



**Shroffs
Foundation
Trust**



Best Practices in Sustainable Agricultural Practices



A set of case studies on sustainable agricultural practices in Chhotaudepur

District prepared as part of internship programme

**Sahil Bali, Kajal, Jaimit Chaudhari,
Tata Institute of Social Sciences, Mumbai
An Institutional engagement with
Shroffs Foundation Trust**

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KAJAL
SAHIL BALI
JAIMIT CHAUDHARI



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1. INTRODUCTION

Chhotaudepur is 28th district of Gujarat. Shroffs Foundation Trust is working in this district since 1995 when the trust got the opportunity to work for watershed area development program. Limited water facilities and soil erosion have affected the agriculture of this district and with limited livelihood options available in the area people migrated and still migrating to other state for work. This has also increased the school dropout rate of the children. As most of the population of this district is illiterate and lack of awareness among people on scientific animal husbandry disallowed them to create it as an alternative livelihood option. To uplift the people from this misery, it was important to bring them together and built confidence among them.

From last 29 years Shroffs Foundation Trust has been engaged to improve the wellbeing of tribal and rural people. Shroffs Foundation Trust successfully able to bring change in agriculture productivity by introducing scientific techniques with the help of agriculture universities and other professionals in the field. SFT has partnership with the Ministry of Rural Development, Government of India for Mahila Kisan Sashaktikaran Pariyojana (MKSP) program is being empowering women by providing various training on sustainable agriculture practices. This booklet is an attempt to showcase the best practices in sustainable agriculture of tribal women who has been practicing sustainable agriculture methods.

Mahila Kisan Sashaktikaran Pariyojana (MKSP) Objectives:

- To enhance the productive participation of women in agriculture;
- To create sustainable agriculture livelihood opportunities for women in agriculture;
- To improve the skills and capabilities of women in agriculture to support farm and non-farm based activities;
- To ensure food and nutrition security at the household and the community level;
- To enable women to have better access to inputs and services of the government and other agencies;
- To enhance the managerial capacities of women in agriculture for better management of bio- diversity;
- To improve the capabilities of women in agriculture to access the resources of other institutions and schemes within a convergence framework.

Expected Outcomes:

- Net increase in the incomes in agriculture on a sustainable basis;
- Improvement in food and nutritional security;
- Increase in area under cultivation & cropping intensity;
- Increased levels of skills and performance by women in agriculture;
- Increased access in agriculture to land, inputs, credit, technology and information;
- Drudgery reduction of women through tools/ technologies;
- Increased access to market and market information for better returns; □Increased soil health and fertility to sustain agriculture based livelihoods;
- Increased visibility of women in agriculture as an interest group.

Coverage:

- Nos of villages: 91
- Nos of women farmers: 7320
- Number of Farm School – 72
- Number of Community Resource Person – 120
- Number of Self Help Groups – 644

Activities:

- Institution building
- Cadre development- capacity building of community Resource Persons
- Capacity building of women farmers on sustainable agriculture practices
- Promotion of sustainable agriculture practices – Demonstrations, training and education on sustainable agriculture practices

2. CONCEPT OF SUSTAINABLE AGRICULTURE

Sustaining agricultural productivity depends on quality and availability of natural resources like soil and water. Agricultural growth can be sustained by promoting conservation and sustainable use of these scarce natural resources through appropriate location specific measures. Indian agriculture remains predominantly rain-fed covering about 60% of the country's net sown area and accounts for 40% of the total food production. Thus, conservation of natural resources in conjunction with development of rain-fed agriculture holds the key to meet burgeoning demands for food grain in the country. Towards this end, National Mission for Sustainable Agriculture (NMSA) has been formulated for enhancing agricultural productivity especially in rain-fed areas focusing on integrated farming, water use efficiency, soil health management and synergizing resource conservation.

Sustainable agriculture systems are those that are economically viable and meet society's need for safe and nutritious food while maintaining or enhancing natural resources and the quality of the environment for future generations.

The concept set out by the Technical Advisory Committee (TAC) of the Consultative Group on International Agricultural Research (CGIAR) states "*Sustainable agriculture is the successful management of resources for agriculture to satisfy the changing human needs, while maintaining or enhancing the quality of environment, and conserving natural resources*"

3. NEED OF SUSTAINABLE AGRICULTURE

Sustainable agriculture systems are designed in such a way, which use existing soil nutrient and water cycles, and naturally occurring energy flows for food production. These systems aim to produce food that is both nutritious and without synthetic inputs that might harm human health. In practice, such systems have aimed to avoid the use of synthetically compounded fertilizers, pesticides, growth regulators, and livestock feed additives, instead they rely upon crop rotations, crop residues, animal manures, legumes, green manures, off-farm organic

wastes, appropriate mechanical cultivation, and mineral bearing rocks to maintain soil fertility and productivity.

The need of sustainable agriculture owes its origin to the philosophy of 'holism', which articulates that all things are connected and their interactions in nature are complex. Promotion of one component creates response to that as well as the system as a whole also responds. Appreciation of the theory of holism is very much embedded in our sayings and scriptures. An ancient Tamil proverb says as follows, "*No fodder, no cattle; no cattle, no manure; no manure, no crop*". A Sanskrit text from about 1500 BC translates as "*Upon this handful of soil our survival depends. Husband it and it will grow our food, our fuel, and our shelter and surround us with bounty. Abuse it and the soil will collapse and die, taking man with it*". These primitive quotes lay the concern deeply on the health of the very basic elements that contribute to the sustenance of complete chain involving production to consumption. For instance, if the vitality of natural resources is impaired because of neglect or misuse, agricultural sustainability and environmental quality and the linkage among these in the quest for human survival becomes at stake.

4. BEST PRACTICES IN SUSTAINABLE AGRICULTURE

4.1 Vermicompost

Vermicomposting is basically a managed process of worms digesting organic matter to transform the material into a beneficial soil amendment. Vermi-compost are defined as organic matter of plant and/or animal origin consisting mainly of finely-divided earthworm castings, produced non-thermophilically with bio-oxidation and stabilization of the organic material, due to interactions between aerobic microorganism and earthworms, as the materials pass through the earthworm gut.

The term vermicomposting means the use of earthworms for composting organic residues. Earthworms can consume practically all kinds of organic matter and they can eat their own body weight per day, e.g. 1 kg of worms can consume 1 kg of residues every day. The excreta (castings) of the worms are rich in nitrate, available forms of P, K, Ca and Mg. The passage of soil through earthworms promotes the growth of bacteria and actinomycetes. Actinomycetes thrive in the presence of worms and their content in worm casts is more than six times that in the original soil (R.V Misra, 2003).

Converting the solid organic waste into compost, an innovative discipline of vermin culture technology, the breeding and propagation of earthworms and the use of its castings has become an important tool of waste recycling the world over. Essentially, the vermin culture provides for the use of earthworms as natural bioreactors for cost effective and environmentally sound waste management (Asha Aalok, 2008).

Benefits of Vermicompost

1. Organic – Vermicompost is produced by using earth worms and it is hundred percent organic. There are no harmful chemical needed to make Vermicompost.
2. Soil Improvement – Vermicompost improves soil aeration and enriches soil with micro-organism. It also attracts earthworms already present in the soil. Earth worms restore and improve soil fertility and increase crop productivity by the use of the excretory products Vermicompost.

3. Increase Plant Growth – It enhances germination, plant growth and crop yield. It also enriches soil with micro-organism and improves root growth and structure.
4. Environment – Vermicompost builds up soil's natural fertility and also regenerates rich population of earth forms in farm soil.
5. Safe – Vermicompost has the biggest advantage of great social economic significance is that the food produced is complete organic, safe and chemical free.
6. Quality – It enhances size, color, smell, taste, flavor and keeping quality of the flowers, fruit, and vegetable and food grains.
7. Production – Vermicompost gives 30% to 40% yields of crops over chemical fertilizers.
8. Water – Vermicompost has greater water holding capacity due to humus contents and reduces the requirement of water for irrigation by thirty to forty percent (Rajiv K. Sinha, 2010).

4.2 Farm Yard Manure (FYM)

FYM refers to the decomposed mixture of dung and urine of the farm animals along with the liter and left over material from roughages or fodder fed to the cattle (Sankaranarayanan, 2004).

Benefits of Farm Yard Manure

1. Farm yard manure supplies all major nutrients and micro nutrients necessary for plant growth.
2. Farm yard manure improves soil physical, chemical and biological properties and improves the soil structure. The FYM application leads to a better environment for root development.
3. Farm yard manure also improves the water holding capacity of soil.
4. Improved soil physical/chemical property and nutrients balances lead to increase and sustain production of crop (Tilahun Tadesse, 2013).

4.3 System of Rice Intensification

The concept of System of Rice Intensification (SRI) focuses on managing the soil, water, plants and nutrients in a balanced relationship, enabling maximum growth of rice plants. SRI increases rice production and raises productivity of land labor, water and capital through different practices of management (Dhakal, 2005).

The System of Rice Intensification, an improved package of rice cultivation practices, is claimed to greatly enhanced yield and substantially reduces water and other input uses in the context of small holder farming. SRI involves four components viz, using a single seedling per hill, transplanting seedling at a younger age (less than 15 days), square planting (25 *25 cm spacing) and using cono weeding (K. Palanisami, 2012).

Benefits of using SRI

1. Compared to traditional methods, SRI requires only 25% of seeds normally used, 50% less labor for transplanting, 50-60% less labor for irrigation, and less use of fertilizer and pesticides. This is advantageous for smallholder farmers. But the first weeding is difficult, and the cost for weeding is more by 50-60%. The cost of fertilizer is less than normal practice, while cost of harvesting remains same.
2. With SRI technique, there is about 40-50% increase in grain yield and 20-25% increase in biomass production. Generally, overall expenditure is either the same or slightly less with SRI compared to traditional, but SRI gives more yields. Therefore, increase in yield of both biomass and grain is a net benefit.
3. SRI consumes 50 to 75% less water compared to traditional methods. Therefore, SRI reduces the frequency of irrigation, conflict among irrigation water users, and riser failure caused by stagnant water.
4. Generally, 15 days-old seedlings are better, and best spacing depends on location and soil conditions. In general, 30 cm spacing is better in lower altitudes and 20 cm spacing at higher altitudes (Dhakal, 2005).

Impacts of SRI

1. With SRI, self sufficiency of food improved earlier rice primarily used for home consumption but with SRI surplus has improved.
2. With fields no longer constantly flooded, farmers do not have to stand in muddy water for hours, pulling up and transplanting seedlings or weeding. This reduces their skin irritations and other illnesses that occur from prolonged exposure to water.
3. Usually rice cultivation requires 8 hours days of labor to cultivate on one hectare of land but with SRI, it has been reduced up to 30 percent.
4. With SRI Income improvements are achieved by lower input costs and higher productivity. More livelihood and fewer medical expenses. With lighter work load farmers can also seek employment beyond agriculture, it gives more time to focus other house hold & social works.

4.4 Bio Fertilizers and Pesticides - Amrutpani and Brahmastra

Bio fertilizers are the product containing carrier based (solid or liquid) living micro organisms which are agriculturally useful in terms of nitrogen fixation, phosphorus solubilization or nutrient mobilization, and to increase the productivity of the soil and/or crop (National Center of Organic Farming, 1985).

Benefits of Bio Fertilizers

The chemical Fertilizers and pesticides affect the quality of agriculture produces in conventional practices, but bio fertilizers and bio pesticides are referred as sustainable friendly system. Bio fertilizers are low cost renewable sources of plant nutrients which supplement the need of plant nutrition and reduce the use of chemical fertilizers. These can be used from seed treatment to soil application. Bio fertilizers generate plants nutrients like nitrogen and phosphors through their activity in the soil in a gradual manner. Bio fertilizers are gaining moment recently due to the increasing emphasis on maintenance of soil health, minimize environmental pollution and reduce the use of chemicals in agriculture (Hari Muraleedharan, 2010).

