5 Livelihood Opportunities and Organic Agriculture

Fig. 5.1 Paheli and Boojho at the Krishi Mela

Paheli and Boojho went to a *Krishi Mela*. They saw many stalls where farmers were showcasing their agricultural products. Both Paheli and Boojho were excited to see so many stalls and agricultural products at one place.

Agriculture is the most important livelihood option in India. Most of the farmers are small farmers cultivating areas of less than one hectare. While incomes in urban areas have risen, farm incomes have declined in many parts of India. India has traditionally been a country

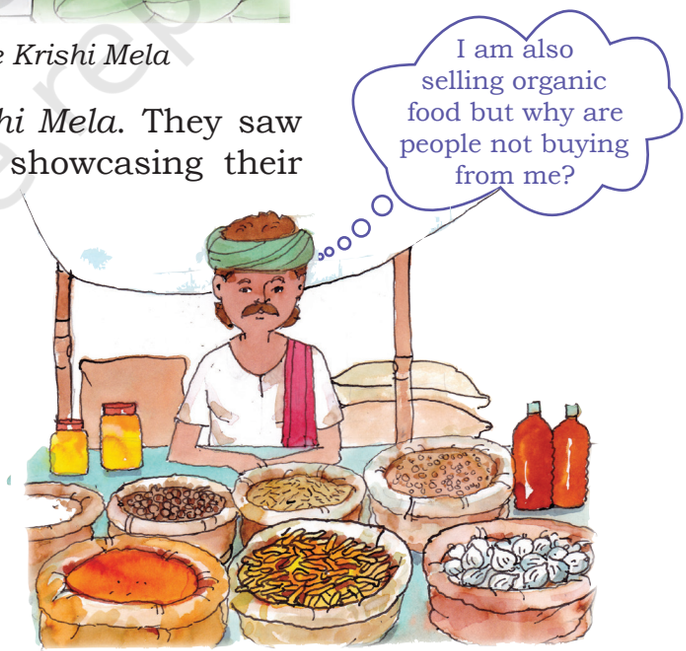

Fig. 5.2 A farmer selling organic products at a local market.

of organic agriculture, but the growth of modern scientific, input intensive agriculture has influenced farmers to use synthetic fertilisers and pesticides in order to achieve higher productivity. However, with the increasing awareness about the safety and quality of food, people now prefer organic products as an alternative.

5.1 Organic Agriculture and Farmers' Livelihood

Organic products not only address the quality and sustainability concerns, but also ensure a debt-free and profitable livelihood option for the farmers. From the year 2002, a number of farmers have adopted organic agriculture to improve the economic viability of farming and combat negative social and environmental effects of conventional farming. Organic agriculture industry in India still has a long way to go.

Income Generation

In countries like India, where majority of the rural people are engaged in agriculture, organic agri-practices could contribute substantially to increase farmers' income. It supports sustainable yield increases in low input systems through agro-ecological methods like agro-forestry, integrated pest management, or the use of leguminous green manure. Farmers cultivating organic crops tend to get relatively higher prices than the conventional ones. Farmers cultivating cash crops, medicinal crops, aromatic crops, etc., also fetch premium prices even with conventional methods.

The increasing demand for organic products has created new export opportunities and APEDA (under Ministry of Commerce) is already looking to tap lucrative export markets for organic products.

Food Processing

Organic food processing could help the rural population, especially women in India.

Many women are already involved in processing rice and making snack items, generating their own income. Women could increase their household income by processing their organically produced local resources and Non-timber Forest Products (NTFPs).

Preservation of food stretches the utility and productivity of the farm produce, which is often wasted during peak seasons but is scarce during lean seasons. Processing technology helps to make food available during lean seasons and also helps to stabilise household income. It can serve several developmental objectives for households, such as increased income, greater savings, food security and better nutrition.

How can we prevent food from spoilage?

Fruits and vegetables are the most important supplements to human diet as they provide the essential minerals, vitamins and fibre required for a balanced diet. India's climatic and soil conditions favour the cultivation of a wide variety of fruits and vegetables. However, nearly 20–30% of the total produce is wasted, as most of the fruits and vegetables are seasonal and highly perishable. Following are the reasons for spoilage of fruit and vegetables—

- Lack of knowledge of proper storage conditions
- Lack of storage facilities
- Lack of transport facilities
- Poor road conditions
- Poor availability of packaging materials
- Lack of local cold storage to store the surplus

I have seen Maa and Grandmaa preparing pickles of chillies and lemons. Maybe that is a way of preservation!

