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The constraints of production and marketing of farm produce in different farming system

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Abstract

Indian agriculture, contributing 18.8% to the Gross Value Added (GVA) as of 2022, is a fundamental pillar of the country's economy, employing nearly 54% of the workforce. Despite its importance, farmers in India face significant production and marketing challenges. This study examines these constraints across four farming systems—Crop + Sheep (C+Sh), Crop + Dairy (C+D), Crop + Dairy + Sericulture (C+D+S), and Crop + Dairy + Horticulture (C+D+H)—by surveying 30 farmers in Kolar district. The data, analyzed using Garrett's ranking technique, highlights that inadequate water availability (mean score: 75.13) is the most critical production constraint, followed by irregular rainfall distribution (mean score: 74.03) and non-availability of inputs at crucial times (mean score: 68.26). In marketing, low prices for produce (mean score: 69.90) and high price fluctuations (mean score: 62.23) are the most pressing challenges. The findings underscore the need for targeted interventions to address these issues, which are vital for enhancing the sustainability and profitability of India's diverse farming systems.

Keywords: Agricultural constraints, farming systems, production challenges, marketing barriers and sustainable agriculture

Introduction

Agriculture continues to play a pivotal role in the Indian economy, contributing approximately 18.8 percent to the Gross Value Added (GVA) as of 2022. Despite the challenges posed by an expanding population, recurring monsoons, and environmental stresses, the sector remains a backbone of the country's socio-economic framework. A significant portion of the Indian farming community consists of small and marginal farmers, who rely on a diversified approach to farming to sustain their livelihoods. This Introduction chapter delves into the complexities of the production and marketing constraints faced by farmers in various farming systems across India. The remarkable growth of Indian agriculture over the last five and half decades, that is, after the initiation of Green Revolution technologies, has assisted in an era of self-reliance in food grain production at 315.6 million tonnes in 2022-23 (Anonymous, 2023) [1].

In the international arena, India claims the top spot for buffalo population, ranks second in the population of goats and fish, hosts the second-largest poultry market, and is fifth in the population of camels, which are experiencing a rapid growth rate according to the 2019 census (Anonymous 2019) [2-3].

Significance of Farming Systems in India

Traditional farming systems in India, honed over centuries, are characterized by mixed farming practices. These systems often involve the integration of crop production with other enterprises such as dairy, poultry, sericulture, fisheries, and beekeeping. This diversified approach helps farmers achieve stability in production, provides subsistence for their families, and mitigates risks from weather aberrations and other environmental challenges. However, the evolving global scenario demands a scientific touch to these traditional practices, paving the way for more sustainable farming systems that can adapt to changing conditions.

The Role of Crop Diversification

Crop diversification has emerged as a crucial strategy to increase farm income and ensure food, nutrition, and ecological security. India's traditional cereal-based cropping systems, though vital, often yield relatively low returns. The shift towards more flexible cropping systems that include income-elastic goods such as horticultural products has provided farmers with opportunities to diversify their income sources. Moreover, the focus on value-added, export-oriented crops has gained importance, offering avenues for economic growth and poverty alleviation. This shift has been instrumental in addressing some of the production constraints faced by Indian farmers, particularly those related to income instability and market access.

Challenges in Indian Agriculture

Despite the progress, Indian agriculture faces several challenges. The high population growth rate, increasing demand for essential commodities, and persistent issues like poverty, low-income levels, and inadequate infrastructure are significant constraints. Additionally, environmental factors such as recurrent droughts and floods, coupled with the prevalence of pests and diseases, further exacerbate these challenges. The remarkable growth in food grain production, particularly following the Green Revolution, has led to India achieving self-reliance in food production. However, sustaining this growth in the face of rising food demands and limited agricultural land remains a critical concern.

Farming System Approach

A farming system is a natural resource management unit operated by a farm household, encompassing a range of economic activities, both on-farm and off-farm. This holistic approach considers the entire farm as an interdependent entity, where various enterprises compete for limited resources such as land, labor, and capital. In India, where small and marginal farmers dominate the landscape, specialized farming practices often prove unsustainable. The gradual reduction in farm size due to land subdivision, coupled with challenges like monsoon failures and population growth, has made vertical expansion through integrated farming enterprises the only viable option for many farmers.

