



# Integrating Farmer Producer Organisations in Sikkim Organic Mission: Opportunities, Challenges and Policy Measures

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## Authors' contributions

*This work was carried out in collaboration between both authors. Author RG designed the study, performed the statistical analysis, wrote the protocol, wrote the first draft of the manuscript, managed the analyses of the study and managed the literature searches. Author MC supervised the study throughout the process. Both authors read and approved the final manuscript.*

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## ABSTRACT

Sikkim, a small mountainous state in the northeast region of India launched an organic mission in 2003 and aimed to become fully organic by 2015. Since organic farming was being traditionally practised by most of the Sikkimese farmers since ages, adoption of organic farming in the state was not a difficult task. In 2016, Sikkim was declared "India's first fully organic state". However, even after achieving the organic tag, Sikkimese crops have not been able to reach high-value organic markets at a larger scale. Most crops are sold within the state at local markets or roadside-stalls. Production, processing and marketing of organic crops under existing farmer collectives like Farmer Producer Organisations (FPOs) will further boost the organic mission and benefit the farmers. With the help of a primary survey among 60 organic farmers in Sikkim, this paper first identifies the constraints faced by organic farmers existing still after the launch of organic mission and then advocates role and necessity of existing Farmer Producer Organisations to enhance the mission. On the basis of mean score, constraints in order of severity were lack of reliable marketing channels (2.87), low yield(2.67), incidence of pests and diseases (2.40), competition from non-organic food (2.33), lower profitability compared to conventional farming

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(2.20), exploitation by middlemen (2.12), high transportation costs (1.98), lack of knowledge about bio-inputs and technology (1.90), lack of storage and processing facilities (1.87) and timely access to seeds (1.68).

*Keywords: Sikkim; hilly state; organic farming; constraints; FPOs.*

## 1. INTRODUCTION

In the post-Green Revolution period, Indian agriculture saw rampant substitution of organic agricultural inputs by chemical inputs. Local seeds, organic manure and locally prepared pesticides were replaced by high yielding variety seeds, chemical fertiliser and pesticides respectively. Such rampant usage of chemical inputs in agriculture led to degradation of physical and biological environment. Agriculture conducted with chemical inputs is both unsustainable and health-degrading. It should be replaced by a sustainable way of farming that takes care of both environment and human health.

Producers and consumers across the globe are increasingly becoming more aware about the quality of food we consume and the impact of food production system on the environment. As such, organic farming has gained increased [popularity across the globe [1,2]. Consequently, global demand for healthy organic foods has been surging sharply in the recent times making it an attractive agribusiness activity [3]. Market for organic food products has been growing for all countries. The United States is the single largest market for organic foods followed by Germany and France (Fig. 1). In 2018, organic farming was practised in about 71.5 million hectares of organic agricultural land in more than 186 countries by 2.8 million producers around the world while organic food market valued about \$59.1 billion in 2010 [4,23]. Globally, organic farmland has been increasing in all regions. The world organic market that was worth 15.1 billion Euros in 2000 has now expanded to worth 96.7 billion Euros in 2018 [4].

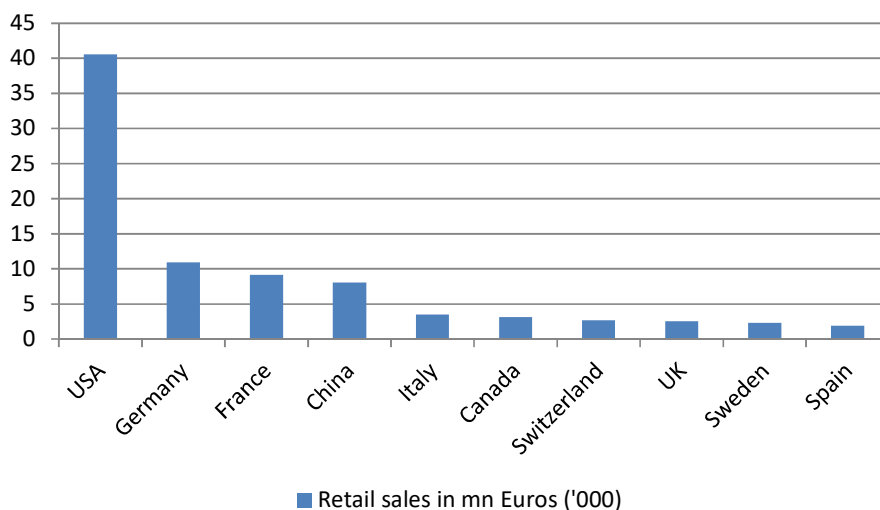
More than 25 percent of organic agricultural land and around 87 percent of organic producers are in developing countries [5]. India has the largest number of organic producers (1149371) in the world (Fig. 2). During 2017-18, organic farming in India was practised in around 1.78 million hectares and total organic production was 1.70 million metric tonnes [6] by 1149371 producers. India and China were initially large producers

