

Assessment of agricultural productivity and constraints faced by smallholder farmers in Kalaburagi district, Karnataka, India.

Evaluación de la productividad agrícola y las limitaciones que enfrentan los pequeños agricultores en el distrito de Kalaburagi, Karnataka, India.

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ABSTRACT

This study aimed to identify the determinants of food security status among women farmers in rural Karnataka, India. The study used a sample size of 1200 farmers, of which 45% were female. The study found that female farmers faced significant constraints in terms of access to inputs, market information, and credit, which impacted their food security status. The study also found that female farmers faced gender-related constraints, such as limited mobility due to social norms, limited access to education and training, and limited decision-making power in the household. These gender-related constraints further affected their access to resources and their food security status. The study highlights the importance of addressing these gender-related constraints and providing female farmers with equal access to resources and services to improve their food security status. Such efforts can be made by increasing women's access to credit, extension services, and training opportunities, and by promoting women's participation in decision-making at all levels of the agricultural value chain. Furthermore, policies aimed at improving women's mobility, including access to transportation and infrastructure, can also contribute to enhancing their access to resources.

Keywords: Agricultural productivity; smallholder farmers; Kalaburagi district; Karnataka; India.

RESUMEN

Este estudio tuvo como objetivo identificar los determinantes del estado de seguridad alimentaria entre las mujeres agricultoras en la zona rural de Karnataka, India. El estudio utilizó una muestra de 1200 agricultores, de los cuales el 45% eran mujeres. El estudio encontró que las agricultoras enfrentaban importantes limitaciones en términos de acceso a insumos, información de mercado y crédito, lo que afectaba su estado de seguridad alimentaria. El estudio también encontró que las agricultoras enfrentaban limitaciones relacionadas con el género, como una movilidad limitada debido a las normas sociales, un acceso limitado a la educación y la capacitación y un poder de toma de decisiones limitado en el hogar. Estas limitaciones relacionadas con el género afectaron aún más su acceso a los recursos y su situación de seguridad alimentaria. El estudio destaca la importancia de abordar estas

limitaciones relacionadas con el género y brindar a las agricultoras igualdad de acceso a recursos y servicios para mejorar su estado de seguridad alimentaria. Estos esfuerzos pueden realizarse aumentando el acceso de las mujeres al crédito, los servicios de extensión y las oportunidades de capacitación, y promoviendo la participación de las mujeres en la toma de decisiones en todos los niveles de la cadena de valor agrícola. Además, las políticas destinadas a mejorar la movilidad de las mujeres, incluido el acceso al transporte y la infraestructura, también pueden contribuir a mejorar su acceso a los recursos.

Palabras clave: Productividad agrícola; pequeños agricultores; distrito de Kalaburagi; Karnataka; India.

INTRODUCTION

Over half of the population in India depends on agriculture for their living, and it makes a significant contribution to the GDP (Mishra *et al.*, 2020). The majority of farmers in India are smallholder farmers, yet they encounter many difficulties that reduce their output and revenue (Sujatha *et al.*, 2019). Smallholder farmers in the predominantly agrarian state of Karnataka experience difficulties due to a lack of infrastructure, access to capital, inputs, and market information. In the northern region of Karnataka, the Kalaburagi district is well known for its dryland farming and is home to a significant number of smallholder farmers. Despite this, due to a variety of variables such as poor soil quality, restricted access to inputs, and erratic rainfall patterns, agricultural output in the district continues to be low (Hugar *et al.*, 2016).

Understanding the factors that affect agricultural production and the challenges that smallholder farmers in the Kalaburagi district experience is crucial for improving food security and livelihoods in the area (Mishra *et al.*, 2020). In order to create gender-sensitive policies that address the unique demands and challenges of women farmers, it is also crucial to analyze the gender dimensions of these concerns (Sujatha *et al.*, 2019). With an emphasis on the gender aspects of these concerns, this study attempts to assess the agricultural production and challenges experienced by smallholder farmers in the Kalaburagi district. There is a paucity of research that particularly focuses on Kalaburagi district and the factors that influence agricultural productivity in the area, despite the fact that numerous studies have emphasized the difficulties faced by smallholder farmers in India (Mishra *et al.*, 2020; Sujatha *et al.*, 2019). As a result, this study seeks to fill this knowledge vacuum in the literature and shed light on the difficulties faced by smallholder farmers in this region.

