

Research

Impact of Land Tenure Security on Farm Investment: Evidence from Jammu and Kashmir, India

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Abstract:

This study looks at how land tenure security affects farm investment in Jammu and Kashmir agriculture. Land tenure stability is seen as an important institutional element affecting farmers' investment decisions since it encourages long-term investment in productive agricultural assets. Using current research and empirical results from Jammu and Kashmir, the study investigates how different tenure structures influence investment behaviour. The findings show that secure tenure increases farm investment by enhancing access to institutional funding, boosting the use of modern agricultural technology, and stimulating investments in land development, irrigation, and other productive assets. In contrast, unstable tenancy arrangements hinder long-term investment due to uncertainty about future land use and restricted access to institutional assistance. The study concludes that improving land tenure security through formal tenancy arrangements, better land administration, increased credit availability, and effective extension services can significantly boost farm investment and contribute to long-term agricultural development in Jammu and Kashmir.

Keywords: Land tenure security, Farm investment, Agricultural productivity, Tenancy, Jammu and Kashmir

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1.Introduction

Agriculture is a critical component of the Indian economy, making substantial contributions to food security, employment, and rural lifestyles. Despite rising economic diversification, agriculture remains the principal source of income for a considerable part of the rural people in the Union Territory of Jammu and Kashmir (J&K). However, agricultural development in the region continues to face several challenges, including fragmented landholdings, limited access to institutional credit, insufficient irrigation facilities, and insecure land tenure arrangements, all of which limit farm productivity and investment (Government of India, 2024).

Land tenure security is the confidence that farmers have about their rights to own, cultivate, lease, or transfer agricultural land without fear of losing those rights (Food and Agriculture Organization [FAO], 2002). Secure land tenure is commonly viewed as a

significant factor influencing agricultural investment since it gives farmers the confidence to engage in long-term improvements such as land development, irrigation infrastructure, soil protection, orchard establishment, and farm mechanisation. In contrast, insecure tenure diminishes farmers' incentives to invest due to uncertainty about future access to land and the capacity to recoup such expenditures (Besley, 1995). The link between land tenure security and agriculture investment has received substantial attention in the development economics literature. Secure property rights promote productive investment by lowering uncertainty, increasing access to institutional finance via collateral value, and supporting efficient resource allocation (Feder & Feeny, 1991). Empirical research have repeatedly demonstrated that farmers with secure land rights invest more in land improvements, use

contemporary agricultural technology, and are more productive than those with insecure tenure arrangements (Deininger, 2003; Place, 2009). As a result, enhancing land tenure security has emerged as a key policy goal for encouraging long-term agricultural prosperity in many developing nations. In India, despite the fact that land reforms have significantly transformed agricultural relations and enhanced ownership rights, informal tenancy arrangements persist in several states. Such relationships are frequently based on verbal agreements with no legal protection, causing uncertainty for tenant farmers and limiting their access to institutional loans, government assistance programs, and long-term investment prospects (Government of India, 2024). Similar arrangements occur in Jammu and Kashmir, where owner farmers, fixed-rent renters, and sharecroppers coexist with varied levels of tenure security. The lack of formal tenancy contracts, as well as the uncertainty surrounding lease continuance, may deter tenant farmers from undertaking productive investments that improve agricultural sustainability and profitability. Despite the significance of land tenure security in influencing farmers' investment decisions, empirical information from Jammu and Kashmir is scarce. Most prior research has focused on land reforms, agricultural production, or tenancy systems, with little emphasis paid to how alternative tenure arrangements influence farm investment decisions. Understanding this link is especially essential since investment in land renovation, irrigation, machinery, and other productive assets has a significant impact on agricultural output, resource efficiency, and rural lives.

Given this context, the current study looks at the impact of land tenure security on agricultural investment in Jammu and Kashmir agriculture. The study aims to offer empirical evidence on the effect of tenure security in boosting agricultural investment by examining the investment behaviour of farmers operating under various tenure arrangements. The findings are likely to add to the current research on land tenure and agricultural development, as well as provide policy suggestions for improving tenure security and fostering long-term agricultural growth in the region.

2. Objectives

- To examine the impact of land tenure security on farm investment in J&K agriculture.

- To empirically analyse the extent of adoption of HYV seeds among sharecroppers, owner operators and fixed renters.

3. Database and Methodology

3.1 Data Base

The study primarily employs primary data of 432 respondents of Jammu, Kathua and Rajouri districts during 2023-2024 collected through structured schedule with the help of multistage sampling technique. The variables used in the analysis are given below table 1.

Table 1: Variable Description

Variables	Symbol
Adoption of high yield varieties (HYV) seeds	ADP
Credit	CR
Farming Experience	LnFXP
Land Tenancy Security	LTS
Irrigation	IRR
Area	LnAR
Distance	DIS

3.2 Methodology

The Logit model is used in this analysis where the dependent variable is binary, taking values of 1 or 0. Let Y_i denote the binary outcome variable, where:

$$Y_i = \begin{cases} 1, & \text{if the event occurs} \\ 0, & \text{otherwise} \end{cases}$$

Let P_i be the probability that the event occurs:

$$P_i = P(Y_i = 1 | X_i)$$

The logistic regression model expresses this probability as:

$$P_i = \frac{e^{(\beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki})}}{1 + e^{(\beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki})}}$$

where:

- P_i = probability of the event occurring,
- β_0 = intercept,
- $\beta_1, \beta_2, \dots, \beta_k$ = regression coefficients,
- $X_{1i}, X_{2i}, \dots, X_{ki}$ = explanatory variables,
- e = base of the natural logarithm (approximately 2.718).

