Promoting Socially Inclusive and Sustainable Agricultural Intensification in West Bengal and Bangladesh (SIAGI)

Agricultural Intensification at Haldibari of Coochbehar District, West Bengal: A Comparison of Major Crops

Report No. 1 of the Value Chains Market Series for Promoting Socially Inclusive and Sustainable Agricultural Intensification in West Bengal

Compiled by:

Pulak Mishra & Bhagirath Behera (IIT),

Subrata Majumdar (CDHI)

Niladri Sekhar Bagchi (IIT)

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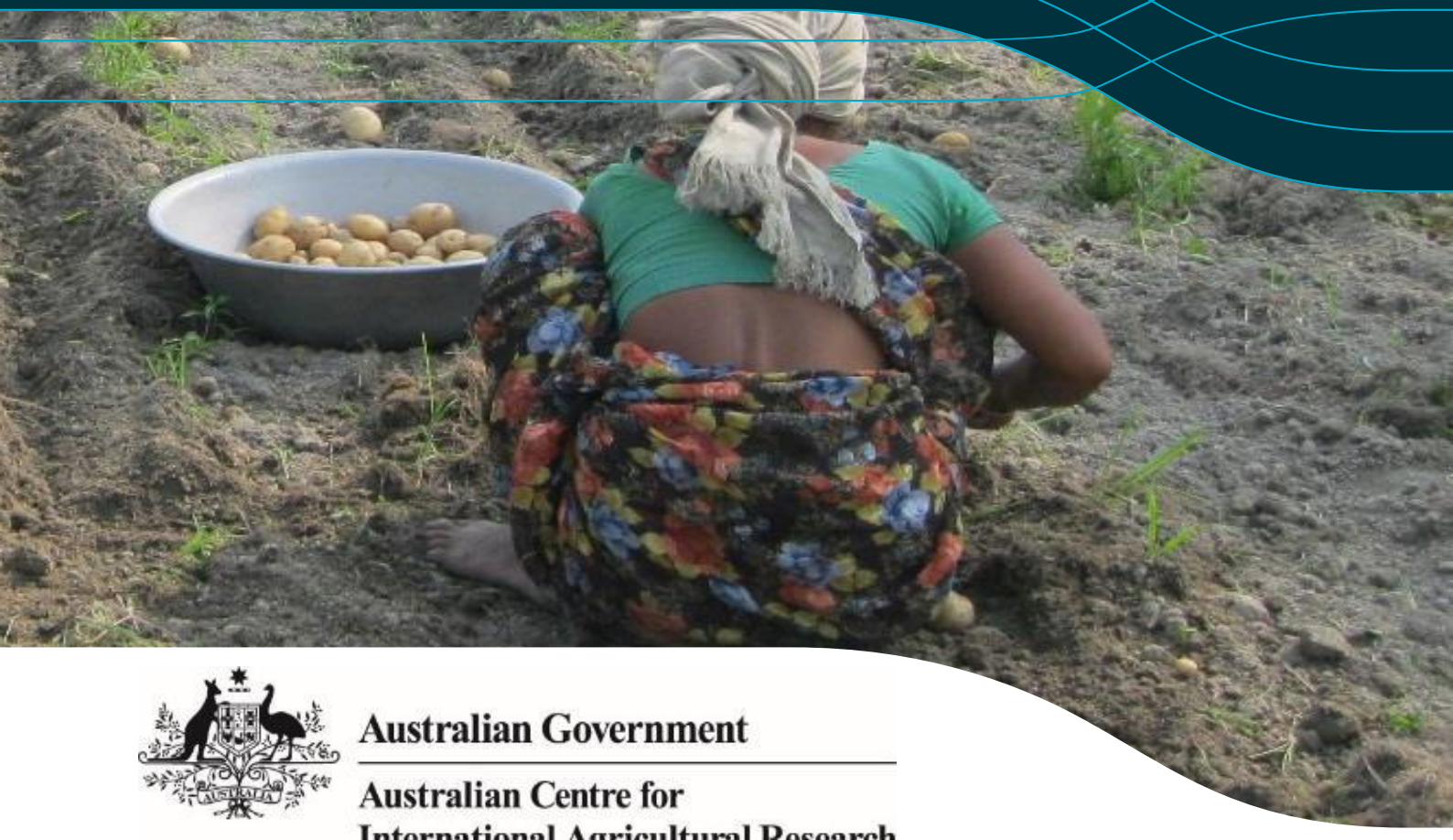

