

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

Agricultural Intensification at Sekendarkhali Village of Amtali Upazila, Bangladesh: Market Dynamics of Sunflower

Report No. 5 of the Value Chains Market Series for Promoting Socially Inclusive and Sustainable Agricultural Intensification in West Bengal and Bangladesh

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25 June 2018



Australian Government

**Australian Centre for
International Agricultural Research**

This report is a part of the MS thesis entitles 'Analysis of Sunflower Value Chain in Selected Areas of Amtali Upazila of Bangladesh. The student is selected for the fellowship under the project "Promoting Socially Inclusive & Sustainable Agricultural Intensification in West Bengal & Bangladesh" sponsored by the Australian Centre for International Agricultural Research (ACIAR). The thesis will be submitted for the degree program in July/2018. Based on the field observation, data collection and FGD, preliminary findings are presented here. We are highly acknowledged SHUSHILAN specially Mahanambrota Das and Sambhu Singha for validating data and other supports.

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1 Background of the study

Agriculture is the foundation of the economy of Bangladesh. It accounts for 14.10% of the sectorial share of GDP (BBS, 2018). Agriculture has linkages with the non-farm sector through forward linkages to agro-processing, consumption and export; provides raw materials to industries and a market for manufactured goods. In order to improve the marketing arrangements for agricultural products, one needs to understand the channels that are currently used for trading in domestic and international markets. At present, the majority of small scale agricultural producers are consuming their production to large extent within the household. The remaining surplus production can be sold either to the local markets or to national markets depending on the products and producer's access to the market. The main constraints for markets are lack of access by marginal and small farmers due to low volume of production, poor road communication during the rainy season, and absence of well-functioning markets.

About Sekendarkhali

Sekendarkhali village is located in Amtali Sadar Upazila of Sadar Union in Polder 43/1. The total size of the village is 5.2 square kilometres and total population is about 1450 where male female ratio is 1.01 which is slightly lower than national average (1.04) (BBS, 2018). The total area under agricultural production is around 57,750 acres (Shushilan, 2016). Most of them are engaged in agriculture as occupation. Around 30% of households are involved in off farm activities like earthen work, van puller, rickshaw puller, 'Tom Tom' driver in Dhaka and Khulna. There are few small industries like rice husking, sunflower seed processing, brick field and agricultural machinery repairing. Figure 1 shows the village location and left side of the Figure (hand drawing) is a map of the village drawn during focus group discussions.

Sekendarkhali and its surrounding villages are impacted by saline water intrusion, resulting in farmers keeping the soil fallow during the rabi season. The cropping pattern is mainly aman-fallow, with paddy (rice) grown in the aman season. Limited fresh water for irrigation in rabi season restricts farmers ability to grow alternative crops. For this reason, people living in these areas have been suffering from lack of food security and income generating activities. In addition to increased salinity, there are many other reasons behind low productivity and less cropping intensity. These include cyclones, submergence, and poor marketing facilities.