The farming system approach is seen as a resource management strategy aimed at achieving economic and sustained productivity. It emphasizes the need for a whole-farm approach to minimize risks and maximize production and profit. By understanding the linkages and complementarities between different components within various farming systems, farmers can optimize resource use and enhance their overall farm output. This approach is crucial for addressing the constraints of production and marketing in different farming systems, particularly in the context of smallholder and marginal farming.

Vegetable-Based Farming Systems

In recent decades, there has been a growing interest in vegetable-based farming systems as a means of sustaining natural resources, increasing farm income, and meeting the diversified demand for food, fodder, and fiber. Vegetable farming systems offer a viable option for small and marginal farmers, who often struggle with the constraints of traditional cereal-based systems. These systems are well-suited to the resource base of small farmers and provide opportunities for higher returns, thereby enhancing their economic viability.

The adoption of appropriate farming systems, particularly those that integrate vegetable-based cropping, is essential for meeting the diverse needs of a growing population. By focusing on these systems, farmers can achieve better resource management, reduce risks associated with market fluctuations, and improve their overall farm productivity. The importance of understanding the interdependencies within the farming system cannot be overstated, as it is key to developing strategies that can effectively address the constraints faced by farmers in production and marketing.

Methodology

The primary data for the study was collected from 30 sample farmers from Kolar and Malur taluks of Kolar district (15 farmers from each taluk) through personal interview methods with the help of a pre-tested structured schedule. The four majorly practiced farm enterprises in the study area were Crop + Sheep (C + Sh), Crop + Dairy (C + D), Crop + Dairy + Horticulture (C + D + H), Crop + Dairy + Sericulture (C + D + S). The collected data pertains to the agricultural year 2022-23. The collected data were classified, processed and presented in order to bring out generalisation of facts from which meaningful inference can be drawn. Garrett's ranking technique was used to rank the production and marketing constraints faced by a farmer in the study area. The order of the merit given by the respondents was converted into percent position using the formula.

Percent position = 100*(Rij - 0.5) / Nj

where,
Rij = Rank given for ith item by jth individual
Nj = Number of items ranked by jth individual

The percent position of each rank was converted to scores by referring to the table given by Garrett and Woodworth (1969). Then, for each factor, the scores of individual respondents were summed up and divided by the total number of respondents for whom scores were gathered. The mean score for all factors/constraints was ranked, following the decision criteria that higher the value, the more important is the order of preference by respondents.

Results and Discussion

Constraints in the production and marketing of farm produce

Garrett ranking technique was used to rank the most important constraints/challenges in the study area. In crop production, about nine constraints were prioritized, and depicted in the table 1 the major constraints faced by the C + Sh farming system was inadequate water availability, which can severely affect crop growth and yield, as water is essential for irrigation and sustaining plant life, followed by change in rainfall distribution which is due to the farm may be experiencing irregular or unpredictable rainfall patterns, which can impact crop planning and cultivation practices. Too much or too little rainfall at the wrong times can be detrimental to crops.

Non-availability of inputs at required time stood at third position, the availability of agricultural inputs such as seeds, fertilizers, and pesticides are crucial for successful crop production. Delays or shortages in obtaining these inputs can disrupt farming operations and reduce yields. Electricity failure/ irregular supply of electricity stood at the last rank.

In sheep production, four constraints were listed. Among them, reduced grazing land ranked first this is due to overgrazing in the available areas, negatively affecting the quality and quantity of forage and ultimately impacting the health and productivity of the sheep, followed by higher lamb/kid cost, shortage of feed and high cost of medicine stood at third and fourth position, respectively. This indicates that there may be difficulties in providing an

adequate amount of nutritious feed for the sheep. Adequate nutrition is vital for the health, growth, and reproduction of sheep. A shortage of feed can lead to malnutrition and reduced productivity in the flock.

The result of the present research study is in line with that of previous studies of Kumar, *et al.*, (2019) [6] who studied about the constraints in the production and marketing of vegetables faced by the Haryana farmers, where the major production related constraints expressed by vegetable growers were lack of information about cultivation of vegetables, higher cost of fertilizers, seeds and labour and their unavailability when needed, lack of suitable cold storage facilities, high cost of storage, costly weedicides, spurious plant protection chemicals, and lack of credit.

