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Farmers preference and challenges of producing oilseed crops in Bangladesh

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Abstract

Despite substantial agricultural and economic growth, the country is still 90% dependent on importing edible oil. Considering the importance of promoting oilseeds cultivation, Solidaridad Network Asia (SNA) in Bangladesh conducted a market assessment and feasibility study on challenges and opportunity of expanding edible oilseeds production in the country. The present paper presents the comprehensive report of the study which was carried out for 6 months from January 2024 to June 2024 using multiple techniques including literature reviews, survey questionnaires, conducting Key Informants Interviews (K-II) with a wide range of other relevant stakeholders and Focus Group Discussions (FGD) with farmers in five Districts namely Dinajpur, Thakugaon, Tangail, Laksmipur and Noakhali. The findings indicated that in Laksmipur and Noakhali districts, farmers cultivate only soybeans as oilseed crop, while in Dinajpur, Thakurgaon and Tangail the farmers cultivate mostly mustard. It was observed that farmers are cultivating some new varieties which are of high yielding, climate resilient and short duration resulted in making more profit than that of earlier time. Farmers of Dinajpur, Thakurgaon and Tangail are now getting more yields through cultivating BARI sarisha-14 mustard variety, while they used to cultivate Tori-7 earlier. BU soybean 2 is better option for soybean production. Most of the farmers opined that cultivating oilseeds was more profitable as they can cultivate three crops in a calendar year. Factor analysis indicated that making decision to cultivate oilseeds was not an issue of single factor, instead temperature, rainfall, cash, irrigation equipment, input availability, comparison of profitability to other crops, quality of seeds, high yielding and short duration varieties were also determining factors. Farmers are fond of cultivating mustard over other oilseeds like soybeans, sunflower or groundnut in the northern part of Bangladesh, while farmers of Noakhali and Lakshmipur preferred soybean. According to FGDs and K-II mustard suffers from thirteen diseases, while soybean from sixteen fungal, two bacterial and virus diseases, of which yellow mosaic virus and anthracnose are the major problems. Based on the findings it was recommended to ensure availability of high yielding climate resilient seeds, timely supply of fertilizer at a subsidized price, access to credit or financial support, area specific measures to solve the agricultural problems, forming effective farmers cooperatives, partnership between public-private research and extension organizations, involvement of next generations in farming, and introducing Rotating Savings and Credit Association (ROSCA) for sustainable and maximizing oilseeds production in Bangladesh.

Keywords: Oil seeds, challenges, respondent, constraints

Introduction

Agriculture is the most vital sector in Bangladesh economy, contributing around 12% of GDP and employing over a third of the population. However, the country relies heavily on imports of oil and fats, meeting only 12% of the demand from local production of oilseed crops like mustard (*Brassica* spp.), soybean (*Glycine max*), sesame (*Sesamum indicum*), and sunflower (*Helianthus annuus*). In Bangladesh, total amount of oilseed production in the year 2022-23 was 1171340.46 M tons from an area of 551299.98 hectares (BBS 2023). According to the National Board of Revenue (NBR) the country imported 0.74 M tons of soybean and 1.06 M tons of palm oil in crude and refined forms in Fiscal Year 2020-21. However, CEIC (2024) database indicated that edible oil imports dropped to 15,723.52 million BDT in July 2024 from 36,702.00 million BDT in June 2023. The big pressure of import on national economy necessitates dedicated, collective and incentive oriented initiatives and effort to inspire the farmers for cultivating more oilseeds crops in Bangladesh. According to Miah *et al.* (2015) by using improved varieties of mustard, groundnut, soybean and sesame the job opportunities may be increased to 12.7, 11.6, 15.4 and 6.1 % man days/ha.

The agricultural sector of Bangladesh faces challenges due to climate change, poor market integration, and limited farmer organizations, which heighten vulnerability to market fluctuations. According to Miah and Mondal (2017) there are challenges like climate variability, competition with other crops for scarce resources, and high infestation of insects and diseases for increasing oilseed crops production. In response, Solidaridad Network Asia (SNA) - an international development organization, in collaboration with the Department of Agricultural Extension (DAE) and private sector partners, is promoting sustainable soybean and mustard cultivation through an integrated approach to mitigate the climate and market risks. Considering the importance of promoting oil seed cultivation, SNA conducted a survey on edible oil seeds production in Bangladesh to identify the constraints that are facing by the farmers, and suggest measures for overcoming the problems. The specific objectives of the study were to identify viable interventions and working model for the small-holder oilseed farmers, take initiatives that need to be in place to encourage the smallholders to take up oilseed farming to reduce import outflows and to analyze the elasticity, prospects and challenges of oil seeds cultivation in Bangladesh. The outcome of the study is envisaged to support the planners to take appropriate actions for mitigating the gap between oilseeds production and demand.

Methodology

Study area selection and sampling techniques: The study focused on the locations where farmers grow mustard and soybeans, and to identify potential of new areas. Five districts were selected, covering six sub-districts (upazillas) and ten unions. Unions with ongoing oilseeds cultivation were prioritized, with two unions chosen from each upazilla, except Baliadanga and Tangail Sadar, which had one union each. The five districts were Dinajpur, Tangail, Thakurgaon, Laksmipur and Noakhali (Fig. 1). The six upazillas were Birganj (Dinajpur), Tangail sadar, Baliadanga (Thakurgaon), Thakurgaon sadar, Kamalnagar (Laksmipur) and Subarnachar (Noakhali). The study was carried out using multiple techniques including collecting primary data through survey questionnaire, conducting Focus Group Discussions (FGD) with farmers and Key Informant Interviews (KII) with a wide range of other relevant stakeholders.