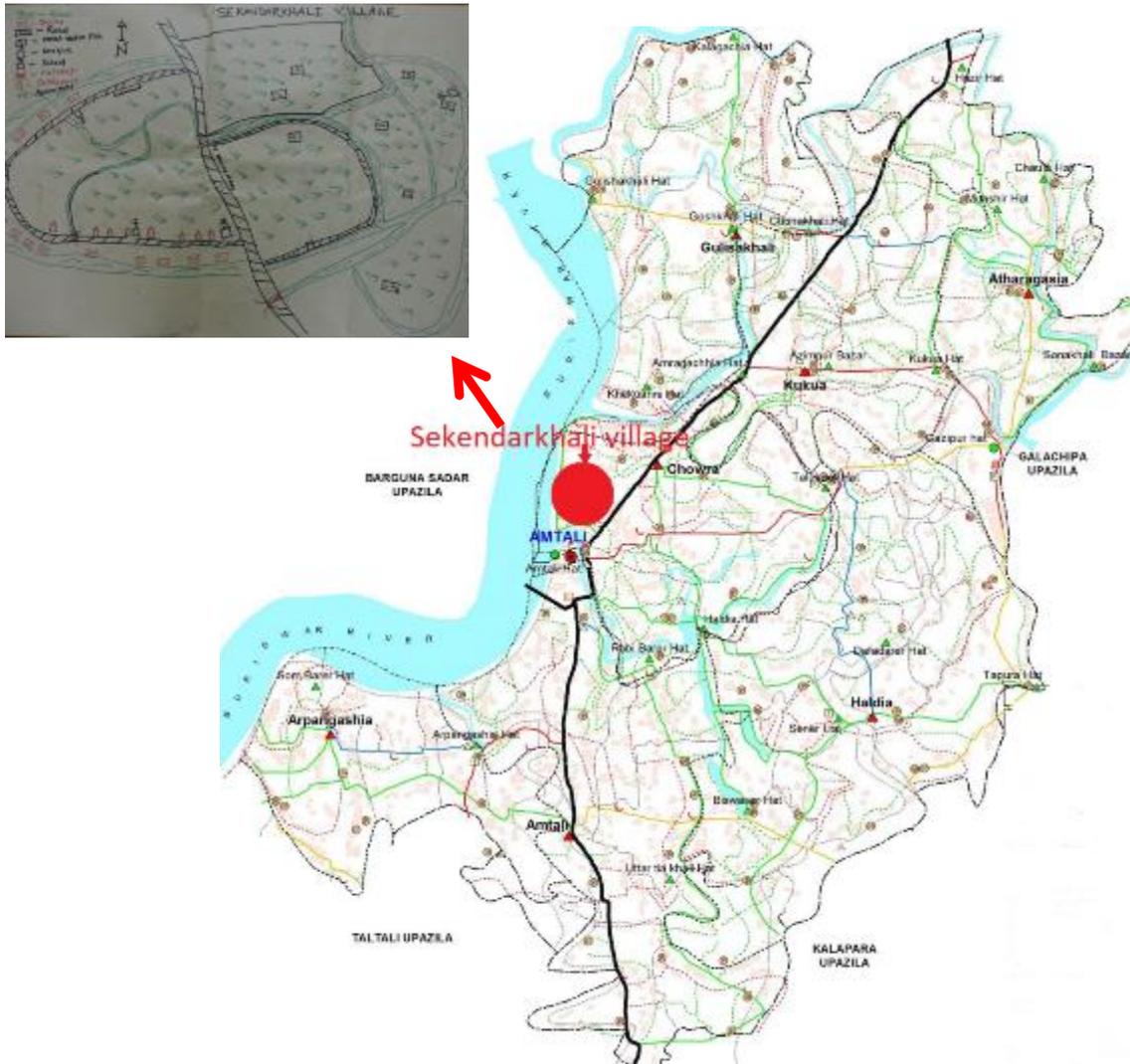


Figure 1 Sekendarkhali village

(Source: <http://www.lged.gov.bd/UploadedDocument/Map/BARISAL/barguna/amtali/amtali>)

More recently, farmers in these villages now grow more crops and engage themselves in more productive activities such as planting crops in rabi season, weeding, irrigating, all types of postharvest activities including marketing and aquaculture (fish) in the canal. To an extent, these can be attributed to interventions arising from ACIAR projects, including CSI4CZ, DSI4MTF and SIAGI. Farmers, especially small and marginal farmers, in rabi season can grow sunflower, groundnut, green chilli, pulses and even boro.

The value of sunflower production

Sunflower is considered an attractive crop because it is saline tolerant and has seemingly high yields, which in turn provide quick returns of the farmers. Sunflower is recently introduced as a good oil seed crop for high quality edible oil, gaining popularity among local farmers because of its easy extraction method. Usually, when there is late rain or floods,

sowing of oil seeds like mustard and sesame are deferred, hampering production. Under such conditions, sunflower stands as a good substitute to fill up this gap of production.

