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Constraints and suggestions in oat and berseem production: Insights from frontline technology demonstrations

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Abstract

The present study was conducted in selected villages under the Frontline Technology Demonstrations (FTDs) implemented by Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri, as part of the All India Coordinated Research Project (AICRP) on Forage Crops and Utilization. Out of twenty villages covered under the project, twelve villages were purposively selected, and ten forage cultivators from each village were interviewed, making a representative sample of 120 farmers. Data were collected through a pre-tested structured interview schedule using the personal interview method. The study focused on analyzing the constraints faced by oat and berseem fodder cultivators and their suggestions for improvement. Findings revealed that non-availability of labour during critical operations (67.55%) was the most severe constraint, followed by high labour cost and requirement for fodder cutting (61.67%), delayed seed supply (47.50%), and stem lodging in berseem (34.16%). Farmers suggested increased mechanization through the use of seed drills and forage harvesters (65.83%), adoption of grass cutters (58.33%), timely availability of quality seeds (45.00%), and development of lodging-resistant varieties (32.50%) as major solutions. The results emphasize the need to strengthen farm mechanization, improve seed supply systems, and promote technological interventions for sustainable fodder production and enhanced profitability in dairy-based farming systems.

Keywords: Berseem, constraints, fodder cultivation, FTD's, oat

Introduction

Green fodder serves as a nutritionally rich and cost-effective feed resource, offering a viable alternative to expensive concentrate ingredients in livestock diets (Mohini *et al.*, 2007) ^[16]. It provides essential vitamins, minerals, and energy, and supports improved digestion in animals. The adoption of green fodder-based feeding systems can significantly reduce the cost of milk production (Jha & Tiwari, 2018) ^[5]. Forages are 5–14 times cheaper sources of digestible crude protein (DCP) and total digestible nutrients (TDN) compared to concentrates (Agrawal *et al.*, 2008) ^[1]. Integrating cereal fodders with leguminous crops improves palatability, digestibility, and overall nutritional quality (Kumar *et al.*, 2016; 2018) ^[9, 10].

Green fodder is inherently rich in carbohydrates, proteins, fats, minerals, vitamins, and water, making it a complete feed source for adult dairy animals. Its inclusion in the diet enhances nutrient availability, boosts milk production, and ensures better reproductive and productive health. Optimum feeding of green fodder reduces the inter-calving interval by supplying essential minerals and vitamins that support timely onset of oestrus. It also promotes faster growth, early attainment of reproductive age, and overall lifetime productivity. Moreover, secondary metabolites such as saponins, tannins, and phenols found in fodder improve meat quality and milk antioxidant potential (Kumar *et al.*, 2015) ^[11]. The microorganisms present in fodder aid digestion, particularly when fed along with crop residues.

Feeding green fodder at an early age accelerates rumen development, improves digestion, and fosters better rumination behavior. Given that concentrate feed is the most expensive component of dairy farming, green fodder offers a sustainable, economic, and palatable alternative.

Leguminous fodders, being rich in DCP and TDN, can partially replace concentrate feed, thus lowering feeding costs and enhancing farm profitability.

In India, fodder crops are grown on about 8.4 million hectares, equivalent to only 5.23% of the total agricultural area, a figure that has remained stagnant over the past two decades (Koli and Bhardwaj, 2018) ^[7]. Despite hosting approximately 15% of the world's livestock, India occupies merely 2.29% of global land area (Kumar *et al.*, 2023) ^[8]. Estimates from the ICAR-Indian Grassland and Fodder Research Institute (IGFRI), Jhansi, indicate deficits of 11.24%, 23.4%, and 28.9% in green fodder, dry fodder, and concentrates, respectively, with shortages projected to increase annually by 1.23% due to rising livestock numbers (Begam *et al.*, 2024) ^[2].

Only about 4% of India's cultivable land is dedicated to fodder production—far below requirement—owing to prioritization of food grains and cash crops supported by government procurement policies (Kaur *et al.*, 2025) ^[6]. This mismatch between demand and supply has created a chronic shortage of quality fodder. Additional constraints include pest and disease infestations, low seed quality and availability, high input costs, limited irrigation, frequent harvesting needs, and inadequate preservation practices, all leading to wastage and discouraging investment in fodder cultivation (Dagar, 2017; Biemond *et al.*, 2012; Meena *et al.*, 2018) ^[4, 3, 13]. Physiological limitations like seed dormancy, uneven maturity, and low seed productivity also hinder forage production (Parihar, 2010; Vijay *et al.*, 2013; 2018) ^[17, 20, 19]. The absence of an organized forage seed market further exacerbates these challenges.

To ensure livestock productivity and profitability, it is essential to enhance fodder yield and optimize the use of crop residues through sustainable production technologies (Misra *et al.*, 2007) ^[15]. Adequate feed and fodder availability underpin the entire livestock sector, influencing productivity, health, welfare, and environmental outcomes (Makkar, 2016) ^[12].

This study aims to analyze farmers' preferences regarding fodder crops in villages covered under the Forage Technology Demonstrations (FTDs) of the All India Coordinated Research Project (AICRP) on Forage Crops and Utilization. The FTDs introduce improved varieties and advanced cultivation practices to participating farmers, thereby promoting enhanced fodder availability, quality, and farm-level sustainability. Through such demonstrations, the project contributes significantly to agricultural development and the improvement of rural livelihoods.

