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Adoption constraints and economic analysis of oil seed cultivation in district Patiala, Punjab

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Abstract

Oilseed crops are the second most important determinant of agricultural economy, next only to cereals within the segment of field crops. Mustard oil being consumed as vegetable oil by large proportion of Indian population occupies an important position in edible oil sector of India. A micro level FLD was conducted during 2022-23 in the districts of Patiala for oilseed crops (Rabi) with the aim to analyze the major constraints in cultivation and adoption of oilseed crops. Total 60 demonstrations were conducted in three villages namely, Kathgarh, Khaktan and Mehmudpur of block Bhunerheri of district Patiala. The quality seed of Gobhi sarson *var* GSC-7 was provided to farmers which was sown in month of October and harvested in first week of April. The data regarding crop yield, cost of cultivation, gross returns etc. were collected from both demonstration and check plots. Data on grain yield revealed 21.0% enhancement in grain yield of oilseeds in comparison to farmers' practice. This ultimately resulted in considerably higher net returns, reaching Rs.138450 per hectare, by implementing improved practices which is 21.02% higher than farmer's practice. Similarly, higher B:C ratio (3.5:1) was observed in demonstration plots. This article analyses the production and adoption challenges faced by farmers in growing oilseed crops.

Keywords: Oilseed crops, adoption constraints, improved practices

Introduction

Rice-wheat is undeniably the most important cropping system in Punjab. There was an increase in the area under wheat and paddy crops due to the introduction of their high yielding varieties and assured prices in the market. Increasingly, the conversation around crop diversification is gaining momentum, as both scientists and farmers recognize the significant negative impacts of the rice-wheat system. It is clear that exploring alternative cropping strategies is vital for sustainable agricultural practices in the region. Moreover rapid and significant increase in population with higher income is likely to further increase the domestic consumption of edible oils. The country is not able to meet up with the annual demand that is increasing at the rate of 6% with production increasing with mere 2% per annum (Jha *et al* 2012) [5]. In Punjab, out of total oilseeds, rapeseed mustard is cultivated on an area of 0.31 lakh ha with productivity of 15.95 q/ha and total production of 0.50 lakh ton (Anonymous, 2022a) [1]. Furthermore, in the 2022-23, rapeseed-mustard was cultivated across 1,130 hectares in Patiala, which is only 0.43% of total cultivated area of the district (Anonymous, 2022) [2]. During last five years, there is 67.65% increase in area under oil seed crops (674 ha in 2019-20 to 1130 ha in 2023-24 (Fig.1).

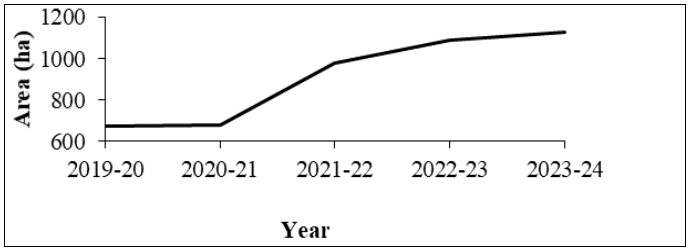

Fig.1: Year-wise area under oil seed crops (*Rabi*) in district Patiala

Moreover, oilseeds are nutritional powerhouses, rich in oil content, fatty acids (both saturated and unsaturated), vitamins, and minerals. They play a vital role not only in the human diet but also in various industries, including the production of items such as paints, textiles, soap, and hair oils. As rapeseed oil contains erucic acid (> 2%), a fatty acid which is associated with adverse effects on heart tissue, notably myocardial lipidosis (Galanty *et al*, 2023) [3]. This can potentially affect the contractile force of the heart. Whereas, canola varieties released by PAU contained < 2% erucic acid, which makes it safe for human consumption. Also, the cultivation of oilseed crops has long been a

traditional practice in the country; however, this practice has significantly declined in recent decades due to the overwhelming focus on major cereal crops like rice and wheat. On the other hand, front Line Demonstrations (FLDs) are proving to be essential for boosting the production and productivity of oilseed crops. The primary goal of these FLDs is to clearly showcase the productivity potential and profitability of advanced oilseed production technologies in real farm environments. These technologies include a comprehensive package that features improved cultivars, precise fertilizer applications, effective plant protection measures, strategic thinning techniques, optimized sowing methods, efficient irrigation practices, and rigorous management of weeds and diseases. It is imperative that we thoroughly assess the progress regarding the productivity potential and profitability of these recommended oilseed production technologies. Additionally, we must address the existing gaps in the adoption of these improved production practices in the field to ensure the future success of oilseed cultivation.