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Author Affiliations:

1. Dr Pulak Mishra, Professor of Economics, Department of Humanities and Social Sciences, Indian Institute of Technology Kharagpur, Kharagpur – 721302 (India)
2. Dr Bhagirath Behera, Professor of Economics Department of Humanities and Social Sciences, Indian Institute of Technology Kharagpur, Kharagpur – 721 302 (India)
3. Subrata Majumdar, Managing Director, Centre for the Development of Human Initiatives, Jalpaiguri – 735121 (India)
4. Niladri Sekhar Bagchi, Doctoral Research Scholar, Department of Humanities and Social Sciences, Indian Institute of Technology Kharagpur, Kharagpur – 721 302 (India)

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1 Background to the study

The objective of this study was to understand the extent of agricultural intensification and its implications for social inclusion and sustainability at the Haldibari area of Cooch Behar district of West Bengal, so that experiences can be shared with the farmers of the SIAGI study villages in Dhaloguri and Uttar Chakoakheti. It is also expected that such an attempt would help in linking the learning from Haldibari to other components of the project, especially for value chain analysis.

About the Study Area

Image 1 Interactions with Farmers

This report is based on data and information gathered through focus group discussions in the village 39, Nijtorof located at Haldibari block of Cooch Behar of West Bengal. The village has around 200 households with a population of about 1000. There is a primary school in a nearby village on the other side of the main road.

There is also an Anganwadi centre (child and women care facility) in the village and a healthcare centre located about 1 km away from this village. People of this village depend mainly on agriculture for their livelihoods. Some of them also (male members of family) migrate seasonally to other parts of the State as wage labour. Migration also takes place to other states for higher earnings (mainly to Kerala where they work in cashew farming and construction works).

2 Farming Practices of Major Crops

There are three cropping seasons here – winter (Rabi season, November-December to February - March), summer (Pre- Kharif season, March - April to June) and rainy season (Kharif season, June-July to September - October). Tomato, chilli, potato, cauliflower, and cabbage are the major crops cultivated in winter. In summer, Boro paddy, jute and summer vegetables are cultivated, whereas mainly Aman paddy and to some extent vegetables are grown in the rainy season.

There are 600 bigha or 200 acres of farming land in the village with good irrigation system. The groundwater is very near to the surface at about 20-feet deep. In non-rainy season, groundwater is the main source of irrigation. Shallow pumps are used to extract groundwater. Initially, farmers were using fat bamboos costing 150-200 Rupees (Rs.) per piece to make shallow pumps which lasted for 5 to 7 years. Nowadays, most of the farmers use plastic pipes costing Rs. 300 to make shallow pumps which last for 20 to 30 years. Many of the farmers (especially the large farmers) have their own pumps, whereas the small farmers hire machines from others. Slight rainfall takes place in winter (December-January) as well and this helps sowing Rabi crops. Let us now consider the major crops paddy, potato, tomato and chilli one by one.

Economics of Paddy Cultivation at Haldibari

Paddy is cultivated during summer (Boro paddy) and Kharif (Aman paddy). The cost of paddy cultivation excluding own labour cost is Rs. 15000 per acre. In general, costs of Boro paddy cultivation are higher than that for Aman paddy. The breakdown of cost of paddy production is given in the following table. Here labour cost represents the actual expenditure by farmers excluding their own labour. Production of paddy varies from 20 to 24 quintal per acre and selling price of paddy varies between Rs. 1000 to Rs. 1200 per quintal.

