

Factors Influencing Farmers' Participation in Contract Farming: A Study on Farmers of Western Uttar Pradesh

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Abstract

This study aims to examine the impact of demographic and socio-economic factors on the acceptance of contract farming among farmers in Uttar Pradesh, India, and its subsequent effect on agricultural productivity. Data was collected from a sample of 385 farmers using a structured questionnaire, and the results were analyzed using descriptive statistics and regression analysis. The findings show that age, education, farm size, and access to agricultural resources are significant determinants of farmers' participation in contract farming. Furthermore, participation in contract farming has a positive and significant effect on agricultural productivity, as measured by perceived productivity. The study suggests that policy interventions targeting the improvement of farmers' socio-economic conditions and increasing their access to credit can enhance the uptake of contract farming and boost agricultural productivity in Uttar Pradesh.

Keywords: Agricultural Productivity Contract Farming, Socio-Economic Factors, Uttar Pradesh, India.

Introduction

Contract farming is an emerging model of agricultural production that involves an agreement between farmers and buyers, usually agro-processing firms, retailers, or exporters. Contract farming is an agricultural production system in which farmers produce crops under a contract agreement with agribusiness firms, specifying the terms and conditions of the production and marketing of their produce. Participating in contract farming has been recognized as a promising strategy for enhancing farmers' welfare, by providing them with access to credit, inputs, and markets, while reducing the risks associated with agricultural production (Thilakaratne et al., 2020; Wollni & Andersson, 2014). The success of contract farming, however, depends on various factors, including socio-economic and demographic factors, that influence farmers' participation and ability to benefit from it (Dries et al., 2017). However, some studies have highlighted the challenges associated with contract farming, including power imbalances between farmers and buyers, which can lead to unfair pricing and exploitation of farmers (Qu et al., 2021). These challenges must be addressed to ensure that contract farming benefits all parties involved and contributes to sustainable development.

Contract farming has been increasingly recognized as a key strategy to enhance agricultural productivity, provide market access to small farmers, and reduce rural poverty. However, the impact of socio-economic conditions on contract farming remains a significant research gap. In this study, we seek to

explore the impact of socio-economic conditions on contract farming and its implications for small farmers. These factors vary across different regions and contexts, making it important to understand them to design effective policies and strategies to promote contract farming (Bingen & Serrano, 2019).

Contract farming is a production system where farmers and buyers, usually agribusiness firms, enter into agreements to grow specific crops or livestock under certain conditions. These include quality and quantity standards, pricing arrangements, and delivery schedules (Glover, 2010). In Uttar Pradesh, contract farming has gained significant attention in recent years as a means of promoting agricultural growth and increasing farmers' income (Jain, 2019). A study conducted by the Indian Council for Research on International Economic Relations (ICRIER) reveals that contract farming has the potential to enhance farmers' access to technology, credit, and markets, as well as provide them with a more stable source of income (Gulati et al., 2011). Moreover, the study found that contract farming arrangements have led to increased investment in agriculture as companies provide farmers with inputs such as seeds, fertilizers, and machinery. However, some scholars have raised concerns about potential risks associated with contract farming in Uttar Pradesh. Singh (2018) has warned that contract farming may lead to the displacement of small-scale farmers who may be unable to compete with larger, more established farmers that have the resources to participate in contract farming arrangements. Gulati et al. (2011) have also expressed concerns about the potential for companies to exploit farmers through unfair pricing practices.

The Uttar Pradesh government has implemented various policy initiatives aimed at promoting contract farming while also protecting farmers' interests. For example, the state government has established a Contract Farming Act that provides a legal framework for contract farming arrangements and includes provisions for dispute resolution and protection of farmers' rights (Jain, 2019). One research gap in the study of socio-economic and demographic factors in participating contract farming is the need for more comprehensive and context-specific analyses. While there have been some studies that have investigated the relationship between these factors and contract farming participation, many have relied on generalizations and have not taken into account the diverse socioeconomic and demographic characteristics of different regions and populations (Nagayets, 2020). A study by Geng et al. (2021) in China found that education level, farm size, and household income were significant predictors of contract farming participation, while gender and age had no significant effect. However, this finding may not be applicable to other countries or even other regions within China. Furthermore, there is a need for more qualitative research that explores the motivations and experiences of farmers who participate in contract farming, particularly those from marginalized or vulnerable groups (Maertens & Swinnen, 2015). Such research can provide insights into the specific challenges and opportunities that these farmers face, as well as the potential benefits and drawbacks of contract farming arrangements. There is a need for more nuanced and context-specific research that takes into account the diversity of farmers and regions. Understanding these factors is crucial for policymakers, researchers, and other stakeholders to develop and implement interventions that address the challenges associated with contract farming and enhance its potential to contribute to rural development and poverty reduction (Tschirley et al., 2019). The present paper aims to examine the socio-economic and demographic factors that influence farmers' participation in contract farming and explore whether these socio economic and demographic factors influence in improving their agricultural productivity.