Sunflower is a short duration crop with a salinity threshold of approximately 2-12 deciSiemens per meter (dS/m). The crop requires very little irrigation and relatively small amounts of fertilizers and insecticides, compared to sesame and mustard (Habib et al. 2017).

The sunflower oil industry also provides employment locally and offers opportunities for export and import substitution. The cake, that is a by-product of oil production, is high in protein and can be used as feed stock for poultry, small animals, dairy and draught animals which are used for ploughing and laddering the field.

A kilogram of sunflower seeds brings 500 to 600 grams of oil, an amount more than that of any other oil seeds. It is considered as premium oil as it contains around 66% linoleic acid (unsaturated fatty acid) and its oil cake contains around 40-44% high quality protein (Habib et al., 2017). These characteristics make it an attractive value added product for the village.

Sunflower seed production competes with sesame and mustard farming. The area, production and yield under sunflower, mustard and sesame in Bangladesh are shown in Table 1. The consumption of edible oil in Bangladesh is around 1029 MT in a year. This is mostly fulfilled through imports. The values of imported edible oil and oilseeds were US\$ 1574 and US\$ 354 in 2017-18 (Bangladesh Bank, 2017). There are two oilseed crushing plants in Bangladesh have an estimated average capacity of 4200 MT/day (maximum 7000 MT/day) with the facility to crush soybean, mustard, rapeseed and sunflower (Gain Report, 2018).

Table 1 Oilseed area, production and yield in 2016-17

OILSEEDS	AREA (ACRE)	AREA (%)	PRODUCTION (MT)	YIELD (T/ACRE)
MUSTARD	831260	69.45	3662860	4.41
GROUND NUT	91188	7.62	66060	0.72
LINSEED	13257	1.11	4164	0.31
SESAME	92671	7.74	33999	0.37
SOYBEAN	155351	12.98	96931	0.62
COCONUT	9602	0.80	408635	42.56
SUNFLOWER	3425	0.28	1913	0.56
TOTAL	1196834	100	974552	7.869

Source: YearBook of Agricultural Statistics, 2017

Justification of the study

The introduction of sunflower as a new crop in Sekendarkhali and its nearby villages was based on the presence of local demand and the intervention of ACIAR projects, KGF, BARI and BRRI. However, there is inadequate understanding of its market, potentially putting

farmers at risk. Analyzing the value chain of sunflower has the potential to identify opportunities to improve sunflower production and marketing, and assist farmers, industry stakeholders, project partners, and government agencies in the area to identify interventions to match these opportunities. In addition, value chain analysis has the potential to inform marketing decisions by producers, processors, consumers, traders, investors, and others. This is achieved by identifying root causes for supply and marketing problems starting from production till the consumption of the product.

Accordingly, a study on the sunflower value chain gives insight about production, marketing and value adding activities which will be helpful for the farmers and other market actors for decision-making. Thus, this study focuses value chain analysis of sunflower to investigate the market dynamic, actors' roles and functions and production and marketing arrangements.

Objectives of the study

The general objective of this study is to analyse the value chain of sunflower in Sekendarkhali of Amtali upazila. To meet this general objective the study was governed by four specific objectives and they are:

1. To identify and assess the roles of actors in the sunflower value chain in the study area;
2. To assess how production and marketing arrangements of sunflower influence income of farmers;
3. To determine the performance along the sunflower supply chain in terms of gross margins; and
4. To examine the business challenges facing sunflower actors in the study area.

Methodology

Sekendarkhali and its surrounding villages under Amtali Upazila of Barguna district are selected purposively for this study. As ACIAR projects are running in this village and farmers are now growing sunflower through the intervention and community engagement, it is timely to examine the marketing of sunflower.

The study used both qualitative and quantitative methods, using focus group discussion, interview and survey techniques. The data was collected from farmers, assemblers/collectors, wholesalers, local processors and retailers. The period of data collection was February to March 2018. The collected data is validated with Shushilan data.