Almost all households grow paddy in the Kharif season.Nearly 50 households (25 percent) have their own stock of rice for self-consumption throughout the year. Others need to buy rice from the market for some months of the year as they sell a large part of their produce to finance the costs of cultivation of the next crop in the Rabi season (winter) immediately after harvest of the Kharif crop(s).

Table 1. Economic Analysis of Paddy Cultivation (per Acre)	
Costs for Land Preparation (Rs.)	3000
Costs for Seeds, Fertilizer & Pesticides (Rs.)	3000
Labour Costs(Rs.)	3000
Harvesting and Carrying Costs from Field (Rs.)	5000
Transport Costs to Markets (Rs.)	1000
Total Costs (Rs.)	15000
Average Production (Quintal or 100 kg)	22

Average Selling Price of Paddy (Rs.)	1100
Revenue from Paddy (Rs.)	24200
Revenue from Dried Stalk (Rs.)	2000
Total Revenue (Rs.)	26200
Profit (Rs.)	11200

Source: Focus Group Discussions

Economics of Potato Cultivation at Haldibari

Farmers of Haldibari area started cultivating potatoes about 20 to 25 years back. Earlier, they used to cultivate indigenous variety of potato which was very small in size with a reddish skin.

Later the experiences of cultivating high yielding tomatoes helped them to introduce some high yielding varieties of potatoes such as *Kufri Jyoti* and *Kufri Pukhraj*. Now around 60 farmers of the village are engaged in potato cultivation, and out of them around 30 are large farmers. They cultivate potato in the Rabi season and it is harvested during March-April. Production of potato varies between 32 and 40 quintal per acre. The average selling price varies between Rs. 3.50 to 4.00 when the market is down. The farmers need to keep 10 to 20 packets of potato (with 50 kg in each packet) for use as seeds in the next season.

When the market is down, costs saved through provision of own labour give some respite to the farmers, especially to the small and marginal ones. These small and marginal farmers suffer losses as they cannot afford to keep their produce in cold storage. On the other hand, large farmers use cold storage located in Jalpaiguri and can mitigate the price related risks to a considerable extent. However, the large farmers also face risks of losses, particularly when the price falls. Importantly, since the quality and size of potato are very good in this area, hardly any potato gets wasted/remains unsold.

The potato value chain is explained in the following diagram where the dotted green line means there is possibility of setting up processing units in the area which can buy potato directly from farmers.

The breakdown of cost of potato cultivation is given in the following table.

Table 2. Economic Analysis of Potato Farming (per Acre)	
Costs for Land Preparation, Seeds, Fertilizers, etc. (Rs.)	30000
Costs for Irrigation, Pesticides, Labour, etc. (Rs.)	6000
Harvesting Costs (Incl. Sorting, Grading & Packing) (Rs.)	9000
Total Costs (Rs.)	45000
Average Production (Quintal or 100 kg)	36
Cost of Production per kg (Rs.)	4.17
Average Selling Price per kg When the Market is Down (Rs.)	3.75
Average Revenue from Potato Cultivation (Rs.)	40500

Average Profit When the Market is Down (Rs.)	-4500
Average Selling Price per kg under Good Market Conditions (Rs.)	7.75
Average Revenue from Potato Cultivation (Rs.)	83700
Average Profit under Good Market Conditions (Rs.)	38700