Methodology

The study was carried out in villages where Frontline Technology Demonstrations (FTDs) were conducted by Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri, under the All India Coordinated Research Project (AICRP) on Forage Crops and Utilization. Out of the 20 villages covered by the project, 12 villages were purposively selected for detailed investigation. From each selected village, 10 forage growers were chosen to form a representative group of fodder

cultivators. Data were collected through a structured interview schedule that was specifically designed to meet the study objectives. The schedule was pre-tested outside the study area to check its clarity and reliability. Based on the feedback from the pre-test, necessary modifications were made to improve the wording and structure of the questions. After finalizing the research design and interview schedule, data collection was done using the personal interview method. The investigator personally visited each selected farmer, introduced himself, and explained the purpose and objectives of the study. Farmers were asked questions one by one as per the schedule, and their responses were recorded carefully. All selected farmers cooperated fully and their responses were included for analysis in the study.

Results and Discussion

Constraints Faced by Oat and Berseem Fodder Cultivators and Suggestions to Overcome Them

The study identified major constraints encountered by farmers involved in oat and berseem fodder cultivation and documented their practical suggestions for overcoming these challenges. Table 1 highlights the rank-wise constraints experienced by the respondents, while Table 2 presents their corresponding suggestions.

The foremost constraint, as reported by 67.55% of respondents, was the non-availability of labour during crucial agricultural operations such as land preparation, sowing, and irrigation. Labour scarcity, particularly during peak seasons, was often attributed to rural-to-urban migration, competition from other high-value crops, and dependence on transient labour. These findings are in agreement with earlier reports emphasizing the increasing challenge of labour shortages in crop-based farming systems due to occupational shifts and rising rural employment alternatives. The second-ranked constraint cited by 61.67% of farmers, related to the high labour requirement and cost during fodder cutting. Oat and berseem being multi-cut crops demand repetitive harvesting, thereby increasing manual work intensity. The absence of affordable mechanized solutions such as forage harvesters or grass cutters further exacerbates this challenge. Similar observations were made in studies highlighting the need for small-scale mechanization to enhance efficiency in forage harvesting and handling operations. Delayed seed supply emerged as the third major constraint, affecting 47.50% of respondents. This issue is closely linked with weak seed distribution channels, limited local seed vendors, inadequate storage, and unorganized seed procurement mechanisms. The untimely availability of seed during sowing periods hampers the establishment of fodder crops, ultimately reducing yield and profitability. The fourth constraint, observed by 34.16% of berseem growers, was stem lodging, which results in significant biomass loss and deterioration in forage quality. Lodging occurs primarily due to over-fertilization, improper irrigation scheduling, and weak plant structural support. The problem is more pronounced in areas with high soil moisture or where nitrogen application is not well balanced with other nutrients.

Table 1: Constraints faced by the forage cultivators in oat and berseem cultivation

Sr. No.	Constraints	F (n=120)	Per cent	Rank
1.	Non-availability of labour during various operations such as land preparation, sowing and irrigation	81	67.55	I
2.	High labour required and cost for fodder cutting	74	61.67	II
3.	Non-availability of fodder seeds on time	57	47.50	III
4.	Stem lodging in berseem	41	34.16	IV

To address these challenges, the farmers suggested a Suggestions to overcome constraints (Table 2). The most widely endorsed recommendation (65.83%) involved the adoption of farm machinery, such as seed drills and forage harvesters. This underlines the strong preference for mechanization to minimize labour dependency and manage time-sensitive operations. The second suggestion, supported by 58.33% respondents, stressed the use of grass cutters to reduce manual workload and cost of harvesting. These recommendations collectively highlight farmers' growing awareness of technological solutions that can

improve operational efficiency and cost-effectiveness in fodder production systems. The third major suggestion, given by 45% of farmers, called for ensuring timely availability of quality seed through input shops and cooperative outlets. This measure would strengthen the seed supply chain, help maintain sowing schedules, and avert yield losses. Additionally, developing lodging-resistant varieties of berseem was suggested by 32.50% of respondents as a long-term strategy to enhance crop stability and reduce field losses caused by environmental and management-related factors.

Table 2: Suggestions made by the forage cultivators to overcome the constraints

Sr. No.	Suggestions	F (n=120)	Per cent	Rank
1.	Use of machines like seed drills and forage harvesters reduces dependence on manual labour	79	65.83	I
2.	Grass cutter like implements for fodder harvesting shall reduce the requirement of labour and fodder cutting cost	70	58.33	II
3.	Government shall ensure timely availability of fodder seeds in input dealers' shop	54	45.00	III
4.	Development of lodging resistant varieties of fodder crops	39	32.50	IV

Overall, the analysis underscores that labour scarcity, delayed seed access, and crop lodging are key limiting factors in fodder cultivation, while mechanization, improved seed systems, and varietal improvement programs are perceived as effective solutions. Collaborative efforts between researchers, extension agencies, and policymakers are therefore vital to ensure that scientific innovations, mechanized tools, and input delivery systems are accessible and economically feasible for small and medium-scale fodder producers. Strengthening capacity-building programs and expanding custom hiring centers for fodder-specific implements could further accelerate adoption of these practices.

Conclusion

The study clearly shows that farmers growing oat and berseem face serious practical problems such as shortage of labour, high harvesting costs, delayed seed supply, and crop lodging. To deal with these issues effectively, simple and locally suited solutions should be encouraged. Promoting the use of small-scale machinery like seed drills, grass cutters, and forage harvesters through custom hiring centers can help farmers save time and reduce labour dependency. Establishing village-level seed banks and ensuring timely supply of quality fodder seeds will support better crop planning and sowing on time. Farmers should also receive training on proper irrigation scheduling, balanced fertilizer use, and crop management to minimize lodging, especially in berseem. Development and popularization of lodging-resistant varieties through research institutions can further enhance productivity. Overall, better coordination among farmers, Krishi Vigyan Kendras (KVKs), local cooperatives, and government agencies is the key to making fodder cultivation more profitable, sustainable, and reliable for small and medium dairy farmers.

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