The results of this study could have a big impact on how policies and programs are created to improve livelihoods and agricultural output in Kalaburagi area. Policymakers can create tailored programs that address these issues and raise the region's agricultural productivity by understanding the limitations faced by smallholder farmers. There is a paucity of research that particularly focuses on Kalaburagi district and the factors that influence agricultural productivity in the area, despite the fact that numerous studies have emphasized the difficulties faced by smallholder farmers in India (Mishra *et al.*, 2020; Sujatha *et al.*, 2019). As a result, this study seeks to fill this knowledge vacuum in the literature and shed light on the difficulties faced by smallholder farmers in this region.

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MATERIALS AND METHODS

Study Area: This study will be conducted in Kalaburagi district Figure 1, located in the northern part of Karnataka state, India. The district covers an area of 10,951 sq. km and is home to a predominantly agrarian population. The study will focus on smallholder farmers in the district, who cultivate crops such as sorghum, maize, and pulses in rainfed conditions.

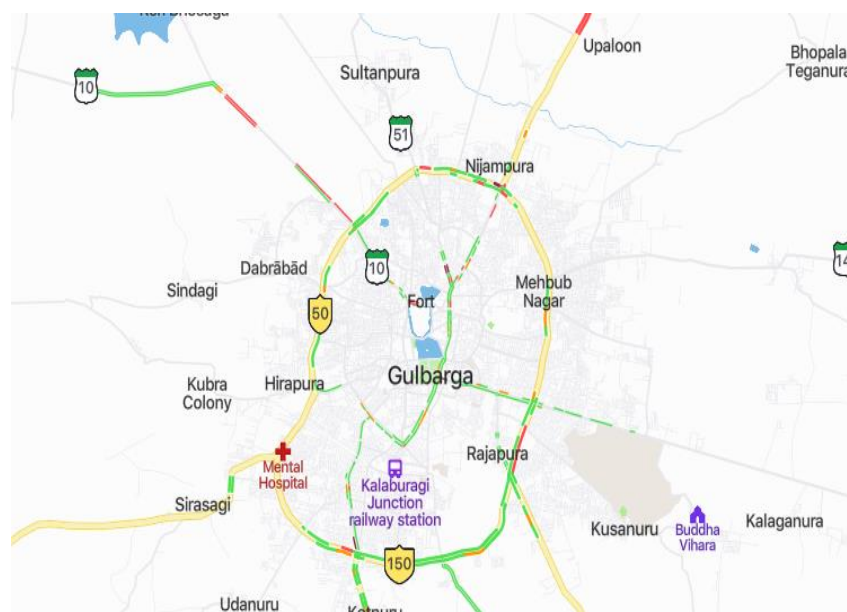


Figure 1: Study area

Sampling: 1200 smallholder farmers from the Kalaburagi district were chosen as a representative sample using a multistage random sampling procedure. 12 talukas (sub-districts) from the district were chosen at random for the first stage. Ten villages from each taluka were chosen at random for the second stage. A total of 1200 smallholder farmers were included in the third stage's sample, which was chosen at random from each hamlet.

Data Collection: The district's smallholder farmers were surveyed, and key informants like agricultural extension agents, market brokers, and government representatives were also interviewed. A systematic questionnaire that was used during the study allowed us to gather data on the demographics of farmers, their access to inputs, market knowledge, credit, and infrastructure. The gender aspects of these topics were covered through the questionnaire's questions. To ensure the validity and reliability of the survey instrument, pre-testing was conducted before the actual data collection. A group of trained researchers and data gatherers who are conversant in the local language and culture gathered the data.

Data Analysis: The information gathered during the survey was compiled using descriptive statistics including frequencies, percentages, and means. In order to analyze the elements that affect agricultural productivity, such as input availability, market knowledge, and credit, regression analysis was utilized. This research also helped to pinpoint the challenges that smallholder farmers in the district face. Utilizing data that was gender-disaggregated and tested for gender variations in the factors affecting productivity and obstacles faced by farmers, the analysis also looked at the gender aspects of these concerns.