4.5 Mixed cropping

Mixed cropping is also known as intercropping and crop rotation. It is the growing of two or more crops at the same time on the same field. Planting more than one crop will allow the crops to grow and work together on the same piece of land. Multiple cropping helps to improve soil fertility and it also increases crop yield. In this type of farming the products and the wastes that are from one crop plant helps in the growth of the other crop. As general practice small duration crop (Pulses) and long duration crops (Cotton) are grown together, the pulses crop fixes nitrogen in the root, which benefits the other crop, Also the harvesting of short duration crop completes before long crop reaches at flowering stage; it avoids competition and supplements each other.

Mixed cropping is the cultivation of two or more crops simultaneously on the same field. It also means the growing of two or more crops on the same field with planting of the second crop after the first one has completed its development. The rationale behind intercropping is that the different crops planted are unlikely to share the same insect pests and disease causing pathogens and to conserve oil (Online Information Service for Non- Chemical Pest Managements in the Tropics, 2016).

Benefits of Mixed Cropping

1. Reduces the insect/mite pest populations because of the diversity of the crops grown.
2. Reduces the plant diseases. The distance between plants of the same species is increased because other crops (belonging to a different family group) are planted in between.
3. Reduces hillside erosion and protects topsoil, especially the contour strip cropping.
4. Attracts more beneficial insects, especially when flowering crops are included the cropping system
5. Minimizes labor cost on the control of weeds. A mixture of various crops gives often a better coverage of the soil leaving less space for the development of weeds.
6. Utilizes the farm area more efficiently.
7. Results in potential increase for total production and farm profitability than when the same crops are grown separately.
8. Provides two or more different food crops for the farm family in one cropping season (Online Information Service for Non- Chemical Pest Managements in the Tropics, 2016).

4.6 Multiple - Vegetable Cropping

Vegetable cropping is important for small farmers because it creates a regular source of income and to best avoid the risk of crop failure multiple cropping is promoted. Vegetable cropping enhances the nutrients in the farmers' diet.

Multiple cropping means two or more crops are grown in succession on the same land per year. These forms are generally known as double cropping, triple cropping and quadruple cropping etc. (Gallher).

Benefits of multiple cropping

1. Increase overall income. When crops are grown individually, individual crops may give better yield. But when crops are grown together individuals yield of crops reduces but total yield are higher.
2. Risk of growing one crop may overcome
3. Weed intensification become less
4. Insects and disease infestation become less
5. It increases the intensity of cropping. And due to intensive cropping small farmers can increase their income.



5. Capacity Building – Role of Farm School, Community Resource person and Adoption of knowledge

Role of Farm School

- Knowledge dissemination platform related to agriculture and allied activities to women members and SHGs Group
- Training through local subject experts for agriculture practices.
- Demonstrations on farm technologies, new seeds and crops, Vermicompost, FYM, Vermi wash, etc.

Role of Community Resource Person (CRP)

- CRPs must participate in entire training programmes organized by PIA throughout the project duration.
- CRPs would be responsible to provide training to Women Farmers and conduct field and SHG level meetings and keep records accordingly.
- CRPs would be given specific targets for preparing plan of each farm family according to sustainable agriculture cropping practice and will conduct demonstrations accordingly.
- CRPs have to motivate the farmers to adopt Sustainable Agriculture methods in their fields and to adopt scientific animal husbandry related activities.
- CRPs have to motivate women farmers to establish nutritional vegetable garden, crop demonstration, vegetable seedling nursery, collection of crop productivity data of each woman farmer, disbursement and recovery of revolving fund, registration fee collection, etc., or work assign by PIA team.
- CRPs will share information to women farmers on weather, insurance and market situation.
- CRP will conduct baseline and end line survey with their allotted respective women farmers along with documenting success/ case studies.
- CRPs will keep all records at village level related to program activities.



6. METHODOLOGY

This chapter discusses the methodology adopted for data collection and analysis to achieve the objectives of the study. This is an attempt to develop an understanding of the practices used by farmers involved in sustainable farming through their experience and challenges faced by them. Before proceeding further it would be appropriate to mention the rationale of the study and purpose of the study. The rationale of the study is to bring the perception of the farmers engaged in sustainable farming. The purpose of this study is to know the farmers opinion and perception towards sustainable farming practices.

Objective of the Study

1. To understand how sustainable agriculture practices making impact on women empowerment.
2. To understand the change occur through MKSP project interventions
3. To understand women problems and how it can be addressed through sustainable agricultural practices.
4. To develop an understanding about farmers perspective regarding sustainable natural farming

Research Method

It is an exploratory qualitative study. The study aims at exploring the farmer's perspective towards sustainable farming with the emphases on the organic inputs used by the farmers involved in sustainable farming as well as their income and expenditure pattern. Researcher restricted this study to sustainable natural farming and related products such as Vermicomposting, Brahmastra, Vermi Wash etc. the report provides a detailed analysis and description of the practices used by the farmers who are involved in sustainable farming through exploratory approach. Data was collected from Chhotaudepur district of Gujarat using structured questionnaire schedule.

Area of study

The area of study is Chhotaudepur district of Gujarat. People from this area have been involved in farming in majority. Earlier people used to migrate to urban areas of Gujarat for employment. At present due to many interventions people are engaged in agriculture throughout the year. The project areas are divided into two blocks Pavi-Jetpur and Chhota-Udepur (Rath area) to get details from developing area and undeveloped areas, that may bring the data to understand the real impact of the sustainable agricultural practice.

Sampling

The study is conducted in Chhotaudepur district of Gujarat. The district is preferred for data collection as most of the population is depended on agriculture for survival. This allowed researcher to gain insight of sustainable farming from varied sustainable farming practices in use. The respondent of was selected by Shroffs Foundation Trust who has been working with the farmers of the area for more than 20 years.

Source of Data

Data was collected from primary and secondary sources. The study has been conducted through structured interview schedule and secondary data. The primary sources of the data were respondents and secondary data was collected from articles, journals, and books etc. that are associated with dealing in sustainable farming.

Data Collection Tool

The structured interview schedule was used to study the farmers perception engaged in sustainable farming. the interview schedule was planned in such a way that interview can go for maximum two to three hours, due to this, respondent were encouraged and was given enough time to give free responses to question raised. Another reason for choosing interview method is that it allows the researcher to gather in depth of the information. The structured interview schedule is preferred for this research over other data collection as the main aim of this study is to explore the perception of the farmers and practices used by them. The advantage of the structured interview is that it helped the researcher to gain in depth knowledge, information and to be flexible which made the respondents comfortable.



7. CASE STUDIES ON VERMICOMPOST

7.1 Geetaben Kanubhai Rathwa

Village – Dholivav Block: Pavi Jetpur



Geetaben is one of the most educated persons of her village. She has a Bachelor degree in Arts and her husband is also educated. Knowing the importance of education she is giving good education to her children. Her son is pursuing mechanical engineering whereas her daughter is pursuing humanities.

Geetaben lives in a joint family and agriculture is the only source of income. Her family livelihood depends on the agriculture activities. She is been engaged in agriculture for more than a decade. There was girl education programme going on in her village when she first came to know about Shroffs Foundation Trust. Later, Shroffs Foundation Trust launched Mahila Kishan Sashaktikaran Pariyojana (MKSP) project and was looking for educated enthusiastic women who can act as community resource person. This is when she joined Shroffs Foundation Trust. She got various trainings by the Shroffs Foundation Trust on different crops.

When she was getting the training on modern scientific agriculture activities she was flabbergast by

knowing these practices what kind of farming is this she used to ask herself. At first, she also refused to adopt this modern agriculture practices but when she visited other farmers who were practicing these methods she got agree to implement one of this modern practices

on a small proportion of land. The challenge she faced while adopting this method was convincing her family to adopt this new practices in agriculture. Her brother in law was totally against this practices “*AAVU KARVA THI KAI KHETHI THATI HASE*” (what kind of way is this of farming) but she convinced her family and they come to the conclusion that her brother in law can do the farming with old practices and she will do it with modern scientific agriculture practice and later they will compare the results. The result was off the charts improved crop and better production.

It's been three years since she adopted this modern scientific agriculture practices. Currently she is practicing Vermi-compost, Farm Yard Manure, Vermi Wash and System of Rice Intensification (SRI) technique. In initial stage of practicing she prepared one bed of



Vermicompost with the help of the team of Shroffs Foundation Trust. After seen the result of Vermicompost she scaled up this process now she has expanded to five beds of Vermicompost.

By adopting these practices, her savings improved she currently own four milch animals and planning to add four more. These practices put her out of debt. The training she received on animal husbandry increased the production of milk. She joined the nearby milk cooperative society which has created another source of income for her family. Further she is planning to scale up the plantation of drumstick and vegetable so that it can create her additional source of income. After seeing results of modern scientific and sustainable agriculture practices other villagers ask her form where she learns all this. They even come to her with their agriculture problems. She is grateful to Shroffs Foundation Trust and how it changed her life. Shroffs Foundation Trust gave her a platform and opportunity to share her experience with others in Mumbai. Currently she is acting as a Community Resource Person and runs a farm school.

Vermicompost practice

Geetaben is practicing Vermicomposting from last two & half years. The change she experienced in farming was tremendous. Below are some of the results of Vermicomposting practices by Geetaben on her five acre of land.

Indicators	Before Adopting Vermi-compost (per acre)	After Adopting Vermi-compost (per acre)
Seeds Quantity	1800 gram	800 gram
Expenditure on chemical fertilizers	5000 INR	700 INR
Vermi-compost dosage	Nil	600 kg
Water times	6-7	3-4
Expenditure on water consumption	1000 INR	550 INR
Soil quality	Hard	Soft
Quality of crop	Roots damage, grey spot on leaves	Roots health improved, green leaves
Production	700-800 kg	1600-1800 kgs

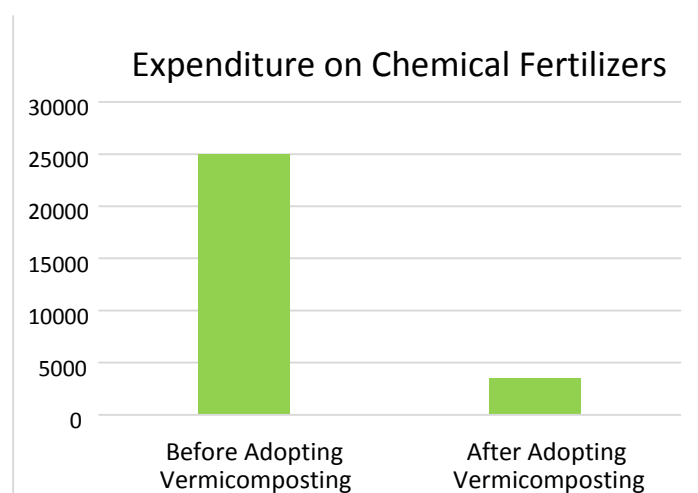


Fig (a) shows expenditure on chemical fertilizers on five acre of land.

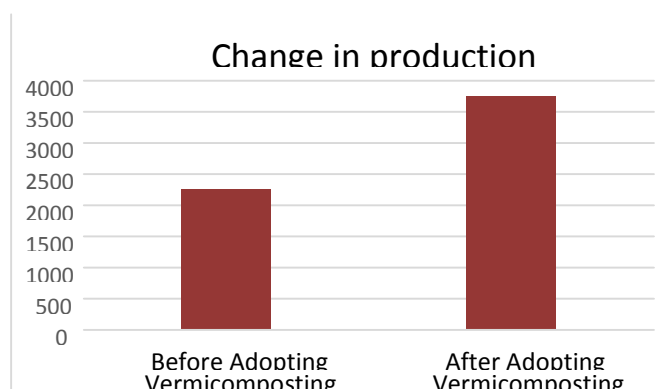


Fig (b) shows change in production of cotton crop in five acre of land.

