or buffalo, house hold articles like Television, cooking gas, Two wheel and Four wheel vehicles etc. Furthermore, children of all these farmers are studying in School (some even in English medium school run by Air Force at Nalia).

- **Role of Women in Decision Making**

During the farmers survey it was observed that, women are playing important role in adopting of Organic cotton cultivation both in Kutch and Surendranagar district. However, since farmers are living on farm itself in Kutch, women also play important role in making day-to-day decisions regarding farm practices and they encourage use of organic inputs as they consider them as safe in use and cheaper. In Surendranagar district most farmers are staying in nearby villages and hence women are more concentrating on household affairs and Men are playing important (dominant) role in making decisions regarding Organic Cotton farming. However, with growing awareness and education in rural area, women are playing active role in making decisions in these districts.

5.4 Observations for Environmental Indicators

As a part of this Impact assessment study information and perceptions regarding various environmental indicators such as improvement in Soil and Water quality, availability of natural resources and their management, availability of Organic inputs, as well as Value of organic farming to member farmers have been assessed by various questions and observations made during the farmers survey.

- **Improvement in Soil and Water Quality**

During the Farmers survey responses regarding their perception of Soil and water quality improvement were obtained and the same have been tabulated in Table no .4.19 and 4.20. As observed in these table 93 % farmers have perception that after adoption of Organic cultivation Soil quality has improved and it has become soft, more permeable and easily tillable.

Responses regarding improvement in water quality are irrelevant, as most of the farmers are not using surface water for irrigation (either they use Tube well water for irrigation or they do not have irrigation facilities available). Water quality in many areas of Kutch is fast deteriorating, because of heavy exploitation of ground water and fast increase in salinity due to sea water seepage in underground water sources, this increases salinity in water. This is very serious problem faced by all coastal areas of Gujarat and adoption of drip irrigation can partly resolve this problem as it will help in reducing ground water exploitation and also help in reduction in irrigation cost for the farmers.

- **Availability of Natural resources and their Management**

During the farmers survey, it was observed that in Kutch district most of the farms were having cattle and their dung with Farm yard waste were collected for making Organic manure for their own requirement. In case of Surendranagar district farmers are partly preparing their own manure, while partly they procure it from outside sources and hence their input cost is higher than Kutch farmers. Some farmers in Kutch district have also started adopting modern techniques of irrigation like drip irrigation.

- **Availability of Organic Inputs**

Agrocel plays important role making available Organic input to their member farmers. Moreover, Extension workers of Agrocel service centres also provide necessary education regarding preparing cheaper organic inputs from locally available materials, and thus they have also built up long-term relationship with farmers.

- **Value of Organic Farming to Members**

During the farmers survey it was observed by the consultant that farmers Value this organic farming and benefits being derived from it. On asking them question regarding strength of their affiliation with this activity, most of them have clear views and they have adopted this as long-term solution of their many problems. They have also shown inclination that they will like to expand this activity in future. It is also worth to mention here that though there is strong attraction of BT cotton cultivation in many areas, these member farmers have shown strong inclination of sticking to Organic Cotton cultivation, even if it has lesser returns in short term, farmers consider this as activity for their future and for security of their next generation they value this farming vary much.

6 Overall Project Success

This Impact Assessment study will remain incomplete, unless organizational review at implementing organization's level is made, particularly in the light of the latest Farmers' Survey findings done by DMM team. As apart of this review, the success of project concept at Agrocel's level will be measured by review of different aspects and parameters and these findings are included here, to give complete review of this SFCF project success. In doing such review, aspects like Agrocel's Business performance over last three years period, economic viability of business operations, cost effectiveness of business operations, sustainability of this project concept and Market Access etc; and strategies adopted by Agrocel will be discussed in this section.

Furthermore, to ascertain the long-term sustainability of this project concept Replicability of this project (functional model) is also important. Agrocel's organizational performance is gauged through their ability to provide necessary services to member farmers as well as the successful management of various operations like procurement, keeping certification records, keeping identity of material stocked and marketing of the same. In short, it was due to the successful management of this SFCF programme.