With respect to the marketing of crops grown in C + Sh farming system presented in the Table 2, the major constraint faced by the farmers is low price for their produce, followed by high price fluctuation and high marketing cost. This is due to the instability in prices which makes it challenging for farmers to plan their sales and income and expenses related to transportation, storage, and other aspects of getting their crops to market similar findings were found in Bhutia *et al*. (2017) [4].

Table 1: Production constraints in crop + sheep farming system

Sl. No.	Production Constraints	Garett's mean score	Rank
A. Production (Crop)			
1.	Inadequate water availability	75.13	I
2.	Change in rainfall distribution	74.03	II
3.	Non-availability of inputs in time	68.26	III
4.	Incidence of pests and diseases	52.00	IV
5.	Shortage of labour	44.80	V
6.	High wage rate	42.80	VI
7.	Lack of technical assistance	34.83	VII
8.	Fragmentation and subdivision of land holdings	30.16	VIII
9.	Irregular supply of electricity	18.00	IX
B. Sheep rearing			
1.	Reduced grazing	68.80	I
2.	High cost on lambs	59.73	II
3.	Shortage of feed availability	43.46	III
4.	High cost of medicines	29.13	IV

In the case of marketing of sheep, farmers are facing lack of cooperative marketing facility, followed by seasonal price fluctuation and lack of market information and lack of transportation facility which ranked at fifth and fourth position, respectively. The result of the present research study is in line with that of previous study by Kumar, *et al*., (2019) [6] who identified the constraints in the production and marketing of vegetables faced by the Haryana farmers where major marketing related constraints included lack of market information, higher price fluctuation, higher amount of price spread, malpractices in weighing and storing of vegetables, problem of storage facilities, lack of processing industries/units, higher price fluctuations, high cost of labour, high transportation cost, and delay in payments.

Table 2: Marketing constraints in crop + sheep farming system

Sl. No.	Marketing Constraints	Garret's mean score	Rank
A. Marketing (Crop)			
1.	Low price for produce	69.90	I
2.	Price fluctuations	62.23	II
3.	High marketing cost	46.00	III
4.	Low demand	32.66	IV
B. Marketing (Sheep)			
1.	Lack of co-operative marketing facility	70.33	I
2.	High involvement of middlemen	60.50	II
3.	Seasonal price fluctuation	51.66	III
4.	Inadequate transportation facility	35.00	IV
5.	Inadequate of market information	32.50	V

In Table 3, the major constraints and challenges faced by the Kolar farmers in C + D farming system are presented. In crop production, ten constraints were identified, out of which inadequate water availability was the major one faced by the farmers, followed by non-availability of inputs at appropriate time and high cost of fertilizer and pesticide stood at second and third position, respectively. Electricity failure/ irregular supply of electricity stood at the last rank and these results are aligned with Singh *et al*. (2013) [8].

In dairy production four constraints/ challenges were listed in which non-availability of feed and fodder was the major constraint which is due to inadequate water availability to grow fodder crops. High cost of improved breeds ranked second position.

With respect to marketing of crops grown in C + D farming system as presented in Table 4, indicated that the major constraints faced by the farmers were low price for produce followed by high marketing cost. This is due to the price fluctuations in the market causing difficulty to farmers to predict and plan the income from various enterprises.

Table 3: Production constraints in Crop + Dairy farming system

Sl. No.	Production Constraints	Garett's mean score	Rank
A. Production (Crop)			
1.	Inadequate water availability	79.16	I
2.	Non-availability of inputs in time	65.63	II
3.	High cost of fertilisers and pesticides	58.26	III
4.	Change in rainfall distribution	57.06	IV
5.	Inadequate technical assistance	55.82	V
6.	High wage rate	45.40	VI
7.	Shortage of labour	45.33	VII
8.	Lack of ICT in technology dissemination and uptake	44.66	VIII
9.	Fragmentation and subdivision of land holdings	26.60	IX
10.	Irregular supply of electricity	26.43	X
B. Production (Livestock)			
1.	Inadequate availability of feed and fodder	60.75	I
2	High cost of cross breeds	59.96	II
3	High cost of animal feed and fodder	49.70	III
4	High cost of medicines	28.60	IV

In case of marketing of livestock, farmers faced major constraints like low milk prices from cooperative society followed by irregular payment by cooperative society which stood at second position and inadequate storage and transport facility at third and fourth position, respectively. These constraints can have a substantial impact on the profitability and sustainability of the C + D farming system, and addressing them may require strategic planning and policy interventions similar findings were found with Mawase and Sarawgi (2014) [7].