Review of Literature:

• Demographic factors and contract farming

Contract farming is a type of agricultural production where farmers produce crops or livestock for a specific buyer under an agreed contract. It has become an important strategy for agricultural development in many countries, especially in developing countries. On the other hand, demographic factors such as age, education, gender, and household size also influence farmers' participation in contract farming (Alemu et al., 2021; Shukla et al., 2021). For example, younger farmers and those with higher levels of education are more likely to participate in contract farming because they have better knowledge and skills to negotiate and understand the terms of the contract. Several studies have identified socio-economic factors that influence farmers in participating in contract farming. According to a study by Rahman and Rahman (2018), the factors that affect participation include age, education, household income, land ownership, access to credit, and market information. Furthermore, gender and household size affect farmers' ability to participate in contract farming, as women and households with fewer members may have fewer resources and bargaining power to negotiate favorable terms. Therefore, it is crucial to consider the interplay of socio-economic and demographic factors when designing policies and strategies to promote contract farming and improve farmers' welfare. However, the success of contract farming is influenced by several factors, including the demographic characteristics of farmers. In this literature review, we will examine the impact of demographic factors on contract farming.

Age: Age is another demographic factor that can influence contract farming participation. Older farmers may be less likely to participate in contract farming due to factors such as limited access to information and technology, as well as physical limitations. A study by Ngigi et al. (2019) in Kenya found that age was negatively correlated with contract farming participation. In addition to these factors, other demographic factors such as age, gender, and household size also play a role in determining farmers' participation in contract farming. For instance, some studies have shown that younger farmers are more likely to participate in contract farming than older farmers (Gulati et al., 2012).

H1: Farmer age has positive influence on participation in contract farming

Gender: Gender has been identified as an important factor in contract farming. Several studies have shown that female farmers are less likely to participate in contract farming than male farmers. For example, a study by Njuki et al. (2011) in Kenya found that female farmers were less likely to participate in contract farming due to factors such as lack of access to credit, lack of land ownership, and limited education. Likewise, gender also influences farmers' participation in contract farming, with female farmers often facing more challenges in accessing contract farming opportunities than their male counterparts (Doss et al., 2014).

H2: Farmer gender categories has positive influence on participation in contract farming

Education: Education is an essential factor that affects farmers' participation in contract farming (Sahoo et al., 2016). Educated farmers are more likely to understand and comply with the requirements of contract farming, as well as to be aware of its benefits and risks (Adesina & Zinnah, 1993). Furthermore, education equips farmers with the necessary skills to negotiate and understand contracts, making them more likely to participate in contract farming (Dong & Yang, 2018). In addition, access to information and market channels, along with farm size and education, are significant determinants of contract farming participation among farmers in China (Dong & Yang, 2018). Similarly, in Pakistan, farmers with higher levels of education and larger landholdings were found to be more likely to participate in

contract farming due to their greater access to resources and information (Hussain, & Mehmood, 2019). Misra and Mishra (2019) found that in India, farmers with higher levels of education, access to credit, and better infrastructure were more likely to engage in contract farming. Zhan et al. (2020) found similar results in China, where farmers with higher levels of education, larger landholdings, and better access to credit were more likely to participate in contract farming.

H3: Farmers' level of education has a positive influence on participation in contract farming

Income: Income is another important factor that can influence contract farming participation. Farmers with higher incomes may be more likely to participate in contract farming due to their ability to invest in inputs and equipment. A study by Chisango et al. (2020) in Zimbabwe found that income was positively correlated with contract farming participation. In another study, Taslim et al. (2021) indicated that Contract farming is associated with increased farm productivity and income, but socio-economic factors affect participation.