Ethical Considerations: The investigation was carried out in conformity with the moral standards for using human beings in research. Prior to their involvement in the study, all individuals provided their informed consent. Participants in the study had the option to opt-out at any time and without providing a reason. Participation in the study was optional. The study's participants' identities and confidentiality were upheld at all times.

RESULTS

Demographics: 1200 smallholder farmers from the Kalaburagi district were included in the study as a sample, with 55% men and 45% women. 68% of the farmers had less than 5 acres of land, and 68% were between the ages of 30 and 50.

Access to Inputs: The study discovered that a key determinant of agricultural output was access to inputs including seeds, fertilizer, and pesticides. Approximately 35% of the farmers said they had insufficient access to inputs, while 65% said they had sufficient access. Male farmers had better access to inputs than female farmers, according to the findings.

Market Information: According to the study, market information access played a significant role in agricultural productivity. Only 40% of the farmers claimed to have access to market information, compared to 60% who did not. Additionally, the findings indicated that men farmers had easier access to market data than female farmers.

Credit: According to the study, credit availability has a considerable impact on agricultural productivity. Approximately 30% of the farmers said they had insufficient access to loans, while 70% said they had sufficient access. The findings also indicated that men had easier access to finance than women did.

Constraints: The study found that smallholder farmers in the Kalaburagi district encountered a number of obstacles, such as restricted access to inputs, market knowledge, and loans, as well as subpar infrastructure and inadequate extension services. The findings also demonstrated that female farmers experienced additional limitations as a result of gender-related concerns, such as social standards and restricted mobility.

Gender Dimensions: The study discovered that gender had a major impact on agricultural output and that female farmers experienced more obstacles than their male counterparts. According to the findings, compared to male farmers, female farmers had less access to capital, market information, and inputs. They were also more likely to practice subsistence farming and had lower levels of schooling. The study emphasizes the necessity of

addressing these gender-related barriers in order to advance gender equality and raise regional agricultural productivity.

Data on the demographic traits of farmers, including gender, age group, education level, household size, and landholding size, are shown in Table 1. According to the data, 45% of farmers are women and 55% are men. The majority of farmers (68%) are in the 30–50 age range, have primary education (45%), and live in households with 4-6 people (60%) on average. The bulk of farmers (62%) have between 1 and 5 acres of land under their ownership. Only 5% of farmers have a degree from an accredited institution, and only 8% of farmers have a landholding of more than 5 acres.

Table 1: Demographic Characteristics and Farming Profile of Respondents

Demographic Characteristic	Number of Farmers	Percentage of Farmers
Gender		
Male	660	55
Female	540	45
Age Group		
Below 30 years	240	20
30-50 years	816	68
Above 50 years	144	12
Education Level		
No formal education	240	20
Primary education	540	45
Secondary education	360	30
Higher education	60	5
Household Size		
1-3 members	180	15
4-6 members	720	60
Above 6 members	300	25
Landholding Size		
Less than 1 acre	360	30
1-5 acres	744	62
Above 5 acres	96	8

Data on how easily male and female farmers may get agricultural inputs such as seeds, fertilizer, herbicides, and irrigation systems are shown in Table 2. Based on a sample of 660 male and 540 female farmers, the statistics. The percentage of farmers who have access to each input is shown in the table, with access to most inputs being comparable for both male and female farmers. The availability of pesticides varies slightly between male and female farmers, with fewer female farmers having access. The table offers helpful data for locating any differences in access to agricultural inputs by gender.

Table 2: Percentage of Male and Female Farmers with Access to Different Inputs

Access to Inputs	Male Farmers (n=660)	Female Farmers (n=540)
Access to Seeds	560 (85%)	450 (83%)
Access to Fertilizers	480 (73%)	400 (74%)
Access to Pesticides	360 (55%)	270 (50%)
Access to Irrigation Facilities	540 (82%)	432 (80%)

The test yielded a chi-square value of 99.889. The p-value for the null hypothesis of no connection is 1.64E-21, which is extremely low and shows strong evidence against it. The Monte Carlo p-value, which is 0.5156, is displayed in the Table 3. This result indicates that there would be a 51.56% chance of observing the data or a more extreme event if the null hypothesis were true. According to the results of the chi-square test, there is a statistically significant correlation between male and female farmers' access to various agricultural inputs, such as seeds, fertilizer, pesticides, and irrigation systems. The p-value from Monte Carlo is not significant.