New Income Generated

Geetaben has created new sources of earning by adopting new modern scientific agriculture practices.

Sources	Quantity	Income Generated
Earthworms sold	40 kg	10000 Rs
Vermiwash	75 liters	1800 Rs

(1 liter of vermi wash – Rs. 30 and 1 kg of earthworms – Rs. 250)

Major Findings

1. Reduction in expenditure on chemical fertilizers up to 86%
2. Production increased by 60%
3. Expenditure on water decrease by 45%



7.2 Madhuben Musabhai Rathwa

Village – Moti Bumadi Block: Pavi Jetpur



Madhuben, a fifty two years old lady from Moti Bumadi village belongs to a average family. Lack of water facilities made her family to depend on rain-fed farming. She with her husband are uneducated and labor work was the only option left for them to sustain. The despondent condition of her family forced her to work as an agriculture laborer. Twenty five paisa was what Madhuben used to earn few decades ago.

She came to know about Shroffs Foundation Trust through its field team member who used to interact with women of the village. From last four years she is connected with Shroffs Foundation Trust. She increased the number of cattle after getting the training from Shroffs foundation trust on animal husbandry. Cattle were the main source that put her family out of misery *“GAYE ANE BHASE NE KARANE AME GARBI NA KHADA MATHI BHAR AAVYA”*. She started selling the milk which generated her new source of income. She is earning twenty four thousand rupees in one month and with this income she installed one bore well in her house which provides her water enough to use in the field. Now with the



availability water she started practicing other farming practices.

Further she involved in other trainings she received trainings on bio fertilizers and its usage and from soil testing report she came to know about appropriate quantity and dosage are required. With the help of Shroffs Foundation Trust she prepared one bed of Vermincompost. She used this Vermincompost fertilizer in farming and after seeing the result she decided to increase this process now she has four beds of

Vermicompost. She was the first woman from her village who started this process and seeing the impact people started visiting her farm to learn this new practices.

This Vermicompost practicing motivated her to start vegetable cropping. She started using Brahamastra, Vermi Wash and Amrutpani in farming. The result was encouraging, production and quality of crop improve and disease resistance of crop also increased. She is thankful to Shroffs Foundation Trust and its team who helped her a lot and with this new source of income she also renovated her house.



Vermicompost practices

The table below shows the result of Vermicomposting of maize crop on one acre of land

Indicators	Before Adopting Vermicompost (one acre)	After Adopting Vermicompost (one acre)
Expenditure on chemical fertilizers	5000 INR	350 INR
Vermicompost dosage	Nil	1000 kg
Water times	Twice in a season	One time in a season
Expenditure on water consumption	1400 INR	700 INR
Soil quality	Hard and crack in soil	Soft
Quality of crop	Yellowish, less plant height	Green, plants growth improve, less disease
Production	5000 Kg	13000 kg

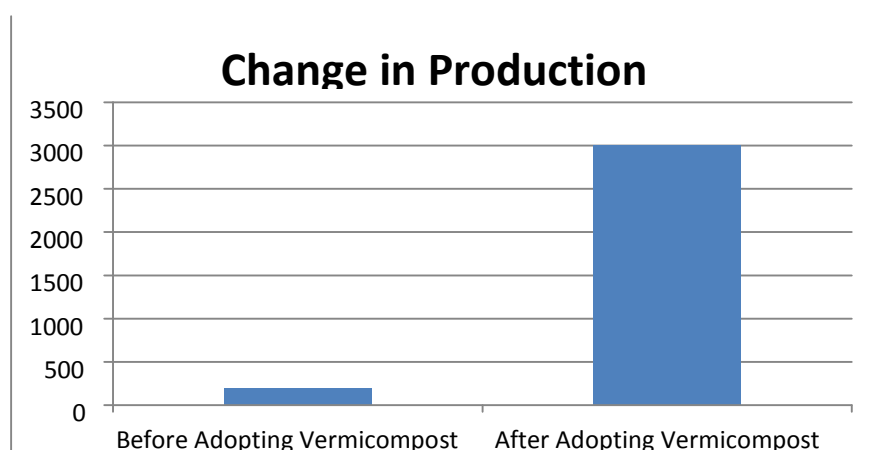


Fig (c) shows change in production (kg) of maize crop on one acre of land.

Major findings

1. Use of chemical fertilizers decreased by 93%.
2. Water consumption decreased by 50%.



7.3. Kuntaben Kamleshbhai Rathwa

Village: Mota Khajuriya

Block: Pavi Jetpur



Kuntaben Rathwa lives in a joint family of fourteen members. All family members are engaged in collective farming. There was lack of irrigation facilities in the village. . Since last three years she is engaged with SFT. She came to know about SFT through its field team who used to organize meetings with the farmers on modern agriculture techniques. The family realized the importance of modern agriculture practices and decided

to adopt it. She has been selected as a Community Resource Person of her village. There are four SHGs and 40 members under her supervision

She faced lots of problems when she started managing SHGs, the members did not know the importance of SHGs they didn't feel to attend the meetings. So, she decided to mobilize people of the village. In initial days while mobilizing people used to comment on her, verbally abused her at some point she even thought to leave the program but gradually villagers realized the importance. Currently under her supervision is made twenty five beds of Vermicompost. She regularly attends the meetings and got various training on different crops and methods. She experienced lots of changes in the crops and production. Regular interactions with the people, SFT team and exposure to market, improved her agriculture knowledge and confidence. Where most of the villagers are engaged in vegetable cropping, she is only sowing those crops whose value and demand is more in the market. In the beginning of the year she plants coriander and tomato so that at time of April when the demand is high she can sell it and earn the most profit. Coriander and tomato is a crop which requires water and most of farmers due to lack of water facilities do not produce this crop. She took the benefit of this and invests in coriander, tomato crop. She got various training on different crops and do farming on the basis of the training she received. For future she planning to drumstick plants and she is also invested in sandal crop.



Vermi-compost practice

The table below shows the result of Vermicomposting of coriander crop on one guntha

Indicators	Before Adopting Vermicompost	After Adopting Vermicompost
Seeds Quantity	10 kg	10 kg
Quantity of chemical fertilizers	50 kg	Nil
Vermi-compost dosage	Nil	250 kg
Water times	2-3 in a week	One time a week
Expenditure on pesticides	3200 INR	Nil
Expenditure on bio fertilizer	Nil	800
Soil quality	Hard and crack in soil	Soft
Quality of crop	Yellowish,	Green, plants growth improve,
		less disease
Production	5000 INR	25000 INR

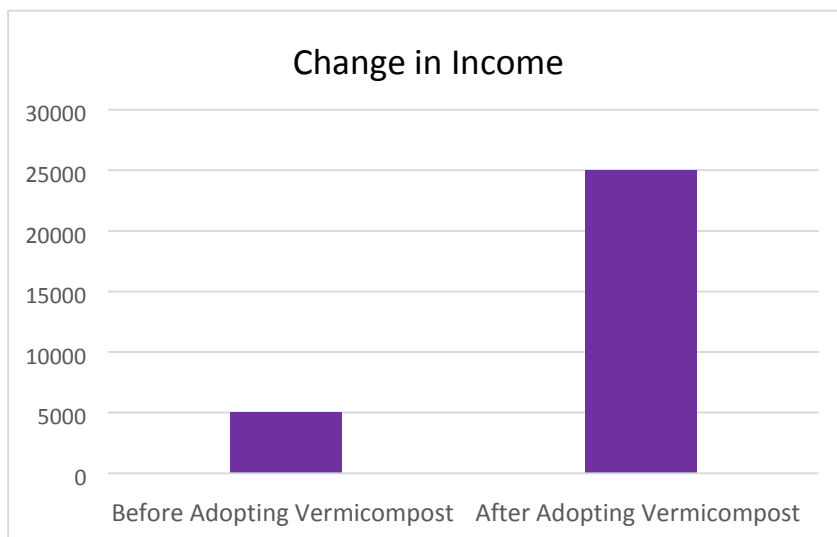


Fig (d) shows change occurs in income (in INR) from coriander crop.

Major Findings

1. Income increased from coriander crop by 400%.
2. Use of chemical fertilizer decreased by 100%.
3. Water consumption decreased by 60%



8. CASE STUDIES ON FARM YARD MANURE

8.1. Rangliben Dilipbhai Rathwa Village: Runwad Block: Chhotaudepur



Rangliben was married in early age and due to that she terminated her studies. Rangliben and her husband both have secondary level education but knowing the importance of education they make sure that their children have sufficient education. Her elder son is in college pursuing bachelor in arts and her younger children are in school pursuing secondary education. She used to live in a nuclear family but now she lives with her in-laws. After the partition of property her husband got five acres of land. Agriculture land is

the main source of family income apart from land, the family owns a tractor which gave them another source of income. The family got five acres of land in which only two acres was the appropriate land for irrigation purpose and the rest three acres of land is near river bank which was sloppy and unsuitable for cultivation.

It has been three years since Rangliben is associated with Shroffs Foundation Trust. The SFT called a meeting in her house where all the members of SHGs were present. In the meeting, SFT told them about the sustainable agriculture practices its importance and benefits. The family understood the importance of modern scientific but sustainable agriculture practices and decided to get the training. They underwent different types of training such as SRI, Vermicompost Different Cropping Pattern, Bio fertilizers and Animal Husbandry. The SFT team also helped the family to make their land suitable of cultivation purposes. Afterwards, the training they have prepared farm yard manure and use it in farming. The family of Rangliben experienced tremendous growth in rice and maize crops. Diseases decreased and the production increased. Earlier she used Urea, DAP and Potas as fertilizer. D Later when she started using Brahamastra and Vermi wash diseases decreased and crop growth found encouraging.

Presently, she manages a farm school and under her supervision she is operating six SHGs. There are sixty three women from her village associated with the SHGs and farm school. First, Rangliben got training from SFT and then she passed the training to women of her farm school. She is very thankful to SFT team that helped her family to improve the agricultural practices. The agriculture scientist of California USA, visited her farm school and farm and appreciated the sustainable agriculture practice. This was a motivational factor for her to increase and promote Sustainable agriculture practices. Further she is planning to install bio gas plant with the help of SFT.



Farm Yard Manure Practice

Given below is the result of farm yard manure on Brinjal crop on 2 acre of land.

Indicators	Before FMY Adoption	After FMY Adoption
No. of Sapling	3000	2200
Gap between Sapling	1 Foot	2 Foot
Chemical Fertilizers Dosage	40 kg	Nil
Expenditure on Chemical Fertilizers	700 INR	Nil
FYM Dosage	Nil	1000 kg
Soil Quality	Hard and Dry	Soft and Moist
Crop Quality	Plant growth 2feet	Plant growth – 4feet
Income from Production	7000 INR	11000 INR
Water times	Every week	Twice a month

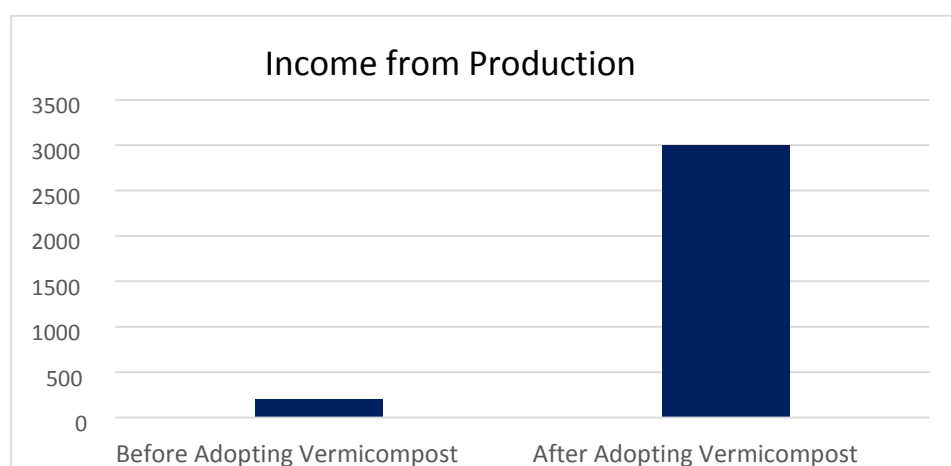


Fig (e) shows change in income (in INR) on two acre of land.