Table 4: Marketing constraints in Crop + Dairy farming system

Sl. No.	Marketing Constraints	Garett's mean score	Rank
A. Marketing (Crop)			
1.	Low price for produce	58.76	I
2.	High marketing cost	56.50	II
3.	High price fluctuations	56.20	III
4.	Low demand	27.56	IV
B. Marketing (Livestock)			
1.	Low price for milk paid by cooperative society	68.46	I
2.	Irregular payment by cooperative society	62.80	II
3.	Inadequate transport facility	40.50	III
4.	No storage facility	34.36	IV

Table 5 presents the major constraints faced by C + D + S farming system. The top production constraint was inadequate water availability, followed by incidence of pest and diseases and high cost of fertilizer and pesticide stood at second and third position. Change in rainfall distribution stood at the last rank.

In livestock production, there are about four constraints/ challenges were listed. Out of which high farmers facing high cost of animal feed and fodder as a major constraint followed by high cost of improved breeds ranked second position.

With respect to marketing of crops grown in C + D + S farming system, the major constraints faced by the farmers were low price for produce, low demand, high marketing cost, and high price fluctuations. Out of which high price fluctuation stood first followed by low price for produce is presented in Table 6.

In the case of livestock marketing, farmers facing major constraints included irregular payment by Cooperative Society which ranked in first position followed by low milk price from cooperative society stood at second position followed by no storage facility and inadequate transport facility with third and fourth position respectively and these results showed analogue results with Kraaijvanger *et al.* (2016) [5].

Major constraints and challenges faced in C + D + H farming system followed by sample farmers in Kolar is presented in Table 7. In crop production, there are about ten constraints, out of which inadequate water availability is the major production constraints, followed by change in rainfall distribution and non-availability of inputs at appropriate time stood at second and third position. Electricity failure / irregular supply of electricity stood at the last rank.

In livestock production, there are about four constraints/ challenges were listed. Out of which high cost of animal feed and fodder stood at first position followed by high cost of improved breeds. Costly medicine takes fourth position in ranking.

Table 5: Production constraints in Crop + Dairy + Sericulture farming system

Sl. No.	Production Constraints	Garett's mean score	Rank
A. Production (Crop)			
1.	Inadequate water availability	79.53	I
2.	Incidence of pests and diseases	71.46	II
3.	High cost of fertilizer and pesticide	62.40	III
4.	Shortage of labour	56.30	IV
5.	Inadequate technical assistance	51.83	V
6.	Non-availability of inputs in time	48.46	VI
7.	High wage rate	47.20	VII
8.	Fragmentation and subdivision of land holdings	33.60	VIII
9.	Irregular supply of electricity	29.93	IX
10.	Change in rainfall distribution	19.46	X
B. Production (Livestock)			
1.	High cost of animal feed and fodder	62.80	I
2.	High cost of cross breeds	56.20	II
3.	Inadequate availability of feed and fodder	46.93	III
4.	High cost of medicines	36.06	IV

Table 6: Marketing constraints in Crop + Dairy + Sericulture farming system

Sl. No.	Marketing Constraints	Garett's mean score	Rank
A. Marketing (Crop)			
1.	High price fluctuations	67.33	I
2.	Low price for produce	61.26	II
3.	High marketing cost	43.83	III
4.	Low demand	29.10	IV
B. Marketing (Livestock)			
1.	Irregular payment by cooperative society	62.40	I
2.	Low price for milk paid by cooperative society	61.53	II
3.	No storage facility	35.50	III
4.	Inadequate transport facility	34.26	IV

With respect to marketing of crops grown in Crop + Dairy + Horticulture farming system, major constraints faced by farmers are low price for produce, low demand, high marketing cost, and high price fluctuations. Out of which low price for produce ranked first followed by high price fluctuation, high marketing cost stood at third position and low demand is in fourth position is presented in the Table 8.

In case of marketing of livestock, major constraints were low milk prices from cooperative society which stood at first position followed by irregular payment by cooperative society which ranked at second position. Inadequate transport facility and no storage facility stood at third and fourth position.

