



OWNERSHIP OF CAPITAL ASSETS AND MAIZE PRODUCTIVITY IN DRY LAND VILLAGES: AN EMPIRICAL STUDY IN DAVANGERE DISTRICT OF KARNATAKA

Dr. Rajeshwari Pujari

Associate Professor & Principal, GFGC, Jagaluru, Davangere District, Karnataka

ABSTRACT This study examines the relationship between ownership of productive capital assets and maize productivity. It is based on primary data were collected during April–June 2022 from 360 farm households from predominantly dryland villages of Davangere District. Multistage random sampling method was used to select sample farmers. Out of 360 selected farmers 296 were able to provide information needed for the analysis. The study employed t-tests to assess productivity differences between asset owners and non-owners. The results reveal that ownership of tractors, bullock pairs, farm implements, tube wells and harvesting yards are found to be significantly associated with higher maize yield. Farm implements recorded the highest gross-income advantage (23.2%). However, farmers ranked bullock pairs first in perceived importance. The findings underscore the importance of improving access to productive assets for enhancing maize productivity under dryland conditions.

KEYWORDS :

1. INTRODUCTION

Agriculture in the dryland regions of Karnataka is characterized by erratic rainfall and limited irrigation facilities. Under such circumstance, crop productivity depends on, among other factors, ownership of capital assets such as tractors, bullock pairs, farm implements, tube wells, and harvesting yards. These assets facilitate timely farm operations. They help in improving resource-use efficiency, reduce production risks, and enhance crop yields. Maize has emerged as one of the most important commercial crops in Davangere district. In this district, substantial proportion of cultivation is undertaken under rainfed conditions. Consequently, availability of productive assets become critical determinants of farm productivity. Recent studies have also emphasized that access to capital assets significantly improves technical efficiency. It is particularly true among small and medium farmers in developing countries (Sheahan & Barrett, 2017).

There is adequate research literature relating to capital assets & farm productivity. Rai et al. (1972) observed dissimilar investment patterns across irrigated and rainfed regions. Studies conducted by Parameswarappa (1988) and Murukannaiah (2006) highlighted the importance of irrigation structures, livestock, machinery, and farm equipment in agricultural investment. Further Singh and Mishra (1974) reported positive relationship between investment in farm implements and farm size. Likewise, Mwanza Joseph (2011) observed that productive assets significantly increased agricultural output and household income. However, the existing literature has largely concentrated on aspects like; trends in capital formation, determinants of investment, and the income effects of asset ownership. Empirical evidence on the direct influence of ownership of specific capital assets on crop productivity at the farm level remains limited. It is particularly in dryland maize-growing regions of Karnataka. This gap assumes greater significance in regions where rainfed agriculture predominates. In this background, the present study examines the relationship between ownership of major capital assets and maize productivity in dryland villages of Davangere district. By comparing crop productivity between farmers possessing given capital assets with those who do not, the study provides empirical evidence on the contribution of capital asset ownership to agricultural performance.

2. METHODOLOGY

This study is based on the primary data collected through a survey from the sample farmers of Davangere district. The agriculture practice in the district predominantly dry land agriculture. Only about 1/4th of the villages of the district have the canal irrigation facility and remaining 3/4th of the villages don't have irrigation facility. Significant proportion of district farmers have the borewell irrigation facility but the water yield in these borewells is very low. It is particularly in the deficit rainfall years. Considering the objective of examining the relationship between ownership of capital assets and maize productivity under dryland farming conditions, Davangere district was purposively selected for the study. A multistage random sampling technique was adopted to select representative farm households from predominantly rainfed villages of the district. In the first stage three taluks have been randomly selected. From each taluk separate lists of villages which are not having the canal irrigation facility have been prepared. From each list 6 villages have been

selected. In this process, totally 18 villages have been selected. From each village 20 farm households were randomly selected leading to total sample of 360 farm households. Survey was conducted during April-June 2022. Out of 360 households interviewed 296 families were able to give information about maize productivity in 2021-2.

3. RESULTS AND DISCUSSION

The results given in table-1 compares maize yield per acre between farmers who owned and did not own selected capital assets. The results provide clear evidence of a positive and statistically significant association between asset ownership and maize productivity. The statistical significance of the differences is examined using the t-test. The t-value for tractor ownership is 7.399, which is significant at the one-percent level. Tractor ownership observed to be enabled the farmers to undertake crop production operations in a timely manner. Therefore, farmers with tractor ownership obtained the relatively higher Maize yield (23.8 qtl) compared to farmers without tractors (19.4 qtl).

Table-1: Ownership of Capital Assets and Maize Yield

Sl No	Capital Assets	Maize Yield, Qtl / acre		t Value
		Not Owned	Owned	
1	Tractor	19.4	23.8	7.399*
2	Bullock Pair	18.9	22.7	9.679*
3	Implements	18.1	22.3	9.999*
4	Tube well	19.0	22.4	7.193*
5	Harvesting Yard	19.9	23.2	3.162*

* indicate the significance at one percent probability level

Similarly, farmers with the possession of bullock pairs obtained the maize yield of 22.7 quintals compared to only 18.9 quintals among the farmers without the bullocks. Relatively high 't' value of 9.679 provide the strong evidence of systematic productivity differences between these farmers. Bullock pairs facilitate timely ploughing, inter-cultivation operations and other farm activities. The strongest statistical evidence is also observed for farm implements, with a t-value of 9.999. Ownership of implements improves farmers' ability to perform essential operations at the appropriate stage of crop growth which reduces operational delays and improves the efficiency.

