



ISSN Print: 2664-844X
ISSN Online: 2664-8458
NAAS Rating (2026): 4.97
IJAFA 2026; 8(9): 10-14
www.agriculturaljournals.com
Received: 08-06-2026
Accepted: 12-07-2026

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An economic analysis of marketable and marketed surplus of paddy in Gadchiroli district of Maharashtra

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DOI: <https://www.doi.org/10.33545/2664844X.2026.v8.i9a.1849>

Abstract

Paddy is an important food and income-generating crop in India and plays a significant role in the livelihood of farming households. The present study was conducted to estimate the marketable and marketed surplus of paddy and to identify the factors affecting marketable surplus among selected paddy farmers in Gadchiroli district of Maharashtra during the agricultural year 2025-2026. Primary data were collected from 90 farmers selected through a multi-stage sampling technique from Desaiganj (Wadsa), Chamorshi and Dhanora areas. The overall paddy production was 4,872 quintals, with an average productivity of 31.26 q/ha. The overall marketable surplus was 3,985.65 quintals (44.28 q/farm), while marketed surplus was 3,935.20 quintals (43.72 q/farm). Larger farmers recorded higher per-farm marketable and marketed surplus, whereas marginal farmers retained a greater proportion of their production for household and farm requirements.

Regression analysis showed that production and landholding size had positive and significant effects on marketable surplus at the 1 per cent level. Seed retained had a negative and significant effect at the 1 per cent level, while storage loss, wages paid in kind and family size had negative and significant effects at the 5 per cent level. Family consumption had a negative but non-significant effect. The coefficient of determination (R^2) was 0.98, indicating that 98 per cent of the variation in marketable surplus was explained by the variables included in the model. The study suggests that increasing paddy production, improving land productivity, reducing storage losses and efficient management of farm and household requirements can help enhance marketable surplus and strengthen the market participation and income of paddy farmers in Gadchiroli district.

Keywords: Paddy, marketable surplus, marketed surplus, farm size, production, regression analysis, Gadchiroli district

Introduction

Paddy is one of the most important food crops in India and plays a significant role in ensuring food security, rural employment and farm income. Rice, obtained from paddy, is a major staple food for a large proportion of the Indian population and is cultivated extensively across different agro-climatic regions of the country. The crop contributes substantially to agricultural production and supports the livelihoods of millions of farm households, particularly small and marginal farmers. Paddy cultivation also generates employment opportunities through various activities such as land preparation, transplanting, harvesting, threshing, processing and marketing.

India is one of the major producers and consumers of rice in the world. Paddy cultivation is carried out under diverse production systems, ranging from rainfed to irrigated conditions. The level of production and productivity varies across regions depending upon rainfall, irrigation facilities, soil conditions, availability of quality seed, technology adoption, farm size and access to agricultural inputs. Maharashtra is also an important paddy-growing state, particularly in the eastern and north-eastern regions, where favourable rainfall and agro-climatic conditions support paddy cultivation. The crop is an important source of food and income for farming households in these areas.

Gadchiroli district of Maharashtra has considerable importance in paddy cultivation, particularly among rural households whose livelihoods are closely associated with agriculture.

Paddy is one of the major crops grown in the district, and a substantial proportion of farmers depend on its production for household consumption as well as income generation. However, the quantity of paddy available for sale is not equal to the total quantity produced on the farm. A part of production is retained by farmers for family consumption, seed requirements, wages paid in kind, storage losses and other farm-level requirements. The quantity remaining after meeting these requirements represents the marketable surplus.

Marketable surplus refers to the quantity of agricultural produce that is available with the farmer for disposal in the market after meeting various farm and household requirements. In contrast, marketed surplus represents the actual quantity of produce sold by the farmer in the market. The difference between marketable surplus and marketed surplus may arise because farmers may retain part of the produce for future consumption, storage, price expectations or other purposes. Thus, both marketable and marketed surplus are important indicators for understanding the production and marketing behaviour of agricultural households.