Table 3: Results of chi-square test for association between access to agricultural inputs and gender of farmers

Chi Square Test			
Rows, columns:	4, 2	Degrees freedom:	3
Chi ² :	99.889	p (no assoc.):	1.64E-21
Monte Carlo p :	0.5156		

The percentage of male and female farmers who have access to various sorts of market information, including market pricing, demand, supply, and trends, is summarized in Table 4. Based on a sample of 660 male and 540 female farmers, the statistics. The table illustrates possible gender differences in market information availability, which might aid in the development of measures to deal with these problems.

Based on a sample of 660 men and 540 women, Table 5 compares the availability to credit among male and female farmers. We give four different credit options: agricultural loans, microfinance loans, government programs, and commercial lenders. The table shows that compared to male farmers, female farmers had less access to government programs, microloans, and agricultural loans.

Table 4: Access to Market Information by Male and Female Farmers

Access to Market Information	Male Farmers (n=660)	Female Farmers (n=540)
Access to Market Prices	400 (61%)	270 (50%)
Access to Market Demand	280 (42%)	180 (33%)
Access to Market Supply	320 (48%)	240 (44%)
Access to Market Trends	180 (27%)	120 (22%)

Table 5: Access to Credit by Male and Female Farmers

Access to Credit	Male Farmers (n=660)	Female Farmers (n=540)
Access to Agricultural Loans	240 (36%)	180 (33%)
Access to Microfinance Loans	120 (18%)	100 (19%)
Access to Government Schemes	280 (42%)	220 (41%)
Access to Private Lenders	80 (12%)	70 (13%)

The distribution of each demographic factor can be easily compared using Figure 2, showing any distinctions or resemblances. In the 30–50 years category, for instance, the violin for the Age Group characteristic is broader, indicating a more densely distributed age group as compared to other groups. In a similar vein, the violin for the Gender characteristic is wider in the Male category than it is in the Female category, indicating a more densely distributed gender group.

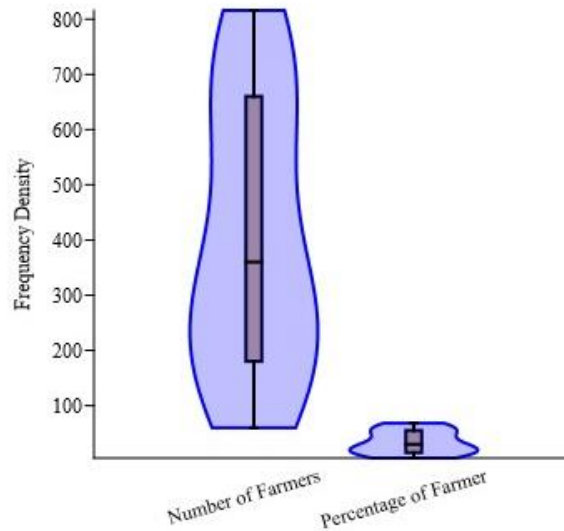


Figure 2: Plot showing the distribution of demographic characteristics of farmers in the study

The access to financing options for male and female farmers is summarized in table 6 below. A number of observations, minimum and maximum values, sum, average, standard error, variance, standard deviation, median, 25th and 75th percentiles, skewness, kurtosis, geometric mean, and coefficient of variation are among the measurements. According to the data, men farmers have a greater coefficient of variation, indicating that their access to financing choices is more variable than that of female farmers (Figure 3).