Source: Focus Group Discussions

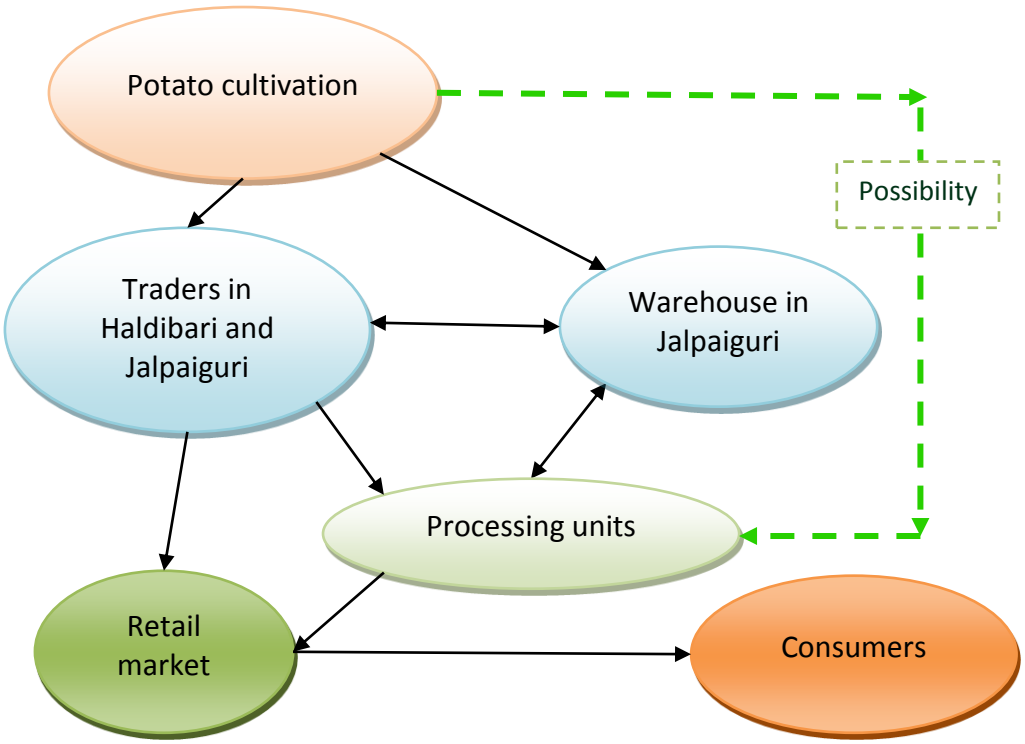

Figure 1 The Potato Value Chain at Haldibari

Box 1 Current Scenario of Potato Cultivation in West Bengal

West Bengal is the second largest producer of potato in India contributing about 25 percent of total output. It is commonly perceived that lack of sufficient cold storage and processing facilities, insufficient government support in sourcing inputs and selling produce, and the presence of middlemen in large numbers, restricts the small and marginal farmers from getting the benefits they deserve from potato cultivation. The problem is aggravated further under adverse climatic conditions. In the first quarter of 2017, the potato price crashed to Rs. 3.20-3.80 per kg primarily due to excessive production, whereas the cost of production is about Rs. 4 per kg. This is very distressing to farmers who cannot afford or avail cold storage facilities or avoid the middlemen or money lenders. Some important issues in respect of potato cultivation are appended below.

Table 3. Potato Cultivation in West Bengal in 2017	
Total output	11 million tonnes
Local Consumption	≤ 5.5 million tonnes
Export to other states or abroad	4.5 million tonnes
Surplus left	1 million tonne

Source: Business Standard (March 17, 2017)

Government Interventions

In times of overproduction, there is always surplus potato left as the cold storage capacity is less than sufficient. This surplus potato is generally absorbed in the market at lower price. Sometimes, there is also wastage of produce. All these cause farmers' distress. However, in the wake of price crash in the potato market, the government of West Bengal has announced a minimum support price (MSP) of Rs. 4.60 per kg for potatoes to be purchased by the government to benefit the farmers. After this announcement, the market price of potato slightly recovered from Rs. 3.20 – 3.80 to Rs. 3.80 – 4.30 per kg. However, the major problem of this government intervention (in the form of MSP) is that the government would procure only 28000 tonnes of potato which is less than three percent of total production (Business Standard; March 17, 2017).

