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RESEARCH ARTICLE :

An assessment of constraints faced by sesame growing farmers in Kerala

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SUMMARY : Identification of constraints and providing timely suggestions are important for sesame farmers in Kerala as the state has been witnessing a declining trend of the crop production. The study is concerned with the constraints faced by sesame growing farmers in Kerala. A field survey was conducted in three districts of Kerala *viz.*, Alappuzha Kollam and Thrissur. Respondents included 30 farmers from each district. Garrett Ranking technique was used to rank the constraints faced in sesame production. As per the survey, high labour cost, excessive rain, drought, weed infestation, labour unavailability, pest and diseases, marketing problem, transportation, drying and threshing problem and storage problem were the constraints identified in the decreasing order of rank. Suggestions and methods to overcome the constraints were also provided.

KEY WORDS :
Constraints, Sesame farmers, Survey, Garrett ranking

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BACKGROUND AND OBJECTIVES

Sesame (*Sesamum indicum* L.) a species of the family Pedaliaceae, is found distributed in Africa, India, South-east Asia and Australia. It is a valued oil crop and is mainly cultivated in tropics. Sesame oil is one of foremost sources of edible oil in India which is culturally associated to the Vedic period (MSSRF, 2007). The sesame crop is popularly known as 'Queen of Oilseeds' attributed by its stabilized keeping quality contributed by high degree of resistance to oxidation and rancidity (Bedigian and Harlan, 1986). It contains considerable amounts of oil, proteins, carbohydrates, essential minerals, a high amount of methionine and tryptophan, fibres as well as secondary metabolites such as lignans, saponins, flavonoids and phenolic compounds. The seeds are reported to be a good source of phosphorus, calcium and iron. They are also rich in vitamin B, E, and contain lesser amount of trace elements. It has a high content of polyunsaturated fatty acids, oleic, and linoleic acid (Lyon, 1972). The presence of natural antioxidants *i.e.*, sesamin, sesamolin, and sesamol provides an excellent stability to the oil (Bedigian *et al.*, 1985).

Sesame is an ancient oilseed crop of India and also an important agricultural export commodity. India ranks second in area and production of sesame (FAOSTAT, 2020). Since 2014, Indian sesame seed production was down by 1.8 per cent year on year. The

Table A: Variation of sesame area and production from 2001-2002 to 2018-2019 in Kerala			
	2001-2002	2018-2019	% Variation
Area (ha)	878	377.66	-57
Production (Tonnes)	284	157.75	-44

Source: GOK, 2020 *(http://www.ecostat.kerala.gov.in)*

Indian crop of sesame production was short by 60 per cent in 2018, as against 418000 MT in 2017 (Anonymous, 2019). Uttar Pradesh, Rajasthan, Madhya Pradesh, Andhra Pradesh, Maharashtra, Gujarat, Tamil Nadu, Orissa and Karnataka are the major cultivators of sesame whereas, Kerala is one of the lowest sesame producing state (Sharma, 2014). According to the report of sesame village project published by MSSRF (2007), availability of quality seed materials for sowing, low yield, pest and diseases, labour availability, lack of awareness of suitable management practices to ensure good yield, high yield variation within the field, vagaries of nature and lack of good returns from sale were the constraints of sesame growers in India.

Sesame provides only a small contribution to the total area of oil seeds in Kerala. Sesame occupied only 378 ha of area in Kerala during the year 2018-19 with a production of 158 MT (GOK, 2020). In Kerala 3.5 thousand ha area under sesame cultivation was lost during the period of 1993-94 to 2009-2010. The GOK, report of 2016 shows 56.30 per cent decrease in area and 58 per cent decrease in production of sesame in Kerala during the period from 2005-2006 to 2014-15. On analyzing the area of the past last 10 years, sesame cultivation was the highest during agricultural year 2009-10 and the area was 608 ha. Area under sesame production declined about 80 per cent during the period of 2001-2002 to 2017-2018 (878 ha to 239 ha) and leading to a decrease of 79 per cent production (GOK, 2016). Variation of sesame area and production from 2001-2002 to 2018-2019 is given in Table A. Cultivation of sesame was restricted to a few districts and the decrease in area of the crop is observed in all these districts with around 94 per cent decline in area (GOK, 2005). Among the sesame cultivating districts, Alappuzha district has 1st position in area with 45.63 per cent total cultivation (GOK, 2014). 43 per cent of total sesame production is in Alappuzha district followed by Kollam district 36 per cent. Thrissur district is reported to have the highest productivity of sesame cultivation (GOK, 2020). In Kerala sesame is cultivated as a summer crop while the leading sesame producers of India cultivate it as a *Kharif* crop (IOPEPC, 2017). As per the government reports, the cultivation of sesame may not be seen in the state within a few years.