and exporters of organic products. However, they have also started witnessing rising demand in the domestic markets [7]. Rising number of supermarkets and increasing incomes in the developing countries have created newer markets for organic products within these countries [8] and the organic products that were earlier exported to USA and European countries have now seen rise in domestic demand [9]. Small and marginal farmers also, with proper support and guidance, can reap benefits from this rising global demand for organic food and earn better incomes.

Organic farming of high value crops is both economically profitable and geographically compatible in India's hilly states. For the small and marginal farmers of India's hilly states like Sikkim, organic farming of high value crops is geographically compatible and economically beneficial [10]. However, farmers face several constraints like lack of marketing channels, lack of storage, poor transportation network, small scale of operation, exploitation by middlemen, and competition from non-organic products that are unique to these regions. These constraints can be overcome only when these hill farmers come together to form farmer organisations and work collectively. Certified organic producers' groups can enable the hill farmers overcome such constraints. This paper identifies the major constraints faced by organic farmers in one of the hilly states of India, Sikkim and then presents farmer organisation as a medium for overcoming existing constraints in organic farming. Therefore, it first discusses Sikkim's organic mission, constraints faced despite the implementation of this mission, and finally chalks out the role for FPOs in enabling farmers overcome these constraints and make agriculture economically viable for small and marginal farmers.

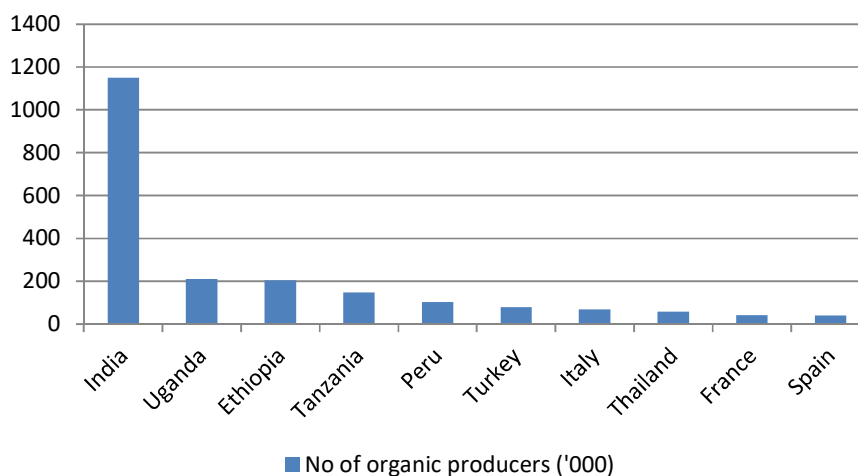
## 2. SIKKIM ORGANIC MISSION

Sikkim is a small land-locked state in Northeast India. Around 89 per cent people are based in rural areas and are dependent on land while around 64 per cent people directly depend on agriculture for livelihood. Agro-climatic conditions



**Fig. 1. Countries with the largest markets for organic food 2018**

Source: FiBL-AMI Survey 2020



**Fig. 2. Countries with largest number of organic producers (2018)**

Source: FiBL-AMI Survey 2020

in the state varies from sub-tropical to alpine creating a favorable region for a wide variety of crops, fruits, vegetables and commercial crops to grow. Such ecological environment supports cultivation of variety of crops but at a smaller scale. In Sikkim, most of the lands are steep, mountainous and rocky slopes leaving very little land for agriculture. Only 17.18 per cent of the total geographical land of Sikkim is available for cultivation of which less than 9 percent is irrigated [11].