The odds of the event occurring are defined as:

$$\text{Odds} = \frac{P_i}{1 - P_i}$$

Taking the natural logarithm of the odds yields the logit transformation:

$$\ln\left(\frac{P_i}{1 - P_i}\right) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki}$$

The left-hand side is called the log-odds (logit). Each coefficient β_j measures the change in the log-odds of the outcome associated with a one-unit increase in the corresponding explanatory variable, holding all other variables constant. The exponentiated coefficient, e^{β_j} , represents the odds ratio, indicating how the odds of the event change for a one-unit increase in X_j .

Here dependent variable is adoption of modern varieties HYV seeds. The econometric equation is given as follows.

$$ADP_i = \beta_0 + \beta_1 DSC_i + \beta_2 DOW_i + \beta_3 EXT_i + \beta_4 CR_i + \beta_5 LnFXP_i + \beta_6 IRR_i + \beta_7 LnAR_i + \beta_8 DIS_i + \epsilon_i$$

Since the outcome variable is of binary in nature, logit framework has been applied and it shows in below equations. LTS consist of DSC (dummy variable for sharecropper), DOW (dummy variable for owner operators) and benchmark dummy being fixed renters and other controlled variables based on literature.

4. Results and Discussion

4.1 Multicollinearity test

Before proceeding towards the analysis, it is pertinent to check for multicollinearity through VIF among the independent variables. In empirical model VIF value is less than 10 so there is no multicollinearity among the explanatory variables.

Table 2: VIF Results

Variable	Centered VIF
DSC	1.35
DOW	1.48
EXT	1.19
CR	1.08
IRR	1.45
DIS	1.06
LnAR	1.10
LnFXP	1.24

4.2 Regression Results

For logit model results the odds ratio has been calculated which is defined as when the independent variable is increased by one unit, the odds ratio (OR) indicates how much the odds of the outcome change

and the link between a predictor variable and the probability of a specific event is measured by the odds ratio.

The Logit model findings in table 2 reveal a McFadden R^2 of 0.38, indicating a satisfactory explanatory capacity regarding farmers' adoption of contemporary high-yielding variety (HYV) seeds. Among the explanatory variables, credit availability (CR) exerts a positive and statistically significant influence ($\beta = 1.704$, $p < 0.01$). An odds ratio of 5.497 signifies that farmers with access to financing are almost 5.5 times more likely to adopt high-yield variety (HYV) seeds compared to those without credit, reflecting a 449.7% increase in the likelihood of adoption. Extension services (EXT) significantly enhance adoption at the 10% level, augmenting the likelihood of adoption by 55.6%. The size of the farm (LnAR) exerts a positive and statistically significant influence ($p < 0.01$), whereby a one-unit increase in the logarithm of cultivated area enhances the likelihood of adopting HYV seeds by 92.0%. Conversely, distance (DIS) exerts a negative and statistically significant influence ($p < 0.05$), suggesting that farmers situated further from markets or service centers are 19.2% less inclined to embrace high-yield variety (HYV) seeds. The tenure structure is also a crucial factor. In comparison to the reference category (fixed-rent renters), sharecroppers (DSC) are 75.8% less inclined to adopt HYV seeds, whilst owner cultivators (DOW) are 56.3% less inclined, indicating that fixed-rent tenants have the greatest likelihood of adoption among the three tenure categories. Conversely, farm experience (LnFXP) and irrigation (IRR) exhibit the anticipated positive and negative impacts, respectively; nevertheless, they are statistically insignificant, suggesting that they do not substantially affect HYV seed uptake in the research region. The data indicate that availability to financing, extension support, bigger operational holdings, accessibility to services, and tenure arrangements are the primary factors of physical capital accumulation via HYV seed uptake.

Table 3: logit model estimates

Variable	Coefficient (β)	z-statistic	p value	Odds Ratio [$\exp(\beta)$]	% Change in Odds
CR	1.704*	2.943	0.0032	5.497	449.7%
EXT	0.402***	1.658	0.0973	1.556	55.6%
DIS	-0.160**	-0.707	0.0476	0.808	-19.2%
LnAR	0.608*	3.363	0.0008	1.920	92.0%
LnFXP	0.326	1.409	0.1586	1.426	42.6%

IRR	-0.303	1.534	0.2212	0.739	-26.1%
DSC	-1.424*	-5.096	0.0000	0.242	-75.8%
DOW	-0.806*	-2.695	0.0070	0.437	-56.3%
Constant	-2.644***	-1.988	0.0468	0.080	-92.0%
McFadden R-squared	0.38				

Note: *, ** and *** denotes 1%, 5% and 10% probability levels

Source: Computed from field survey

4. Conclusion

The findings reveal that the adoption of HYV seeds is significantly influenced by access to credit, extension services, operational landholding, distance, and land tenure arrangements. Credit availability, extension support, and larger farm size enhance the likelihood of adopting HYV seeds, whereas greater distance reduces adoption. Compared with fixed-rent tenants, sharecroppers and owner cultivators are less likely to adopt HYV seeds, indicating that tenure arrangements play an important role in farmers' investment decisions. These findings suggest that strengthening institutional support and improving land tenure security are essential for promoting physical capital accumulation in agriculture. Therefore, policy efforts should focus on expanding access to affordable institutional credit, strengthening agricultural extension services, improving rural infrastructure and market accessibility, promoting secure and long-term tenancy arrangements, and providing targeted support to small and tenant farmers. Such measures will encourage the adoption of modern agricultural technologies, enhance farm investment, and contribute to sustainable agricultural growth.

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