Major Findings

1. 100% cut in Chemical Fertilizers consumption
2. Water consumption reduce to 50 %
3. 57% increase in production income



8.2. Pinkiben Maheshbhai Rathwa

Village: Vasedi Block: Chhotaudepur

Pinkiben got married at the age of sixteen she left her studies because her family needed help in constructing their house. Pinkiben have one acre of land and one small well with very less water. She with her family completely depended on rain-fed farming. She even bought drinking water from outside. Due to lack of water facilities she only produce rain-fed paddy in the monsoon season which is only sufficient to meet the food requirement of family. Her father in law was a bus driver so whole family was depended on her father in law's income and she even used to work as construction laborer in Vadodara.



Pinkiben worried about her children's future decided to enlarge the well. She used to work late night to construct the well. She pawned her jewellery to set her husband's cycle repairing shop. SFT field team started selection of Community Resource Person from her village, she was contacted, but she was not selected because of her less qualification but she



got reelected when the former Community Resource Person left. She got various training from SFT. When she told her husband to adopt SRI technique her husband refuses to accept but gradually he understood and adopted SRI. The result made him realize benefits of this modern agriculture practices. The training she got from SFT, she started implementing it on her field. Earlier due to lack of water facilities she sticks to limited crops but now with the

training she started vegetable cropping.

The modern agriculture practices resulted in better production and crops. The weeding lessened and removal of weeding is become easier. Villagers visit her field to learn how she is practicing these methods she help other farmers also in adopting these practices. In future she is planning to scale up her production and trying to activate the SHGs which are not working at the moment.

The table below shows the result of FYM of Maize crop in 15 Guntha land:

Indicators	Before FYM Adoption	After FYM Adoption
Seed Quantity	7.5 kg	5 kg
Gap between Plants	5 inch	12 inch
Chemical Fertilizers Usage	75 kg	50 kg
Expenditure on Chemical Fertilizers	525 INR	350 INR
FYM Usage	Nil	250 kg
Soil Quality	Hard and Dry	Soft and Moist
Crop Quality	Less weight, small seeds, tasteless, less fodder	Large seeds, more weight, soft & tasty and more fodder
Production	300 kg	400 kg
Water times	Twice a week	One time a week
Weeding time	240 men hour	48 men hour

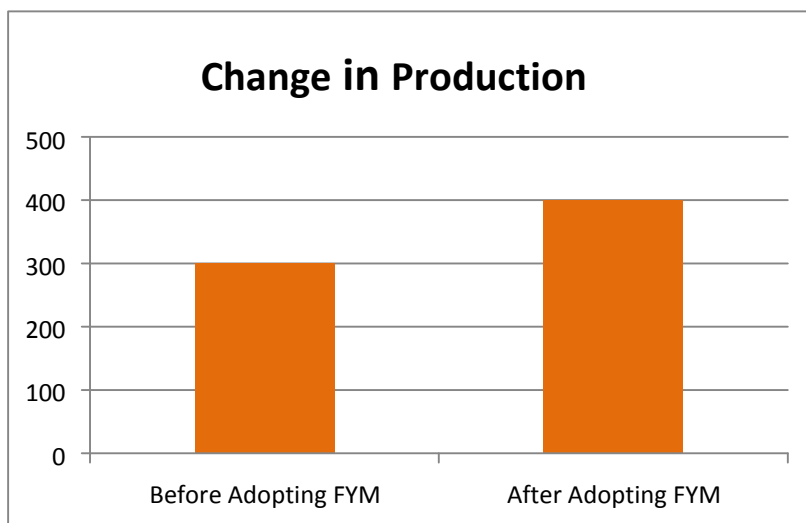


Fig (f) shows change in income (in INR).

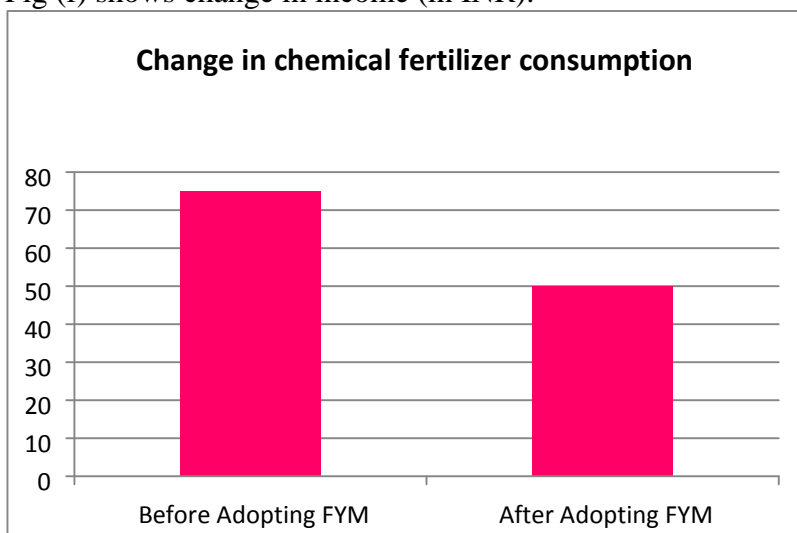


Fig (g) shows change in chemical fertilizer consumption (in kg).

Major findings

1. Production increased by 33%
2. Seed consumption decreased by 33%
3. Chemical fertilizers reduced by 33%
4. Water consumption decreased by 50%

8.3. Urmilaben Rajeshbhai Rathwa

Village: Vasedi Block: Chhotaudpur

Urmilaben got married in 2010 at the age of 20. She now lives in a joint family. She is engaged in agriculture before marriage and it is also the reason she left her education. She is married in a poor family where every member is involved in agriculture activities. The condition of her family was so bad that they were unable to afford health care. She used to live in kuchha house where the family barely manages agriculture expenses. When MKSP project started she got the opportunity get training. After joining the MKSP program and the farm school, she started regular saving in SHG. Community Resource Person gave her training on various crops and techniques.



She has prepared Farm Yard Manure (FYM) beds which she used in her field.

Earlier farming was difficult because of rough and hardens soil condition but with the use of FYM soil has become softer and weeding lessened. In future she is planning to increase the natural way of agriculture practices and prepare protective Vermicompost beds. As agriculture is the only source of income the family have she trying to scale it up through these practices. So that her daughter's education can be secure.

The table below shows the result of FYM on Brinjal crop on 3 guntha.

Indicators	Before FYM Adoption	After FYM Adoption
Number of Sapling	600	400
Gap between Sapling	6 inch	12 inch
Chemical Fertilizers Usage	100 kg	Nil
Expenditure on Chemical Fertilizers	1650 INR	Nil
FYM Usage	Nil	500 kg
Plant Height	1 feet	2 feet
Soil Quality	Hard and dry	Soft
Crop Quality	Dry leaves with black spots	Green leaves,
Production in Income	3000 INR	6000 INR
Water times	Thrice a week	One time in a week
Weeding time	24 men hour	8 men hour

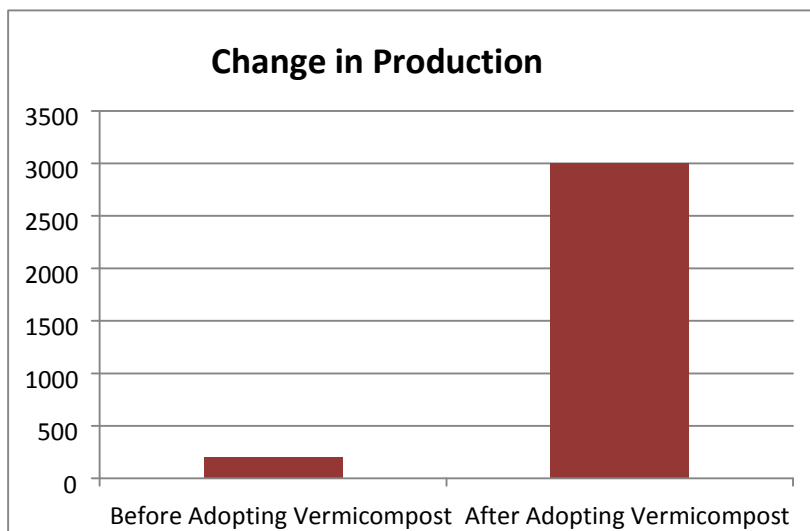


Fig (h) shows change in income from production (in INR).

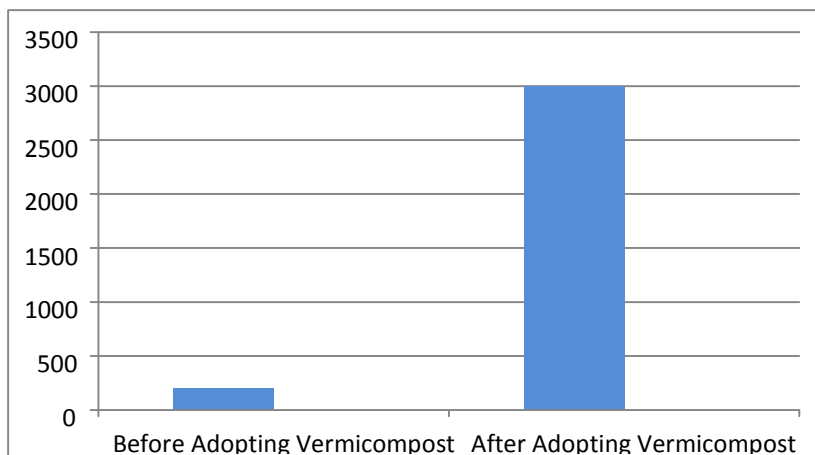


Fig (i) shows change in usage of chemical fertilizer (in kg).



9. CASE STUDIES ON SYSTEM OF RICE INTENSIFICATION (SRI)

9.1. Gauriben Jaswantsingh Rathwa

Village: Dholivav Block:Pavi Jetpur



“MANE MOKO MADIYO CHE TO HU AKHA GAM NI KHETHI NE BADLWA MANGU CHU”

Gauriben dream is to change the agriculture practices of her village though she is not well educated but is a confident woman with good conversation skill whereas her husband is educated and have a bachelor degree in agriculture. Her husband works in Tata Motors industry so she has to take care of all the agriculture activities.

Through MKSP she came to know about

Sustainable Agriculture Practices. She selected as a Community Resource Person, because of her good reputation in the village. She manages the farm

school in her village. There are sixty three members as MKSP target. She formed seven Self Help groups and she is also a president of *Shree Ji Sakhi Mahila Mandal*. She participated in all the trainings and programs organized by Shroffs Foundation Trust.

The training given by Shroffs Foundation Trust helped her in farming. She came to know about the difference between chemical and bio fertilizers and pesticides. Shroffs Foundation Trust helped her in adopting modern practices such as System of Rice Intensification and Vermicompost. She started modern scientific agriculture practices by creating two Vermi beds which led to decline of the usage of Urea, DAP and Potash. From last one year she has completely stopped using Urea, DAP and Potash. By using bio products such as Amrutpani and Brahamashtra, her crop production is increased and quality, of soil health is improved, it made her work easier.



These practices increased her vegetable cropping and improved the taste of her vegetables. The results gave her confidence to sell her crop in the market (Vadodara) which helped her to learn about the market, dealing with the customers. *“HAVE KOI PAN VAAT NO DARR NATHI RHYIO”*. She is actively involved in the activities of Shroffs Foundation Trust for promoting awareness on entrepreneurial activities such as, papadi and pickle making.