Green Revolution benefitted other states having developed irrigation facilities in terms of increased production and productivity whereas, hilly states like Sikkim and other North-eastern states could not be benefitted due to lack of adequate and timely fertiliser, undeveloped irrigation and fragile soils [12]. In Sikkim, organic farming system is not new and has been traditionally practised in its rural areas since many years. However, when chemical substitutes for plant nutrients and pesticides were easily available in the later

years, wide use of chemicals in the farms occurred since 1975-76 [10]. Still, large areas under some particular crops like large cardamom remained untouched by chemicals though. Thus, chemical fertiliser usage in the state (12 kg/ha) was quite below the national average (90 kg/ha). Also, soil is rich in organic content and around 89.80 percent area is untouched or unaffected by chemicals [13]. This helped later in easy adoption of organic farming. Sikkimese farmers own an average of 1.9 hectares of farmland.

Thus, to maintain environment quality and traditional farming of the state, a resolution was passed in the Sikkim Legislative Assembly in 2003 to transform Sikkim into a totally organic state. Use of chemical inputs and subsidies on these lands were completely prohibited and the state was aimed to be made fully organic by 2015.

In the initial stage, large scale support on chemical fertilisers, insecticides and pesticides were removed. Experts were mobilised to conduct massive public awareness and disseminate techniques of organic farming to the farmers. In the next stage, around hundred villages were selected and termed 'Bio-villages' where farmers were trained on organic farming techniques and producing organic manure through rural composting, herbal composting and vermi-composting, by making use of locally available materials [14]. Local medicinal plants were used as organic pesticides. Subsidies were provided for improvement and construction of manure production infrastructures like vermin compost pits. Certified organic manures were made available. Organic farming was integrated with livestock for dung and animal manures. Government of Sikkim formed a joint venture with Indian Farmers Fertiliser Cooperative Limited (IFFCO) called SIKKIM IFFCO ORGANIC LTD which will provide the farmers with agri-inputs, bio-fertilisers, processing and marketing of organic produce assisting the state in its organic mission. An MoU was signed with Sikkim State Cooperative Supply and Marketing Federation Limited (SIMFED) to provide market linkage to the certified farmers. Eventually Sikkim was proclaimed as a fully organic state of India by the Prime Minister on 18th of January 2016. Under this mission, more than 76,000 ha of land have been brought under organic farming benefitting more than 66,000 agricultural households.

Supported by favorable climatic conditions and prevalence of chemical-free traditional farming systems, the Himalayan states are increasingly contributing to the development of organic sector in India. Among them, Sikkim has been successful in converting the largest share (80.08%) of total land to organic farming [15]. Alongwith Sikkim, other Himalayan states also have adopted organic farming, however, with varying levels of intensity. States like Sikkim, Himachal Pradesh and Uttarakhand have developed their organic policy frameworks while states like Nagaland and Manipur are yet to develop organic policy but have been supporting organic farming.

**Table 1. Area under organic cultivation in the Himalayan states of India (2018)**

State	Share of organic land in total cultivated area (%)
Sikkim	80.08
J & K	3.12
Himachal Pradesh	2.57
Uttarakhand	5.37
Arunachal Pradesh	3.72
Manipur	3.86
Meghalaya	16.81
Mizoram	1.1
Nagaland	3.39
Tripura	0.81
Assam	1.04
West Bengal	0.11

Source: IFOAM

The Mission has positive impact on cost of production which is lower than under the inorganic farming. For instance, instead of purchasing inorganic inputs from markets, Sikkimese farmers under this Mission are trained and prepare organic-inputs like green manure, vermicompost using farm residues only. They also prepare pesticides and insecticides using local plants like teetay-paati, banmaara, etc. cow-urine is stored and used as insect repellent. Usage of local resources has brought down the cost of cultivation significantly. Benefits of organic farming on human health and environment such as reduced intake of hazardous chemicals through food, such as increased soil fertility, revitalization of ground water, have been experienced by the farmers. However, simultaneous development of marketing has been a bottleneck not properly attended. As a result, the farmers are not able to

enjoy the financial gains as they should have and which they deserved [16].