On the basis of survey findings and interactions done with Agrocel's office and service centres, aspects like Supply Chain development, Need of organizational capacity building in the light of present and future growth trend of the project have been assesses and this is discussed here. Similarly, as regards market linkages also support / role of partner organization have been crucial and Agrocel's performance in this area will also be discussed. Thus, in this section attempt have been made to give a comprehensive review of Overall project (Concept) success for SFCF project that has been implemented by Agrocel in last 3 years period.

❖ Business Performance

Agrocel have been associated with this Straight From Cotton Fields project since last 3 years period, i.e. from year 2001-02. The overall performance of Agrocel in last 3-year period has been given in following Table no. 6.1.

Table 6.1: Agrocel's Business Performance in Last 3 Years Income (Rs. in Lakhs)

YEAR	ORGANIC COTTON	PREMIUM PERCENT	ROTATIONAL CROPS	PREMIUM PERCENT	OTHER CROPS	PREMIUM PERCENT

2001-2002	14.69	8	0		0	
2002-2003	46.4	8	10.10 (SESAME)	8	70	*25
2003-2004	158.00	8	295.00	8	80	*25

*25 % Premium given in Basmati paddy

Since this project was for Organic Cotton cultivation, Agrocel's performance regarding Organic Cotton cultivation has been summarized in following Table 6.2.

Table 6.2 : Organic Cotton Production Figures

Year	Annual Forecast	Actual Production	Number Of Farmers Participating
2001-2002	N.A	65 MT	29
2002-2003	750MT (600 CERTIFIED)	600 MT (241 MT CERTIFIED)	118
2003-2004	1945 MT CERTIFIED)	761 MT CERTIFIED)	221

As it can be observed from the above table, starting from 65 MT production in the year 2001-02, Agrocel has reached to the level of 761 MT production of certified Organic Cotton in the year 2003-04. There is also increase in number of farmers from 29 to 221 in this period. Thus, Agrocel has made increase of 10 times on both this count.

❖ Economic Viability

Economic viability of this project concept is clearly reflected in its performance in last 3 years period. There has been increase in production and sales of Organic cotton in terms of quantity and increase in number of member farmers in this period.

❖ Cost Effectiveness

Agrocel has been successfully undertaking co-ordination for Organic cotton cultivation in Kutch and Surendranagar district of Gujarat. They have been able to organize procurement and processing of this Organic cotton to get maximum value addition. During this process of co-ordination with Organic Cotton farmers and Market, Agrocel has always tried to make their operation cost effective, by keeping their overheads to minimum possible level. They are also seeing that at farmers' level also they get cost effective production and hence they provide knowledge input to farmers as well as necessary organic inputs at 50 % concessional rate. During

the value addition operation also Agrocel has made tie-up with various agencies to get optimum cost for doing such operations and thus, overall in their operation Agrocel has achieved Cost effectiveness.

❖ Sustainability of Project Concept

Sustainability of this project concept is evident from the fact that from initial 35 members in the year 2001-02, Agrocel in having 620 members at present, in just 3 years period. Details of various categories of these members (Family members) are given in following table 6.4.

Table 6.4: Progress Regarding Farmers' Membership numbers

Type Of Farmers (Small/Medium/Big)	Number	Land Under Cotton
Marginal	33	236 Acre
SMALL	281	2006 ACRES
BIG	16	118.5

N.B: There are 330 Farmer joint family and total numbers of members are 620

❖ Market Access at Agrocel's level

In the following table 6.5, Agrocel's performance as regards marketing of Organic Cotton and its value added products is summarized.