System of Rice Intensification

The below table are the results of SRI practiced by Gauriben in her 0.40 acre of land

Indictors	Before Adopting SRI	After Adopting SRI
Seed Variety	Normal seeds	GR-13
Distance Between 2 plants	Uneven	25cm X 25cm
No. of water	4-6 times	2-3 times
Quality of production	Yellow Rice, Less weight	White Rice, Weight Increased
Quantity of Production*	800 kg	2000 kg
Soil Quality	Hard and cracks in soil	Soft, no cracks in soil

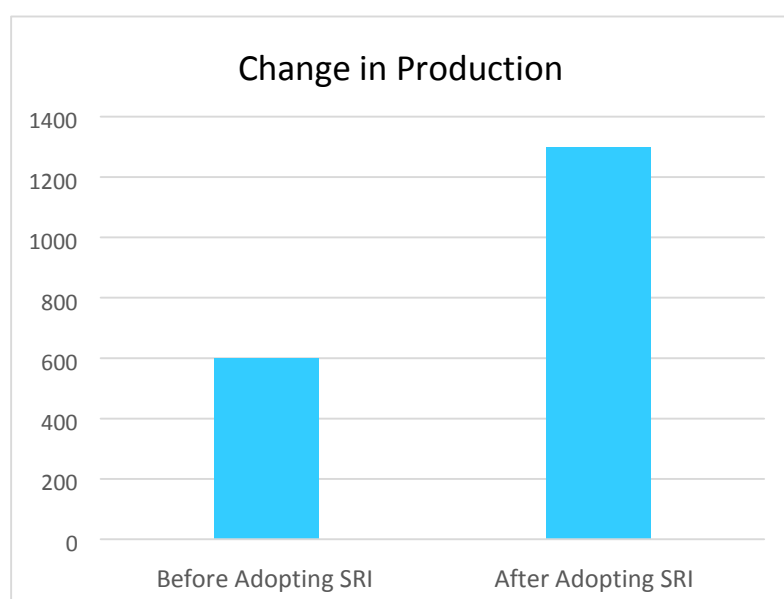


Fig (j) Shows change in production (in kg) in 0.40 acre of land.



9.2. Sonalben Rathwa

Village: Maladhi Block: Chhotaudepur



Sonalben was unable to complete her study due to financial constraints. She has primary education till fourth standard. Her family condition was so bad that she used to write on tiles instead on black board (notebook). She got married at early age and her husband used to do labor work. After marriage Sonalben joined her husband in labor work to support the family. She started migrating within one year of marriage due to poor productions in agriculture in her village. Sonalben and her husband decided to move to Kutch to support their sons' education. They used to work

eighteen hours a day they were engaged in cattle maintenance and construction works. The family used to earn three hundred rupees a month. During the monsoon season the family comes back to their village for farming and goes back to labor work when the season ends. When they were in Kutch she saw SHGs functioning and realized that saving is very important for future purpose. She called women from her village and formed a SHGs group under mission manglam.

Earlier she used to put cattle waste directly in the fields and totally depended on the rain-fed farming. In this circumstance the production was only fifty two hundreds kilograms. The crop was not sufficient to feed ten member of the family that was the main reason for the migration. She connected with Shroffs Foundation Trust through their field team who gave them various trainings such as animal husbandry, SRI, Crop pattern, Amrutpani and Brahamashtra making etc. The family showed their concern that they have less land and nobody is practicing this method. This is not the way of farming *"TAMHE SU SEKHI LAVYA, TAMHE SU AA NAVI KHETI KRWANA. HAME VARSO SE KHETI KARI AA ARUANNE AAJONI RITHE JA KHETI THASSE"* but later the family got convinced and adopted sustainable agriculture practices.

Sonalben compared her crop and production with traditional methods to Sustainable agriculture methods. In 2013, she installed bore well and started farming on large scale. SFT trustee visited her farms to see the improvements she made in agriculture. With the help of SFT she came to know about lots of new things about agriculture. The training made her life easier she got time to rest and other activities. In future she is planning to have manufacturing unit for Amrutpani and Brahamshtra for production and sell the bio fertilizers and bio pesticide. she is trying to activate the SHGs who are not functioning properly.



SRI Practice

The table below shows the practice of SRI by Sonalben in half acre of land before and after adopting SRI.

Indictors	Before Adopting SRI	After Adopting SRI
Seed Variety	Unknown	Gujarat – 4
Seed Quantity	25 kg	5 kg
Distance Between 2 plants	Uneven	25 cm X 25 cm
No. of water	Twice a season	Once a season
Quality of production	Yellow Rice, Less weight	White Rice, Weight Increased
Quantity of Production*	300 – 400 kg	900 - 100 kg
Soil Quality	Hard and cracks in soil	Soft, no cracks in soil
Height of the plant	2.5 feet	5 feet
Chemical Fertilizers Usage	50 kg	20 kg
Weeding	240 men hour	16 men hour

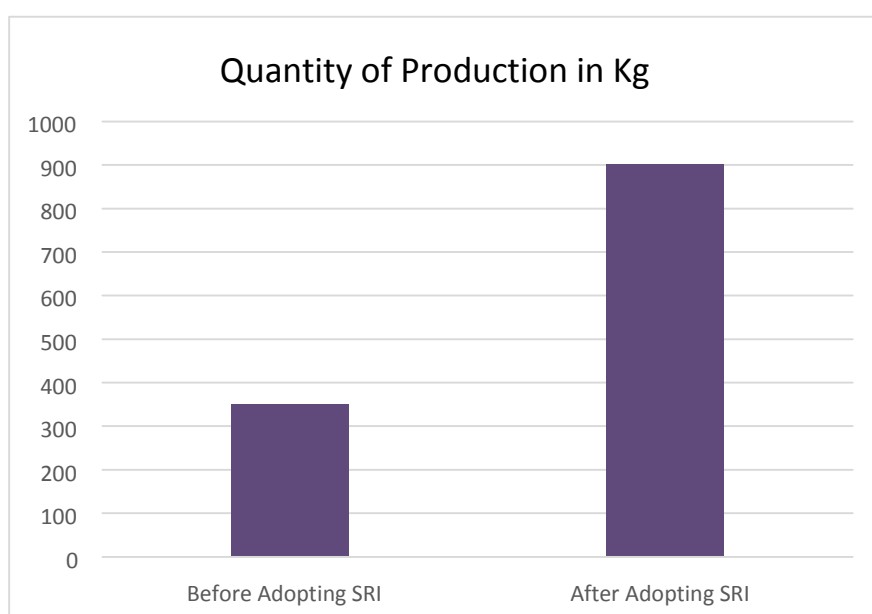


Fig (k) shows change in production (in kg) of paddy in half acre of land.



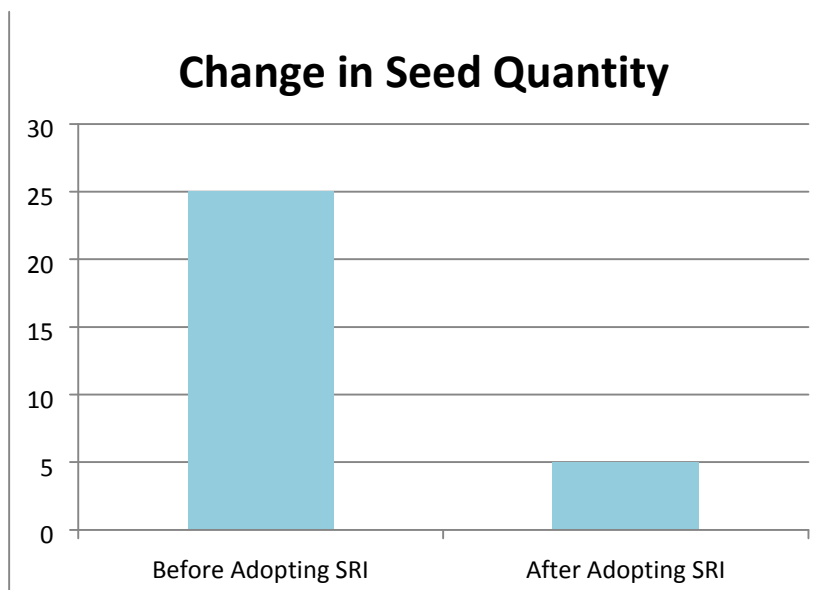


Fig (l) shows change in seed quantity (in kg) of paddy in half acre of land.

Major Findings

1. Increase in production of crop by 150%
2. Reduction in seeds by 80%
3. Reduction in water by 50%
4. Height of the plant increase by 100%



9.3. Sushilaben Rajubhai Rathwa

Village: Moti Bumadi Block:Pavi Jetpur



Sushilaben joined SFT in 2013 and it has been two years since she is acting as a Community Resource Person. She is actively involved in Farm School activity. There are ten SHGs under her farm school of seventy eight members. She has prepared sixteen Vermicompost beds in her village. She also helps her farm school members in preparing of Vermicompost beds. In her field she grows Green gram, Rice, cotton and maize. She has three acres of land but the irrigation facility is available in only two acres of land remaining one acre land is under rain fed farming. Due to

less irrigation facilities she do not have practice of vegetable farming. She used to go for farm labor labor work. The milch animals were the main source for her income.

Earlier she uses indigenous seeds, farm waste and chemical fertilizers for cropping. The shortage of water affected her production as well. She is implementing the methods in her field from the training she received from SFT. Due to limited water she has only one bed of Vermicompost. The soil quality has improved by using bio fertilizers. In future she is planning to scale up the Vermicompost beds and stop the dosage of chemical fertilizers.

The table below shows the SRI practice in twenty guntha

Indictors	Before Adopting SRI	After Adopting SRI
Seed Variety	Indigenous seeds	Gujarat – 13
Seed Quantity	20 kg	8 kg
Distance Between 2 plants	Irregular	25 X 25 cm
No. of water	Depends on rain	Depends on rain
Quality of production	Yellow Rice, Less weight	White Rice, Weight Increased
Quantity of Production	200 – 240 kg	1000 kg
Soil Quality	Hard and cracks in soil	Soft, no cracks in soil
Height of the plant	2.5 feet	4.5 feet

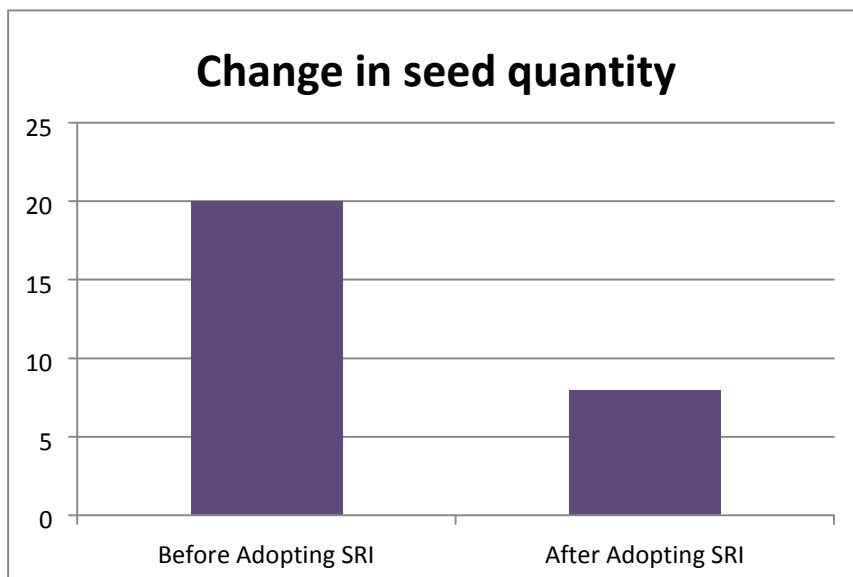


Fig (m) shows change in seed quantity (in kg) of paddy in twenty guntha.