### 3. MATERIALS AND METHODS

The present study was carried out in two districts of Sikkim-West and South. They were selected purposively as they are major agricultural districts of the state. From each district, two blocks were chosen and from each block, two villages were selected by simple random sampling. 15 farmers from each village were selected. In total 60 farmers were interviewed using an interview schedule in the months of February and March, 2020. The interview schedule contains a set of ten questions. Responses of the farmers were collected on a three-point scale- 1 for least severe, 2 for severe and 3 for most severe. These constraints were finally ranked based on weighted mean score.

### 4. RESULTS AND DISCUSSION

#### 4.1 Constraints despite Organic Mission

Even though Sikkim has completely adopted organic farming, farmers in the state apparently appear to be losing the opportunity of reaching high-value markets. They have not been able to enhance their income through the organic farming they practice on the hills of Sikkim. Despite the organic mission in the state, farmers continue to face several constraints and data regarding these constraints has been presented in Table 2.

Consistent with previous studies on organic farming [17-19], the results show that majority of the respondents have reported lack of reliable marketing channel (2.87) as the most severe constraint faced by organic farmers in the state. This implies that limited and poorly developed marketing networks have prevented the farmers from earning potential prices. Organic produce which could fetch premium prices in remunerative markets are sold in local markets and roadside stalls due to lack of proper marketing channels. Similar to [18] the results indicate that organic agriculture in India faces inadequate organic inputs, lack of local markets, inadequate training, guidance and certification. Reduction in yield (76.7%) has been identified as the second most severe constraint by the majority of the farmers. Majority of the farmers have complained that production has fallen after shifting to organic farming. This result is consistent with the view of [20] who states that

organic agriculture has lower yield than conventional agriculture despite being environment-friendly and more profitable. Some farmers have reported that yield of ginger, turmeric and vegetables have fallen by 2-3 times. Loss in yield has further aggravated the problem of small farmers in Sikkim who cultivate crops in small quantities in small land plots. These hill farmers were already operating at smaller scale and with further reduction in yield, their scale has reduced further.

Majority of respondents expressed heavy incidence of pests and diseases (2.40) as third severe constraint. They have reported that organic crops are more prone to pest and animal attacks. Earlier when inorganic crops were grown, pests and diseases were cured and completely eliminated by chemical pesticides and insecticides. But now, organic pesticides only repel the pests and insects and do not kill them because of which they attack the crops again and again.

The fourth most severe constraint faced by the farmers is unfair competition from non-organic food. Farmers have also reported that they face an unfair competition from the inorganic products that are imported from other states. Local farmers put in their best efforts to produce organic crops, face loss in yield and attacks of pests, and finally have to sell at lower prices. Inorganic food imported from outside the state is cheaper and are demanded more. Some farmers even complained that instead of Sikkim's organic produce fetching higher prices, inorganic vegetables from Siliguri are undeservingly sold at very high prices only few rupees lesser than the state's organic produce. Since the products are mostly sold at local markets or roadside stalls where locals are not ready to pay premium prices, the mission is unable to provide higher returns to the farmers.

Fifth major constraint has been identified as the lesser profitability of organic farming (2.33). Majority of the organic farmers in the state have found organic farming less profitable. This may be due to the loss of yield in initial years, more spoilage due to pests and lack of storage and lower prices realised by the farmers. Majority of the farmers have reported exploitation by middlemen (2.12) as the sixth severe constraint. Farmers are often frequented by the local traders and middlemen who procure crops from farmers at very low prices and sell at high prices in the towns making huge profits. Middlemen take

advantage of the poorly developed infrastructure and markets and force the farmers to sell the perishable commodities at very low prices. Farmers make marginal profit while middlemen take a bigger share. High transportation costs (1.98) have been identified as the seventh most severe constraint by majority of the respondents. High cost of transportation facilities makes marketing expensive. Most of the rural areas are connected to the towns by a single hilly road. Transportation is not easily available. Very limited number of vehicles plies between the urban and rural areas because of which transportation costs are high. Some farmers have reported that unsold products at the end of day are either dumped off or given for free to people in the town as transporting them back would incur high transport cost.