Table 6.5 Agrocel Sales – Market and Product wise Break-up

(Rs. in Lakhs)

YEAR	EXPORT/ DOMESTIC	GINNED COTTON	YARN	FABRIC	T - SHIRTS	SEEDS	OTHERS	TOTAL
2001-	EXPORT	0.60	0.33	8.93	--	---	9.86
2002	DOMESTIC	36.35	29.65	0.21	0.63	3.47	6.77	77.8
2002-	EXPORT	4.77	3.57	1.73	34.30	--	--	44.39
2003	DOMESTIC	13.98	26.15	0.09	0.38	11.87	0.75	52.20
2003-	EXPORT		05.02	0.63	15.51			21.64
2004	DOMESTIC	139.81	44.10	0.15	0.04	43.12	0.00	227.10

Source: Agrocel office at Koday, Mandvi.

❖ Replicability of the Project (Model)

It is important to note here that Agrocel has been instrumental in implementation of this Organic Cotton cultivation programme under SFCE. Agrocel has not only implemented this programme successfully in Kutch district, but now they are also trying to Replicate this model in other districts of Gujarat, for e.g. they have already started this in Surendranagar district.

Apart from replicating this model successfully in Cotton crop, Agrocel has also successfully replicated this model in other rotational crop in organic land like Sesame. They are also trying to replicate this model for other alternate crops like Castor and Gram in their project area, and they have also started efforts in getting value added processing done as well as to organize market for such Organic produces, both in domestic as well as Export market. Thus, Agrocel has done remarkable work in short period in making this model a success and also Replicable Success.

❖ **Organizational Performance as Service provider**

Agrocel's performance as service provider in Agro input services is having excellent track record. They have been providing agro input services to about 20000 farmers all over India through their 18 service centres. Details of their state wise number of Agro-service centre is summarised in following table 6.6.

Table 6.6: Details of State wise distribution of Agrocel Service centres

Sr. No.	Name of State	Number of Service Centres
1	Gujarat	9
2	Maharashtra	4
3	Orissa	1
4	Haryana	1
5	Uttaranchal	1
7	J & K state	1
8	Tamil Nadu	1

The type of services provided by Agrocel is summarised here below:

- a. Free field services for technical guidance to the farmers
- b. Soil and water testing by field officer at farmers field
- c. Provide all types of inputs required to farmer, available under one roof
- d. Organise seminars, workshops for farmers for education and awareness tour
- e. Market support with premium price through Agrocel market linkages

- f. Processing of Neem seed for generating local employment and make Neem cake and oil for farmers
- g. Providing electric motor service to farmers through local entrepreneur at Agrocel service centre
- h. Organised demonstration plots at farmers field and Agrocel field for new variety new products
- i. Provide total range of water management system like drip irrigation, sprinklers, etc.

Agrocel is having 3 service centres in Kutch and 1 in Surendranagar for providing Agro input services for Organic Cotton cultivators. They have also started providing organic seed for farmers for Cotton and Sesame crops. Agrocel is providing community cotton storage facilities for keeping identifiable stock of Organic Cotton till it is marketed in raw or processed form. Agrocel is providing assistance in getting farmers' land certified by certification agencies like Skall and they maintain all records regarding Soil and Water quality for member farmers.

❖ **Management of Project operation**

As indicated earlier, Agrocel is providing co-ordinating services in organizing Organic cotton cultivation in rural, backward areas of Kutch and Surendranagar district, mostly through smallholder Cotton farmers. Their role is pivotal in many aspects. Agrocel is associated right from convincing farmer to adopt organic cultivation to providing them necessary inputs and farming technology to providing them market access to get remunerative prices of their organic produce. Agrocel is also assisting farmers in maintaining their records for Organic certification and help them each stage of certification. Agrocel also organize procurement from farmers' doorstep, arrange for value added processing, finance for these operations, arrange for marketing and export of these produces. Thus, Agrocel is playing important role of providing all back-up services for these small holders Organic Cotton Cultivators of Kutch and Surendranagar District of Gujarat.

❖ **Supply Chain Development**

Agrocel has developed supply chain for Agro input services and organic input materials required for this Organic Cotton cultivation. They have also organized effectively the supply chain for providing reliable supply of Organic Cotton and their value added products, particularly to their partner organizations like Vericott and Traidcraft for European markets.