The government has also announced transport subsidy of Rs. 0.50 per kg for railways and Rs. 1 per kg for shipments abroad. However, the small and marginal farmers are unlikely to take advantage of these subsidies as they cannot afford the current transport expenditure and the government subsidy is paid in deferred period. This forces the small and marginal farmers to sell their output to middlemen at lower rates as they cannot even afford or get access to cold storage. (Business Standard, March 17, 2017)

Cold Storage Related Problems

The state has a cold storage capacity of 7 million tonnes against the current output of 11 million tonnes. This big gap in storage capacity leads to unavailability of storage space specifically to the small and marginal farmers as big farmers and other influential groups hold cold storage bonds which they can on-sell at a profit. On the other hand, the state government has fixed a rental of Rs. 1360 per tonne per season for cold storage. This is much lower than the rate of Rs. 2400 in neighbouring state Bihar. This government controlled lower rental is likely to prevent new private investment in expanding storage capacity as it makes setting up new storage facilities less profitable.(The Economic Times, March 9, 2017)

Box 1, continued

Table 4. Cost of Running Cold Storage	
Initial investment in cold storage	Rs. 8000 per tonne
Operational cost	Rs. 1250 per tonne per year
Government controlled rental	Rs.1360 per tonne per year

Source: The Economic Times (March9, 2017)

Emerging Issues for SIAGI Project

The present market scenario of potato and exiting infrastructural constraints raise some important issues that possibly require attention in the SIAGI project. Specifically, the community engagement process during value chain analysis raises the following issues:

- How can farmers' distress be overcome in potato cultivation and ensure reasonable price in the long run?
- Although the MSP can give the farmers temporary relief (though at a limited scale with coverage of only 3 percent of total production) in the short-run, can it affect market mechanisms in the long-run?
- Can expansion of storage facilities necessarily resolve the problem, particularly in the presence of middlemen? If not, what should be the intuitional interventions to remove imperfections and other structural constraints?
- How can collective farming help in overcoming the problem vis-à-vis contract farming?

This aspect is very important considering that nearly 10000 potato farmers in West Bengal are currently engaged in contract farming with multinational companies like PepsiCo. In the current year, they have got a price of Rs. 8.40 per kg compared to the market price of Rs. 3.4 – 3.8 per kg. On the other hand, under contract farming, only process grade potatoes like Atlantic, FC3, and FC5 etc. are cultivated to make potato chips. It does not cover normal varieties of potato. (The Indian Express, March 9, 2017).

Economics of Tomato Cultivation at Haldibari

Farmers in this area have been growing tomatoes for the last 25 to 30 years. Majority of households (150 out of 200) in this village are involved in tomato cultivation. In the beginning they used to grow Rupali variety of tomato for about 5 to 7 years, until yield began to fail. Some farmers then left tomato cultivation because of the highly fluctuating price of tomato and highly perishable nature, and shifted to potato cultivation which has a stable price considering the availability of cold storage facility. Potato farming was also seen to require less labour compared to frequent and high labour requirement of tomato farming. The introduction of the Rocky variety reinvigorated tomato cultivation in the area, and is still currently under cultivation. Tomato is sown in the middle of November and harvested in February-March period. For small farmers, a minimum of three family members are required on a regular basis as labour for the duration of nearly four months. Hiring of extra labour is necessary during the sowing period. The breakdown of cost of tomato production per acre of land is given in the following table.

Table 5. Economic Analysis of Tomato Cultivation (per Acre)	
Costs of Seeds and Seedlings (Rs.)	1800
Costs of Land Preparation (Rs.)	3000
Costs of Fertilizers, Pesticides and Hormones (Rs.)	18000
Labour Costs (Including Own Labour Costs) (Rs.)	45000
Irrigation (Rs.)	6000
Costs for Staking (Rs.)	3350
Total Costs (Rs.)	83850
Total Costs excluding Own Labour Costs (Rs.)	44850
Average Production in Good Season (Quintal or 100kg)	250
Cost of Production per kg (Rs.) (With Own Labour Costs)	3.35
Average Selling Price per kg (Rs.)	4.50
Total Revenue in Good Season (Rs.)	112500
Transportation Costs of Produces to Markets (Rs.)	11200
Profit in Good Season (Rs.)	56650
Average Production in Bad Season (Quintal or 100kg)	200
Cost of Production per kg (Rs.) (With Own Labour Costs)	4.20
Total Revenue in Bad Season (Rs.)	90000
Transportation Costs of Produces to Markets (Rs.)	9000
Profit in Bad Season (Rs.)	36150