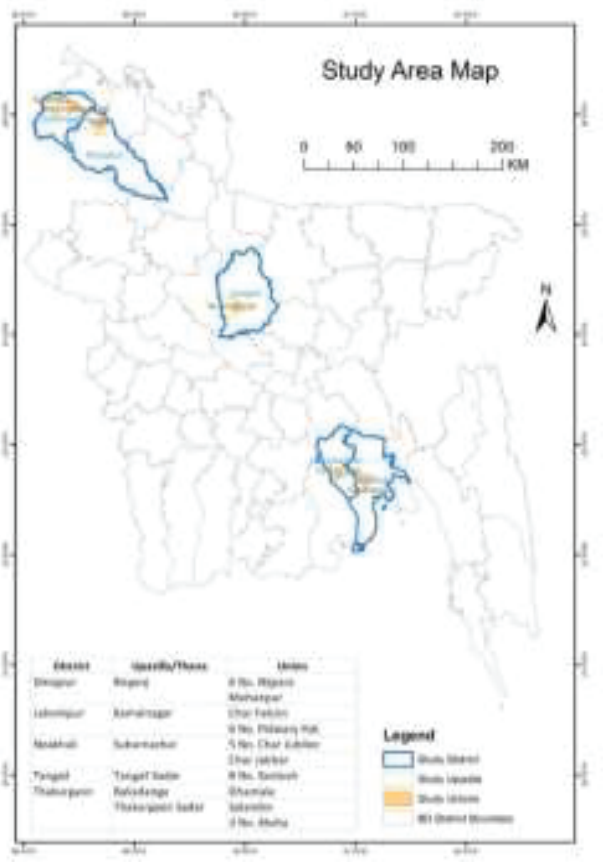


Figure 1. Map of the study areas.

Data collection methods: The study followed a mixed approach including both quantitative and qualitative methods. Desk research was carried out on a regular basis following a list of relevant documents. The policy anatomy was considered with a view to exploring the policy support provisions and challenges/policy barriers in relation to oil seeds cultivation.

The primary survey was conducted with 100 farmers under five districts. A structured questionnaire was used for conducting the survey with farmers. In addition, 30 KII was also conducted with the relevant personnel of the five districts. The sample size of the primary survey with farmers was 100, while 20 farmers were interviewed from each field of the five fields.

Two Research Assistants who got engaged in collecting data from the fields were trained on the tools after finalizing the survey, K-II and FGDs tools incorporating feedback from SNA personnel.

The selection of K-II participants was objective driven to cover the total scope of the study. To address different aspects and acquire relevant knowledge and information, the participants were selected from a wide range of stakeholders' group. For conducting K-II, semi-structured questionnaire as a tool was used. The semi-structured format was considered keeping provision of flexibility to ask probe and more relevant questions as and when required to serve the specific purpose of conducting that particular K-II. Altogether 24 K-IIs were conducted. The FGDs were conducted with farmers only. A total of 10 FGDs were conducted where 2 FGDs from each of the five districts.

Results and Discussion: In relation to oilseeds cultivation, there is a signature finding that in Dinajpur, Thakurgaon and Tangail the mustard cultivation is very common, while soybean cultivation is not commonly available. On the other hand, in Noakhali and Laksmipur the farmers cultivate soybeans while they do not prefer to cultivate mustard. A very few farmers cultivate sunflower and groundnut.

Figure 2 reflects that out of 100 farmers, who got interviewed, cultivate mustard or soybeans, while only a very few responded cultivate sunflower and groundnut. Farmers of Birganj of Dinajpur district, Baliadanga and Thakugaon Sadar of Thakurgaon district, and Tangail Sadar of Tangail district cultivate mustard only, while in Kamalnagar of Laksmipur district and Subarnachar of Noakhali district the farmers do not cultivate mustard usually, instead cultivate soybeans only.

Figure 3 indicates the experience of average, maximum, and minimum years of oilseed cultivation by the farmers across six Upazillas. Farmers of Baliadanga have the shortest cultivation history, with an average of 5 years, a maximum of 6 years, and a minimum of 2 years. This indicates that farmers here are relatively new to oilseed farming. Farmers of Birganj have more experience, with a maximum of 35 years, a minimum of 1 year, and an

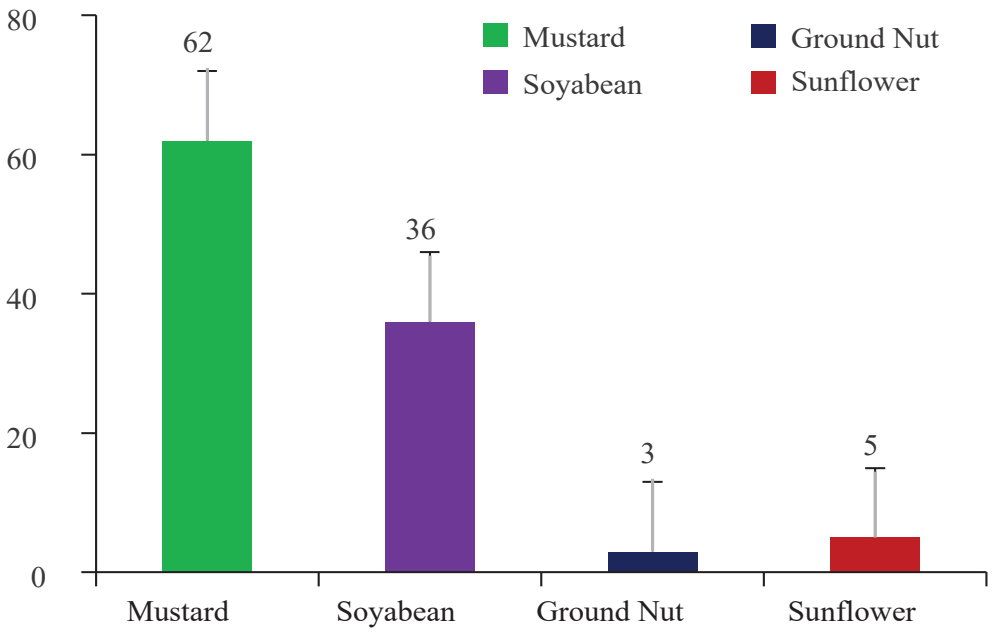


Figure 2. Respondent farmers on cultivation of different types of oil seed crops in five districts of Bangladesh.