The study examines the constraints faced by sesame growing farmers in selected districts of Kerala. The findings of the investigation will be useful for research programmes and also relevant for developing policies for optimizing sesame production in the state.

RESOURCES AND METHODS

The study was conducted in three districts of Kerala *viz*., Alappuzha, Kollam and Thrissur. Alappuzha and Kollam area leading districts of the crop, whereas, Thrissur is having the highest productivity of sesame. Thirty sesame growing farmers were selected for the study. Constraints were identified in consultation with experts dealing with the crop and farmers were asked to rank the problems proposed to them. The data collected were analyzed using Garrett's Ranking Technique. The constraints are arranged based on their severity from the point of view of respondents and the ranks are being converted to scores. Garrett's formula for converting ranks into per cent is:

Per cent position = 100 * (Rij – 0.5)/Nj

where, Rij = rank given for i^{th} constraint by j^{th} individual

Nj = number of constraints ranked by j^{th} individual

The per cent position of each rank was converted into scores referring to the table given by Garrett and Woodworth (1969). For each factors, the scores of individual respondents was added together and divided by the total number of the respondents for whom scores will be added and the mean scores for all the constraints will be arranged in descending order and the constraints will be accordingly ranked.

OBSERVATIONS AND ANALYSIS

The findings of the present study as well as relevant discussion have been summerized under following heads:

Constraints faced by sesame farmers:

It is important to understand constraints of sesame

production, as the state has been witnessing a declining trend in area and production. Here, Garrett's ranking technique was used to identify and rank the constraints. The prime advantage of this technique over simple frequency distribution is that the constraints are arranged based on their importance from the point of view of respondents.

High labour cost, excessive rain fall, drought, weed infestation, unavailability of labour, pest and disease, marketing problem, problems for transportation, drying and threshing and storage problems were the constraints of sesame growing farmers in Kerala (Table 1).

Labour cost and labour unavailability:

In Kerala sesame is grown in summer rice fallows. Land has to be properly tilled for proper germination of sesame seeds. Land preparation is a labour intensive operation and it requires skilled labour for operation of tractors and for obtaining a proper tillage of the field. Further intercultural operations, harvesting, transportation of harvested bundles, drying and winnowing also depends on labour availability. As per the Table 1, high labour cost is the first and major constraint in sesame production. Due to the unavailability of labour, which is ranked as fifth constraint they has to depend on labours from other states which also contribute to additional labour cost.

Excessive rain fall:

Data presented in Table 1 revealed that waterlogging associated with excessive rain fall was the second constraint of sesame production with the score of 37.40. Sesame often falls prey to unpredictable rains. This was especially true as the state has been facing flood during the past two years, which affected the agriculture sector severely. According to farmer's response, excessive rain fall caused waterlogging in the field for 3-4 days, which resulted in decay of plants. Lodging of plants, yellowing of leaves followed by drying of plants were the major problems of waterlogging. It resulted in delayed harvesting, decay of harvested bundles, problems of drying and chaffy seeds. Waterlogging resulted in delayed and poor germination. The intermittent rain fall also resulted in non-uniform maturity of pods.

Drought:

Sesame is grown in summer as a rainfed crop in Kerala. The developmental stages such as germination, flowering and maturity require proper moisture in soil although it is considered as a drought tolerant crop. Drought associated with unavailability of rain fall is the 3rd constraint of sesame farmers with a score of 28.10 (Table 1). The consequences of drought faced by farmers are poor, delayed and non-uniform germination, poor growth and drying of plants.