At production level farmers were identified by physical visits to the sunflower fields. The information of where farmers were located was obtained from Shushilan, who operates in the area and is SIAGI's NGO partner in Bangladesh. Assemblers were identified by physical visits to the farmers at which transaction between farmers and assemblers

took place. Wholesalers were identified by physical visits to the markets. Retailers were identified through physical visits to their marketing places. A combination of purposive and snowball sampling techniques were used to select the respondents. The sample size comprised of 60 respondents where farmers were 20, assemblers/collectors/wholesalers were 12, processors were 3 and remaining were the retailers. Farmers and traders data was collected through two separate types of questionnaire.

Questions include farm type, crop choice, input use, cost of input and output, labour use, marketing activities, value addition and cost of value addition. A checklist was used during focus group discussions which is mainly focus on the broad questions and sequence of questions. Data were analysed through descriptive statistics. Data validation and triangulation were done through checking and rechecking the data.

2 Results and discussion

Role of actors in sunflower value chain

Sunflower production in Sekendarkhali and its surrounding villages are predominantly done by small farmers with 0.01 to 1 acre of land. It is observed that about 90% of the farmers were small and marginal who owned on an average one acre of land. The process of sunflower farming included land preparation (ploughing), planting, regular weeding, and harvesting. While medium and large scale farmers used tractors for ploughing, such service is only available for very few small and marginal farmers. In the production stage both women and men are involved, while its marketing is dominated by men with only 10% of women have brought sunflower seed into the markets as they are women managed farmers. Small and marginal sunflower farmers do not have any storage facilities and were interested to sell their seed soon after the harvest. As a result the price of sunflower seed is low. Main inputs in sunflower production in Amtali were seeds and fertiliser and the cost of labour.

Production of good quality sunflower seeds is critical to production of good quality sunflower oil. Currently, the availability of good quality sunflower seeds represents the weakest link in the sunflower value chain in the regional market. In local markets, those farmers purchase sunflower seeds for planting, do not maintain quality certification which makes problem of germination and yield. This is aggravated by the lack of standards in the existing marketing system of sunflower seeds in the central market. In addition, the annual supply of sunflower seeds in the closest city markets in Patuakhali and Dhaka fluctuates a lot. This is largely due to changes in weather conditions and seasonality of production.

The resulting unstable supply of sunflower seeds leads to capacity underutilisation in the sunflower oil milling industry. This affects the level of efficiency and effectiveness in the utilisation of investment in the sunflower value chain.

Sunflower value chain map and dynamics

The sunflower oil value chain in Sekenderkhali is mapped in figure 2.

The sunflower crop when harvested is in most cases sold to local traders called collectors or assemblers either at the farmgate or at the local markets. These traders are either on commission from local processors or are acting independently. The independent traders may then locate buyers for the seeds, or negotiate with the processors, while the commissioned collectors usually work based on an order from the processor. In a small number of cases some of the farmers also take their seed to the processors themselves and produce oil for themselves or sell sunflower oil in the local markets.

The processors are the pivotal point for the sunflower oil in the study area, as all the seed must pass through these actors and change the form. There are local mills that process

sunflower seeds into oil who charge fees for processing. There is a large processor named Aamato, located in the Patuakhali sadar, upazila that converts seed into oil and sells to the central market. The company agents collect seeds from the farmers of Sekendarkhali and surrounding villages. They therefore come into contact with a wide variety of actors and have different types of transactions.