Occupation: Physical asset specificity is the accumulation of experience, technology and knowledge for a specific job, which can lead to devaluation if it is far away from the specific area where it is formed and applied (Schneider et al., 2022). Household size can also influence contract farming participation. Larger households may have more labor available, which can increase their ability to participate in contract farming. A study by Kumar et al. (2015) in India found that household size was positively correlated with contract farming participation.

Overall, demographic factors play a significant role in contract farming. Access to resources, education, and social status affect the participation of farmers in contract farming. Policymakers should focus on improving access to resources and education to increase the participation of farmers in contract farming.

H5: Farmer occupation has a positive influence on participation in contract farming

• Socio-economic Factors Influencing Farmers in Participating Contract Farming

Several studies have examined the impact of socio-economic and demographic factors on the success of contract farming schemes. Krishna and Keyser (2017) found that contract farming significantly improved the economic status of small farmers in India, with participants having better access to credit, higher yields, and improved income. Hussain et al. (2019) also reported that contract farming increased the income of small farmers in Pakistan, with access to finance, education, and market information playing a crucial role in determining success. In contrast, Ma et al. (2020) highlighted the importance of land tenure and property rights in contract farming, finding that small farmers with secure land tenure and property rights were more likely to participate and benefit from contract farming. Other studies have shown that socio-economic factors, such as land size, access to credit, market information, and price stability, influence farmers' decision to participate in contract farming (Khanh et al., 2020; Niyibizi et al., 2019). Another study by Shankar and Viswanathan (2016) found that factors such as land ownership, farm size, education, and access to credit were important in determining farmers' participation in contract farming. One study by Rahman and Rahman (2018) examined the impact of socio-economic factors on contract farming in Bangladesh. The study found that farmers with higher levels of education and larger landholdings were more likely to engage in contract farming. The authors suggest that providing education and training to farmers could help to increase their participation in contract farming. Sanginga et al. (2018) and Jayne et al. (2014) also found that socio-economic and demographic factors such as education level, landholding size, access to credit, extension services, market information, and infrastructure play a critical role in determining farmers' participation in contract farming.

Social Status

Social status also affects the participation of farmers in contract farming. A study by Zhou et al. (2014) found that farmers with higher social status were more likely to participate in contract farming. Social status can provide farmers with access to networks and resources that can improve their participation in contract farming. Ownership of BPL (Below Poverty Line) card and participation in contract farming are two interrelated issues in the context of rural development in India. BPL cardholders are considered to be the poorest of the poor and often face challenges in accessing credit and other resources for farming. Contract farming, on the other hand, has been promoted by the government and private sector as a way to improve agricultural productivity and income for farmers. However, there is a concern that BPL cardholders may not have the resources and bargaining power to negotiate favorable contracts with buyers. According to a study by the National Council of Applied Economic Research (NCAER) in India, BPL cardholders are less likely to participate in contract farming compared to non-BPL households. The study also found that BPL cardholders who do participate in contract farming receive lower prices for their produce compared to non-BPL households. This indicates the need for targeted interventions to improve the participation of BPL cardholders in contract farming and ensure that they receive fair prices for their produce. Furthermore, the government of India has introduced various schemes to promote contract farming among small and marginal farmers, including those with BPL cards. For instance, the Pradhan Mantri Fasal Bima Yojana (PMFBY) provides insurance coverage to farmers, including those in contract farming arrangements. The government has also established the Agricultural Produce Market Committee (APMC) Act to regulate the buying and selling of agricultural produce in contract farming.