Majority of the farmers have identified lack of knowledge about bio-inputs and technology (1.90) as the eighth major constraint for the organic farmers in the state. Farmers have reported that even they have received off-farm bio-fertilisers and bio-pesticides, they do not use as most of them are unaware about the dosages and usages of such inputs. Thus, they rely on

traditional inputs that require more labour for preparation and also less effective than off-farm bio-inputs.

Lack of storage and processing facilities (1.87) has been identified as the ninth major constraint by most of the farmers. Farmers have observed that organic crops have shorter shelf life and thus need either quick transportation or cold storage facilities. They can also be processed and value-added. However, lack of such facilities lead to greater amount of spoilage of these perishable crops. This finding supports the view of [21] and [22] that lack of storage facilities force the farmers to sell off to middlemen at throwaway prices in India and South Africa respectively. Very few villages have been provided with storage facilities. Poorly developed post-harvest infrastructure has always kept farm income and opportunities at low levels. Sikkim mostly grows horticultural crops that need either quick transportation to nearby commercial centers or cold storage facilities within the state. The state lacks both. Even though the seeds are provided to farmers, the time of provision was mostly delayed and late. Thus majority of the farmers have identified non-availability of seeds in time

**Table 2. Constraints faced in organic farming by farmers in Sikkim (n=60)**

Sl. No.	Constraints	Most severe		Severe		Least severe		Mean score	Rank
		Frequency	%	Frequency	%	Frequency	%		
1	Low yield	46	76.7	8	13.33	6	10	2.67	II
2	Competition from non-organic food	20	33.3	40	66.67	0	0	2.33	IV
3	Incidence of pests and diseases	28	46.7	30	50.00	5	8.33	2.40	III
4	Lack of reliable marketing channels	52	86.7	8	13.33	0	0	2.87	I
5	Lack of storage and processing facilities	15	25.0	22	36.67	23	38.3	1.87	IX
6	High transportation costs	10	16.7	39	65.00	11	18.3	1.98	VII
7	Exploitation by middlemen	26	43.3	15	25.00	19	31.7	2.12	VI
8	Less profitable than conventional farming	14	23.3	44	73.33	2	3.33	2.20	V
9	Timely access to seeds	9	15.0	23	38.33	28	46.7	1.68	X
10	Lack of knowledge about bio-inputs and technology	7	11.7	40	66.67	13	21.7	1.90	VIII

Source: Field Survey, 2020

as the tenth most severe constraint faced by organic farmers. Seeds are not distributed on time by village level extension workers. This delays the process of production of organic crops.

## **5. ROLE FOR FPOS IN ORGANIC FARMING**

Against such circumstances, farmer collectives like Farmer Producer Organisations (FPOs) can help farmers produce process and market their products in remunerative markets. In 2017, around 30 FPOs were registered in Sikkim in order to aggregate the state's small farmers to enable them in production and marketing activities. Since most of the Sikkimese farmers are small and do not possess volume individually (both inputs and outputs), FPOs ensure better income through aggregation and economies of scale. Farmer organizations can play a significant role in promotion of organic agriculture [23]. Another study by [24] has found empirical results supporting the notion that if organic farmers are organised as a group, they can benefit themselves more compared to individual organic farmers. It has been found that across 4 districts of Sikkim, group-based organic farmers could utilise government facilities and other resources more effectively than individual organic farmers. Also, organic farmer groups in East Sikkim were able to find proper marketing channels for their produce. Finally, mean per capita income was also higher for group-based farmers than individual farmers. Thus, organic farmers can be benefitted more if they organise themselves into groups.