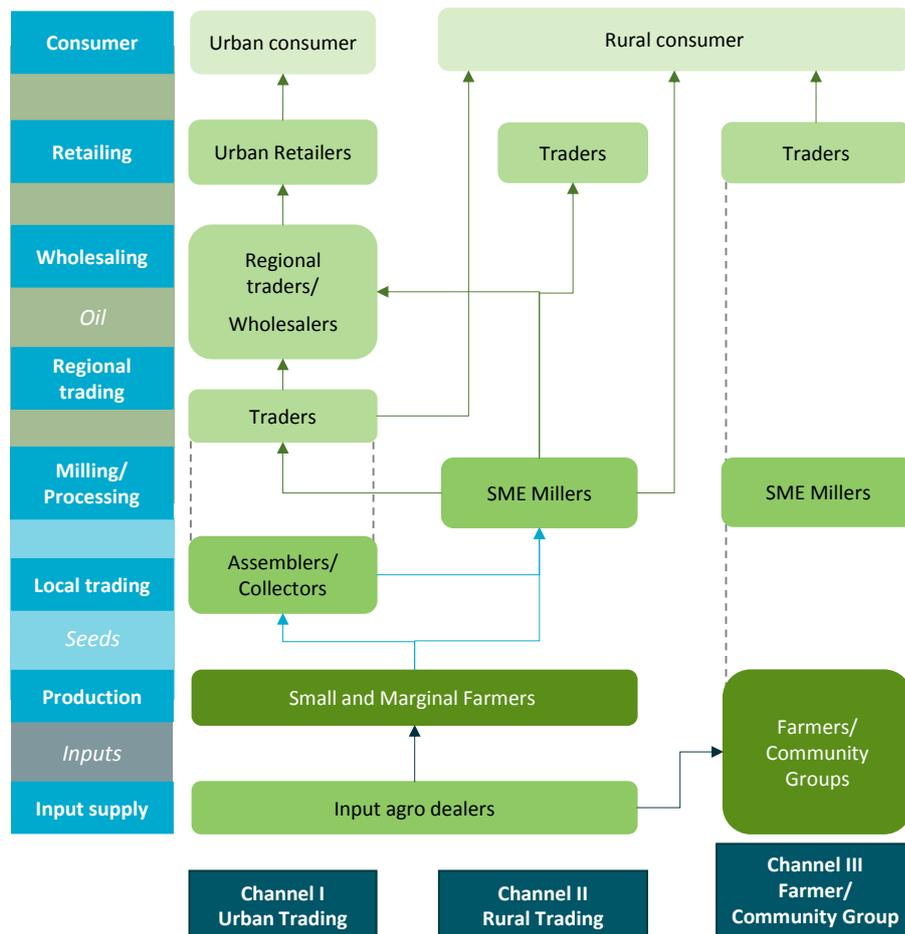


Figure 2 Value chain map for sunflower oil in Sekendarkhali village

On the other hand, smaller, local processors are paid for their milling services, and oil and cake are returned to the trader or farmer who brings it. In other cases, a processor may purchase seeds and produce oil through processing and sell them to the other actors.

Once the oil is produced, the owner (farmer, trader or processor) may then either sell directly to the rural market, or sell to rural retailers, and then sell to traders for movement toward the urban market. The market for sunflower oil within the regions is well established and absorbs more than 75% of the sunflower oil produced in the regions. Therefore only a relatively small percentage is traded outside the regions. Local consumers are able to purchase sunflower oil in the following ways:

- from farmers who are paid for the processing of their crop,
- from local traders who purchased from farmers and paid for the processing
- from processors who bought either the seed or oil from the farmers
- from retailers who bought the oil from processors or traders
- from farmer/community groups who own processing equipment.

Urban consumers either obtain the oil from urban retailers, urban wholesalers/retailers or purchase the oil when making trips to the region.

The price of sunflower seeds varies between the two extremes of excess supply, and scarcity. Excess supply occurs usually during the time of harvest since all the farmers in the region harvest simultaneously. During this time the price of sunflower seeds reaches an annual low. However later in the year as the supply is consumed, and especially during the time of replanting, the price of sunflower seeds climbs to the year's highest position.