average of 14 years. Kamalnagar and Subarnachar have identical maximum values (40 years) but differ in their averages (22 years and 25 years, respectively), showing a longer history of cultivation of soybean. Tangail Sadar stands out with the longest cultivation history of mustard, with a maximum of 50 years, an average of 29 years, and a minimum of 8 years. Farmers of Thakurgaon Sadar have a maximum of 35 years and an average of 9 years, but with a lower minimum of 2 years. This data confirms that while most areas have a long history of oilseed farming, Baliadanga presents an opportunity for further development and awareness efforts, as it is comparatively new to this agricultural practice.

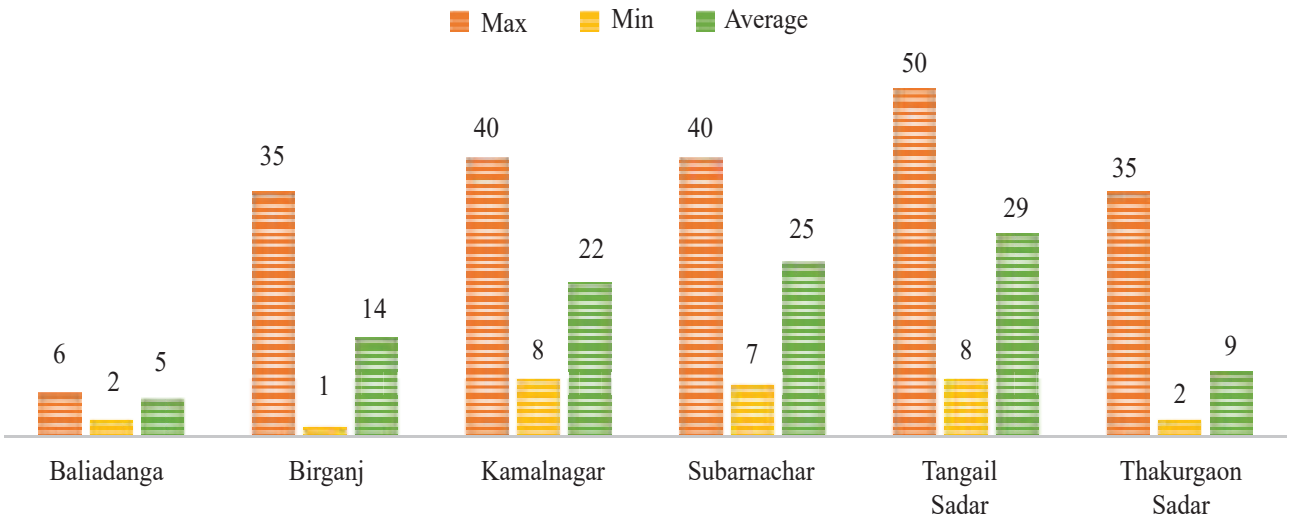


Figure 3. Average years of farmer experience of oil seed cultivation in six upazillas.

There is an important finding that 43% farmers cultivate oilseed on the total amount of land (Figure 4) that they have, or even they borrow from others which has a signature that they are convinced with cultivating oil seed.

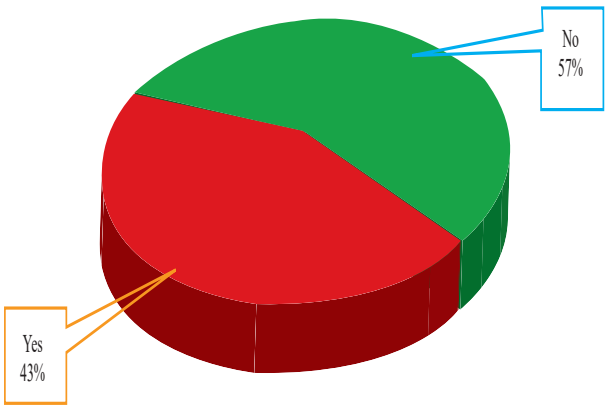


Figure 4. Percentage of respondents cultivate oilseed on the total land that they have or they borrow.

Motivation of farmers behind oilseed cultivation: In response to the question regarding reasons/motivation of cultivating oil seeds, almost all the farmers opined that oil seed cultivation was profitable. The Figure 4 depicts the response status and most of the farmers considered economic aspects while they choose for oil seed cultivation.

The Figure 5 illustrates various motivations behind oilseed cultivation across different regions. More profit was the top motivation for farmers in all regions, with Baliadanga 9 respondents, while Thakurgaon Sadar 10, Birganj 20, Kamalnagar 20, Subarnachar 20, and Tangail Sadar 19 respondents. Cultivating in between other crops is another significant factor, especially in Kamalnagar (2 respondents), Tangail Sadar (1 response), and Birganj (2 responses). Buy-back guarantee and training were noted by some farmers in Thakurgaon Sadar (2 respondents each). Regular advice from BADC/DAE was more prominent in

Baliadanga (3 respondents), but it was a minor factor for others (2 respondents in Birganj, and 1 in Tangail Sadar). Other factors had minimal impact overall, with only 1-2 respondents across the regions. Therefore, profitability is the primary motivation for oilseed cultivation, followed by the flexibility to cultivate between other crops.