Source: Focus Group Discussions

For better yield of tomato, good winter is necessary. In case of heavy fog, costs of pesticides and hormones increase by Rs. 15000 to Rs.20000 per acre. Along with chemical fertilizers, heavy use of cow dung as organic fertilizer is also made. About 3000 kg of cow dung is used per acre of land. Small farmers save the labour costs to the extent of Rs. 40000 to Rs. 45000 by providing their own labour. Thus, for small farmers, the explicit costs of cultivation (i.e., the actual expenses made by the farmers excluding their own labour costs) turn out to be Rs. (83850 – 39000) which is equal to Rs. 44850.

Production of tomato varies in each year. In good season, the output is 240 to 260 quintal per acre, whereas, in bad season, the output varies from 180 to 210 quintal per acre. Hence, the average production ranges from 200 to 250 quintal per acre. Adjusted for very low price of tomatoes (about Rs. 1.5 per kg) harvested at the end of the season are sold to van owners or to agents of processing units of Nepal. After harvesting, tomatoes are sent to Haldibari wholesale market in plastic baskets using local vans at a cost of Rs. 400 per van. Each van can carry about 9 quintals of tomato.

Image 2 Tomato Cultivation at 39, Nijtorof

The tomatoes produced at Haldibari are very famous all over India. The wholesale agents from Delhi, Punjab, Patna, Gorakhpur and Andhrapradesh come to Haldibari market to buy tomato for trading. These big traders are not interested to buy directly from the farmers due to entry barriers created by the local traders. Price of tomato fluctuates very frequently mainly due to demand supply mismatch delivery time and perishable nature of the produce. Even during a day price varies from morning to noon to afternoon. Sometime, cartelization by the traders also results in price fluctuations. This is very important considering that tomato cultivation has become popular in this area over the years, and more farmers are becoming involved in farming of this crop.

Image 3: Van Used for Transportation in Haldibari Area

There is no tomato processing unit in the area. So far, the farmers have not got any proposal for contract farming from various processing units located in other places. Agents from these processing units visit towards the end of harvest and buy bad quality tomato at a price of about Rs. 1.5 per kg.

There is no cold storage facility for tomato in the area or in nearby places. Due to highly perishable nature of the crop, farmers are forced to sell the produces to the local traders at whatever price they offer. Thus, the farmers do not have any bargaining power to charge higher price for their produce. This is largely so because they do not necessary information about other nearby wholesale markets. Further, the farmers have the notion that Haldibari market gives them better price as it is famous for tomato all over India.

Importantly, the farmers have easy access to institutional credit for cultivating tomato. In addition to sourcing credit using Kishan Credit Card or from banks (like Bandhan Bank), they also get financial support for this crop from self-help groups' collective farming and profit/surplus earned from cultivation of paddy.