However, it has been observed that due to communication gaps at times there are problems faced in maintaining the supply in this chain, but this is not regular aspect in Agrocel's operation. There is need of strengthening of this supply chain by having better understanding and developing relations with Key partners.

❖ **Support / Role of Partners in Agrocel's Project Success**

In the success of Agrocel in successfully implementing and managing this SFCF project over 3 years period, support given by their partner organizations like VERICOTT, UK and TRAIDCRAFT EXCHANGE, UK is of utmost importance. They have played crucial role in making this programme a success by providing front end support through promoting and marketing of their produce in high value European markets. Traidcraft Exchange, have also provided necessary guidance as regards successfully managing the marketing of organic produces in international markets and they have also helped in observing the quality standards meeting the international certification norms for Organic cultivation. Traidcraft Exchange also provided in availing necessary financial assistance for this SFCF project from SHELL FOUNDATION, UK.

Apart from these international partner organizations, role of domestic partner organizations have also been very crucial in providing facilities for value added processing of Organic cotton (Ginning, Spinning, Knitting / Weaving and conversion into T-Shirts etc) under strict processing parameters and subsequently also to provide storage for this material. Thus, Agrocel' success is due to their building up long lasting relations with these organizations and co-ordinating various aspects in an integrated operation.

❖ **Need of Capacity building incl. Human Resource Development**

There is an urgent need of developing necessary Human Resources in the areas of extension service organizing, procurement, marketing and overall management of the project. This has become even more pressing with fast growth rate of Agrocel in last few years.

Agrocel is successfully led by Mr. Hasmukh Patel- General Manager, but there is an urgent need of creating next line for his support and taking up responsibilities as organization is growing. In absence of such support many a times organization's performance may get affected in coming period, especially in the areas of export marketing and managing Farmers training programmes etc.

It is strongly suggested to induct experienced and professionally qualified manpower, wherever the management of Agrocel feels such need,

7 Conclusion

The Key Successes/ Impact so far:

We have met most of the targets set out for the project

- Total of 620 farmers recruited on the cotton project,
- Organic standards are in place and farmers' land have been certified – can mention number of acres certified to date
- Research & demonstration is on to cultivate better varieties of cotton – how many varieties – 5 varieties, + 1 variety is in trial position.
- Three rounds of organic certification of cotton plots have been completed by SKAL.
- There are clear environmental gains from farmers moving from conventional to organic farming – better health practice, soil conservation, use of appropriate technologies (soil preparation, composting, preparation of pesticides, crushing of cotton stalks).
- There is evidence that young people in the area are making a choice to get into agriculture rather than migrate to cities in search of employment. There is successful check on migration to urban areas from the project area. (Already explained in survey finding discussion with sample numbers)
- Supportive work on sustainable agriculture in partnership with other organisations – e.g. use of water harvesting techniques, better seed technology, promotion of drip irrigation, demonstration of better varieties of cotton, input & marketing support for multi-crops – is creating a great deal of confidence on the ground, besides achieving sustainable results.
- The Agrocel brand is registered and there is a growing recognition of this brand – number of buyers using the brand. 7 buyers using the Agrocel brand – swing tickets are displayed on final products.
- The Agrocel website has been launched, and number of visits to the site is increasing – seen through the follow up requests being made.
- The model being promoted by the project has achieved recognition in India and overseas, and there is an increasing demand for the yarn. Perhaps number of cotton buyers of yarn increase from year 1 to year 3. 5 buyers for yarn as of now.
- The efforts at marketing the fibre (rather than just the finished product) is picking up – particularly with good response from some major retailers (e.g. M & S) & campaign organisations (Bishopston Trading, Oxfam Belgium),
- There is a consolidation of the supply chain – developing good relationships with processors (at least two at each level of the supply chain), which will add to the sustainability of the project.