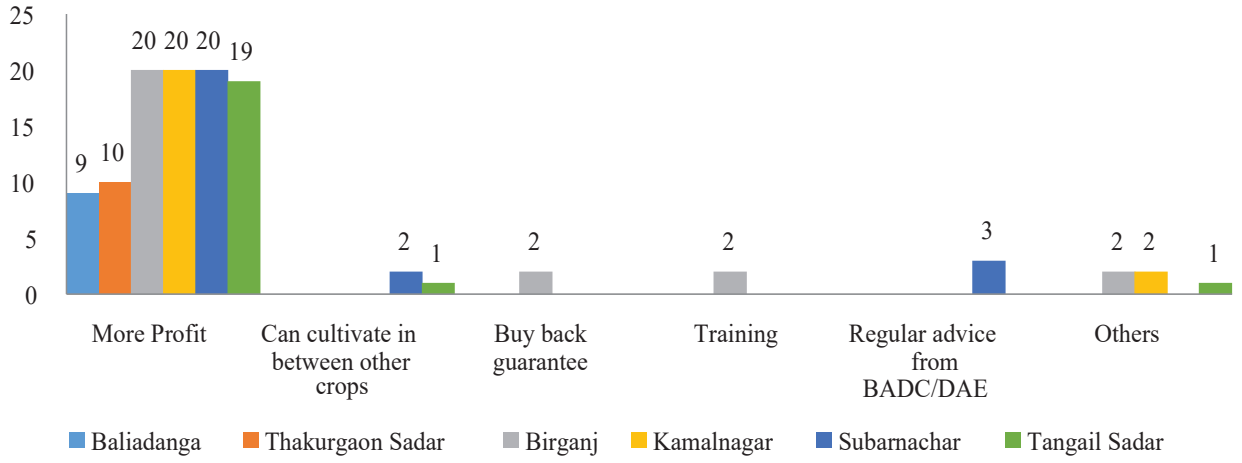


Figure 5. Types of motivation works behind to cultivate oilseed.

Profitability of cultivating oil seeds: While cultivating oilseeds is comparatively profitable but in reality, the economic analysis of production of this crop remains unnoticed to most of the farmers who are not cultivating oil seeds.

In response to the question to know about comparison of income with other crops, Figure 6 indicates that 98% of the farmers opined that cultivation of oilseed is more profitable than other crops, while 2% are unsure. No one believes that it was less profitable than other field crops.

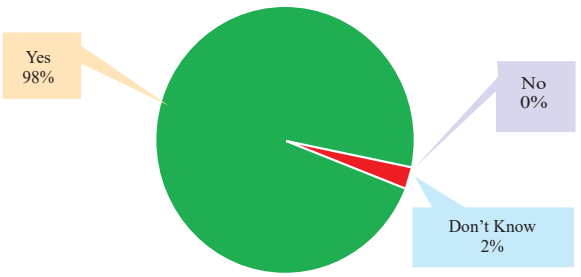


Figure 6. Response in relation to comparative profitability of oilseeds with other field crops.

Figure 7 indicates the response of farmers on the average income from oilseed cultivation from 6 regions. In Thakurgaon, specifically in the Baliadanga and Thakurgaon Sadar upazilas, farmers earn the highest income (30,000 Tk/ bigha) from mustard seeds compared to other upazilas like

Birganj (28,320 Tk/bigha) and Tangail Sadar (16,579 Tk/bigha) and average income from soybean seeds in Kamalnagar (28,080 Tk/bigha) and Subarnachar (28,600 Tk/bigha). This is because

oilseed cultivation is relatively new in Thakurgaon, leading to fewer farmers growing it and causing higher demand with limited supply, which results in better prices for the farmers there.

Figure 8 presents the average income per bigha (0.133 ha) of mustard seed cultivation against cost invested. Cultivating oilseed is profitable which has been further validated from the income and cost calculation. It was observed that in Baliadanga and Thakurgaon the cultivation of mustard was higher profitable, which was about 30,000 BDT, than that of Tangail Sadar (15,750 BDT). The income in Tangail was relatively less and the reasons behind were the lack

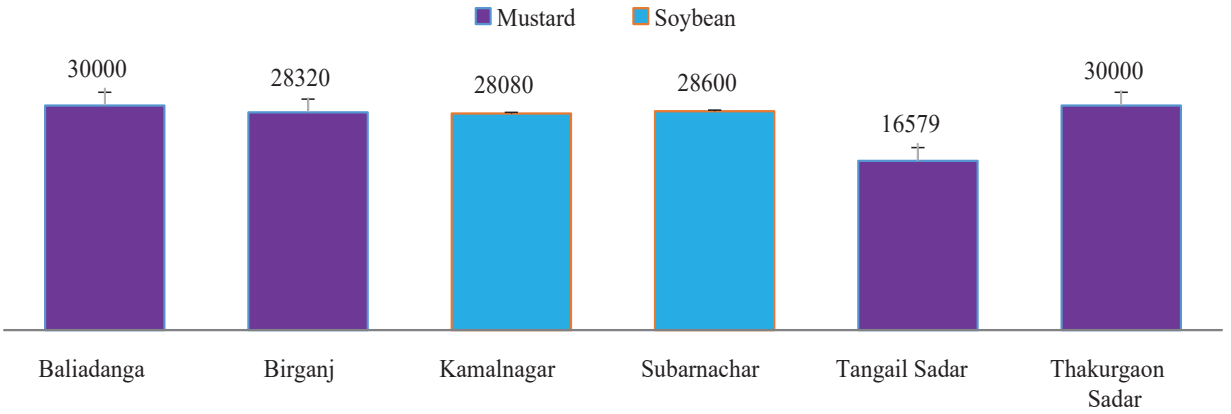


Figure 7. Average income (Tk.) from oilseed cultivation per bigha.

