



Constraint Faced by Sorghum Grower in Ajmer district of Rajasthan

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Abstract

Sorghum (*Sorghum bicolor* (L.) Moench) is an important cereal crop belonging to the family Poaceae and is recognized as the fifth most important cereal crop globally after maize, rice, wheat, and barley. The present study was conducted to identify and prioritize the major constraints faced by sorghum growers in Ajmer district of Rajasthan. Primary data were collected from 80 randomly selected sorghum farmers through a pre-tested interview schedule. The Garrett Ranking Technique was employed to analyse and rank the constraints under four categories, namely technical, input, marketing, and miscellaneous constraints. The findings revealed that among the technical constraints, lack of availability of high-yielding variety (HYV) seed emerged as the most severe constraint (Garrett score: 71.45), followed by lack of knowledge about chemical weed control (67.10) and poor knowledge of recommended fertilizer dose (61.14). Regarding input constraints, high cost of labour ranked first (71.65), followed by unavailability of HYV seed at sowing time (63.20) and small landholding size (54.54). Among marketing constraints, lack of knowledge of market information/intelligence was identified as the most important constraint (71.26), followed by high transportation cost (64.13) and lack of storage facilities (54.33). In the miscellaneous category, attack of wild animals (Nilgai) was the most serious constraint (64.66), followed by insect-pest and disease incidence (60.50). The study concludes that inadequate availability of quality seed, high labour costs, poor access to market information, and crop damage by wild animals are the major factors limiting sorghum production and profitability in the study area. The findings suggest the need for timely supply of quality seed, strengthening of extension services, dissemination of improved production technologies, improved market intelligence systems, development of storage and transportation infrastructure, and effective measures for controlling wild animal damage to enhance sorghum productivity and farmers' income.

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1. Introduction: Sorghum (*Sorghum bicolor* (L.) Moench) is an important cereal crop belonging to the family Poaceae and is recognized as the fifth most important cereal crop globally after maize, rice, wheat, and barley (Baloch et al., 2023). Originating in northeastern Africa, sorghum is now cultivated in more than 110 countries, particularly in the semi-arid and tropical regions of

Africa, Asia, the Americas, and Australia (Charyulu et al., 2024). Its exceptional tolerance to drought, high temperature, and low soil fertility makes it one of the most climate-resilient cereal crops and an important component of sustainable agriculture under changing climatic conditions (FAO, 2024, Baloch et al., 2023).

Sorghum is a multipurpose crop grown for grain, fodder, forage, silage, biofuel, and industrial applications. The grain is an excellent source of carbohydrates, proteins, dietary fibre, vitamins, and essential minerals such as iron, zinc, and phosphorus. It is naturally gluten-free and contains high levels of phenolic compounds and antioxidants, making it an important functional food with potential health benefits (Awika, 2022, Baloch et al., 2023). In addition to human consumption, sorghum stalks and leaves serve as valuable livestock feed, while the crop residues are used for bioethanol production, paper manufacturing, and other industrial purposes.

In India, sorghum (jowar) occupies an important place among coarse cereals and is cultivated during both the kharif and Rabi seasons. Major sorghum-growing states include Maharashtra, Karnataka, Madhya Pradesh, Telangana, Andhra Pradesh, Rajasthan, and Gujarat. During the year 2023-24, Rajasthan have 509.389-thousand-hectare area under sorghum cultivation, which was 1.84 percent of total gross cultivated area. During this year production of sorghum was 451.408 thousand MT. (Rajasthan Agriculture statistics at a glance-2023-24)

With increasing concerns over climate change, water scarcity, and food insecurity, sorghum has gained renewed attention as a climate-smart crop. Its deep root system, high water-use efficiency, and ability to withstand prolonged dry spells enable it to maintain productivity under adverse environmental conditions. Recent advances in genomics, molecular breeding, and precision agriculture have accelerated the development of high-yielding, nutrient-rich, and stress-tolerant sorghum varieties, thereby strengthening its role in sustainable agricultural production systems (Baloch et al., 2023, Charyulu et al., 2024).