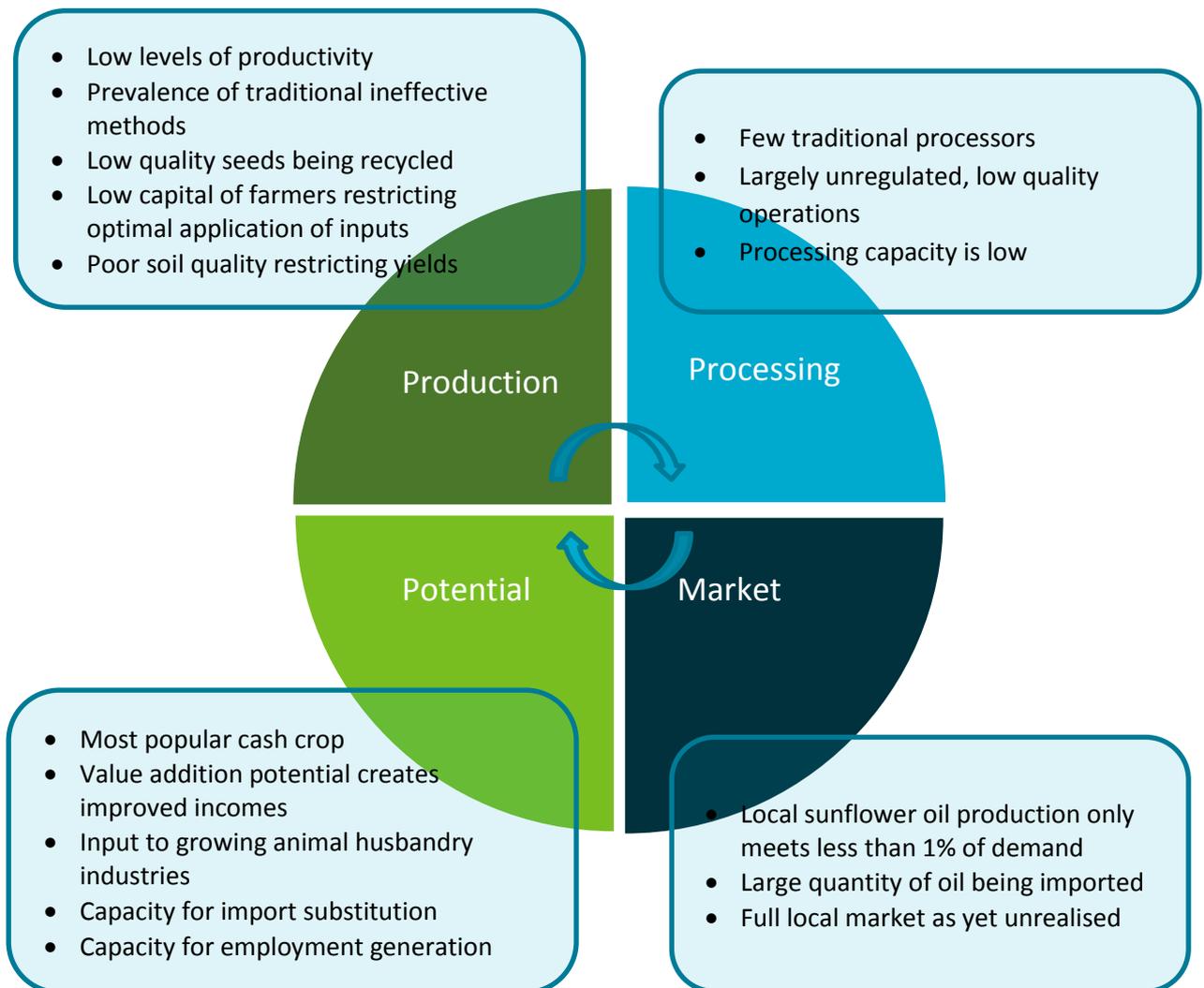


Figure 3 The sunflower value chain dynamics

The sunflower value chain dynamics can be seen four interlinkages (Figure 3). Production and processing are linked with low level of productivity and local level processing mill which is mainly traditional and mostly unexplored yet.