of ensuring good management. Farmers there cultivate mustard without taking much care of land preparation, giving sufficient fertilizers and using the old varieties. In Tangail Sadar, the area where the study was conducted, farmers were cultivating mostly Binasorisa-9, Tori-7 and Maghi which are low yielding varieties. According to DAE, altogether 41,700 hectares of land in the district was cultivating mustard. While BARI sharisha 14 is the good variety, still the farmers of Tangail cultivate other varieties. Moreover, compared to other districts, farmers of Tangail give main effort for rice cultivation, and often neglect to take proper care for their oilseed cultivation, especially after sowing seeds, leading to lower yields. This negligence further contributes to their reduced income levels. However, farmers opined that mustard cultivation requires less efforts, less labor and less cost. Farmers in Kamalnagar upazilla of Lakhmipur district claimed that average price of soybean was 58.5 Taka/ kg while farmers of Subarnachar Upazilla of Noakhali district recorded a slightly higher rate of 59.63 Taka/ kg. The farmers in Kamalnagar got higher yields (3361.5 kg/ ha) on an average than the farmers in Subarnachar who harvested on an average 3025.3 kg/ha. As a result, farmers in Kamalnagar got more profit as the production cost per Bigha was almost same.

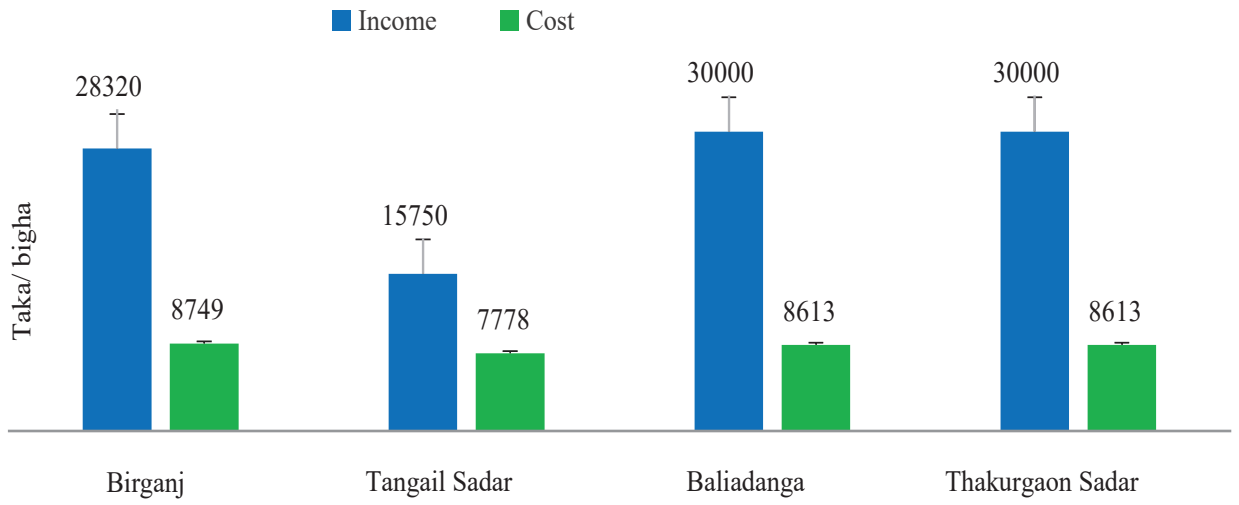


Figure 8. Average income of mustard seed cultivation.

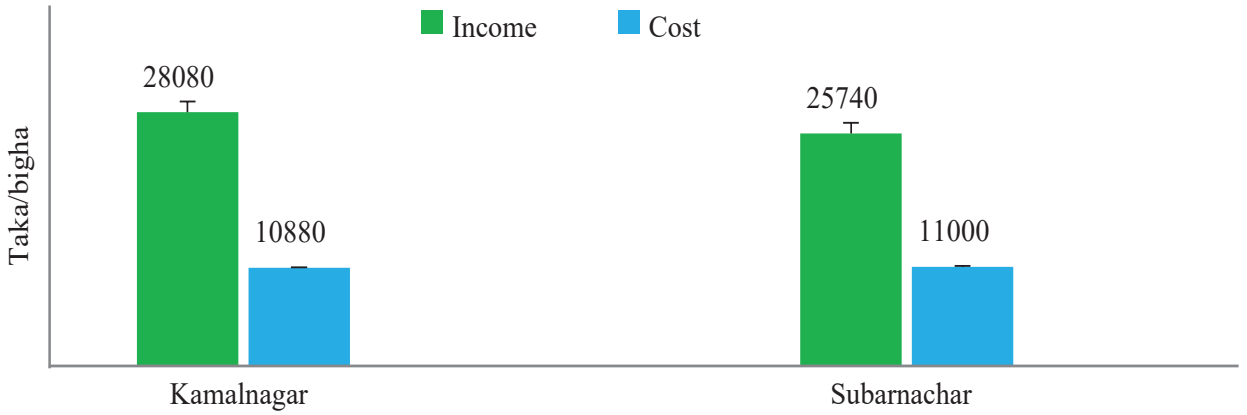


Figure 9. Income and cost of soybean production in Kamalnagar and Subarnachar.

The Figure 9 shows that the average income (per bigha) was 28,080 BDT when cost was 10,880 BDT of soybean production in Kamalnagar, while the average income was 25,740 BDT when the cost was 11,000 BDT of soybean production in Subarnachar. The profitability of oilseed cultivation was substantiated with the logic that farmers can cultivate three crops in one land per year.