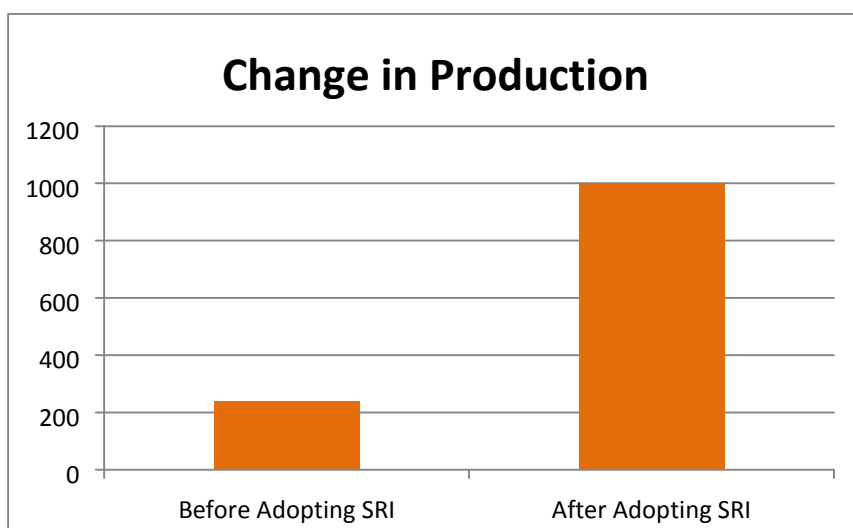


Fig (n) shows change in production (in kg) of paddy in twenty guntha.



10. CASE STUDIES ON BIO-FERTILIZERS AND PESTICIDES:

10.1. Nayanaben Karsanbhai Rathwa

Village: Jodavant Block: Chhotaudepur



Nayanaben's father died when she was in sixth standard and all the burden fall on her shoulder. She left her education and joined her mother in agriculture but she knows the importance of education and put her children in hostel as there is poor electricity at her village. She is been actively playing the role of Community Resource Person from last three year. Her husband has a degree in agriculture knowing the importance of agriculture he supported her wife to join SFT.

Earlier she used to practice traditional method in agriculture and she used to put bio waste directly in the field but after the training she got know about new methods.

She experienced that farmers who produce crop by using chemical fertilizers suffer bad result. Those who have adopted sustainable agriculture practices experienced virtuous results. She owns one and half acres of land. She practiced SRI and mixed cropping of tur and udad crops. she added vegetable crops. Earlier due to lack of water facilities she was not able to grow vegetable. The usage of Amrutpani

and Brahmashttra on vegetable have encouraging results, now it has become regular source of income. This new methods in agriculture have improved the condition of her family and created a regular source of income. Now she has bought a mini rice mill from the loan she has taken from bank with the help of SFT.

The table below shows results of Brinjal crop in two guntha

Indicators	Before Using Bio Fertilizers	After Using Bio Fertilizers
Number of Sampling	600	500
Use of Chemical fertilizers	50 kg	20 kg
Use of FYM	Nil	250 kg
Use of Chemical Pesticides	1 liter	Nil
Use of Amritpani and Brhamastra	Nil	2 liter
Expenditure on Chemical Pesticides	1000 INR	Nil
Expenditure on Amritpani and Brhamastra	Nil	400 INR
Height of Plant	1.5 feet	3 feet
Gap between Sapling	5 inch	12 inch
Production	4000 kg	9000 kg

The table below shows the result of tomato crop on two guntha

Indicators	Before Using Bio Fertilizers	After Using Bio Fertilizers
Number of Sampling	600	500
Use of Chemical fertilizers	100 kg	Nil
Use of FYM	Nil	250 kg
Use of Chemical Pesticides	1 liter	Nil
Use of Amritpani and Brhamastra	Nil	2 liter
Expenditure on Chemical Pesticides	1000 INR	Nil
Expenditure on Amritpani and Brhamastra	Nil	400 INR
Height of Plant	2.5 feet	5 feet
Gap between Sapling	1 feet	2.5 feet
Production	5000 kg	7000-8000 kg



11. CASE STUDIES ON MIXED CROPPING

11.1. Ramilaben Maheshbhai Rathwa

Village: Nani Kanas

Block: Chhotaudepur



Ramilaben left her education due to financial crisis at her home and joined her parents in agriculture activities. She was eighteen year old when she got married. Her husband is also into agriculture. Her husband also had worked as a Community Resource Person in Sunshine project (Agriculture diversification program under department of tribal development)) but when MKSP project initiated Ramilaben was chosen as a Community Resource Person. Ramilben is supervising six SHGs of sixty five members.

Earlier, due to the shortage of water she faced difficulty in farming. When SFT launched its

water shed management project, check dam was built and drainage got repaired which has helped in increasing water table in the well. Due to financial crisis she was not able to use chemical fertilizers on her crops. The condition of her family was so bad that they have only one set of cloth to wear the whole year and in every season without keeping the track of time the whole family used to work. For agriculture activities she took debt from local money lender and agreed to return a portion of agriculture production, which was higher than formal rate of interest.

Joining the MKSP project she felt togetherness with the villagers. The role of Samaj Shilpi has increased her level of confidence, earlier she was shy by nature but now she is actively participating discussing the knowledge she gained from various trainings on promotion of Sustainable agriculture practices in her village. She says most of the villagers ask my suggestions and adopting it. The vegetable farming promoted by Ramilaben has become a regular practice and become source of income. For miscellaneous household material they don't have to borrow money from others. By adopting the new agriculture techniques the production of tomato increased, prior the production was consumed by the household but now she has surplus for selling purposes as well.



Presently she focused more on mix cropping because if one crop fails the other can be the source of income. The other reason for mix cropping is that it provides good fodder for the animals. She totally stopped using chemical fertilizers. These practices have changed her life and building a safer future her children. Further she is planning to adopt drip irrigation.

Earlier Ramilben used to practice mix cropping but she was unaware of the technique but after the training she could be efficiently practice.

The results are as follows:

Indicators	Before Adopting Mix-Cropping (one acre)	After Adopting Mix Cropping (one acre)
Seed Quantity of Udad	10 kg	4 kg
Seed Quantity of Tur	15 kg	10 kg
Chemical Fertilizers Usage	20 kg	Nil
Bio Fertilizers Usage	Nil	50 kg
Expenditure on Fertilizers	540 INR	320 INR
Water times	3-4 times in a crop duration	Monsoon + 1 time
Production of Udad	20 kg	100 kg
Production of tur	25 kg	160 kg
Distance Between Plants	Almost one inch	Five inch
Height of Tur	3-4 feet	6-8 feet
Distance Between Crops	1-2 feet	3-4 feet

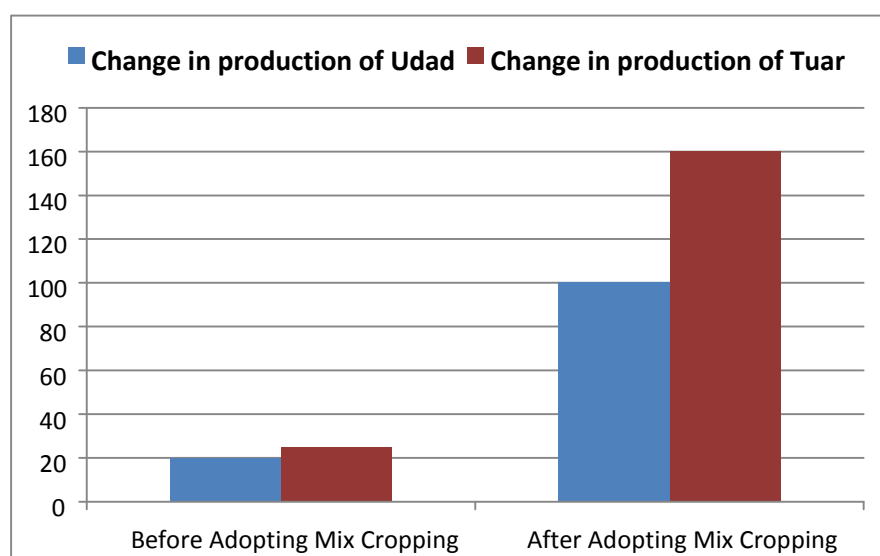


Fig (o) shows change in production (in kg) of udad and tuar in one acre of land.

11.2. Kokilaben Arjunbhai Rathwa

Village – Oliamba Block: Chhotaudepur

Kokilaben dropped her education due to early marriage at the age of sixteen. She and her husband both engaged in agriculture activities. SFT staff visited her village and explained the about the MKSP project. After due interactions Kokilaben was chosen as a Community Resource Person of her village. SFT staff trained her on importance and benefits of SHGs and micro finance activities. Presently she is supervising six SHGs of sixty five members. Knowing the importance of saving her regularly saves as per the rule of SHG for future purpose. She has received intensive trainings from SFT on agriculture techniques and animal husbandry.



She passed these trainings to other members of MKSP project through the farm school. Under her farm school she has prepared thirty two beds of vermicompost.

She has six acres of land but only two and half acre of land has irrigation facilities and the remaining land depends on monsoon for farming. Earlier the production of paddy, cotton and Maize was lower due to lack of water and the vegetable she grows was only for family consumption. Earlier she was not used to practice mix cropping but after the training she realized the importance of mix cropping and how it reduces the risks. Now she started mix cropping on a half acre of land with Brinjal and cabbage,



She showed concerns while practicing the agriculture practices but the result was worthy. Gradually she started vegetable cropping on a larger scale. With the use of bio fertilizers such as

Amrutpani and Brahamshtara plants get less infected. She has received every kind of training on crops. She is thankful to SFT team and who told her about different kind of government program and schemes. This participation has increased her confidence. Being a Community Resource Person she wanted to change the farming of her village.

This has also created and improved her source of income now she has become independent.

The table below shows results of mix cropping in half acre of land.

Indicators	Before Adopting Mix-Cropping (half acre)	After Adopting Mix-Cropping (half acre)
Water times	3 times in each crop	2 time in each crop
Production of Brinjal	200 kg	500 kg
Production of Cabbage	100 kg	400 kg
Production of Cauliflower	15-20 kg	200 kg
Distance Between Plants	Irregular	1 feet
Weeding Labor Cost	1500-2000 INR	300 INR

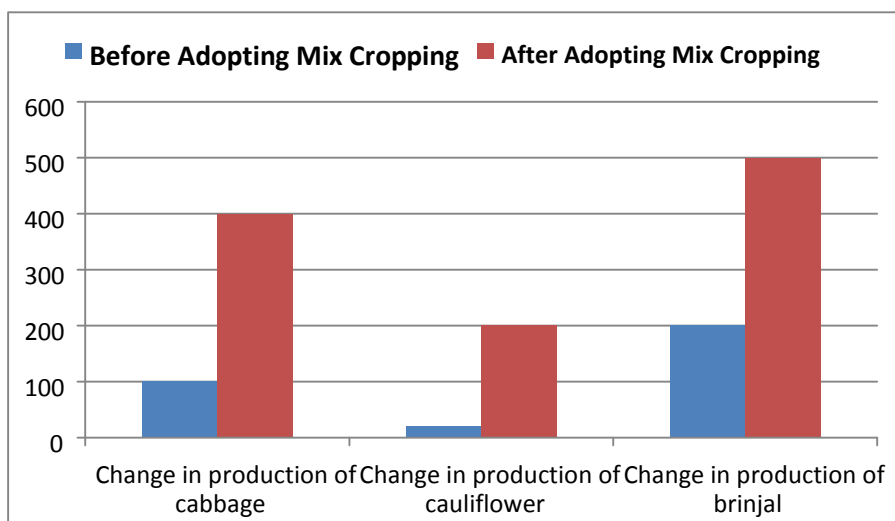


Fig (p) shows change in production (in kg) of cabbage, cauliflower and Brinjal in half acre of land.



