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Constraints Faced by the Farmers in Adoption of Recommended Sorghum Practices by Atma in Dindigul District of Tamil Nadu, India

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A B S T R A C T

The present study was undertaken to analyse the constraints faced by the farmers in the adoption of sorghum production practices. A list of trainees was obtained from the State Department of Agriculture (SDA). About 120 samples of respondents were selected using a proportionate random sampling method. An ex-post facto research design was followed for the study. It was revealed that the failure of seasonal rainfall, labour scarcity, drought, low price to the product, non-availability of bio-fertilizer, high cost of plant protection chemicals, non-availability of inputs and lack of technological guidance was the major constraint in the adoption of sorghum practices.

Introduction

Sorghum, scientifically known as (*Sorghum bicolor* L.)stands as a pivotal cereal crop of immense agricultural and economic significance worldwide. Sorghum, known as "Jowar" in India, is a staple cereal crop that holds immense agricultural importance in the country. It is grown across diverse agro-climatic regions due to its adaptability to varying environmental conditions and resistance to drought.

Jowar is a dietary mainstay, used for making flatbreads, porridge, and other traditional dishes in many parts of India. Furthermore, it plays a crucial role in providing fodder for livestock, supporting India's vibrant dairy and animal husbandry sectors. Its versatility, nutritional value, and capacity to withstand adverse conditions make sorghum a cornerstone of food security and rural livelihoods in India.

In Tamil Nadu, sorghum is extensively grown in Salem district followed by Dindigul, Tiruchirapalli, Dharmapuri and Virudhunagar (Deshmukh, 2014).

Agricultural Technology Management Agency (ATMA) was introduced as a pilot program (1998-2003) in 28 districts (DAC, 2005). Following a positive feedback from the pilot implementation (IIM, 2004), the ATMA model was scaled up across 251 rural districts in 2005 and throughout the country in 2007 (Sarat *et al.,* 2016).

Agricultural Technology Management Agency (ATMA) is a registered society of key stakeholders involved in agricultural activities for sustainable agricultural development in the district (Rajak *et al.,* 2022).

The key institution in implementing this new approach was the ATMA which was responsible for facilitating and coordinating "farmer-led" extension activities within each district (Kumar *et al.,* 2020).

The Agricultural Technology Management Agency (ATMA) strategy calls for integrated approach wherein different stakeholders come closer to plan, organize, and execute, the activities to take full advantage of the technologies demonstrated in the operational area. Therefore, the critical analysis of coordination process is crucial to seek the problems of the stakeholders involved in ATMA in the district (Kalsariya *et al.,* 2017).

Materials and Methods

The study was carried out in Dindigul district of Tamil Nadu. The sorghum trainee's list was collected from the State Department of Agriculture (SDA). In Dindigul out of fourteen blocks three blocks viz., Sanarpatty, Vadamadurai and Dindigul were selected as more respondents had participated.

A sample size of 120 respondents was selected by using a proportionate random sampling method. An ex-post facto research design was followed for the study. Appropriate statistical tools were used for the study.

Results and Discussion

In the present study, efforts were made to categorize the constraints faced by farmers in the adoption of sorghum practices recommended by ATMA.

General Constraints

A cursory look at table 1 clearly indicates that labours scarcity was revealed as the constraint by (80.83 per cent) of the respondents. The availability of agricultural labourer is drastically declining in the study area as most of the labourers were absorbed by the '100 days employment programme' implemented by the Government under National Rural Employment Guarantee Act. The labourers are enjoying lot of leisure time and are paid more wages for less work. Hence, they prefer to work under this scheme. The labourers also demand higher wages irrespective of the nature of their work. The finding is in line with the findings of (Yoga Narasimhulu, *et al.,* 2016).

Low price to the product were found to be the second major constraints faced by (66.66 per cent) of the respondents. The available area is more and the production was also increased which resulted in large price. This might be the reason for the lower price to the product.

Non-availability of bio-fertilizer was considered the third constraint with (64.16 per cent) of the respondents. As majority of the respondents applied bio-fertilizers at the same time, which resulted in a heavy demand for bio-fertilizers and an irregular supply of bio-fertilizers by the government depots and private input dealers might be the reason for reporting this constraint.

The high cost of plant protection chemicals was considered to be the fourth constraint faced by (63.33 per cent) of the respondents. They reported that the escalation of the cost of plant protection chemicals had deterred them from adopting the technologies.

As most of the respondents belong to the small and marginal farmers category, they are not able to spend more money on pesticide application. Hence, they felt it was a major constraint.

Non-availability of inputs was considered to be the fifth constraint faced by 56.66 per cent of the respondents. Planning and storing of the grain as the seed for the next season was not done properly and also non-availability of agricultural depots within easy reach may also be a reason for the above constraint.