Activity 5.1

Imagine you have a big farm. The climate is very suitable for growing chillies and lemon. You have cultivated chillies and lemon in your farm. You have a very good harvest. But you could sell only one-fourth of your farm produce in the local market. What do you think you will do with the rest, since you cannot consume all at home?

Think and discuss with your teacher and friends.

Food processing converts the excess fruits and vegetables into the food which can be used for a long

time. It increases its shelf-life. The food product can then be marketed and easily consumed.

Activity 5.2

Ask your Maa and Grandmaa to prepare pickles and help them in the preparation.
You may also discuss the following in the class—

1. Why do we add more salt and sugar in pickles and *murabbas*?
2. Why do we keep the pickle in sunlight?

Since organic produce is more prone to spoilage, on-farm handling, storage and processing becomes an essential component of organic farming. To control the post harvest losses, the available food processing technologies provide a large platform for the future prospects of food industry.

Handling and processing of organic products should maintain the quality and integrity of the product.

Some components of organic processing are mentioned here.

Pest control

Organic standards and norms are followed even during processing.

Pest control is one of the most important aspects of organic food processing. It is meant for storage of raw material such as grains, cereals, etc. Organic produce is more susceptible to pests. Therefore, a set of precautions, such as maintaining cleanliness and hygiene, use of baits and traps are required for the same. If required, biological pesticides may also be used. Baking soda, canola oil, *neem* leaves are some examples of bio-pesticides.

Use of chemical pesticides is ofcourse strictly prohibited for an organic product.

Ingredients

Each and every ingredient that is used in processing must be organic. Permissible non-organic ingredients may be used to a minimum extent— in the permissible limits and necessarily be authorised by the certification body. Water and salt can be used

in organic products. Preparations of micro-organisms and enzymes may be used in food processing. Food additives of natural origin (plants or animals) can also be used as per the standards.

Ascorbic acid in citrus fruits, agar gel in sea weed, pectin in papaya and apple, xanthium gum produced by bacterial fermentation and oil are some examples of food additives.

Processing methods

Processing of organic food can be done by mechanical, physical and biological processes. No chemical method is used.

The popularly followed organic processing methods are—

- Mechanical and physical (crushing, mixing, grinding, etc.)
- Biological (use of microbes or enzymes)
- Smoking (with the help of smoke, e.g., smoked fish)
- Distillation (evaporation and subsequent condensation of liquid)
- Precipitation
- Filtration

Tejpratap is a farmer. He has a very big farm where he grows lots of fruits and vegetables. Most of the farm products are sold in the local market. But some are left over. He does not know what to do with this unsold product. The distance between his village and town is too long to take it there. The money which he gets from selling his product is not enough for him to transport the product.

Tejpratap's wife is intelligent and does not let the vegetables go waste. She uses them to make pickles and then sells them. She dries the ginger and turmeric, grinds them into powder and makes small packets to sell. Everybody in the family helps her in processing the product. In this way, nothing goes waste from Tejpratap's farm. In fact, they have adequate income which they use for educating their children.

Oh! That means processing of food helps to generate income.

Packaging

When the foods are processed they need to be packaged in a manner that they do not spill and help in a longer shelf-life. Keeping in league with the organic fervour, the packaging material chosen could be biodegradable, recyclable and eco-friendly, wherever possible. Care must be taken to ensure that the material used for packaging does not contaminate food. Some additives, such as lactic acid, ascorbic acid, natural gums, etc., can be used for manufacturing of packaging films for packaging of organic food.

The packages need to be sealed in such a manner that any adulteration is not possible without manipulation or damage of the seal.

Labelling

Look at the pictures given below. Three pictures of packed organic rice — Picture A shows packed food with adequate and required labels; Picture B shows packed food with incomplete labels and Picture C shows packed food without proper labels, only organic rice is written.

Which packed food would you like to buy? Give reasons for your choice.