Cost and revenue drivers and margins

On average, the total costs (production and marketing) incurred by the farmers are Tk. 11,986.30/acre (100 decimals) of sunflower. The costs incurred by farmers included cost of using seed, labour, and fertilizers. On average farmers harvested 310.75 kg of sunflower seed per acre which much lower than the other areas (varied from 562.5 kg to 750 kg per acre). The lower yields, according to farmers, was due to stagnation of water due to excessive rainfall. Farmers used individual storage facilities to keep small quantities of sunflower after harvest in their homestead area. Most farmers indicated that they stored sunflower before sales.

Table 2 Total production cost during the season 2017-2018

Serial/no.	Activity/Input	Tk/acre
1.	Land preparation	1930.95
2.	Labour	4075.76
3.	Seeds	3514.14
4.	Fertilizers	2465.45
	Total cost	11,986.30

Most of the farmers sell their produces in the farmyard. Therefore they do not have any marketing cost for carrying the produces into the market. The gross margin at farm gate during the period of February-March 2018 was estimated to be Tk 3551.20 which is low due to lower yield (see table 3). This year, farmers noticed that they do not get profit due to loss of yield that comes from heavy rainfall and water logging but they argued that they can make profit in the coming years if they received better price which they received in the last year. The market price of sunflower seed is comparatively good which Tk 50/kg and they can sell their produce in the market with the presence of local processing mills and a large processing mill. Farmers of the nearby villages can produce 562.5 to 750 kg/acre of sunflower seed which gives Sekendarkhali village farmers the impression that it can be a profitable crop. Currently, the production of sunflower is insufficient to meet the local demand.

Table 3 Gross margin (per acre) for sunflower farmers for February-March 2018 cropping season

Sl/n	Parameters	Parameter value
1.	Quantity sold(kg) (668.75kg/acre)	310.75
2.	Selling price in Tk per kg	50.00
3.	Production cost in Tk/acre	11,986.30

4.	Gross revenue (1*2)	15,537.50
5.	Profit margin (4-3)	3551.20

Note: During the calculation, land use cost and depreciation were not taken into account as land is fallow. If we consider these, the profit margin might be change.

Assemblers received a total gross margin of Tk 588/100 kg of sunflower seeds (table 4).

Table 4 Gross margin for assemblers/collectors of sunflower

S/N	Parameter	Parameter value
1.	Quantity of sunflower bought in kg	100
2.	Buying price in Tk Per kg	50
3.	Purchase cost (1*2)	5000
4.	Transport costs (Tk/100kg)	200
5.	Loading and unloading (Tk/100kg)	450
6.	Total cost incurred (3+4+5)	5650
7.	Quantity sold, kg	100
8.	Selling price /kg	55.88
9.	Gross revenue (7*8)	5588
10.	Profit margin (9-6)	588

At wholesale node the total gross margin is found to be Tk. 209/100kg of sunflower seeds (table 5). The gross margin at wholesale node was lower compared to that at assembling node.

Table 5 Gross margin for wholesalers of sunflower

S/N	Parameter	Parameter value
1.	Quantity of sunflower bought in kg	100
2.	Purchase price, Tk/kg	55.88
3.	Purchase cost (1*2)	5588
4.	Transport costs (Tk/100kg)	200
5.	Labour charges (Tk/100kg)	250
6.	Market charges (Tk/100kg)	75
7.	Total cost incurred (3+4+5+6)	6113
8.	Quantity sold in kg	100
9.	Selling price, Tk/kg	63.22
10.	Gross revenue (8*9)	6322
11.	Profit margin (10-7)	209

Note: The profit margin is calculated on the basis of variable cost.

It is observed that processor received gross margin of 100 kg of equivalent sunflower seed which is around 40.0 kg oil is Tk 878 (table 6). This does not take into account fixed costs.