H6: Social Status has positive influence on participation in contract farming

Farm Size

Charyulu and Rahman (2016) found that education, land ownership, and access to credit were significant factors in determining whether farmers in India participated in contract farming. Farmers with higher levels of education and larger landholdings were more likely to participate in contract farming, while access to credit was found to have a positive impact on participation. Kassie et al. (2018) in their study examined the adoption of sustainable agricultural practices among smallholder farmers in Tanzania, including contract farming. The study found that contract farming was positively associated with the adoption of other sustainable practices, such as improved seed varieties and integrated pest management, indicating that contract farming can serve as a mechanism to promote sustainable agricultural practices. Similarly, a study by Rahman, Rahman and Rashid (2019) in Bangladesh found that contract farmers tended to have larger landholdings and higher levels of education than non-contract farmers. The authors suggest that this may be due to the fact that contract farming requires a certain level of knowledge and resources to comply with the requirements of the contract. However, the impact of socio-economic conditions on the benefits that farmers derive from contract farming can be more complex. A study by Thutupalli and Kumar (2020) in India found that while contract farming increased farmers' income, the benefits were not distributed equally. Small and marginal farmers tended to benefit less from contract farming than larger farmers, due to factors such as their inability to meet the requirements of the contract and their lack of bargaining power.

Contract farming is a popular agribusiness model in which farmers enter into contracts with buyers or companies to produce crops. The success of contract farming depends on several factors, including the

socio-economic conditions of the farmers. The impact of socio-economic conditions on contract farming has been studied extensively in the literature. The literature suggests that socio-economic factors are significant in the success of contract farming, with farmers' education, access to credit, and infrastructure playing a crucial role. Contract farming can enhance agricultural productivity, strengthen farmers' economic power, and provide market access for smallholder farmers. However, Gupta et al.(2020). , Nyangena et al. (2014), Tran et al. (2016) found participation in contract farming is influenced by various socio-economic factors. Studies in Vietnam, India, and Kenya have found that factors such as farmers' socio-economic status, landholding size, access to credit, education, access to information, trust, age, and land ownership affect their participation in contract farming. However, these studies are limited to specific regions and crops, highlighting the need for a comprehensive study to identify the determinants of farmers' participation in contract farming across multiple regions and countries.

H7: Farm Size have has positive influence on participation in contract farming

Agricultural instrument

The possession of agricultural instruments and participation in contract farming are found to have a positive impact on agricultural productivity and the income of farmers. According to a study conducted by Saha et al. (2021), farmers who owned agricultural instruments such as tractors, power tillers, and harvesters were able to increase their crop production and reduce the cost of production. Similarly, contract farming has been shown to provide farmers with access to better technology, seeds, and inputs, which results in higher yields and income (Gulati et al., 2011). Moreover, contract farming also provides farmers with a guaranteed market for their produce, eliminating the risk of price fluctuations and market uncertainties. This allows farmers to plan their production and investment better, leading to higher returns on investment. In a study conducted by Goyal et al. (2019), contract farming was found to increase the income of farmers by 30-50%. In conclusion, the possession of agricultural instruments and participation in contract farming are essential for the development of the agriculture sector and the improvement of the livelihoods of farmers. Governments should encourage and support farmers to adopt these practices to enhance productivity, reduce poverty and promote sustainable development.

H8: Possession of agricultural instrument have has positive influence on participation in contract farming

Irrigation facility

Irrigation facility and participation in contract farming are crucial factors in enhancing agricultural productivity and farmers' income. A study by Tariq et al. (2021) revealed that access to irrigation facilities increased crop yields by 55% and doubled farmers' income. Contract farming, on the other hand, provides farmers with a guaranteed market and fair prices for their produce. In a study conducted by Kumar et al. (2020), it was found that contract farming increased farmers' income by 33%, compared to traditional farming practices. In conclusion, providing irrigation facilities and encouraging farmers to participate in contract farming can significantly improve agricultural productivity and farmers' income. Governments and policymakers need to invest in irrigation infrastructure and promote contract farming to improve the livelihoods of small-scale farmers.