Use of the produced seed: Dunford (2016) reported oilseeds need to be cleaned by removing plant stems, sticks, leaves and foreign material before storing in order to keep the seed quality in good shape. Managing oil seeds in storage conditions are more difficult than storing cereal grains as they are more susceptible to quality deterioration and have limited insect control options. Yaseen *et al*. (2019) found that the quality degradation of stored food items including cereals, pulses and oilseeds is largely caused by insect and pest infestation.

In response to the question about the use of seed by the farmers, they responded that most of the amount of seed they usually sell immediately while they keep a portion for their own use. After interviewing 60 farmers, it was found that 53 farmers sold immediately their seeds after harvesting. However, most of the farmers shared that usually they don't store oil seeds because they need money immediately for which they sell it soon after the harvest.

In order to check the reality, the study team explored the information about market directly from the farmers. In response to the question relating to the selling of their oil seeds, maximum farmers shared that they sell their oilseed to the wholesalers. The Figure 11 presents the status of the farmers' responses.

Figure 12 shows that the farmers sell their oilseeds mostly in the local markets where a certain percentage of farmers

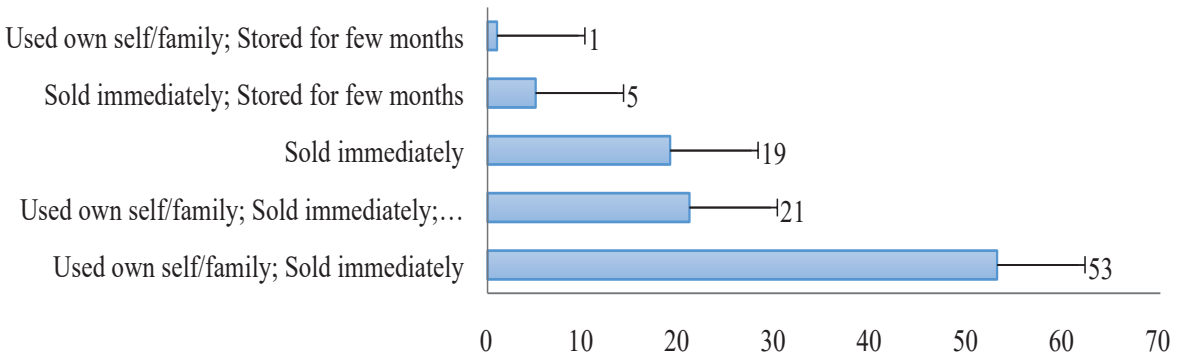


Figure 10. Use of oil seed after harvesting.

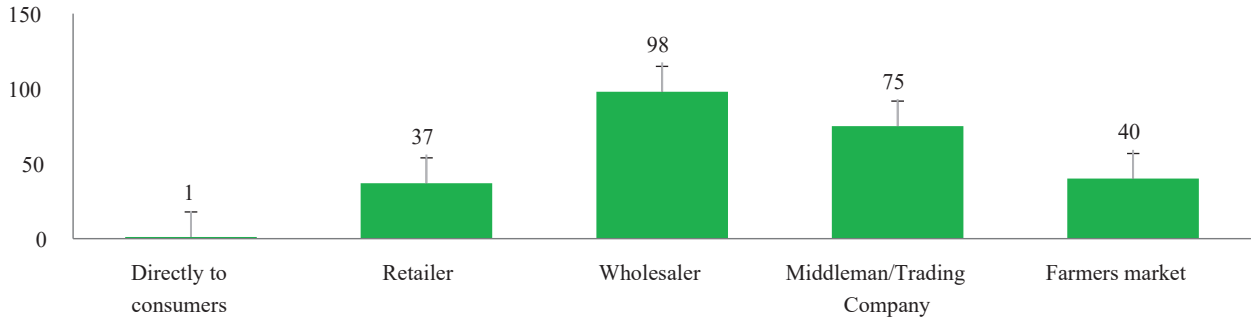


Figure 11. Types of customers to whom farmers sell their produced oilseeds.

sell the seeds to the next level market like regional markets. In relation to the satisfaction of getting fair price, most of them responded that they get the fair price of oil seed due to high demand in the market. About 80 % of the farmers said that they have the contracts (buyback guarantee) with the buyers and that is the reason of the ready market of their products.

Challenges of oilseeds cultivation facing by the farmers : Farmers who are cultivating oilseeds have been encountering multiple challenges. Through FGDs, the study team explored the following problems with the oilseeds cultivation:

Mustard diseases : Thirteen diseases affect mustard, with four of economic significance, such as *Alternaria* blight, white rust, downy mildew complex, *Sclerotinia* stem rot, and powdery mildew. According to Shrestha *et al*. (2005) average yield loss ranged from 32 to 57 % due to humidity, temperature and frequent rainfall, with higher seed infection in non- sprayed treatments and 4.2 to 4.5% decrease in oil content due to the *Alternaria* leaf blight disease caused by *Alternaria brassicae* in mustard (*Brassica juncea* (L).

Soybean diseases: Sixteen fungal, two bacterial, six viral, and three nematode related diseases affect soybean. Bacterial blight, common in soybeans, is exacerbated by cool, rainy weather but is less damaging in hot, dry conditions. Islam *et al.* (2021) observed that soybean production faces challenges such as lack of suitable varieties, pest issues, climate changes, lack of promotion, industrial reluctance, inadequate oil extraction facilities, disease attacks, unstable market prices and limited funding and technical knowledge. Begum (1995) reported thirty-nine insect pest species in oilseed crops in Bangladesh, with seven classified as major pests and the rest as occasional or potential pests.