8 Annexure

8.1 Annexure- 1 Farmer Survey Questionnaire

Questionnaire #			
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1.	Name of District	Kutch		Surendranagar	
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2.	Name of Taluka		Name of Village	
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3.	Started Organic Cotton Farming	2001-02		2002-03		2003-04	
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4.	Village Distance from the Agrocel Office	In Kilometre:
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5.	Name of the Head of Household	
----	-------------------------------	--

6.	Name of the Respondent	
----	------------------------	--

7.	No. Of Members in the Family		
----	------------------------------	--	--

8.a	Ownership of House	1=Own, 2=Rented, 3=Others	
-----	--------------------	---------------------------	--

8.b	Type of House	1=Pucca, 2=Kutcha, 3=Semi Pucca	
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8.c Tick the facilities available in your house

Electricity		Water		Cattle shed		Toilet		Kitchen	
-------------	--	-------	--	-------------	--	--------	--	---------	--

9. Land Holding Details (in Acres / Hectares)

Total Cultivable Land				Certified Land Organic-Cotton Farming			
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Name of other Inter-Organic-crop Farming	1.	2.	3.
--	----	----	----

10. Facilities available for Farming

Tractor		Water / Tube Well		Electric / Oil Engine Pump	
---------	--	-------------------	--	----------------------------	--

11. Increase in yield after starting Organic-Cotton Farming

Yes		No		If Yes in what %	
-----	--	----	--	------------------	--

12. Has the quality of cotton improved?

Yes		No		If Yes in which way	
-----	--	----	--	---------------------	--

13. Has price realization increased?

Yes		No		If Yes in what %	
-----	--	----	--	------------------	--

14. Do you feel health benefit by adopting organic farming

Yes		No	
-----	--	----	--

15. Do you feel – Soil Quality has improved by adopting organic farming?

Yes		No	
-----	--	----	--

16. Do you feel –Water Quality has improved by adopting organic farming?

Yes		No	
-----	--	----	--

17. Migration to urban area from your family, stopped after adopting organic-farming

Yes		No	
-----	--	----	--

18. Has organic-farming help you to reduce / make you free from debt.

Yes		No	
-----	--	----	--

19. Do you agree that organic-farming has helped farmers to increase their income and there by reduced suicide incidence in this area?

Yes		No	
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20. How is the market access for organic-cotton?

21. Specific problems faced after starting organic-cotton farming

Date	Sep	04	Place		Interviewer	
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8.2 Annexure- 2 List of Contacts

1.	Patel Chaman R. Service Centre Incharge Agrocel Industries Ltd. T Prabhudas Complex Dhrangadhra	11	Mukhtiyar Kaur Bava Singh Bhanada, Abdasa Kutch
2	K Satyamurti Team Leader Agrocel Industries Ltd. Kothara, Kutch	12	Shikh Jangsingh Prem Singh Bhanada, Abdasa Kutch
3	Hasmukhbhai Patel General Manager Agrocel Industries Ltd. Koday, Kutch	13	Bilawar Singhji Bhanada, Abdasa Kutch
4	Shailesh Patel Project Officer Agrocel Industries Ltd. Koday, Kutch	14	Jagdish Singh Nirmal Singh Khirsara, Abdasa Kutch
5	Sukhdevsingh Shikh Bhanada, Abdasa Kutch	15	Kishore Kumar - Farm Manager Nodevandh, Abdasa Kutch
6	Kumar Satyamurti-Team leader Agrocel Industries Ltd Shri Pashchim Kutch Gramudyog Sangh At Kothara, Taluka Abdasa, Dist: Kutch	16	Satbirsingh Chaudhary Don, Mandvi Kutch
7	Pravinbhai Patel Field Officer Agrocel Industries Ltd. Koday, Kutch	17	Balvantsingh Fatehsingh Don, Mandvi Kutch
8	Hardayalsingh L Shikh Bhanada, Abdasa Kutch	18	Tulsi Mangi Chaudhary Haripura, Mandvi Kutch
9	Chhinderpal Singh Bhanada, Abdasa Kutch	19	Karshanbhai Mangi Chaudhary Haripura, Mandvi Kutch
10	Dilavar Singh Bhanada, Abdasa Kutch	20	Narmdaben Harilal Chaudhary Haripura, Mandvi Kutch
		21	Jakhubhai (Ravibaug) Jakhaniya, Mandvi Kutch
		22	Mongiben Jayantibhai Parasiya Madanpura, Mandvi Kutch