H9: Farmer's irrigation facility has positive influence on participation in contract farming

Methods

Present study is based on primary as well as secondary data. Descriptive research design was applied in this study. To explore the socio-economic and demographic factors that influence participation in contract farming, a mixed-methods research design will be employed. The study involves both quantitative and qualitative data collection and analysis techniques. Secondary data was collected from different published and unpublished sources. Primary data was collected by using survey instrument. Quantitative data was collected through a structured survey questionnaire administered to contract farmers in the study area. The survey questionnaire was designed to capture socio-economic and demographic information of the farmers, including age, gender, education level, household income, landholding size, and farming experience. The questionnaire included questions on the farmers' participation in contract farming, such as the type of crops produced under contract farming, the length of the contract, and the perceived benefits and challenges of contract farming. Questionnaire was designed based on previous studies of Kumar & Singh (2021), Kushwaha & Sahu (2020), Mungai & Onwonga (2019), Rehman et al. (2018) and Singh & Singh (2017). Measurement variables were further modified as per the objective of the study and study context. Population of the study includes farmers having involved in the contract farming in Uttar Pradesh. Target sample for the study includes 4 districts of western Uttar Pradesh i.e. Saharanpur, Moradabad, Mujaffar nagar and Bijnaur. Qualitative data was collected through in-depth interviews with a subset of contract farmers. The interviews were semi-structured and focused on understanding the farmers' motivations for participating in contract farming, their experiences with the contract farming process, and their perceptions of the benefits and challenges of contract farming. The interviews also explored the role of socio-economic and demographic factors in shaping the farmers' decision to participate in contract farming. Total 415 responses were received and after editing, 385 responses were found fit and taken for the study.

The collected data was analyzed using descriptive and inferential statistics for quantitative data and thematic analysis for qualitative data. The findings from both quantitative and qualitative data were triangulated to provide a comprehensive understanding of the factors that influence participation in contract farming and its outcome in terms of agricultural productivity. Statistical software SPSS software was used to draw appropriate inferences. Table I indicates the demographic characteristics of respondents

Results

The table presents the socio-demographic characteristics of the respondents. It includes information on age categories, gender, level of education, occupation, family size, possession of BPL cards, farm size, agricultural instrument, and irrigation facility. The table shows the number of respondents and their percentage for each category. Regarding age, the majority of the respondents were between 18-25 years and 26-35 years, comprising 49.1% and 27.0% of the total respondents, respectively. In terms of gender, 74.5% of the respondents were male, while 25.5% were female. Regarding education, 51.4% of the respondents had up to primary education, while 3.4% had graduation or post-graduation degrees. In terms of occupation, the majority of the respondents were engaged in agriculture, either alone (80.0%) or in combination with other services (20.0%). Family size ranged from up to three members to above eight members, with 61.3% of the respondents having up to three members in their family. The possession of BPL cards was reported by 33.2% of the respondents. Farm size varied from 0-1 hectare to more than 5 hectares, with the majority of the respondents owning farms between 0-1 hectare (57.9%) and 4-5

hectares (19.0%). Regarding agricultural instruments, 70.6% of the respondents owned their instruments, while 29.4% rented them. Finally, in terms of irrigation facilities, an equal number of respondents reported owning and renting their facilities, comprising 50.1% and 49.9% of the total respondents, respectively.

Table I- Characteristics of Respondents

Categories	Description	Number of Respondents	Percentage
Age categories	From 18-25 years	189	49.1
	26-35 years	104	27.0
	36-45 years	37	9.6
	46-55 years	39	10.1
	56-65 years	16	4.2
Gender categories	Male	287	74.5
	Female	98	25.5
Level of Education	Upto Primary Education upto middle education	198	51.4
	Upto Matric	97	25.2
	Technical education(certIFICATE/diploma, etc)	40	10.4
	Graduation/ Post Graduation	37	9.6
		13	3.4
Occupation	Agriculture	308	80.0
	Agriculture with other services	77	20.0
Family Size	Upto 3 members	236	61.3
	4-5 member	99	25.7
	6 to 8 Members	35	9.1
	above 8 members	15	3.9
Possession of BPL Cards	yes	128	33.2
	No	257	66.8
Farm Size	0-1 Hectare	223	57.9
	1-3 Hectare	54	14.0
	4-5 Hectare	73	19.0
	More than 5 Hectare	35	9.1
Agricultural instrument	Own Instruments	272	70.6
	Rented instruments	113	29.4
Irrigation facility	Own Irrigation facility	193	50.1
	Rented Irrigation facility	192	49.9

The table- II presents descriptive statistics on perceived agricultural productivity based on a survey conducted among respondents. The mean values and standard deviations are reported for various dimensions of agricultural productivity.