11.3. Zingliben Shaileshbhai Rathwa

Village: Nani Kanas Block: Cohhotaudepur



Zingliben is uneducated woman who used to support her household in agriculture related activities. The reason for not pursuing education was social constraint that woman should not go out of the house and also there was no school in her village. After the marriage Zingliben lives in a joint family she has three children. Her family is involved in agriculture as they have seven acres of

land. Earlier due to less facilities of irrigation the crops perished, and she has to go to other farmers' fields for labor work. Her family owns three Buffalos and four Bullocks. These cattle helped her in their field and she also rented them to other farmers. She faced some financial crisis, which affected their farming. She also pawned her jewellery for agriculture activities.

She is come to know about SFT through her neighbor who is a Community Resource Person in MKSP program. She has received training on various crops at the farm school. Her family refused to adopt new agriculture techniques, because of threat of crop failure. Gradually she convicted her family with the help of SFT team members. She has learned the systematic way of farming through SFT and the farm school started in her village. As most of the farmers in her village uses chemical fertilizers and pesticides without any measurement her family was no different and does the same but from the training she understood that how harmful farming she was practicing?

As she was unaware of different types of method in farming she didn't practice mixed cropping. After receiving the training from farm school now she is practicing mixed cropping of tur and udad. Mixed cropping resulted in better crop quality and production. Presently is farming tomato which has created a regular source of income. In future she is planning to create and sell vermi wash.

The table below shows the result of mix cropping in one acre of land

Indicators	Before Adopting Mix-Cropping (one acre)	After Adopting Mix Cropping (one acre)
Seed Quantity of Udad	15 kg	7 kg
Seed Quantity of Tuar	12 kg	5 kg
Chemical Fertilizers Usage	50 kg	12 kg
Bio Fertilizers Usage	Nil	75 kg sala
Expenditure on Fertilizers	1300 INR	750 INR
Expenditure on pesticides	800 INR	200 INR
Water times	3 times	1 time
Production of Udad	40 kg	200 kg
Production of tuar	20 kg	150 kg
Distance Between Plants	Irregular	5 inch
Crop Quality Udad	Root perish	Healthy and black
Crop Quality Tuar	Flowers fall off	Flourished flowers
Height of tuar	4-5 feet	7 feet

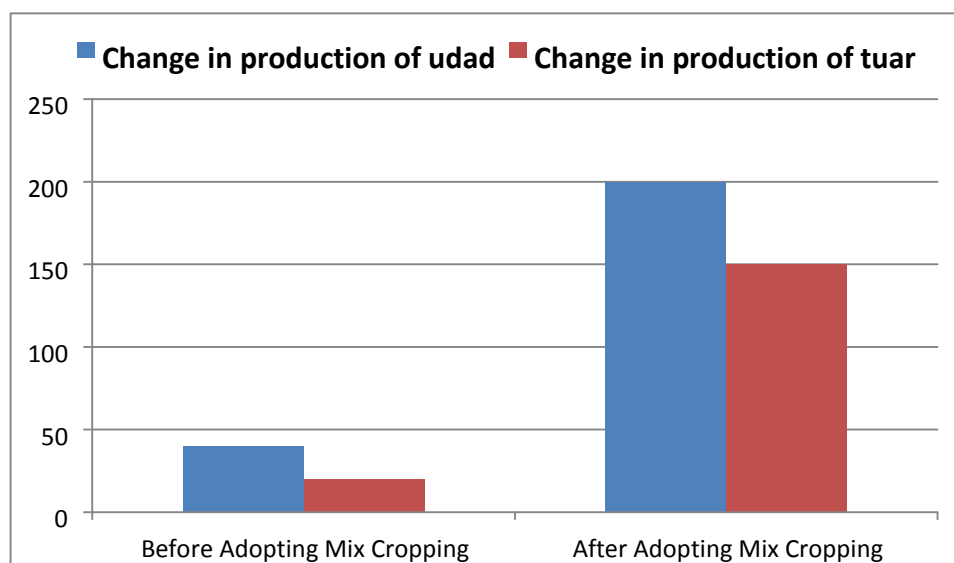


Fig (q) Shows change in production (in kg) of udad and tuar in one acre of land



12. CASE STUDIES ON MULTI CROPPING – VEGETABLE CROPPING

12.1. Veenaben Bhimsingh Rathwa

Village: Vasedi Block: Chhotaudepur



Veenaben got married at the age of twenty one. Her husband and she both have taken primary education. She dropped the school and joined her parents in agriculture activities to support the family income.

Veenaben has two sons one is pursuing MLT course in Vadodara and the other is a carpenter. She was a part of SHG group in Mission Manglam. When MKSP started these SHGs came under their supervision and she came to know about Shroffs Foundation Trust. . Presently she works as Community Resource Person and she is supervising five SHGs of fifty of members and a farm school. She has received

more than hundred sessions on modern agriculture and animal husbandry. It has been three years since she is a part of MKSP program under SFT. SFT recognized her as Community Resource Person. She got intensive trainings on which has increased the level of her confidence to improve the condition of her family as well as of her village, earlier she was hesitating to go out of her house. This involvement with SFT empowered her to take decision in agriculture activities. Under her farm school she made twelve Vermicompost beds and sixteen farm yard manure beds.

Earlier she was not practicing vegetable farming but after getting training, she started practicing vegetable cropping. She has two acres of land and a well nearby to her house. Presently in five guntha of land she has cropped Brinjal, cluster beans (guar), black - eyed pea with bio fertilizers. With modern agriculture practices the production increases. The result of vegetable crop was astonishing she fed fifty two members of her extended family and neighbors and the surplus she sold out and earned about Rs. 15000/- When she was not practicing vegetables farming, she used to buy it from local Hat (weekly market) and the family was able to consume only three-four days a week but now the situation is changed the family get vegetable in every meal.

She is thankful to SFT and MKSP program for helping her to improve the condition of the family earlier there was not enough production for self - consumption but now with modern practices she even have for selling purposes.

The table below shows the result of vegetable cropping in 5 gumtha

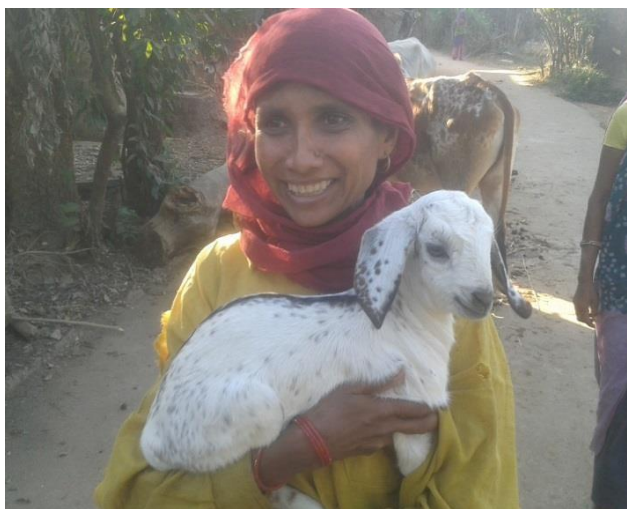
Indicators	Vegetable Crop
FYM usage	1000 kg
Amrit Pani and Brhamastra	3-4 liters
Water	One hour in a week
Expenditure on water	150 INR a week
Production of Bringle	100 kg
Production of Guar (cluster beans)	60 kg
Production of Chawli (Black eye pea)	40 kg

12.2. Najuben Nansingh Rathwa

Village: Khadakwada Block: Chhotaudepur

Najuben has not taken formal education; her husband has secondary level of education.

Najuben have two sons and a daughter. Due to poor economic condition at home Najuben used to work as construction labor in the cities like Surat, Navsari and Vadodara. She used to earn fifty rupees a day. Earlier she has no water facility in her field and due to which the crops perish. In this situation with no other alternative option left unwilling Najuben have to ask for water from other farmers who



charge half of the production. So the remaining agri produce was not sufficient to feed the family. In this circumstance she also pawn her jewellery for six thousand rupees. She used the amount to meet the agriculture inputs expenses. She paid eight thousand rupees to get her jewellery back.

Her husband was engaged with SFT in year 1993. He used to work as labor. SFT staff contacted the family and prepared Najuben to work as a Community Resource Person of her village. Gradually she started attending trainings and meetings organized by SFT. Initially, she didn't talk and participate in the meetings and trainings due to her appearance as she wears tribal clothes which were slightly different from the majority. Sometimes she even thought of quitting as a Community Resource Person then her sister in law told her to wear saree in meetings with this change in her appearance she started taking to other people. She received lots of trainings on various crops and techniques. Her husband supported her and suggested her to apply the training she received from SFT on their field. She saw huge change in her crops.

She got training in first year and in second year she started the farm school. she used the knowledge in her vegetable farms and experienced good quality of produces. She even has started going to main market to sell her vegetables for better returns. She decided to sell her crop by herself because it gives her more profit. She have installed water pipeline and gets the water from the river. Earlier, the land was so rough that harvesting seems like an impossible task and weed removal resulted in body pain and ulcer. But now the condition has changed soil quality improved and removal of weed became an easier task. She is grateful to SFT and its literacy classes that now she has functional literacy, how to write and calculate. She is very enthusiastic even though she is not much educated she is Community Resource Person and dedicated to change agriculture pattern of her village.

The table below shows the result of vegetable cropping (tomato) in half acre of land.

Indicators	Before Adopting	After Adopting
Height of the plant	2-3 feet	4 feet
Amrit Pani and Brhamastra	Nil	8 liters
Expenditure on Amritpani and Brhamastra	Nil	800 INR
Chemical Fertilizers Usage	15 kg	8 kg
Expenditure on Chemical Fertilizers	400 INR	200 INR
Vermicopost Usage	Nil	200 kg
Production of Tomato	80-110 kg per week	220-250 kg per week
Quality of Crop	Small in size, more diseases	Large in size, less diseases, green leaves
Chemical Pesticides Usage	1 liter	Nil
Expenditure on Chemical pesticides	1000 INR	Nil

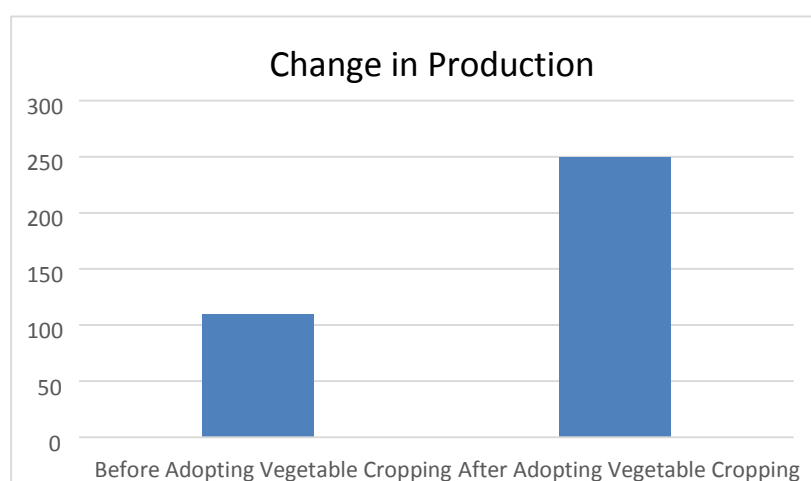


Fig (r) shows change in production of tomato crop.

Major Findings

1. Soil quality improved and risk of crop failure reduced
2. Production increased by 130%
3. Expenditure on chemical fertilizers and pesticides decrease by 30%

13. CASE STUDIES ON CAPACITY BUILDING

13.1. Rasilaben Atulbhai Rathwa

Village: Vasedi Block: Chhotaudepur



So many women have to drop school due to early marriage and Rasilaben is one of them. Rasilaben was just fourteen years old when she got married hence she could not complete her higher secondary education. Rasilaben has three sons all of them are pursuing secondary education. The family earns their livelihood through agriculture. She was a member of a SHG group in Mission Manglam. When MKSP program started these SHGs came under their supervision and she came to know about Shroffs Foundation Trust and become community resource person for the program.