Access to a tube well can provide supplementary irrigation during critical crop-growth stages and reduce dependence on uncertain rainfall. Its productivity-enhancing role is therefore particularly important during dry spells. Therefore, farmers with tube-well observed to obtained the maize yield of 22.4 quintals compared to 19 quintals among the farmers without tube-well. The difference significant at 1 percent probability. Though harvesting yard don't have direct impact on maize productivity, it was observed to be having positive association with the ownership many other assets like tractors, bullock pairs and implement. Hence, harvesting-yard has significant positive association with maize yield. Overall, the results demonstrate that all five capital assets are significantly associated with higher maize productivity.

Farmers owning each of the five capital assets obtained higher gross income compared to the farmers who did not owned such assets

(Table-2). Ownership contributes not only to physical productivity but also to the economic returns from maize cultivation. The largest percentage difference is observed among farmers owning farm implements. They earned the gross income of ₹40,179 per acre. It was 23.2 percent higher compared to the gross income earned by farmers without farm implements (₹32,604). Implements may enhance income primarily through timely execution of agronomic practices. Tractor ownership generated GI of ₹42,948 per acre compared with ₹34,998 for non-owners. It represents a 22.7 percent difference. Similarly, bullock-pair ownership was associated with a 22.6 percent higher income (₹40,847 against ₹33,310). These results indicate that timely land preparation and cultivation operations can translate productivity gains into higher economic returns.

Table-2: Ownership of Capital Assets and Gross Income from Maize

Sl No	Capital Assets	Maize Yield, Qtl / acre		% Difference
		Not Owned	Owned	
1	Tractor	34998	42948	22.7
2	Bullock Pair	33310	40847	22.6
3	Implements	32604	40179	23.2
4	Tube well	34200	40292	17.8
5	Harvesting Yard	35993	41700	15.9

The income advantage associated with tube-well ownership was relatively lower (17.8 percent) despite its potential to provide supplementary irrigation under uncertain rainfall. Harvesting-yard ownership recorded the smallest difference that is 15.9 percent. It reveals that the major contribution of harvesting yard may be through reducing post-harvest losses and improving handling rather than directly increasing field productivity.

An attempt has been made to examine the farmers' perceptions regarding the relative importance of different capital assets in enhancing maize productivity. The Garrett ranking technique was used to convert farmers' ordinal preferences into quantitative scores. In this method, each farmer was asked to assign ranks the selected assets according to their perceived importance. Subsequently, rank assigned to an asset is converted into a percentage position using the standard Garrett formula which is based on the number of assets ranked and the particular rank obtained. Then corresponding Garrett table value is assigned to each percentage position. The mean Garrett score for each asset is calculate by aggregating the scores across respondents and dividing by the number of respondents. A higher mean Garrett score indicates a stronger perceived importance of the asset. The results given in table-3 reveal a clear hierarchy of perceived importance. Bullock pairs occupy the first rank with the highest mean Garrett score of 61.00. It indicates that farmers perceive bullock pair as the most important capital asset. Timely performance of inter-cultivation is most important and there is no substitute for this operation. But still most of the small and marginal farmers reluctant to own them due to maintenance problem and economic viability.

Table-3: Perceived importance of capital assets in Maize Productivity

Sl. No.	Capital Asset	Mean Garret Score	Rank
1	Bullock Pair	61.00	I
2	Tube well	59.17	II
3	Tractor	56.67	III
4	Implements	53.33	IV
5	Harvesting Yard	43.33	V

Tube wells reported to be most important for supplementary irrigation in reducing the risks arising from erratic rainfall. Thus, tube wells secured second rank with the mean score of 59.17. Tractors rank third (56.67), suggesting substantial importance of mechanisation, although their perceived role is somewhat lower than that of bullock pairs. Farm implements rank fourth with the mean score of 53.33, whereas harvesting yards record the lowest score (43.33) and rank fifth. The relatively low ranking of harvesting yards indicates that farmers perceive post-harvest infrastructure as less important. They perceive that it is less critical to crop productivity itself than assets directly involved in production operations. Interestingly, although farm implements recorded the highest t-value in Table 1, farmers ranked them fourth in perceived importance. Overall, Garret ranking results suggests that farmers place greatest importance on assets that ensure timely field operations and reduce rainfall-related production risks.

4. CONCLUSION

Ownership of productive capital assets observed to be significantly

enhanced maize productivity in dryland conditions of Davangere district. Tractors, bullock pairs, farm implements and tube wells were associated with significantly higher maize yields. Their ownership was also associated with higher gross income; particularly for implements, tractors and bullock pairs. Farmers' perceptions, however, ranked bullock pairs first, followed by tube wells and tractors. The study highlights the need to improve small and marginal farmers' access to productive assets. Animal power and supplementary irrigation facilities could significantly contribute to maize productivity and resilience to rainfall uncertainties.

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