So, why do we need labelling of organic products? Labelling gives clear and accurate information about the organic status of the product. When the complete

A B C

Fig. 5.3 Packed organic rice with different labels

standards and requirements are fulfilled, products would be sold as 'produce of organic agriculture'.

The name and address of the person or company legally responsible for the production or processing of the product would be mentioned on the label.

When 95% of the ingredients are of certified organic origin, the product may be labelled as 'Certified Organic' with a certification logo.

When the product has 70% to 90% of the ingredients which are of certified organic origin, those products may not be called organic. Such products may be labelled as 'Made with Organic Ingredients'.

When the product has less than 70% of the ingredients of certified organic origin, the organic ingredients may appear in the list, but such products cannot be called 'organic'.

Added water and salt are not standards for percentage calculation of organic ingredients.

Fig. 5.4 Certification logo for organic products

Activity 5.3

Visit a shop selling packed organic items. Observe and read the labels of five items which you might be using frequently in your day-to-day life. Notice the difference in the labelling. Discuss and share with your peers in class.

Storage and transportation

When we store organic products we have to maintain certain conditions like—

- Controlled temperature
- Cooling
- Freezing
- Drying
- Humidity regulation (moisture control)

Storage areas and transport containers for organic products need to be cleaned using methods and materials permitted for organic production only.

In addition to these points, there are some additional rules and regulations by NPOP. The production and handling plan of organic products must include—

(i) Description of practices and procedures to be performed.

(ii) List of each substance and input used during production, storage and handling indicating its composition, source, locations where it will be used and documentation of commercial availability as applicable.

(iii) Description of the monitoring practices and procedures followed and maintained to verify the above plan.

(iv) Description of the record-keeping system implemented to comply with the requirements of NPOP.

(v) Description of the management practices and separation measures established to prevent contamination of organic and non-organic products during parallel processing and handling.

(vi) Pollution sources must be identified to avoid contamination.

(vii) Processing and handling of organic products should be done at different times and place and it should be kept isolated from handling and processing of non-organic products.

Activity 5.4

- Make a visit to a nearby small scale food processing unit. Record the details of the procedures and protocols followed by them. Make a list of chemicals and preservatives they are using.
- Make a list of 10 additives and agents permissible for organic food processing.
- Study the labels on bottles and packets for ingredients.

5.2 Employment Generation

Agriculture is the main source of employment for those living in the rural areas. Specialised and mechanised practices reduce rural employment. Sustainable agriculture, as witnessed through organic farming system, being labour-intensive helps in overcoming such problems.

Organic farming requires over 15 per cent more labour than conventional farming and therefore provides rural job opportunities. Some of the commonly used organic farming techniques such as strip farming, non-chemical weeding, collection, value addition and transportation of organic supplements require significant involvement of labour.

5.3 Food Security

Sustainable organic agriculture ensures food security by increasing yield in low input areas and improving the quality and nutritional value of food. It conserves biodiversity and natural resources on the farm that favour greater range of crop varieties and edible produce. Organic management can improve soil structure and therefore reduce the crop's susceptibility both to drought and waterlogging. Improved ecological balance and organic preventive measures hinder pest population and hence healthy yields are possible. A farmer can thus become self-sufficient in terms of food quality.

5.4 Social Sustainability

Local Acceptance

Organic farming is designed with a bottom-up approach, on the basis of ecological and social awareness of practising farmers using natural resources in a sustainable manner. Since organic agriculture practices consider long traditions and customs, the local acceptance helps in promoting sustained growth and yield.

Indigenous Knowledge

Our country has a vast treasure of tribal diversity and a rich heritage of traditional farming practices based on long practical experiences of the farmers. Many good practices in farming are a result of the repeated exercises to meet the requirement of food, fibre and shelter, and have thus contributed a pool of locally adapted solutions for environmentally safe and

sustainable farming practices. Some of these practices such as crop rotation, mixed farming, intercropping, etc., are being promoted over the time in organic agriculture. Organic agriculture focuses on traditional knowledge and local innovations, e.g., locally adapted crop varieties can support and strengthen stability in climate resilient agriculture. Modern organic farming practices are now embedded in a complex of practical knowledge, social acceptability, system of beliefs and global view due to proven scientific researches. A balanced use of indigenous knowledge with appropriate information added from new scientific technologies would drive sustainable agriculture to enrich itself.