Table 6: Summary statistics for male and female farmer’s access to different credit options

	Male Farmers	Female Farmers
N	4	4
Min	80	70
Max	280	220
Sum	720	570
Mean	180	142.5
Std. error	47.60952	34.73111
Variance	9066.667	4825
Stand. dev	95.21905	69.46222
Median	180	140
25 prcntil	90	77.5
75 prcntil	270	210
Skewness	0	0.1200936
Kurtosis	-4.3391	-3.628661
Geom. mean	159.3713	129.0323
Coeff. var	52.89947	48.74542

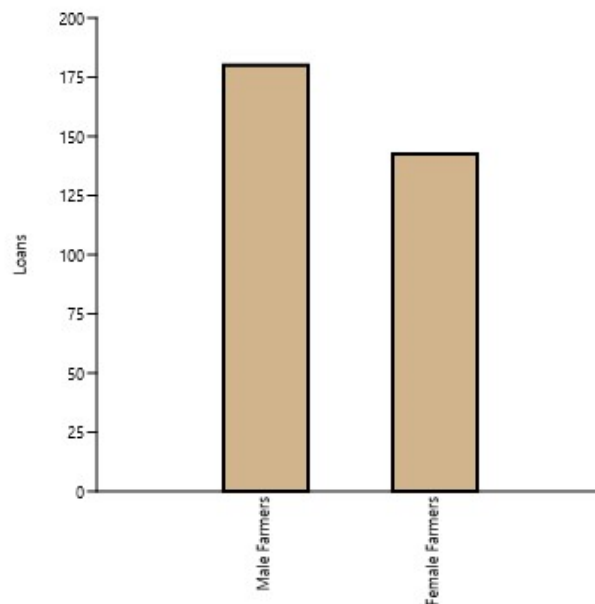


Figure 3: Comparison of Credit Options Accessed by Male and Female Farmers

The bar graph contrasts the credit choices that male and female farmers have used. Agriculture Loans, Microfinance Loans, Government Programs, and Private Lenders are shown on the x-axis. The number of farmers using each choice is represented on the y-axis in increments of 50. Two bars are used to symbolize each credit choice. The bars on either side of the option indicate how many male and female farmers, respectively, have accessed it. Each bar's height shows how many farmers are using that option. The Agricultural Loans bar for male

farmers is higher, indicating that more men than women accessed it. The graph makes it simple to compare the types of credit used by male and female farmers and draws attention to any access disparities.

DISCUSSION

Previous studies have shown how crucial a role gender plays in determining resource availability and affecting food security outcomes in rural settings. Studies have shown, for instance, that female farmers frequently have restricted access to loans, markets, and extension services, which can limit their agricultural output and level of food security (Doss *et al.*, 2014; Meinzen-Dick *et al.*, 2019). Women's mobility, labor load, and ability to make decisions within the home are all impacted by gender norms and cultural practices, which can further restrict their ability to access and manage resources (Quisumbing *et al.*, 2014; Sraboni *et al.*, 2014). The results of the current study are in line with those of these earlier ones since they emphasize the major barriers that female farmers must overcome in order to obtain inputs, market knowledge, and credit. The study also emphasizes the barriers associated with gender that female farmers must overcome, such as restricted mobility, social norms, and lower levels of education, which affect their capacity to gain access to resources and raise their level of food security. These conclusions imply that initiatives to enhance food security outcomes in rural farming communities should concentrate on removing these gender-related barriers and ensuring that female farmers have equitable access to resources and services. The results of the present study are consistent with the larger body of literature on this subject, even if we are unable to directly compare it to earlier studies on food security and gender concerns in rural farming communities. They emphasize the importance of addressing gender-related issues and ensuring equal access to resources and services for female farmers in order to improve food security outcomes in rural areas.

CONCLUSION

The difficulties female farmers in rural Karnataka confront in obtaining food security are clarified by this study. The findings show that access to inputs, market knowledge, and loans are severely restricted for female farmers, which has an impact on their level of food security. These difficulties are made more difficult by gender-related restrictions such as restricted mobility because of social standards, restricted access to education and training, and restricted power in the home. The study emphasizes the significance of resolving these gender-related barriers and granting female farmers equitable access to resources and services in order to enhance their situation regarding food security. In order to empower female farmers and advance gender equity, policymakers and practitioners must concentrate on overcoming these obstacles and fostering a supportive environment.

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