23	Amarben Laxmanbhai Kharai Mota Asambiya, Mandvi, Kutch	37	Gangaram Amrashi Patel Mota Ankevaliya, Dhrangadhra Surendranagar
24	Bhimjibhai Popatbhai Mapani Mota Asambiya, Mandvi Kutch	38	Kantilal Nagardas Patel Mota Ankevaliya, Dhrangadhra Surendranagar
25	Vasant Gopal Mepani Mota Asambiya, Mandvi, Kutch	39	Ishwar Nagardas Patel Mota Ankevaliya, Dhrangadhra Surendranagar
26	Harjibhai Dhanjibhai Karai Mota Guniyasar, Mandvi, Kutch	40	Baldevbhai Revabhai Mota Ankevaliya, Dhrangadhra Surendranagar
27	Arjan Ladha Gadhvi Nani Rayan, Mandvi, Kutch	41	Popatbhai Narshibhai Patel Mota Ankevaliya, Dhrangadhra, Surendranagar
28	Kusturben Dolatbhai Valani Nava Vas, Mandvi, Kutch	42	Rameshbhai Bachubhai Patel Mota Ankevaliya, Dhrangadhra Surendranagar
29	Mavaji Lalji Vekariya Piyava, Mandvi, Kutch	43	Ghanshyambhai Bachubhai Patel Mota Ankevaliya, Dhrangadhra Surendranagar
30	Megji Lalji Vekariya Piyava, Mandvi Kutch	44	Ramesh Narshi Mota Ankevaliya, Dhrangadhra Surendranagar
31	Purbai Ramji Piyava, Mandvi Kutch	45	Ishwarbhai Nanjibhai Mota Ankevaliya, Dhrangadhra Surendranagar
32	Harji Manji Ramani Talwana, Mandvi Kutch	46	Ishwarbhai Mota Ankevaliya, Dhrangadhra Surendranagar
33	Ramesh Harji Ramani Talwana, Mandvi Kutch	47	Chatarbhai Amarsinghbhai Mota Ankevaliya, Dhrangadhra Surendranagar
34	Premji Mavji Talwana, Mandvi, Kutch	48	Ishwarbhai Mahadevbhai Mota Ankevaliya, Dhrangadhra Surendranagar
35	Narshibhai Muljibhai Patel Mota Ankevaliya, Dhrangadhra Surendranagar		
36	Bharatbhai Bachabhai Patel Mota Ankevaliya, Dhrangadhra Surendranagar		

49	Popatbhai Mota Ankevaliya, Dhrangadhra Surendranagar	58	Samjibhai Narayanbhai Ramgadh, Dhrangadhra Surendranagar
50	Parshotam Gordhan Patel Ramgadh, Dhrangadhra Surendranagar	59	Nathalal Bhagavan Ramgadh, Dhrangadhra Surendranagar
51	Jitesh Iswar Patel Ramgadh, Dhrangadhra Surendranagar	60	Baldevbhai Vanmali Patel Ramgadh, Dhrangadhra Surendranagar
52	Khimjibhai Naran Patel Ramgadh, Dhrangadhra, Surendranagar	61	Tribhovanbhai Ganesh Patel Ramgadh, Dhrangadhra
53	Prabhubhai Mohan Patel Ramgadh, Dhrangadhra, Surendranagar	62	Jeram Narshi Patel Ramgadh, Dhrangadhra Surendranagar
54	Zaver Tarshi Patel Ramgadh, Dhrangadhra, Surendranagar	63	Jivraj Khushal Patel Ramgadh, Dhrangadhra Surendranagar
55	Chaman Narshi Patel Ramgadh, Dhrangadhra Surendranagar	64	Ghanshyam Gordhan Patel Ramgadh, Dhrangadhra Surendranagar
56	Natavarbhai Ramjibhai Patel Ramgadh, Dhrangadhra Surendranagar	65	Vithal Prabhu Patel Ramgadh, Dhrangadhra Surendranagar
57	Natvar Narayan Patel Ramgadh, Dhrangadhra Surendranagar		