Weed infestation:

Weed infestation is the fourth ranked constraint in sesame production. *Cleome viscosa*, *Cynadon dactylon* and *Melochia corchorifolia* are the major weeds as per the farmer's response. Currently high infestation of *Melochia corchorifolia has* become a major menace in sesame cultivation. The absence of suitable control measures for the weed is a problem to be addressed.

Pest and disease:

Parrot attack is the main pest problem in sesame. A pandemonium of parrot attacks sesame at maturity stage, greatly troubling sesame growers. Phyllody attack is also observed near to harvest.

Table 1 : Constraints faced by sesame farmers in Kerala

Sr. No.	Constraints	Garrett score	Garrett ranking
1.	Excessive rain	37.40	2
2.	Weed infestation	22.63	4
3.	Labour unavailability	14.63	5
4.	High labour cost	39.86	1
5.	Drought	28.10	3
6.	Storage problems	5.73	9
7.	Marketing problem	7.70	7
8.	Pest and diseases	14.53	6
9.	Trasportation, drying and thrushing problems	6.43	8

Marketing problem:

For large scale sesame growers, lack of market is a big problem which was ranked 7th. Most of them sell sesame to nearby houses and local markets.

Trasportation, drying and thrushing problem:

After harvest of the sesame plant bundles, these have to be transported to the area of drying. For those who cultivate sesame in remote area, this is a problem. Also, for those who cultivate in homesteds, lack of sufficient land area for sun drying of the bundles often causes problem. Lack of mechanization for drying and thrushing is an added difficulty (Garrett score 6.43).

Storage problem:

Storage pest (Garrett score 5.73) causes damage to sesame seeds, but it is a minor constraint which was ranked 9th.

Suggestions to overcome these constraints:

It was necessary to get the feedback of how farmers want these constraints to be sorted out. To understand the view of the farmers about these constraints, they were asked to give suggestions. The suggestions offered by farmers and scientists and those collected from literatures to solve the above mentioned constraints enumerated below.

During the recent years excessive and untimely rain fall has posed a major problem in sesame cultivation. Water proofing the crop is an urgent requirement for enhancing cultivation. This includes use of waterlogging tolerant varieties, application of foliar fertilizers (Pang *et al*., 2007), use of slow-release or controlled-release fertilizers (Varadachari and Goertz, 2010) and suitable plant growth regulators (Ren *et al*., 2018). Installing a proper drainage system and incorporating herbaceous perennial legumes such as lucerne, clovers and Messina (*Melilotus siculus*) adapted to waterlogging and inundation, along with the main crop has been suggested to reduce waterlogging (Cocks, 2001). Athul (2016) have identified a local sesame variety 'Ayaly' showing tolerance to waterlogging.

Poor germination and slow growth are major problems under drought. Seed priming can be practiced to improve tolerance to drought in field condition. Hydropriming and osmopriming can be practiced to induce drought tolerance (Farooq and Hussain, 2017). Increasing soil organic matter with organic fertilizers or green manure (Bond and willis, 1969), mulching, use of antitranspirants, reducing plant density and competition among plants, use of phosphatic fertilizers that promote radical growth, use of tolerant varieties.

Hand weeding is the only practiced method of weed control in sesame by the farmers. Use of stale seed bed method and application of preemergence herbicides can control weeds to a major extent. Other than depending on chemical herbicides, weed suppression can be achieved by improving early vigour of sesame plants through seed priming techniques such as hydropriming and nutrient priming (Sreepriya and Girija, 2018). Weed density and biomass in sesame field could be significantly suppressed when wheat straw applied as cover crop and without tillage soil compared with soil tillage without straw treatments in Iraq (Al-Eqaili *et al.*, 2017). Similarly, rice straw can be used as a cover crop in sesame field in Kerala. These practices also limits labour cost and need of labour.

According to farmer's suggestion, cultivating sesame in our own homesteads without employing labour is the profitable way of sesame cultivation.

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