Crop duration of modern varieties: Farmers need short-duration varieties of mustard, groundnut, and soybean to fit in the 80-90 days gap between aman and boro rice as reported by Miah and Mondal (2017). Long duration

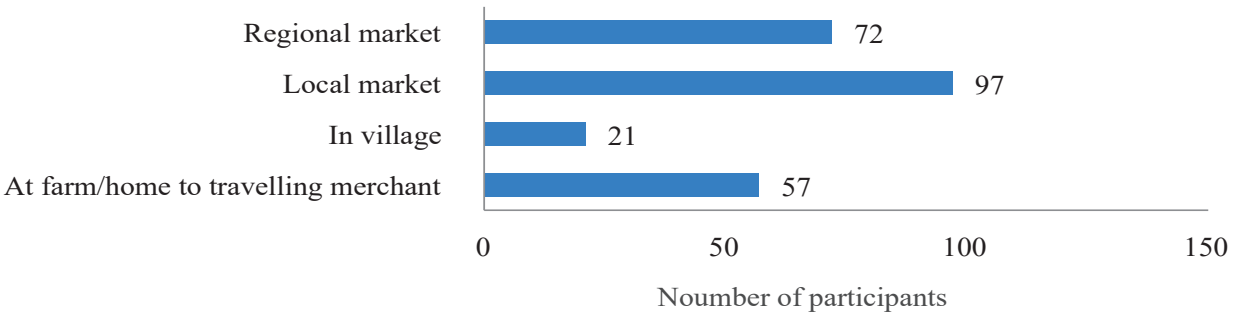


Figure 12. Different selling points of oilseeds.

varieties are usually high yielder but affect the next season crops. BARI sarisha14, BU soybean1 and BU soybean5 are short duration varieties.

Climate variability: Climate change has led to unpredictable weather, necessitating the introduction of crop varieties suitable for diverse climate conditions. Yu *et al.* (2010) reported that even with substantial investments, floods, droughts, cyclones over the past twenty years have still resulted in considerable economic losses and negatively impacted peoples' livelihoods. Oilseeds crops suffer from sudden temperature rise, early flash flood, salinity (in the coastal belt) and drought mostly.

Financial constraints: Hossain *et al.* (2022) concluded that small farmers are facing many risks for unavailability of viable land holdings, poverty and financial inability for investment in the farming sector. Farmers face high interest rates, buy expensive fertilizers, and lack of access to government financial support leading to inferior input purchases. As consequence the farmers can not apply sufficient inputs for their standing crop in time and get reduced production.

Transport issues: Limited transport options lead farmers to sell in local markets, reducing their potential earnings. Improved transportation could increase their profits.

Other constraints : The FGDs with the farmers indicated many other constraints in oilseeds cultivation (Figure 13). The top five challenges that the farmers mentioned are high price of fertilizer, lack of high-quality seeds, high price of pesticides, high price of insecticides and excessive rain.

The relevance of climate change to the production of oil seeds in Bangladesh is significant due to its potential effects on agricultural productivity and the livelihoods of farmers. Rising temperatures, changing rainfall patterns, sea-level rise and salinity intrusion, increased frequency of extreme weather events, water availability and irrigation challenges have become pressing global issues with significant implications for various sectors, including agriculture. Rao (2014) found some challenges in oilseeds production include inadequate quality seeds, insufficient input subsidies, poor extension services, lack of procurement facilities, insufficient storage and processing infrastructure and low, fluctuating yields due to rain-fed and poor soils. The combination of the climate change-related factors poses a significant challenge to oilseeds production in Bangladesh. Weather variability in different parts of Bangladesh, especially the very irregular pattern of temperature and rainfall is harming mustard and soybean production, and also expanding saline situation that is hindering the expansion of oilseed areas (Miah and Mondal 2017).

Soybean can be cultivated in two seasons each year, Rabi (15 December to 15 April) and Kharif-2 (15 July to 15 November). Soybean production occurs predominantly

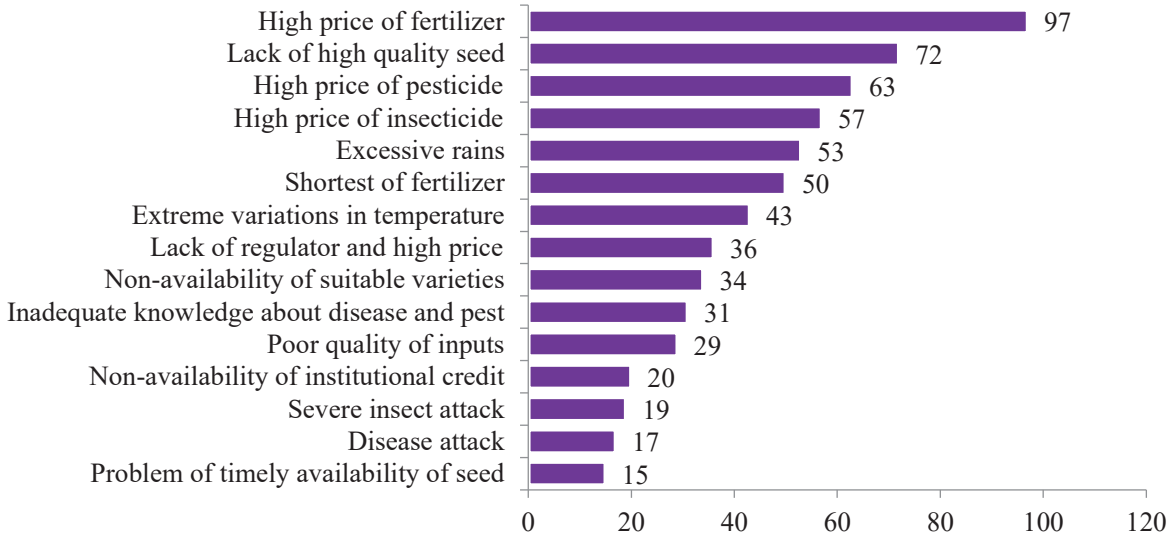


Figure 13. Constraints or difficulties in oilseed production faced by the farmers.

during the Rabi season, and production of soybean seeds takes place mostly during the Kharif-2 season.