8.3 Annexure-3 Soil and Water Analysis Sample report copy

SOIL ANALYSIS REPORT – 2001

S.R.	Name Of Farmers	Village	E.C	P.H	O/C	P	K	Remarks
1	Amarben Laxman Kerai	M' Asambiya	0.29	8.91	0.36	9.70	153	
2	Bhimji Parbat Mepani	M' Asambiya	0.84	9.50	0.26	10.00	208	3 Ton/Acre/Gypsum/Use
3	Harji Manji Ramani	Talwana	0.15	8.93	0.33	10.00	120	
4	Ramesh Harji Ramani	Talwana	0.15	8.73	0.30	11.90	120	
5	Narmadaben Harilal Chaudhri	Haripura	0.21	9.47	0.33	9.30	132	2ton/Acre/Gypsum/Use
6	Tulsi Manji Chaudhri	Haripura	0.64	9.49	0.18	8.90	186	2.5ton/Acre/Gypsum/Use
7	Karsan Manji Chaudhri	Haripura	0.22	8.63	0.23	10.50	142	
8	Vasant Gopal Mepani	M' Asambiya	0.37	9.48	0.24	12.20	164	2ton/Acre/Gypsum/Use
9	Ravi Bag	Jakhaniya	0.33	8.92	0.29	7.00	164	
10	Premji Mavji	Talwana	0.15	9.02	0.44	8.80	142	1ton/Acre/Gypsum/Use
11	Harji Dhanji Patel	Goniyasar	0.29	8.91	0.36	9.70	153	
12	Megji Lalji Vekariya	Piyava	0.36	9.27	0.18	7.50	153	2ton/Acre/Gypsum/Use
13	Mavaji Lalji Vekaria	Piaya	0.88	9.41	0.32	11.90	208	2.5ton/Acre/Gypsum/Use
14	Purbai Ramji	Piaya	0.66	9.06	0.29	10.00	197	1ton/Acre/Gypsum/Use
15	Ramjibhai Laljibhai	Piaya	0.26	9.34	0.35	10.80	153	2ton/Acre/Gypsum/Use
16	Agrocel Farm	Koday	0.35	8.90	0.35	11.70	186	
17	Naranbhai Ramjibhai	Faradi	0.20	8.84	0.17	6.30	132	
18	Nareshbhai Karmshi	N'khakhar	0.66	8.40	0.23	10.30	176	
19	Laxmiben Karmshi	N'khakhar	0.94	8.61	0.33	9.20	197	
20	Mahendrasing Boneval	Desalpar	0.51	9.63	0.26	8.50	150	2.5ton/Acre/Gypsum/Use
21	Visvbandhu Gautambhai	Siracha	0.44	8.88	0.21	7.50	175	
22	Govindbhai Shivdash	N'khakhar	0.29	9.03	0.21	9.60	142	1 Ton/Acre/Gypsum/Use
23	Babubhai Valjibhai	N'khakhar	0.24	8.53	0.30	8.50	153	
24	Satbirshih Chaudhary	Don	0.28	9.24	0.20	6.90	132	1.5ton/Acre/Gypsum/Use
25	Parsotambhai Pachanbhai	Momaymora	0.67	8.10	0.14	6.90	164	
26	Balvantsinh Fatehsing	Don	0.43	9.32	0.18	7.00	164	2 Ton/Acre/Gypsum/Use
27	V.R.T.I.	Naglpur	1.38	8.91	0.32	8.50	230	2 Ton/Acre/Gypsum/Use