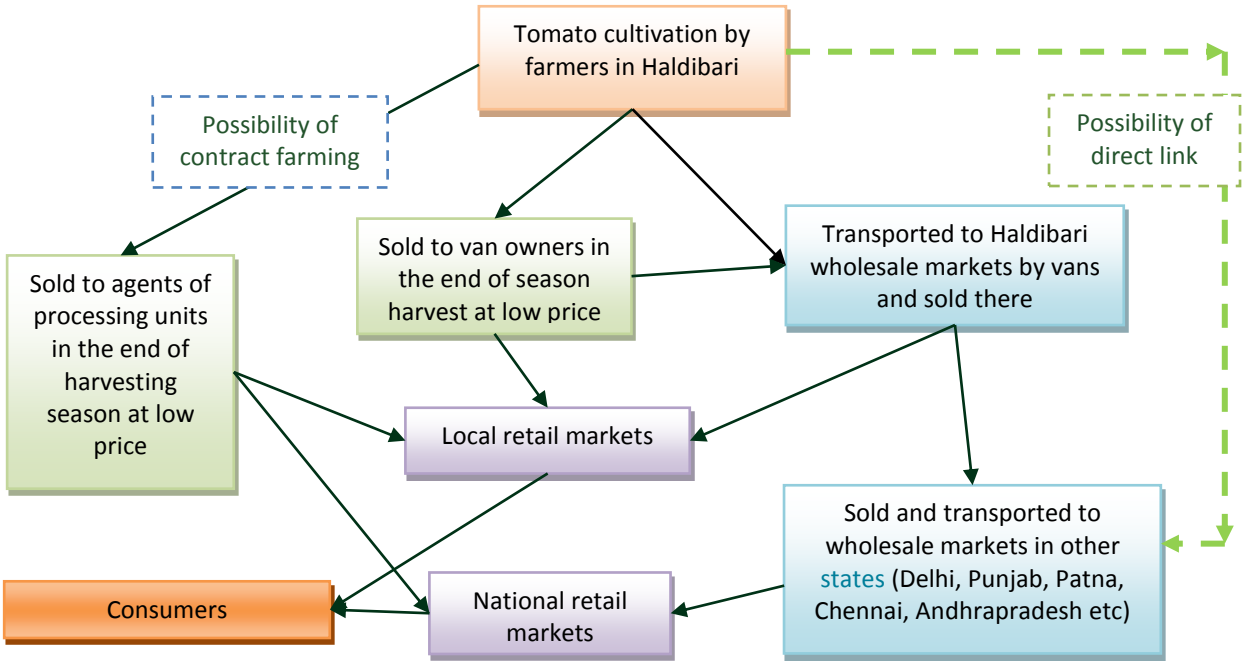

Figure 2 Tomato Value Chain

Economics of Chilli Cultivation at Haldibari

Most of the households of this village are involved in chilli cultivation. The main variety of chilli cultivated in this area is called *Akashi* which is an indigenous variety with small size and very hot taste. Green chillies are mostly grown here, chilli meant for direct consumption in raw form chilli or use in cooking. Mostly, women are involved in field labour chilli as the work required is not considered strenuous. As it is shown in the table below, chilli has the lowest cost of production among all the Rabi crops grown in this area. There is no cost for seeds as the chillies first plucked are kept for seeds for the next season.

Chilli is harvested in every week for a period of more than 2 months. In the initial weeks yields are higher and after the 4th week yield starts declining. When the farmers provide own labour, the actual cost comes down to Rs. 13500 to Rs. 15000 per acre land. For plucking chillies, labour charge is Rs. 3 per kg which is saved if it is done by family members. Price of chilli varies from Rs. 12.5 per kg to Rs. 50 per kg) with an average price of Rs. 31.25 per kg If the labour cost of Rs. 30000 per acre is saved by providing family labour, the actual profit from chilli cultivation may exceed Rs. 200000 per acre.