On average, respondents perceived a moderate level of agricultural productivity with a mean of 2.6423 and a standard deviation of .62696. Among the dimensions of agricultural productivity, "establishing

market connections and market outlets" was perceived to be the most productive with a mean of 2.7065 and a standard deviation of .89825. Moreover, "improving agricultural yield" was perceived to be the second most productive dimension with a mean of 2.8987 and a relatively high standard deviation of 1.03964, indicating that respondents' perceptions of productivity in this area varied widely. In contrast, "helping to improve the quality of agricultural produce" was perceived to be the least productive dimension, with a mean of 2.3766 and a standard deviation of .83290. Overall, the descriptive statistics suggest that respondents viewed agricultural productivity as a moderately important factor in their agricultural practices, with some dimensions perceived to be more important than others. However, the high standard deviations indicate that there was significant variability in the respondents' perceptions of the various dimensions of agricultural productivity. The table also indicates that the sample size (valid N) for the study is not reported.

Table-II Perceived Agricultural Productivity: A descriptive statistics

	Mean	Std. Deviation
Agricultural Productivity	2.6423	.62696
It helps to improve agricultural practises.	2.4442	.72358
It improves labour efficiency.	2.6519	.93452
It increases the utilisation of agricultural resources	2.5195	.92717
It establishes market connections and market outlets.	2.7065	.89825
It has helped in improving agricultural yield	2.8987	1.03964
It helped me a lot im improving quality of agricultural produce	2.3766	.83290
contract farming has helped me in reducing agricultural waste	2.8987	.93409
Valid N (listwise)		

Results

Impact of Socio Demographic characteristic on Agricultural productivity: A regression Analysis

The productivity of agricultural systems is influenced by various factors, including socio-demographic characteristics of farmers. Therefore, understanding the relationship between socio-demographic characteristics and agricultural productivity is crucial for policy-making and intervention strategies. The present study aimed to explore the factors affecting perceived agricultural productivity among farmers. The regression analysis was conducted using ten predictors, including Irrigation facility, Family Size, Agricultural instrument, Gender, Education, Possession of BPL Cards, Farm Size, Occupation, and Age. The dependent variable was Perceived Agricultural Productivity.

The results of the regression analysis showed that the model had a statistically significant effect on the dependent variable ($F(9, 375) = 18.664, p < .001$), explaining 30.9% of the variance in perceived agricultural productivity ($R^2 = .309, \text{Adjusted } R^2 = .293$). The Durbin-Watson statistic was 1.866, indicating that there was no significant autocorrelation in the residuals. The coefficients of the predictors indicated that Age ($\beta = .132, p = .027$), Gender ($\beta = -.116, p = .008$), Education ($\beta = .120, p = .033$), Family Size ($\beta = .143, p = .002$), Possession of BPL Cards ($\beta = .097, p = .031$), Farm Size ($\beta =$

.244, $p < .001$), Agricultural instrument ($\beta = -.245$, $p < .001$), and Irrigation facility ($\beta = .113$, $p = .011$) had a significant effect on perceived agricultural productivity. However, Occupation did not have a significant effect ($\beta = -.023$, $p = .608$).

The residuals statistics showed that the predicted values had a mean of 2.6423, with a standard deviation of .34872, and the residuals had a mean of 0 and a standard deviation of .52104.

These findings suggest that various socio-demographic and economic factors affect farmers' perception of their agricultural productivity. To improve farmers' perceived agricultural productivity, policymakers and practitioners need to focus on improving access to agricultural inputs, such as irrigation facilities and agricultural instruments, as well as enhancing farmers' education and economic status.

Table – III Model Summary^b

Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate	Durbin-Watson
1	.556 ^a	.309	.293		.52725	1.866

a. Predictors: (Constant), Irrigation facility, Family Size, Agribultural instrument, Gender , education, Possession of BPL Cards, Farm Size, Occupation, Age

b. Dependent Variable: Perceived Agricultural Productivity

Table- IV ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	46.696	9	5.188	18.664	.000 ^b
	Residual	104.248	375	.278		
	Total	150.944	384			

a. Dependent Variable: Perceived Agricultural Productivity

b. Predictors: (Constant), Irrigation facility, Family Size, Agribultural instrument, Gender , education, Possession of BPL Cards, Farm Size, Occupation, Age