Table 6 Gross margin for processors of sunflower oil

S/N	Parameter	Parameter value
1	Quantity of sunflower bought in kg	100
2	Buying price, Tk/kg	63.22
3	Purchase cost (1*2)	6322
4	Transport costs (Tk/100kg)	250
5	Processing cost(Tk/100kg)	700
6	Packaging cost (Tk/100kg)	450
7	Total cost incurred (3+4+5+6)	7722
8	Quantity sold, kg	40
9	Selling price, Tk/liter	215
10	Gross revenue (9*8)	8600
11	Profit margin (10-7)	878

Note: The profit margin is calculated on the basis of variable cost.

The total gross margin at the retail node was found to be Tk 450/ 100 kg sunflower oil (table 7). The gross margin at retail node was found to be lower compared to that other nodes. As most of the retailers sell sunflower oil with other processor items, they received comparatively low margin of each items.

Table 7 Gross margin for retailers of sunflower oil

S/N	Parameter	Parameter value
1.	Quantity of sunflower bought in kg	100
2.	Buying price, Tk/kg	215
3.	Purchase cost (1*2)	21500
4.	Transport costs (Tk/100kg)	250
5.	Labour (Tk/100kg)	150
6.	Shop rent and others (Tk/100kg)	125
7.	Market charge (Tk/100kg)	25
8.	Total cost incurred (3+4+5+6+7)	22050
9.	Quantity sold, kg	100
10.	Selling price, Tk/kg	225
11.	Gross revenue (9*10)	22500
12.	Profit margin (11-8)	450

Note: The profit margin is calculated on the basis of variable cost.

Constraints and Opportunities

Sunflower farmers and market actors face constraints to cultivate and market the sunflower seed and oil. Production constraints limit the production area and reduce the yield.

Marketing constraints limit the farmers and actors for receiving lower profit. The opportunities indicate the future hope that can be reached by mitigating the constraints.

Constraints

- Lack of /scarcity of improved seeds which forces farmers to use own seeds which are often low-yielding
- Water logging results in low yields, and in some cases results in losses of the farmers
- Low quality of seeds due to poor postharvest handling, resulting in farmers receiving lower returns from the sunflower oil production
- Inadequate knowledge on sunflower production techniques and management
- Higher production costs making sunflower seeds and oils expensive
- Processing skills are lacking mainly among small and marginal farmers and processors, leading to poor quality products that are not competitive with the market preference

Opportunities

- Opportunity for growth of private sector entrepreneurs/farmers, through the supply of higher quality sunflower seeds
- Farmers training on improved agronomic practices and management that allow them to optimize the usage of their land holding and enable the proper use of input supplies for improved productivity
- Opportunity for the introduction of systems for the training, registration and regulation of sunflower oil processors in order to standardize practices and quality standards
- Opportunity for the training of production and processing actors in order to improve productivity, reduce costs and provide a lower priced, more competitive product for the end market
- Increasing demand for sunflower oil based on growing health consciousness
- Opportunity for import substitution with the introduction of competitive local oil

3 Conclusions

Sunflower, as a cash crop, can significantly contribute to increase household income and food security and thus raising the standard of living of rural people. The study found that the common marketing system used involves many links with no value addition within the channels which potentially increases the total cost from double handling. The findings revealed that 40% of the total production were sold by farmers to chain actors in 2017/2018 cropping season while the remaining 60% was left for domestic consumption. The study also identified the presence of certain trading arrangements between producers and traders, in addition to standard purchasing and selling transactions.

Most of the farmers collected seeds for planting from the nearby local market from the local seed traders. Some also used the seed of their own cultivated during last season. This is because of scarcity of seeds. Farmers in the study area were in good communication with the traders specifically the collectors for selling their produce. Most of the collectors were known persons in the village. In this case, the farmers described about the credibility of making sale with the collectors.

Farmers were not engaged with the marketing activities in the study area. Thus, marketing comprised of collectors, processors, wholesalers, retailers. Sunflower oil production is profitable as farmers (those who converted their seed into oil) received Tk 225/kg. The main business challenge in sunflower production is scarcity of quality seed and the marketing challenge is fluctuation of prices.

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