Due to the excess use of chemical fertilizer, there is a chance of deterioration of soil fertility problem was faced by (52.50 per cent). The reason for the constraint is that the majority of the respondents fall under the old age category, so they followed the traditional method of farming. They also take more care in maintaining the field from pesticide residues.

Non-availability of a threshing machine at the proper time was the seventh constraint faced by 40.83 per cent of the respondents. The availability of threshing machines is considered to be low in the nearby areas.

Hence this may be the reason for these constraints. High charges for the threshing sorghum were the eighth constraint faced by (34.16 per cent) of the respondents.

Less availability of the threshing machine and the charges they demand were also very high which is not affordable by the sorghum farmers.

Bio-Physical constraints

In the bio-physical constraints, failure of seasonal rainfall was considered to be the major constraint faced by 85.00 per cent. The farmers cultivating sorghum under rainfed conditions entirely depend upon the south-west monsoon during critical stages of crop growth.

Further, most of the respondents reported there is no assured irrigation facility like bore wells, tanks, canal irrigation, or river irrigation to irrigate the fields in their area.

In some areas, wells are present but the available water was sufficient only to meet the domestic demand and it was not sufficient to irrigate the crop. Due to the above facts, the respondents would have considered it as an important constraint.

Drought is the next major constraint faced by (78.33 per cent) of the respondents. During the season the farmers used to face uncertainty like severe drought which would cause a lack of rain and a heavy shortage of water in the fields. Moreover, it may be due to the climate and location of the study area. These may be the reasons for the above-mentioned constraint.

Technological constraints

Lack of technological guidance was considered the major technological problem with (55.00 per cent) of the respondents. The farmers felt that the extension personnel were not making adequate efforts to provide the latest technological information to the respondents.

Lack of technological knowledge about recommended varieties was reported by (38.33 per cent) of the respondents. The reason for this constraint is that, after attending ATMA training they may forget about the variety name and details of sorghum.

This is due to the majority of the respondents belonging to middle and old-age groups. It's quite natural, that the age factor is the main reason for forgetting the information.

Institutional Constraints

Among the two institutional constraints ‘lack of ATMA officials at block level’ becomes the first major constraint with 38.33 per cent of the respondents. In block level only one BTM and two ATM officials were present. They are not possible to disseminate the technical facilities and may not cover every farmer's needs. This may be the reason for the above constraint.

‘Weak extension activities at village level’ were reported as the second constraint by 32.50 per cent of the respondents. The possible reason may be the lack of sufficient extension functionaries to act as facilitators to disseminate the information.

Due to the overload of the extension officials, it may not be possible to visit all the farmers. This may be due to the insufficient staff members in the State Department of Agriculture may be the reason.

They are not possible to cover the entire area in disseminating the technologies. It may lead to weak extension activities. This might be the reason for the above-expressed constraint by the respondents.

The study concluded that the major constraints faced by the farmers in the adoption of sorghum practices were labour scarcity, low price to the product, failure of seasonal rainfall and lack of technological guidance.

The State Department of Agriculture (SDA) should offer awareness about fertilizer usage and marketing information that is appropriate to the farmer's needs.

The department should facilitate proper marketing infrastructure and give assurance to the farmers in the availability of inputs like seed stocks, plant protection chemicals and renting machinery at a low cost to the small and medium level of farmers.

The farmers are encouraged to form an FPO group to sell their produce in groups and combine the activity in a standardized manner.

Regular training should be conducted for making a decision support system to cater to the information needs of the farmer in a user-friendly form.

Table.1 Constraints faced by the farmer in the adoption of sorghum practices recommended by ATMA

(n=120)

S. No.	Constraints	Number of respondents	Per cent	Rank
I	**General constraints**			
1	Non-availability of inputs	68	56.66	**V**
2	Labour scarcity	97	80.83	**I**
3	Low price to the product	80	66.66	**II**
4	High cost of plant protection chemicals	76	63.33	**IV**
5	Due to the excess use of chemical fertilizer, there is a chance of deterioration of soil fertility	63	52.50	**VI**
6	Non-availability of the threshing machine at the proper time	49	40.83	**VII**
7	High charges for threshing of sorghum	41	34.16	**VIII**
8	Non-availability of bio-fertilizer	77	64.16	**III**
II	**Bio-Physical constraints**			
1	Failure of seasonal rainfall	102	85.00	**I**
2	Drought	94	78.33	**II**
III	**Technological constraints**			
1	Lack of technological knowledge about recommended varieties	46	38.33	**II**
2	Lack of technological guidance	66	55.00	**I**
IV	**Institutional constraints**			
1	Inadequate ATMA officials at block level	46	38.33	**I**
2	Weak extension activities at village level	39	32.50	**II**

Author Contributions

V. Sandhiya: Investigation, formal analysis, writing—original draft. T. Balakrishnan: Validation, methodology, writing—reviewing.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical Approval Not applicable.

Consent to Participate Not applicable.

Consent to Publish Not applicable.

Conflict of Interest The authors declare no competing interests.

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