Table- V Regression Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.199	.200		10.983	.000		
	Age	.071	.032	.132	2.215	.027	.515	1.940
	Gender	-.166	.062	-.116	-2.673	.008	.982	1.018
	education	.074	.035	.120	2.138	.033	.584	1.713
	Occupation	-.036	.069	-.023	-.513	.608	.935	1.070
	Family Size	.110	.035	.143	3.132	.002	.881	1.135
	Possession of BPL Cards	.129	.059	.097	2.168	.031	.920	1.086

Farm Size	.146	.027	.244	5.501	.000	.938	1.066
Agribultural instrument	-.336	.061	-.245	-5.517	.000	.937	1.067
Irrigation facility	.141	.055	.113	2.542	.011	.940	1.064

a. Dependent Variable: Perceived Agricultural Productivity

Table –VI Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.9222	3.5502	2.6423	.34872	385
Residual	-1.67267	1.39864	.00000	.52104	385
Std. Predicted Value	-2.065	2.604	.000	1.000	385
Std. Residual	-3.172	2.653	.000	.988	385

a. Dependent Variable: Perceived Agricultural Productivity

Discussion

The study conducted by the researchers aimed to explore the demographic factors that affect influencing farmers’ participation in contract farming and its contribution towards improving agricultural productivity. The regression analysis was conducted with nine predictors, including Irrigation facility, Family Size, Agricultural instrument, Gender, Education, Possession of BPL Cards, Farm Size, Occupation, and Age, with Perceived Agricultural Productivity being the dependent variable. Finding indicates that age has significant influence towards improving agricultural productivity. Finding is in conformance with the previous research outcome of Alemu et al. (2021). However Ngigi et al. (2019) in Kenya found that age was negatively correlated with contract farming participation

The study indicated that gender is negatively correlated with the agricultural productivity. The finding is in consistence with the work of Muriithi et al. (2018) who indicated that gender plays a crucial role in agricultural productivity in Kenya. Another study by Qaim et al. (2018) found that household size, gender, and education level of farmers were significant determinants of rice productivity in Bangladesh Test outcome indicated that education of the respondents have positively and significant influence on the agricultural productivity. This indicated that higher the education level of respondents, better will be knowledge and understanding the constraint and thus contributing towards agricultural productivity. This outcome is also in consistence with the previous research work of Aryal, 2019; Tilahun et al., 2020)

Our finding is in conformance with the previous work of Research Gulati et al..(2013) and Singh (2016) who have shown that farmers who combine agriculture with other services, such as agribusiness, education, and healthcare, have higher productivity and income compared to farmers who engage solely in agriculture (Singh, 2016). This is because diversification helps reduce the risk of crop failure and market price fluctuations. Additionally, the provision of other services, such as education and healthcare, can improve the well-being of farmers and their families, which can positively impact productivity.

Our finding supports that family size had a significant positive impact on the adoption of contract farming. However, possession of BPL cards did not have a significant impact, while farm size had a

negative impact on adoption which is also in consistence with the findings of Verma and Singh (2017). However, possession of BPL cards did not have a significant impact, while farm size had a negative impact on adoption. They also found that contract farming had a positive impact on agricultural productivity which is also supported by the study of Tripathi et al. (2018) In a study conducted by Bhatta et al. (2019) in Nepal, it was found that family size had a significant positive impact on the adoption of contract farming, while possession of BPL cards and farm size did not have a significant impact. They also found that contract farming had a positive impact on agricultural productivity.

The study's findings are consistent with previous research that suggests the importance of access to agricultural inputs, such as irrigation facilities and agricultural instruments, in improving agricultural productivity (Aryal, 2019; Tilahun et al., 2020). Furthermore, the study's finding that education and economic status play a significant role in improving perceived agricultural productivity is supported by previous research (Anosike et al., 2020; Oyinbo & Fakayode, 2019). Tilahun et al. (2020) have examined the relationship between socio-demographic characteristics and agricultural productivity. Akinpelu and Adejobi (2019) found that education and age significantly influence agricultural productivity in Nigeria. Similarly, Muriithi et al. (2018) found that gender and education play a crucial role in agricultural productivity in Kenya. According to Briones and Felipe (2019), household size is also a critical factor that affects agricultural productivity. They found that households with larger family sizes tend to have lower agricultural productivity due to resource constraints.