From all the farming system Kolar farmers facing inadequate water availability as a major constraint, as this district does not have surface irrigation facility followed by change in rainfall distribution and non-availability inputs in time. Which is due to the lack of surface irrigation facilities in the district. This makes the region highly dependent on rainfall, and any changes in rainfall distribution can exacerbate the water scarcity issue.

Table 7: Production constraints in Crop + Dairy + Horticulture farming system

Sl. No.	Production Constraints	Garett's mean score	Rank
A. Production (Crop)			
1.	Irregular supply of electricity	75.20	I
2.	Inadequate water availability	74.40	II
3.	Non-availability of inputs in time	60.60	III
4.	Change in rainfall distribution	59.23	IV
5.	High cost of fertilizer and pesticide	52.16	V
6.	High wage rate	45.40	VI
7.	Shortage of labour	44.60	VII
8.	Fragmentation and subdivision of land holdings	34.00	VIII
9.	Incidence of pests and diseases	30.60	IX
10.	Inadequate technical assistance	18.36	X
B. Production (Livestock)			
1.	High cost of animal feed and fodder	62.80	I
2	High cost of cross breeds	56.20	II
3	Inadequate availability of feed and fodder	46.93	III
4	High cost of medicines	36.06	IV

Additionally, delays in obtaining necessary agricultural inputs can further hinder farm productivity, making water availability a critical concern for farming in this area. Hence, the null hypothesis "Fluctuations in rainfall is the major production constraint in farming system and low price received by farmers is the major constraint in marketing of farm produce" is accepted Mawase and Sarawgi (2014) [7].

The findings of the present study are in par line with the previous studies conducted by Singh *et al.* (2013) [8] where farmers opined that major constraints are the non-availability of newly developed high-yielding variety seeds in crop production, Lack of crossbred and exotic breed animals in Animal husbandry and Lack of availability of improved good planting material suitable for local conditions in Horticulture, respectively.

Table 8: Marketing constraints in Crop + Dairy + Horticulture farming system

Sl. No.	Marketing Constraints	Garett's mean score	Rank
A. Marketing (Crop)			
1.	Low price for produce	69.70	I
2.	High price fluctuations	55.90	II
3.	High marketing cost	49.20	III
4.	Low demand	27.00	IV
B. Marketing (Livestock)			
1.	Low price for milk paid by cooperative society	69.90	I
2.	Irregular payment by cooperative society	59.40	II
3.	Inadequate transport facility	35.50	III
4.	No storage facility	34.50	IV

Conclusion

The research highlights the multifaceted constraints in the production and marketing of farm produce within different farming systems in India. Inadequate water availability emerges as the most critical production constraint, severely impacting crop yield and overall farm productivity. The challenges are compounded by irregular rainfall distribution and the non-availability of essential inputs, leading to decreased agricultural output. In livestock production, high costs of feed, fodder, and improved breeds further strain farmers' resources. On the marketing front, the study finds that low prices for produce and high price fluctuations are significant barriers to farmers' economic viability. These constraints are particularly detrimental in the absence of cooperative marketing facilities, leading to farmers receiving lower returns on their investments. The high involvement of middlemen, coupled with inadequate transportation and storage facilities, exacerbates the situation, making it difficult for farmers to achieve sustainable income levels.

The findings underline the importance of adopting a whole-farm approach that integrates various farming enterprises to optimize resource use and enhance productivity. Strategic interventions, such as improved water management practices, timely availability of inputs, and enhanced market infrastructure, are essential to mitigate these challenges. Addressing these constraints is crucial for enhancing the sustainability and profitability of Indian farming systems, particularly for small and marginal farmers who are most vulnerable to these issues.

Future Scope

Future research should focus on developing and implementing innovative strategies to overcome the identified production and marketing constraints in Indian farming systems. Emphasis should be placed on enhancing water management practices, given its critical role in agricultural productivity. Additionally, research could explore the potential of digital platforms to provide timely market information and reduce the influence of middlemen, thereby improving farmers' access to markets. There is also a need for studies that examine the impact of climate change on farming systems and develop adaptive strategies to mitigate its effects. By addressing these areas, future work can contribute to the development of more resilient and sustainable farming systems in India.

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