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S.R.	Name Of Farmers	Village	E.C	P.H	P.P.M	S.A.R	R.S.C	Ca	Mg	Na	Cn	Bcn	Cl
1	Amarben Laxman Kerai	Mota Asambiya	6.9	8.09	4416	23.42	0	10	1.5	56.2	Low	9.6	61
2	Bhimji Parbat Mepani	M' Asambiya	6.5	8.19	4160	27.56	0	7	1.4	56.5	1.6	4.8	57.6
3	Harji Manji Ramani	Talwana	4	8.12	2560	19.19	2	5	1	33.2	3.2	4.8	32.5
4	Ramesh Harji Ramani	Talwana	4	8.34	2560	19.36	0.4	5	1	33.5	2.4	4	32.3
5	Narmadaben Harilal Chaudhri	Haripura	2.3	8.4	1472	11.61	2	4	0.8	18.0	2.4	4.4	16.2
6	Tulsi Manji Chaudhri	Haripura	2.6	8.42	1664	15.8	3	3	0.8	21.8	4	2.8	18.4
7	Karsan Manji Chaudhri	Haripura	5.3	8.1	3392	18.03	0	7.8	2.2	42.2	1.6	3.6	47
8	Vasant Gopal Mepani	M' Asambiya	5.6	8.07	3584	33.99	3.2	4.4	Low	50.3	2.4	5.2	48
9	Ravi Bag	Jakhaniya	4.9	7.9	3176	21.04	0	6.2	1.2	40.4	Low	4.8	45.2
10	Premji Mavji	Talwana	6.3	8.12	4032	18.94	0	11.2	1.8	48.3	0.8	3.6	50.5
11	Harji Dhanji Patel	Goniyasar	3.8	7.9	2432	17.58	0.2	6	0.6	32.0	Low	6.8	32
12	Megji Lalji Vekariya	Piyava	4.2	8	2688	20.3	2.8	4.5	1.5	35.1	Low	8.8	33.8
13	Mavaji Lalji Vekaria	Piaya	3.6	8.07	2304	22.7	2.8	4	Low	32.0	Low	6.8	30.5
14	Purbai Ramji	Piaya	4.1	8.04	2624	21.4	6	4.5	0.9	35.1	Low	10.4	30.5
15	Ramjibhai Laljibhai	Piaya	4	8.25	2560	21.11	0.4	4	1.2	34.0	Low	5.6	35
16	Agrocel Farm	Koday	3.5	7.85	2240	20.34	2.8	4	0.4	30.1	Low	7.2	29
17	Naranbhai Ramjibhai	Faradi	2.7	7.75	1728	15.75	2	4	Low	22.2	Low	6	22.5
18	Nareshbhai Karmshi	N'khakhar	2.9	8.35	1856	30.22	5.2	1.6	Low	26.9	Low	6.8	22
19	Laxmiben Karmshi	N'khakhar											
20	Mahendrasing Boneval	Desalpar	2.7	7.5	1728	25.5	2.8	2	Low	25.5	Low	4.8	22
21	Visvbandhu Gautambhai	Siracha	3	8.61	1920	23.3	3.8	2.8	Low	27.5	3.2	3.2	24.6
22	Govindbhai Shivdash	N'khakhar	2.6	7.6	1664	14.86	1.2	3.5	0.9	22.0	Low	5.6	21.3
23	Babubhai Valjibhai	N'khakhar	1.85	7.6	1184	7.55	0	5	0.6	12.6	Low	4.8	15.3
24	Satbirshih Chaudhary	Don	4.4	8	2816	11.75	0	10.8	2.4	30.2	Low	6.8	37
25	Parsotambhai Pachanbhai	Momaymora	2.2	8.1	1408	5.95	0	8	1.2	12.8	Low	5.2	17.8
26	Balvantsinh Fatehsing	Don	3.5	8.27	2240	16.11	0	5.5	1	29.0	Low	5.6	32.5
27	V.R.T.I.	Naglpur	1.36	8.27	4870	15.26	7.6	1.2	Low	11.9	3.2	5.6	6.8