Gender Equity

Organic farming provides equal work and employment opportunities to men as well as women. There are improvements seen in the health, food security and economic conditions of women involved in organic farming. Organic farming offers great opportunities for women in value addition practices which is gradually leading to more equality and empowerment and also ensures that the workload and benefits are shared equitably between men and women.

Bridging the Gap in Social Divide

From social point of view, sustainable agriculture involves full participation of rural as well as urban communities and ensures safe and sustained food supply for everyone.

5.5 Case Study

Here is a case study which will show how the use of chemicals ruins the farming system and how gradually after conversion to organic farming, things improved at a farm. The study was commissioned by Natural Resources and Ethical Trade programme, managed by Natural Resources Institute and conducted by the Soil Association in the context of the Department for International Development Natural Resources

Advisors Conference in July 1998. The aim of the case study was to assess whether the expected results of such projects are achieved.

The Ambootia Tea Estate, Darjeeling, West Bengal, India

It is one of the 83 gardens which constitute the Darjeeling tea industry and dates back to the estates established by the British in 1856. In the 1980s and 90s, the estate, like many others, had suffered declining yields. The total production of Darjeeling tea had fallen from 14.5 million kg in 1990 to 11 million kg in 1995. Production on this estate itself slid from 206 tonnes in 1989 to 171 tonnes in 1991 despite optimum use of chemical fertilisers and pesticides. Deforestation had led to serious soil erosion culminating in a landslide that took many workers' houses with it. In 1986, the workers invited a former manager to take over ownership in an attempt to revive the estate's fortune. A commitment to long term sustainability led the management to adopt organic and finally bio-dynamic systems.

Organic Agricultural Impact

By switching to organic methods of farming like use of leguminous green manure and compost production, soil fertility is achieved. Soil erosion is reduced by contour planting, maintaining soil cover, and cutting rather than eradicating weeds. The emphasis on ecological diversity has helped the natural predator population. An increase in the number of ladybirds which feed on aphids, thrips and red spider mite has meant that the regular problems associated with these pests are a thing of the past. The soil is more moisture retentive than it was under conventional management, which has led to a more stable yield in dry weather.

Environmental Impact

As part of the management plan to increase diversity, providing more habitats for predators and reducing

soil erosion, 50,000 trees are planted each year. The management and workers believe that the discontinuation of the use of agro-chemicals has led to a healthier environment due to less water contamination and a better air quality. Respiratory diseases are reported to have reduced since the use of chemicals was stopped. The premiums obtained through organic and fair trade status have enabled the estate to undertake a systematic landslide rehabilitation programme which had previously been put off due to lack of funds. In addition, the estate has gained approval from the government for two hydroelectricity schemes of 100 kilowatts which when operational will provide up to 70 per cent of the seasonal requirement of electricity. This development will reduce dependence on polluting fossil fuels, having a positive impact on the environment.

Economic Impact

The move from a high to a low external input system has meant an increase in labour requirements of 35 per cent with an increased income to the workers. The emphasis on developing a largely closed system has led to the production of herbs required in the production of the bio-dynamic preparations. The collection of biomass and cow dung for compost making involves a large number of workers. The estate makes and applies 2,100 tonnes of compost every year, mostly unmechanised. The workload is spread more evenly over the year leading to an increase in full-time as opposed to part-time work.

In order to produce more compost, the estate has encouraged workers to keep cows. The milk provides an additional source of income to the workers. No figures could be obtained about the overall economic performance of the estate, but it continues to thrive having recently developed a new range of exotic teas including 'white', 'green', 'oolong' and 'souchong'.

Social Impact

As a result of the decline of the estate, the workers suffered a number of lockouts between 1981–86 causing disruptions to their livelihood. The cooperation between management and workers, in rebuilding the estate, has brought about a combined commitment and respect and a sense of stability hitherto unknown in the tea industry in India. This has been stimulated by the fair trade registration. The fair trade and organic evaluations set out guidelines, make suggestions and monitor implementation of issues from compost systems to worker involvement in efficient management of the estate. All statutory labour requirements are met and a joint body of workers and management decide upon welfare schemes using the product premia.