According to the FGDs dry weather in some areas, downpour in others prevents soybean sowing. Farmers cannot start soybean sowing due to lack of monsoon rainfall, and now that monsoon has arrived about a week ago, it has been consistently down pouring. Because of this, some farmlands are submerged in water, and some are in a condition that they cannot prepare the seedbed.

Out of 100 farmers almost 50% opined that their oil seed cultivation gets affected due to climatic events, which have been shown in the following figure 14.

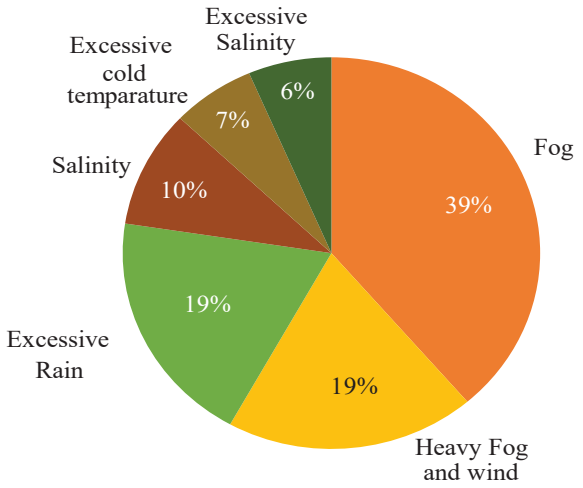


Figure 14. Farmers' opinion about climatic events that affect oilseed production.

Support required for the farmers : The Figure 15 presents the number of participants' opinion about their requirements for oilseed cultivation.

Measures that needed to take for increasing oilseeds production: Gupta and Gupta (2016) suggested that new approaches are needed to address the challenges to increase oil crops productivity in a sustainable manner. Karim *et al* (2023) elaborated the potentiality of stress tolerant genotypes to address the problems of soybean cultivation in the coastal area. Through FGDs the following suggestions have been made to ensure sustainable oilseeds production in Bangladesh:

i. Farmers should have easy access to high yielding and locally adapted seeds.

ii. Ensuring timely supply of quality fertilizer at a subsidized rate.

iii. Support access to credit or financial support and area specific measures should be taken.

iv. Formation, activation and strengthening farmers' cooperatives and facilitate their actions in seed breeding, production, collection, distribution, crushing, refining and marketing as needed. Support should be provided to institutionalize the networks of all actors with the farmers' cooperatives.

v. It is important to facilitate the partnership building between Research Institutions and farmers' cooperative to have access to information about new, high yielding and climate resilient varieties.

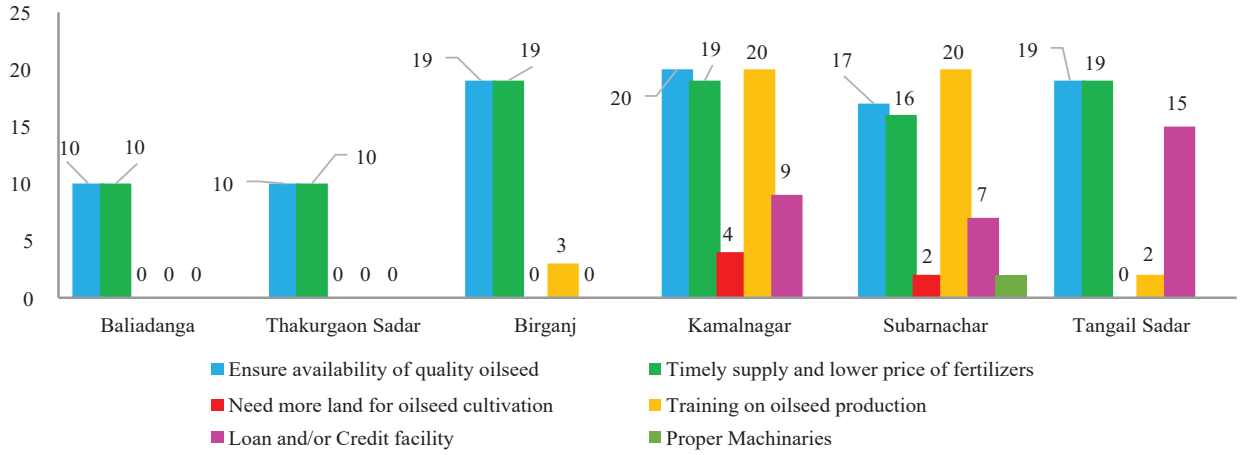


Figure 15. Facilities and supports that required for increasing oilseed cultivation.

Conclusion

Although Bangladesh is almost self-sufficient in cereal production, the country is dependent on 90% import of oilseed. Mustard is the predominant oilseed crop in almost all over the country, though soybean remains concentrated in the southern coastal region. Climatic variability, insufficient availability of short duration varieties, lack of quality inputs including seeds, access to financial institutions, attack of pest and diseases, lack of easy access to market, and high input costs are the major challenges of oilseeds production in the country. However, concerted effort of public and private organizations, pragmatic and realistic research on technology development and formation of farmers' cooperative for combating problems and challenges may lessen the constraints of increasing oilseed crop production in the country.

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