Different aspects where fpos can help:

### **5.1 Economies of Scale through Aggregation**

Farmers in rural areas of Sikkim produce crops in small quantities and consume inputs in smaller amounts. Thus, they face high costs of cultivation. Aggregation and supply of their produce to high value markets through farmer groups can fetch higher prices [25,26]. Collective provision or purchase of expensive inputs can be made accessible to small farmers also [23]. The strength of FPOs lay in the collective action of farmers which results in economies of scale and increased bargaining power with the farmers. Thus, if Sikkimese farmers aggregate themselves under a producer organisation and aggregate their demand for inputs and sale of

outputs, they will gain greater volume and economies of scale. As such, average cost for inputs will fall while the outputs will be sold at higher prices.

### **5.2 Market**

Even after certification, major amount of organic crops in Sikkim are sold within the state. Organic farming has become only partially-successful for the Sikkimese farmers as their high-value organic crops are sold mostly within the state at lower prices. Such products can fetch good prices only when they reach bigger cities like Delhi, Bangalore and Mumbai where supermarkets, retail chains and large processing firms are emerging rapidly and urban population's demand for healthy organic food is increasing. FPOs have the ability to directly connect these small hill farmers of Sikkim to the high-value markets of the metropolitan cities provided the farmers supply quality output. FPOs through fair and transparent transaction with bulk buyers can provide assured markets and best price for the organic produce. FPOs can deal with contracting companies for selling organic produce to secure best possible prices.

### **5.3 Value-addition**

Sikkim grows large cardamom, oranges, ginger and turmeric. Farmers have reported that organic crops have shorter shelf-life than the inorganic crops. After harvesting, most of the farmers immediately sell away the crops to the middlemen. These middlemen clean and sort the crops in their godowns and further sell the crops to other agents at higher prices. If the processes like cleaning, sorting, processing, packaging and labeling are done by farmers themselves collectively, they can get better prices compared to what they get by selling crops directly at farm gate.

### **5.4 Input Production**

In Sikkim, fertilisers are prepared by the farmers using locally available farm residues. Thus, cost of fertiliser consists of only manual labour cost. Cost of fertiliser will involve manual labour costs for collecting, transportation composting and applying. In a study about Nicaragua, [5] has found that fertilisation cost is lower for organic farmers than inorganic farmers if organic materials are easily available near their farms. FPOs can produce inputs at low costs so that the profit margin expands.

## 5.5 Awareness

It's difficult to reach each individual farmer and provide hands-on training to all of them. All the stakeholders of organic farming, i.e. farmers, consumers, government agencies, marketing agencies, etc can be sensitised by Local Resource Person (LRP) about the importance of organic agriculture in terms of health, environment and market prospects through FPOs. This will not only expand organic market in the future but also encourage the state to extend more support.

## 5.6 Training

Only those organic crops fetch premium prices that meet certain quality standards. In East Sikkim, farmers reported that some of them were spraying pesticides directly to the plant which was actually meant for roots. Thus, right knowledge disseminated through regular trainings and demonstrations is necessary to enable the farmers to grow quality crops in order to make it marketable.

## 5.7 Infrastructure

During field visits, it has been learnt from farmers that organic crops have lower shelf- life and more susceptible to diseases. Villages lack cold storages necessary for keeping organic products fresh. Inadequate transportation infrastructure further delays quick transport of these crops. A production facility for biofertiliser and biopesticides can be established to produce and supply organic inputs to deficit areas. Sikkim currently exports large cardamom. But to gain maximum benefit from such exports, food safety requirements, high level of coordination and a strong processing sector are necessary [27]. However, it is almost impossible to setup these facilities by individual farmers. Rather, it requires a collective action by the farmers.

## 5.8 Involving Self Help Groups (SHGs)

Organic farming highly depends on the usage of manures, organic fertilizers, bio-fertilizers, vermi-compost, bio-pesticides, etc. Thus, regular and adequate supply of organic inputs is necessary for rapid expansion of organic farming in this mountainous state. For this, FPOs can involve SHGs for producing certified organic inputs. The transfer of technology for production of certified organic inputs along with training, financial

assistance, facilities for distribution and marketing should form the major components of such schemes for the SHGs.

## 5.9 Exports

Rising demand for organic food in the developed countries has motivated the developing countries to increase land under organic farming. US and the European Union are the biggest consumers of organic food (more than 90% in the last two decades) [28]. FPOs can link with buyers in these countries and grow and export products that meet their criteria.