Sports and recreation centres have been built to foster community spirit and investments in education have seen a reduction in the student–teacher ratio, an increase in the availability of computers and the introduction of a scholarship scheme. An efficient garbage collection scheme has also been introduced to maintain hygiene around the estate.

Institutional Impact

The estate is owned by workers and management and runs on a cooperative basis, which has led to it becoming a strong organisation. The manager of the estate is the Founding Chairman of the Bio Organic Tea Association in India which has assisted in promoting the message of organic farming to the government. Agricultural and Preserved Food Products Export Development Authority (APEDA) recently attended the Bio Fach in Nuremberg, Germany from 14–17 February 2018, to promote India's ever widening production of organic products.

Problems and Obstacles to Development

The main problem has been in surviving the conversion, as on top of the bad state of the estate before 1986, heavy investment was required in the

early years. The first step involved rejuvenation and pruning of the tea plants, increased planting and increasing temporary and permanent shade trees. During the years subsequent to the adoption of the organic system, yields fell from 487 kg per ha in 1994 to a low of 404 kg per ha in 1996, a 17 per cent reduction. This drop, along with the increased costs put pressure on the estate but was balanced by the improved market access and premium prices achieved by the organic and fair trade status. Fair and assured prices kept the estate viable.

Organic Village

In North Sikkim there is a cluster of small villages— Lum, Gor, Sangtok, Sagyong and Tarang which fall under Lum, Gor, Sangtok Gram Panchayat Unit. Many progressive farmers in these villages grew cereals and pulses and adopted vegetable cultivation also. Most of the big farmers made their major earnings through large cardamom plantations. However, a disease outbreak led to a reduction in cardamom productivity. Not knowing what to do, there arose an urgent need to look for an alternative crop production to revive the earnings. The farmers eventually considered Sikkim mandarin (oranges) as an option. This is a highly paying crop which stood a good chance for a successful cultivation. The success of innovative farmers in their orchard yield encouraged others, and eventually a group of interested farmers were selected for an exposure tour to other orange growing belts of the state by the government.

Today, the most popular place for production of oranges in Sikkim is Jeel Hathidunga in West Sikkim. Farmers in this village have a good productive orchard every year. To increase orange production in the area, massive drive campaigns were launched by the government to revive the old orchards through rejuvenation programmes. At the same time, there was also a plantation of new orchards. The plantation drive was initiated in 2008–09 and continued year after year covering more areas. The government provided a majority of the support to each individual farmer by providing organic pesticides, manure, incentives and technology for rejuvenation.

Fig. 5.5 Oranges after harvest in a Sikkim village

For new plantations, support was given through a variety of plant material, organic manure, bio-pesticides and technology through training and exposure.

All these efforts finally resulted in plenty of fruits in both revived and newly planted orchards. The whole Gram Panchayat Unit has now been converted into an orange belt. The farmers started to earn a steady income through sale of these fruits. To celebrate this success, an Organic Fair and Orange Festival is celebrated annually during the peak orange season where a large number of visitors come to celebrate the occasion.

Source: Revolution in Horticulture: Sikkim's 22 Years of Achievement, published by Horticulture and Cash Crop Development Department, Government of Sikkim, August 2016.

Gerbera Plantation

Basilakha is a small village located in East Sikkim. Farmers of this village were engaged in traditional agriculture. They used to cultivate paddy, maize, pulses and some vegetables. This village had turned from ordinary to extraordinary by hardwork of progressive farmers. Their zeal, enthusiasm and hardwork to do something new and great have completely changed the economic scenario of that village. Exploration towards alternate avenues for income generation led to the change in cropping pattern.

Knowing that besides crops and vegetables, flowers too have a large market and they can be sold not only in Sikkim but also in other parts of India, such as Delhi, Mumbai and Bengaluru, they became more interested in growing flowers.

Noticing their interest in flowers, gerbera cultivation was introduced by MIDH, Sikkim in 2009 at Basilakha with a single unit. The most enthusiastic and progressive farmer was selected and made to grow the flowers. The result was outstanding and this encouraged other farmers and the government officials. It had a very positive impact on the village. More farmers were encouraged towards growing flowers. At present, the total number of farmers growing gerbera is more than 60 in that small village itself.