Methodology

The present analytical study was undertaken to evaluate the effectiveness of front-line demonstrations of oilseeds in terms of crop productivity and net returns of the farmers relative to the farmers' practices. The demonstrations were conducted carried out in operational area of Farm Advisory Service Centre, Patiala, Punjab during the year 2022-23. Total 60 demonstrations were conducted in three villages namely, Kathgarh, Khaktan and Mehmudpur of block Bhunerheri of district Patiala.

Table 1: Details of practices followed under FLD and farmer's practice

Practice	FLD	Farmer's practice
Seed	GSC-7	Local
Seed rate (Kg/ha)	3.75	2.65
Sowing	In lines	Broad casting
Use of Suphur	Through SSP	Not applied
Thinning and gap filling	30 DAS	Not done
Insect pest management	Recommended practices	Un-recommended practices

All the demonstrations were regularly monitored by PAU-FASC scientists especially to supervise the critical farm operations and crop health. Various extension activities like group meetings and on-spot guidance were conducted at the demonstration site with an objective to spread the outcomes of the technology among other farmers of the area. The variety chosen for demonstration was GSC-7 and the crop was sown in the month of October and harvested in first week of April. The recommended dose of nitrogen and phosphorus were applied through urea and single super phosphate, respectively. Half dose of urea and whole of phosphorus was applied at sowing and remaining urea was applied at first irrigation. In demonstration plots critical inputs in the form of quality seed (GSC-7) was provided. The detail of practices followed in FLD and farmers practice plot are given in table 1. The data regarding crop yield, cost of cultivation, gross returns etc. were collected from both demonstration and check plot.

Results and Discussion

Data on grain yield revealed that on an average (n=60), improved technologies recorded a 21.0% enhancement in grain yield of oilseeds in comparison to farmers' practice (Table 2). The improvement in grain yield observed in demonstration plots can be attributed to several factors, including the use of improved seed varieties, appropriate seed rates, effective sowing methods, and integrated nutrient and pest management practices. These elements collectively contributed to the overall growth and development of the crops. This ultimately resulted in considerably higher net returns, reaching Rs.138450 per hectare, by implementing improved practices which is 21.02% higher than farmer's practice. Similarly, higher B: C ratio (3.5:1) was observed in demonstration plots. Higher economic returns by using recommended package of practices under frontline demonstration over farmers' practice was also reported by Jaidka and Brar (2023) [4].

Table 2: Economic analysis of frontline demonstrations and farmers practices

Cultivation practices	Seed yield (q/ ha)	Average sale price (Rs./ q)	Gross return (Rs/ ha)	Cost of cultivation (Rs/ ha)	B:C ratio
FLD	21.3	6500	138450	39490	3.50
Farmers' practice	17.6	6500	114400	38240	2.99

Constraints in the adoption of oil seed crops

1. Due to higher emphasis on field crops these crops are generally grown in marginal and sub marginal area where fertility of the land is low for growing field crops so farmers using these crops just not to keep the land fellow.
2. Weather uncertainty at the harvesting of crop is one the reason for lesser cultivated area of oil seed. Thunder storm at maturity of crop causes considerable damage to the crop.
3. Lack of mechanization and sophisticated machinery for harvesting persuade labour requirement for harvesting of crop which restrict the adoption of oil seed crops.
4. Less income from oil seed crops (Rs. 62500/ha) as compared with wheat (Rs. 100000/ha).
5. Import of oil is cheaper as compared to locally produced oil, due to lower import tariffs and high domestic taxes. This has affected the competences of domestic oil seed industry.
6. One of the major challenges in oil seed production is land fragmentation. Framers have small land holding which makes it difficult for them to adopt modern farming techniques.
7. Lack of suitable post harvest technology to prevent post

harvest losses and lack of proper storage and marketing facility to avoid deterioration of quality.

Conclusion

The results of the study indicate that frontline demonstrations led to an increase in grain yield and improved the benefit-to-cost ratio (B: C). There is a need to popularize improved production technologies among farmers to achieve higher yields and greater financial benefits. Additionally, market prices and the availability of high-quality seeds play a crucial role in the adoption and spread of any technology in the field. So it is the high time to support the oilseed growers through the research and development, long term planning, government policies coupled with remunerative pricing of the produce. The transfer of technology should be strengthened through a participatory approach involving a multidisciplinary team of researchers.

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