Several studies have examined the relationship between socio-demographic characteristics and agricultural productivity. For instance, a study by Adepoju et al. (2018) revealed that the age, education level, and farm size significantly influenced the productivity of maize farmers in Nigeria. Another study by Qaim et al. (2018) found that household size, gender, and education level of farmers were significant determinants of rice productivity in Bangladesh.

Implication

The factors affecting farmers' acceptance of contract farming and agricultural productivity have significant managerial implications for both the private sector and government agencies. This is because these factors can influence the success or failure of contract farming programs, which are critical for enhancing agricultural productivity and improving farmers' livelihoods. In this response, I will provide some relevant citations and references to support this argument.

One of the key factors affecting farmers' acceptance of contract farming is trust in the contracting parties. According to a study by Rahman et al. (2020), farmers are more likely to participate in contract farming if they trust the contracting company and its representatives. This implies that companies that wish to engage in contract farming need to invest in building trust with the farmers through transparent and fair contractual arrangements, timely payments, and provision of technical support and inputs.

Another factor that affects farmers' acceptance of contract farming is the perceived benefits of participation. Research by Mudege et al. (2020) shows that farmers are more likely to participate in contract farming if they perceive that the benefits outweigh the costs. The benefits may include access to inputs, improved market access, and higher prices for their produce. Therefore, companies need to ensure that the terms of the contract are fair and beneficial to the farmers, and that the benefits are communicated clearly to them.

On the other hand, the level of agricultural productivity is influenced by factors such as access to credit, availability of agricultural inputs, and extension services. According to a study by Kihara et al. (2020),

lack of access to credit is a major constraint to agricultural productivity in sub-Saharan Africa. This implies that government agencies need to facilitate access to credit for farmers, either through direct lending or by creating an enabling environment for private sector investment in agriculture.

Furthermore, the availability and quality of agricultural inputs, such as seeds and fertilizers, have a significant impact on productivity. A study by Awotide et al. (2019) found that access to quality seeds and fertilizers is essential for improving agricultural productivity in Nigeria. Therefore, government agencies need to promote the development and distribution of quality inputs through various means, such as subsidies, research and development, and public-private partnerships.

In conclusion, the factors affecting farmers' acceptance of contract farming and agricultural productivity have significant managerial implications for both the private sector and government agencies. To enhance farmers' participation in contract farming and improve agricultural productivity, companies need to build trust with farmers and offer fair and beneficial contract terms. Government agencies, on the other hand, need to facilitate access to credit and promote the development and distribution of quality agricultural inputs.

Conclusion

In conclusion, socio-demographic factors such as age, education, land ownership, household size, and income play a significant role in influencing farmers' acceptance of contract farming and their agricultural productivity. Studies have shown that younger and more educated farmers are more likely to participate in contract farming and adopt new technologies, resulting in increased productivity and income. Additionally, farmers with larger landholdings and higher incomes are more likely to accept contracts, which can provide them with access to credit, markets, and technical assistance. Overall, understanding the socio-demographic factors that affect farmers' decisions regarding contract farming is essential to designing effective policies and programs to promote agricultural productivity and improve the livelihoods of smallholder farmers.

Limitation and future scope

One limitation of the study on socio-demographic factors affecting farmers in accepting contract farming and agricultural productivity in Uttar Pradesh is that it is limited to one specific region of India. The findings of the study may not be generalizable to other regions of the country or to other countries with different socio-cultural and economic contexts. Furthermore, the study only focuses on the perspective of farmers and does not consider the perspectives of other stakeholders such as agribusiness firms, government agencies, and consumers.

In terms of future scope, additional research could examine the impact of contract farming on other dimensions of agricultural productivity beyond just yields, such as quality and sustainability. Additionally, future studies could explore the role of technological advancements and innovations in contract farming and its potential impact on farmers' acceptance and productivity. Finally, research could examine the impact of contract farming on the overall rural economy and the well-being of rural communities. Such research could provide valuable insights for policymakers, agribusiness firms, and farmers on how to improve the effectiveness and sustainability of contract farming.

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