In the beginning, they started growing gerbera at a low-cost polyhouse. The number of flowers grown in each polyhouse is 600–800 respectively. Besides the polyhouse, farmers are supported with tissue culture planting material, organic fertilisers, training and marketing.

Fig. 5.6 Gerbera plantation in polyhouse

The flowers are sold to local markets and Siliguri. Marketing is done by the progressive growers who collect the produce from other growers and then send to markets. Each farmer earns an average of ₹40,000 to ₹50,000 per annum. The total income of the village from gerbera cultivation alone is around ₹28 lakhs per annum.

Source: Revolution in Horticulture: Sikkim's 22 Years of Achievement, published by Horticulture and Cash Crop Development Department, Government of Sikkim, August 2016.

Off-season Vegetable Cultivation

Tashi Sherpa, one of the progressive vegetable growers of Sikkim, was into conventional farming of potatoes and other cereal crops. After attending many awareness programmes, he got an opportunity for an exposure visit to vegetable growing states of India. This encouraged him to become more interested in trying out commercial vegetable cultivation. With support from the department he started cultivating off-season vegetables like cabbage, cauliflower and radish. Due to his zeal and enthusiasm, he was provided a good variety of seeds and training on the scientific method of cultivation by the Government of Sikkim. Today, he is one of the most progressive vegetable growers of his area. He has motivated more than hundred farmers of his surrounding areas. Today, all the farmers are taking up cultivation of off-season vegetables like carrot, broccoli and peas. The profitable aspect of the business has been the main source of motivation for all. The farmers now plan to develop the total area as off-season vegetable model cluster and produce off-season vegetables throughout the year.

Today, off-season vegetable cultivation is a booming business for many small and marginal farmers of the state.

Source: Revolution in Horticulture: Sikkim's 22 Years of Achievement, published by Horticulture and Cash Crop Development Department, Government of Sikkim, August 2016.

Fig. 7.8 Vegetable cultivation in the farm of Tashi Sherpa

Glossary

Biodegradable— Decomposed by micro-organisms thereby avoiding pollution.

Eco-friendly— Not harmful to the environment.

Fair Trade Certification— FTC is a certification process that sets standards for the way product is produced and how much a farmer/farming cooperative earns. The criteria are fair price for farmers and decent working and living conditions for workers.

Recyclable— Substance that can be recycled or made suitable for reuse.

Shelf-life— The length of time for which an item remains usable/fit for consumption.

Perishable— Likely to decay or get spoilt quickly.

Susceptibility— Liable to be influenced or affected by external factors.

What have we learnt?

1. Agriculture is the most important livelihood option in India.
2. Agri-practices have contributed a lot to increase farmers' income.
3. Farmers cultivating organic crops tend to get relatively higher prices than the conventional ones.
4. Organic agriculture focuses on traditional knowledge and local innovations, e.g., locally adapted crop varieties, crop rotation, mixed farming, intercropping, etc.
5. Organic farming provides equal work and employment opportunities to men as well as women.
6. Organic food processing helps in generating and increasing income of rural farmers.
7. Processing technology helps in making the food available during the lean season.

Exercises

1. Answer the following questions.

i. How are organic products helpful in income generation of a farmer?

ii. What is food processing? Why is it important in organic farming?

iii. Describe the methods of organic food processing.

iv. State reasons for the spoilage of agricultural products. What measures can be taken to avoid the spoilage?

v. What precautions must be taken while packaging of organic material?

vi. What is the significance of labelling packed organic material?

vii. Write a short note on social sustainability of organic farming.

viii. How does organic agriculture ensure food security?

2. Read the following statements and write 'True' or 'False'.

i. Organic products are more susceptible to pests.

ii. Conventional farming does not have negative social and environmental effects.

iii. APEDA comes under Ministry of Commerce.

iv. Organic farming system is more labour-intensive than conventional method of farming.

v. Organic farming ensures equal work and benefits to men and women.

3. Project

Make a survey in your town to find out what preservation practices are being followed by individual homes of a community and make a report to share in the class for discussion.