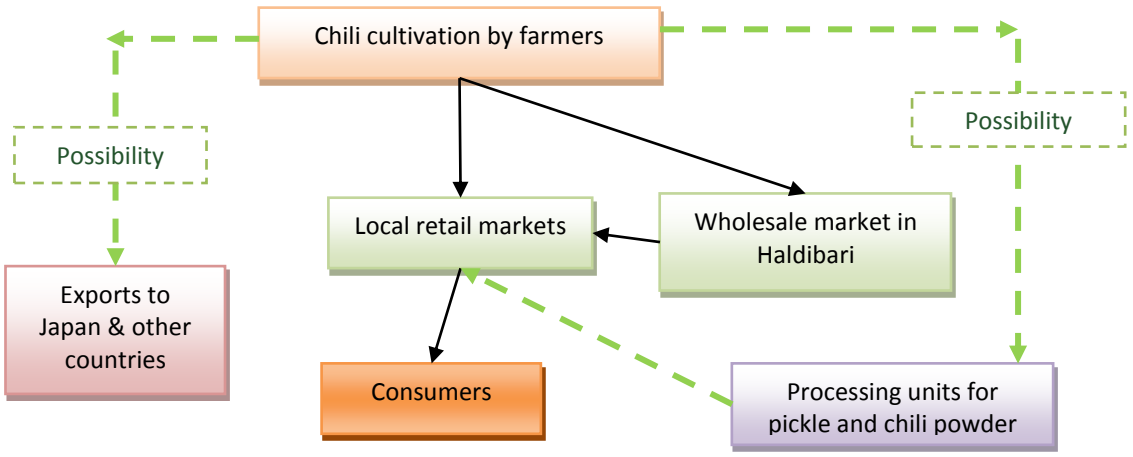

Figure 3 Value Chain of Chilli

Table 6. Economic Analysis of Chilli Cultivation (per Acre)	
Costs of Fertilizers, Pesticides, Irrigation, etc. (Rs.)	13500
Labour Costs (Rs.)	30000
Total Costs (Rs.)	43500
Average Production (Quintal or 100kg)	75
Average Selling Price per kg (Rs.)	31
Total Revenue (Rs.)	225000
Total Profit (Rs.)	181500

Source: Focus Group Discussion

3 Comparative Analysis of Major Crops Cultivated at Haldibari

Comparing the costs of production and average sales revenue, it appears that chilli gives the maximum returns to the farmers. This is probably the highest amongst the alternative Rabi crops cultivated in the area. Further, since the costs of cultivation is much less than the other crops (especially when family labour is provided), the rate of returns appear to be very high for this crop. In addition, intercropping of coriander, spinach, carrot, garlic, etc. is also practiced along with chilli. This gives the scope for earning extra income to the farmers without incurring much additional costs.

Chilli also has a very good potential for export. Representatives from Japan visited the area last year and showed keen interest to import chilli from Haldibari area at a very high price of Rs. 150 per bundle of 6-7 chillies provided it is grown in fully organic way.

Furthermore, if suitable variety of chilli is cultivated, farmers can process the produce and make red chilli powder. The local varieties grown are not suitable for processing chilli powder. This would give better price even when the price of raw chilli is low. At present, the farmers are not much interested in making chilli powder as the current *Akashi* variety, though not suitable for making chilli powder, gives them good income. There is also possibility of other forms of processing of green chillies like making pickle which is quite popular in North Indian dishes.

1. Chilli seems to have distinct advantages in respect of social inclusion and sustainability compared to the crops like tomato and potato largely due to the following reasons:
2. Since chilli requires a very small amount of initial investment (Rs. 13500 per acre), it can be afforded by the small and marginal farmers including women.
3. There are regular returns from chilli are (as it is harvested in every week) which is very helpful for the small and marginal farmers.
4. Labour works required for chilli cultivation is not strenuous and hence are for women. This creates possibility of larger inclusion of women in the process.
5. Chilli requires much less chemical fertilizers and pesticides as compared to other crops, which is suitable for maintaining soil health and sustainability.
6. Chilli is not as highly perishable as tomato; it can be stored in normal room temperature for about one week. This reduces the market risks considerably.

In case of tomato, there is scope for setting up of tomato processing units in the area for making sauce, jam, jelly and puree. Further, labelling tomatoes with registered Haldibari stickers, developing cold storage facilities, and establishing direct links with the large traders from other states can also be explored. However, yield of tomato is declining. In the initial years, as much as 20 to 25 kg of tomato used to be harvested from a plant. At present, this has come down to only 3 to 4 kg per plant. Importantly, the farmers do not have much idea about the specific reasons for such decline in yield, but they are concerned about the future of tomato cultivation in the area.

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