2. Methodology: In order to examine the issues farmers were having with the production and sale of the sorghum crop, Garret's ranking technique was utilized. The producers and marketers of the sorghum crop were asked to rate the elements that affect them. Using the following formula, these rankings of merit were converted into units of score:

$$\text{Percent Position} = [100(R_{ij}-0.5)] \div N_j$$

Where,

R_{ij} = Rank given for the i^{th} variable by j^{th} respondents

N_j = Number of variables ranked by j^{th} respondents

By using the Garrett and Woodworth table (1969), the percent position of each rank was translated to scores. The scores of each respondent were then added up for each element and divided by the total number of respondents whose scores were added up. The average scores for each component were ranked from least to most important, and the most impacting elements were those with the highest ranks.

3. Result and Discussion: This Result and discussion, section addresses the issue that sorghum growers are facing. The difficulties farmers encountered in growing and marketing the sorghum were examined using Garret's ranking technique. The farmers were asked to rate the variables that affect sorghum crop marketing and productivity. These merit orders had one more conversion to become a unit of score.

In this section constraints were divided into four major sections like technical constraints, Input constraints, marketing constraints and other miscellaneous constraints. This major section also divided into sub groups that are discussed below.

Table-1: Technical constraint faced by sorghum growing farmers in Ajmer district of Rajasthan

S. N.	Constraints reported by the farmers	Total Score	Garret score	Rank
1.	Lack of knowledge about seed treatment	3581	44.7625	IV
2.	Lack of availability of High yielding variety seed	5716	71.45	I
3.	Lack of Knowledge about recommended seed rate	2730	34.125	VI
4.	Poor knowledge about irrigation management	2497	31.2125	VII
5.	Poor knowledge about dose of chemical fertilizer	4891	61.1375	III
6.	Lack of knowledge about chemical weed control	5368	67.1	II
7.	Technical guidance unavailable at the time of sowing	3493	43.6625	V

The technical constraints faced by 80 sample sorghum growing farmer in the study area, have been depicted in table-1. The table reveals that out of 7 technical constraints lack of availability high yielding variety was a major constraint for sorghum grower with Garrett Score 71.45, therefore this constraint assigned first rank in technical constraints this is followed by lack of knowledge about weed control with garret score 67.1 (only manual labour were applied for weed control that leads to high cost of production), poor knowledge about dose of chemical fertilizer with garret score 61.13, lack of knowledge about seed treatment with garret score 44.76, Technical guidance unavailable at the time of sowing with garret score 43.66, Lack of Knowledge about recommended seed rate with garret score 34.12, Poor knowledge about irrigation management with garret score 31.21 which were assigned rank was II, III, IV, V, VI, VII respectively.

Similar findings have been reported by Kumar et al. (2018), who observed that non-availability of quality seed and inadequate technical knowledge were the major constraints affecting adoption of improved sorghum production technologies. Likewise, Rathod et al. (2017) reported that lack of technical guidance, poor awareness of seed treatment, and inadequate knowledge of weed and nutrient management significantly limited sorghum productivity.

Table-2: Input constraint faced by Sorghum Cultivating Farmers in Ajmer District of Rajasthan

S. No.	Constraints reported by the farmers	Total Score	Garret score	Rank
1.	Unavailability of HYV seed at sowing time	5056	63.2	II
2.	lack of irrigation facility	2347	29.3375	VI
3.	Small land holding	4363	54.5375	III
4.	Unavailability of short duration varieties	3873	48.4125	IV
5.	High cost of labour	5732	71.65	I
6.	Seed fertilizer and chemicals are costly	2629	32.8625	V