## 6. STRATEGIES FOR THE FUTURE

It is concluded from the study that Sikkim has a lot of prospects in creating a favourable environment for the FPOs that can benefit the small farmers immensely. Stakeholders should work in the direction of devising appropriate solutions for the already identified region-specific problems. A few suggestions are mentioned hereunder:

### 6.1 Strong Infrastructure Base

Creation of proper all-weather road infrastructure to link the farmers to remunerative markets will immensely benefit the farmers.

### 6.2 Quality Training

The Board of Directors should be trained to search for multiple market linkages for providing assured markets for the members. Interventions by the government to help farmers gain business acumen are necessary to enable them to tap the market in a better way. On the other hand, farmers also should be trained regularly on recent advances in agriculture. It was reported that only a few days before this survey, there had been an instance where a farmer sprayed a medicine on the plant while it was meant for applying on the roots. As a result, the crop died. Thus, farmers have to be trained in all aspects.

### 6.3 Involving SHGs

Since SHGs mostly perform post-harvest and processing activities; their members can be involved in processing, grading, sorting, cleaning and packaging of the farm produce collected by the FPOs. This way income is enhanced more due to value-addition and also specialisation of SHG members in value addition.



## 6.4 Crop Insurance

Interactions with the farmers revealed a lack of awareness regarding crop insurance. Crop insurance can be used to minimize farmers' losses due to natural calamities. Also, insured farmers tend to adopt improved farming practices and can provide more output for sale in the market.

## 6.5 Provision of Credit

Provision of collateral-free credit to farmer organisations would encourage them to conduct business, earn profit and then eventually become self-sustaining organisations. These farmer collectives require the initial push of finance without which some of them might fail.

## 6.6 Value-addition at the Local Level

Agri-based value addition is low in Sikkim. Sikkim has huge potential in fruit and vegetable processing, cardamom-oil extraction, ginger preserving etc. Most of the oranges from the state are sent to Kolkata and local markets [10] while some are exported to Bhutan for processing [29]. Currently, a significant amount is being processed by the Government Fruit Preservation Factory located at Singtam. However, provision of processing units to FPOs can utilise all the crops at village level for value-addition which in turn will enhance farmers' income. Processing industries can help in optimum utilisation of perishable commodities.

## 6.7 Shunning the Middlemen

After harvesting, farmers clean the soil from gingers and sell it to traders in the villages who sort and sell the produce to merchants and commission agents in the nearby markets [10]. In the process, the actual producers of the ginger get low prices only for the fresh ginger while the long chain of middlemen makes huge profits after value-addition activities. If the FPOs conduct these value-addition activities at the local level, and sell directly to large markets outside the state then farmers can get better incomes. Farmers expect immediate better returns which is a serious problem.

## 6.8 Research & Development

Perhaps, a lack of proper understanding of hill agriculture has led to no effect of policies. Thus, more research to understand the region- specific

problems should be conducted and then appropriate suggestions should be implemented.

## 7. CONCLUSION

So far, mere adoption of organic farming has not been able to help farmers overcome pre-existing challenges like lack of reliable marketing challenges (86.7%) and low yield of organic agriculture (76.7%). Exploitation by middlemen (43.3) and incidence of pests and diseases also have remained major problems faced by Sikkimese farmers despite the organic mission. In such a situation, FPOs can play pivotal roles in overcoming such constraints faced by small and marginal farmers of hilly states. In case of Sikkim, integrating FPOs in the organic mission would be an added advantage as compared to other states. It would result in better utilization of this Organic Mission policy of the state government. FPOs have the benefits of economic of scale in both input and output markets, better market outreach, value-addition activities, training, better technology dissemination, etc. in such a situation, FPO can be an appropriate institution for the hill farmers to overcome the basic constraints of hill agriculture. Needless to say, FPOs are currently in the initial years in Sikkim and thus require proper handholding. In short, reliable and regular marketing channels, strong infrastructure base, adequate credit assistance, expansion of more processing and value-addition units, educating farmers about the benefits of FPOs and utilization of brand Sikkim Organic are the need of the hour.

## CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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