Under her supervision she manages six SHGs of seventy members. She have received different training from SFT and later the training she received she passes to other members of her farm school. These regular members have learned a lot from the training and improved their agriculture practices. Earlier the family members did not allow her to go out of the house and she has less voice in decision making at house hold levels. After joining the program with SFT this situation is changed. The training she received on agriculture she passes it to her family and the members of other SHG groups the voice of women in agriculture activities improved.

She learnt a lot with the help of SFT also her confidence and family support encouraged her to fight for her rights. The panchayat of her village was going to construct toilets under Swachh Bharat Mission, but knowing that the panchayat would not construct a good quality toilet she went to panchayat office and raised her voice to allow her for construction of the toilets. The panchayat gave her the bricks to construct the toilets but she returned them and continued her fight to sanction the money and finally she received the amount of twelve thousand rupees and she added some amount from her side and constructed toilets according to the family need. She successfully received the amount for ten members to construct the toilets. Her active participation in the training and her role as a community resource person is bringing change in her village.

Major accomplishments

1. She has created 32 vermi compost beds and 23 FYM beds
2. Her farm school has 70 members
3. Every month is received 2-3 trainings by SFT and passes it to other members of the farm school.



13.2. Shardaben Alpeshbhai Rathwa

Village: Virpur Block: Chhotaudepur



Shardaben joined business process outsourcing (BPO) training after completing her higher secondary education, where she got training on computer education and tailoring. After this, she got married to a boy who was with her in the business process outsourcing training. Her husband also has an ITI diploma degree. Shardaben have two daughters. Her husband was a Community Resource Person under sunshine

(Agriculture diversification) project but when MKSP project started she became Community Resource Person. There are eight SHGs of one hundred and eight members under her farm school. She got various training on different crops and techniques and pass the training to other member of her farm school. She passes each and every training from soil preparation to crop harvesting phase to her members.

In every month she got 2-3 trainings by SFT organized to develop CRPs, She passed all the trainings to all the members of the farm school who did not attended the sessions. Till now hundred members of her village got the training the remaining eight members were migrated and left so their training remains incomplete. She also visits other village farms who need help on soil testing, Vermicomposting, farm yard manure etc. As she is a community resource person of her village and runs a farm school she sometimes faces challenges to manage the work but her husband is very matured helps her in her work. Shardaben's husband owns a computer to serve the community to access the information of government websites and filing online applications.

Shardaben has borrowed loan of Rs.50000/- from Shardadevi Gramodyog Society and bought a mini rice mill. With the adoption of improved agriculture techniques the villagers experienced lots of changes such as now the weeding process does not take much time as it used to take earlier. Under the MKSP project every member has to fill details of her/his agriculture activities such as crop, production and expenditure etc in khedut pothi. The filling of khedut pothi shows result of the farmer expenditure and income. Under the farm school she also runs literacy classes. She successfully completed two batches of literacy classes.

Major accomplishments

1. She facilitated to prepare 24 vermicompost beds and 54 farm yard manure beds under her supervision.
2. 10 members of her farm school adopted SRI technique
3. 50 members educated through literacy classes and appeared in Sarva Siksha Abhiyan.

14. CASE STUDIES ON MICRO FINANCE

14.1. Rekhaben Ranjithbhai Rathwa

Village: Moti Bumadi Block:Pavi Jetpur



Rekhaben left her education because the people advised that the education was not important. In initial years of her marriage she used to live in a joint family but later she separated from her joint family. As she moved from her family she started saving and bit by bit she built her house. She still didn't get proper proportion of land from her family. Presently she is farming on a small piece of land which is not sufficient for survival so she goes to other farmers land for

labor work and in return she gets one third of the production. She has been with SFT from last three years. She started attending different sessions on agriculture techniques and also came to know about small tools and technologies on agriculture mechanization. These training enhanced her knowledge and she planned to purchase Mini rice mill to generate some income to improve the financial conditions of her family. She got training on rice mill operation. Her husband supported her decision and agreed to take a loan of fifty thousand from Shardadevi Gramodyog Society microfinance. It has been four months since she bought the rice mill. She does not charge money for threshing process but take husk as a charge. Till now she has sold husk of thirty six thousand rupees. She is the only owner of mini rice mill in her village. This rice mill has generated a regular source of income for her family.



15. LEARNINGS

Working with an organization

Interpersonal skills improved during the field engagement. We came to know about the organization hierarchy, staff roles, how managers motivate their staff members and review meetings to keep the work in check. The most important thing we have learned how to break complex tasks into parts. The organization working environment also helped us to work in a limited time period and how to manage time and tasks. We were directly communicating with the project head and senior program manager which helped us in establishing relationship with other staff members and their continuous support helped us in completing our task. Weekly feedbacks and meeting on our work helped us to improve.

Clarity on Sustainable agriculture practices

As agriculture was new field for us and it was good opportunity to learn about agriculture related practices. Here our main focused learning was on sustainable agriculture practices and we could experience these practices in the field that how people have adopted these practices. In whole process, we could realize that how small land holding farmers also can adopt these sustainable agriculture practices and get benefited from them. Agriculture is major livelihood source in India and there is huge opportunity working with poor and small land holding farmers. This experience working with SFT gave insights to think about the situation of farmers and to work with them.

People's voice

When we visited villages in Chhota Udepur district, which are tribal villages, we interacted with tribal people and got to know their context. It showed the ground reality of agriculture in tribal areas, which was based on people's voices. As tribal women shared their experiences within the house and outside and in agriculture area, it helped us to know about them.

Various departments and their functioning

As our main task was on sustainable agriculture practices under Mahila Kisan Sashktikaran Pariyojana (MKSP), but along with that we got to know about Shardadevi Gramodyog Society, under which we could learn the functioning of handicraft unit, food processing unit and micro finance. We also got opportunity to learn about Business Process Outsourcing (BPO). All these experiences broadened our knowledge within the organization.

16. POSSIBLE INTERVENTIONS

Create a market: Chhota Udaipur district is lacking of big/major market. It is very essential to create a market where in the farmers can sell their produce. The district has large scale of produce that demand a major market. For example, at present time in Vadodara (nearest city place) some small market has been established on the name of organic market for natural market. A good market can be established in Vadodara by which the farmers can promote vegetables produced by adopting natural agricultural practices. The city Vadodara has large number of educated person who can understand the value of naturally cultivated vegetables. By developing a market in Vadodara farm produce can be sold with creating brand of less chemical fertilizer/pesticide vegetables or natural vegetables that will create more demand on such vegetables in nearest time.

This market can be run without any mediator. The market can be developed by only farmers (women) co-operative in which all the decisions about growing vegetables and selling will be taken by the farmers guided by agricultural Universities and Organization itself.

Promoting agro-mechanization

In the field of agriculture it is necessary to promote agro-mechanization. The organization has already been promoting agro mechanization i.e. Rice Trans planter, rice milling machine etc.

The more can be done by promoting flour machines in the villages as women has to go three to four kilometers to get their grain flour. If the flour machines will be promoted into the area, it will reduce women drudgery. Women can earn their livelihood as entrepreneurs. Under the microfinance schemes agro-mechanization can be promoted. Moreover there are few schemes of government of Gujarat that supports renewable energy equipments i.e solar panel-water pumps. Bamboo machinery can be also add value to rework on bamboo crafts.

Promoting Entrepreneurship:

In the area, many varieties of produces has been grown. In a very large scale the production has been come. It is necessary to balance the demand and supply of vegetables but it cannot be. So possible solution is to promote micro enterprises through helping entrepreneurs in processing the fruits and vegetables and linking it to the market. Food processing can be a very important option as farmers has been getting lower price. At present the demand of processed food is more in market. Processed supplements also has good demand.

—Participatory activities/—Proper follow up of activities after review meetings

As many problems found in the institutional building, it is necessary to conduct timely workshops for the women with participatory activities. The participatory activities should be problem centric and should have interventions to solve the problems in the institution building. During the review meetings all the gaps should be keep in mind and tried to fix in a fixed time.

Follow up of literacy classes:

Follow up should be taken of literacy classes and coordinators should meet once in a month to all the women and support to CRP for the literacy classes. Volunteer groups can be created for the literacy drive. Along with these interns should be motivated to join the drive.

Market Linkages:

Market linkage should be emphasis as there is a large scale up in production of farm produces. Many hotels, restaurants and schools-hostels have been available nearby area that can be tapped and frequent supply can be done to those areas. All the hotels and restaurants buy vegetables from nearby market. If this opportunity tapped and connected to a supply chain than in a certain period of time it becomes very sustainable for the farmers. It is needed to focus on nearby hotels, schools-colleges, canteens, hospitals. Many players already exist in the market to demand the more raw produces i.e. already custard apple pulp has been processed in SGS (Sharda Devi Gruh Utpadak Sahakari Mandali Ltd).



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18. APPENDIX

Case studies questions

I. General Profile-

Name of Respondent: _____

Residential address: _____

1. Sex (Male / Female)

2. Age (in years)

3. Educational Level:

4. Marital status

(Unmarried / Married / Widowed / Divorced)

5. Type of family

(Nuclear Family/ Joint Family / extended family)

6. Religion

(Hindu / Muslim / Christian / Buddhist / Sikh / Jain)

Any other (specify) _____

7. Community

8. Category

9.

Sr. No	Legal Certificates	Yes	No
1.	Caste certificate		
2.	Ration card		
3.	Election card		
4.	Employment card		
5.	Adhar card		
6.	Health card		
7.	BPL		

II. AGRICULTURAL LAND DETAILS:

1. Extent of land owned :

1. Less than two Acres

2. 3 – 4

3. 5 – 6

4. 7 – 8

5. 9 – 10

6. More than 10 Acres of land

2. Major Crops cultivate on the land:

3. Do you have any irrigational facilities? Yes / No

4. If yes, what are the sources?

Source of irrigation	Irrigation equipment	Area of Agricultural land cultivate by irrigation
River		
Irrigation channel given govt.		
Open well		
Tube Well		
Ponds		
Any other?		

5. Do you think you need to improve your agricultural activities (land and operations)? Describe.
6. What types of fertilizers and manures do you use in your field?
7. Do you know any agricultural development programmes of the government? If yes, please mention them:
 - 1.
 - 2.
 - 3.
9. Are you a beneficiary of any programme & Schemes of the Government? Yes / No.
If yes, please mention the scheme:
 - 1.
 - 2.
 - 3.
11. What were the income generation sources in family before adopting organic practices?
12. Total income before adopting organic practices?
13. What are the income generation sources in family?
14. Income accrued from agricultural activities only: in Rs.

Questions

1. What was the previous work you were engaged in?
2. What were the previous practices you used in agriculture before adopting these methods?
3. What were the challenge you face while practicing old methods?
4. Is there any challenge you faced while adopting these challenges?
5. How you connected with Shroffs Foundation Trust?
6. What was the role played by the Shroffs Foundation Trust?
7. What is your involvement and engagement with Shroffs Foundation Trust?
8. What was the family response when you decided to adopt these changes?
9. What was the difference in the scale of production when you used chemical fertilizers and bio fertilizers?
10. What was the quantity of chemical fertilizers/pesticides you used in farming activities before adopting organic practices?
11. What was the quantity of chemical fertilizers/pesticides while practicing organic methods?
12. In which ratio you use chemical fertilizers and organic fertilizers? Reduction?
13. What was the expenditure on chemical fertilizers before adopting organic practices?
14. What was the expenditure on chemical fertilizers while using organic practices?
15. What is difference in the scale of quality when you used chemical fertilizers and bio fertilizers?
16. Is there any change occur in the consumption of water?
17. Do you want to use organic products in future?
18. What are your future plans are you willing to increase the usage of organic products?
19. Is there any change befall in your health while using chemical fertilizers and organic fertilizers?