The input constraints faced by 80 sample sorghum cultivating farmers in the study area have been presented in the Table 2. It's clear from the table that high cost of labour was major input constraint in front of sorghum grower therefore this constraint assigned first rank with garret score 71.65, this is followed by Unavailability of HYV seed at sowing time with garret score 63.2, Small land holding with garret rank 54.53, Unavailability of short duration varieties with garret score 48.41, Seed fertilizer and chemicals are costly with garret score 32.86 and lack of irrigation facility with garret score 29.33, which were assigned rank II, III, IV, V and VI respectively. Similar observations were made by Patil et al. (2019), who reported that rising labour wages, shortage of quality seed, and fragmented landholdings were among the most serious constraints in sorghum

cultivation. Kumar and Singh (2020) also identified high input costs and limited access to quality seed as major barriers to improving sorghum production.

Table-3: Marketing constraints faced by sorghum growing farmers in Ajmer district of Rajasthan				
S. N.	Constraints reported by the farmers	Total Score	Garret score	Rank
1.	Lack of storage facility	4346	54.325	III
2.	Transportation facilities are very costly	5130	64.125	II
3.	Lack of knowledge of market information	5701	71.2625	I
4.	Low price of quality produce in the market	3778	47.225	IV
5.	Unnecessary deductions in market at the time of selling	2324	29.05	VI
6.	Very high fluctuation on price	2721	34.0125	V

Marketing constraints faced by 80 sample sorghum cultivating farmers in the study area have been presented in the table 3. It is clear from the table that out of 6 marketing constraints lack of knowledge of market intelligence was major marketing constraint faced by farmers, garret score 71.26 therefore it received first place. Followed by costly transportation facility with garret score 64.12, Lack of storage facility with garret score 54.32, Low price of good quality produce in the market with garret score 47.22, Very high fluctuation on price with garret score 34.01 and Unnecessary deductions in market at the time of selling with garret score 29.05 obtained. This is given II, III, IV, V, and VI respectively. These findings are in agreement with Meena et al. (2019), who reported that poor market intelligence, inadequate storage facilities, and high transportation expenses reduced farmers' bargaining power and profitability. Similarly, Birthal et al. (2015) highlighted that lack of timely market information and weak market infrastructure adversely affected marketing efficiency in rainfed agriculture.

Table-4: Miscellaneous Constraints faced by sorghum growing farmers in Ajmer district of Rajasthan				
S. N.	Constraints reported by the farmers	Total Score	Garret score	Rank
1.	The early showing sorghum crop affected by the low temp.	2894	36.175	IV
2.	Late showing reduces the yield	3173	39.6625	III
3.	Attack of wild animals (Nilgai)	5173	64.6625	I
4.	More insect pest disease attack	4840	60.5	II

Miscellaneous constraints faced by 80 sample sorghum cultivating farmers in the study area have been presented in the table-4. Four miscellaneous constraints were selected other than three major group of constraints. Out of the four attacks of wild animals was on first position with 64.66 garret score. This was followed by more insect pest and disease attack with garret score 60.50, yield reduction due to late sowing with garret score 39.66 and early sowing sorghum crop affected by the low temperature with garret score 36.17 were obtained. This was given II, III and IV rank of constraints respectively. Similar findings were reported by Jat et al. (2021), who observed that crop damage by wild animals had become a serious concern in Rajasthan, causing significant yield losses in rainfed crops.

Conclusion: The study revealed that sorghum farmers in Ajmer district face several production and marketing constraints that adversely affect productivity and profitability. The major constraints identified were the lack of availability of high-yielding variety seeds, high labour costs, inadequate market information, and damage caused by wild animals. Addressing these constraints through timely input supply, effective extension services, improved market infrastructure, and

suitable crop protection measures will enhance sorghum production, profitability, and the livelihood of farmers in the region.

Policy Implication: Timely availability of quality HYV seed, strengthened extension services, improved market information, and effective measures to reduce labour costs and wild animal damage are essential to enhance sorghum

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