The study of marketable and marketed surplus is important from the perspective of agricultural marketing, price policy, food supply and farm income. Estimation of surplus helps in understanding the quantity of paddy entering the market and the extent to which farmers participate in agricultural markets. It also provides useful information for developing appropriate storage, procurement, transportation, market infrastructure and institutional support mechanisms. Therefore, analysing the factors influencing the availability of paddy for marketing is essential for improving the efficiency of the agricultural marketing system and strengthening the economic position of farmers.

In this context, the present study focuses on the marketable and marketed surplus of paddy in Gadchiroli district of Maharashtra. The study attempts to examine the production and utilization pattern of paddy, estimate the marketable and marketed surplus, and identify the major factors influencing the Marketable surplus among selected paddy farmers.

Objective

1. To Estimate the marketable surplus and marketed surplus of Paddy in Gadchiroli District
2. To study Factors affecting Marketable surplus.

Methodology

Data and sampling

The study was conducted in Gadchiroli district of Maharashtra during the agricultural year 2025-2026. Primary data were collected from 90 selected paddy farmers through a pre-tested interview schedule

A multi-stage sampling technique was adopted for the selection of respondents. Paddy-growing farmers were selected from Desaiganj (Wadsa), Chamorshi and Dhanora areas. The selected farmers were classified into four groups based on their operational landholding: Marginal (below 1.00 ha), Small (1.00-2.00 ha), medium (2.01-4.00 ha) and Large (4.01-10.00 ha). The sample comprised 26 marginal, 42 small, 17 semi-medium and 5 medium farmers, making a total of 90 respondents. The collected data were used to estimate the marketable and marketed surplus of paddy and to analyse the factors affecting marketable surplus.

Concepts used

1. Farm Requirement

Farm requirement refers to the quantity of paddy retained by the farmer to meet farm and household needs, such as family consumption, seed requirement, storage loss, wages paid in kind and other necessary uses.

2. Marketable Surplus

Marketable surplus refers to the quantity of paddy available with the farmer for sale after meeting the farm and household requirements from total production.

3. Marketed Surplus

Marketed surplus refers to the actual quantity of paddy sold by the farmer in the market during the reference period.

4. Factors affecting Marketable Surplus

The quantity of paddy available for marketing depends on several farm-level and household factors. Marketable surplus is influenced not only by the total production of paddy but also by the quantity retained for family consumption, seed requirements, storage losses, wages paid in kind and other farm requirements. Landholding size and production capacity may increase the availability of surplus, whereas higher household consumption and retention requirements may reduce it. Therefore, identifying the factors affecting marketable surplus is important for understanding the marketing behaviour of paddy farmers. In the present study, factors such as production, family consumption, landholding, seed retained, storage loss and wages paid in kind were considered to examine their influence on the marketable surplus of paddy farmers in Gadchiroli district.

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 + b_6 X_6 + b_7 X_7$$

Where,

- Y = Marketable
- a = constant

b_1 - b_7 = Regression coefficients of the respective independent variables

- X_1 = Production of paddy (quintals)
- X_2 = Family consumption (quintals)
- X_3 = Land holding (hectares)
- X_4 = Seed retained (quintals)
- X_5 = Storage loss (quintals)
- X_6 = Wages paid in kind (quintals)
- X_7 = Family size (number of members)

Tools used for data analysis

The statistical tools such as Mean, Percentage, and Regression Analysis have been used for the purpose of analysis.

Result and Discussion

The results of the present study assess the production, utilization, marketable and marketed surplus of paddy among selected farmers in Gadchiroli district of Maharashtra during 2025-2026. The study also examines the factors affecting marketable surplus across different farm-size groups using suitable statistical methods. The findings are presented in relation to the objectives of the study.

Productivity of Paddy across Different Farm Size Groups

The productivity of paddy varied across different farm-size groups, reflecting differences in landholding size. Productivity is an important measure of farm performance as it indicates the quantity of paddy produced per unit of cultivated area. In the present study, paddy productivity was estimated on a per hectare basis for different farm-size

groups to examine variations in production efficiency among the selected farmers. The comparison of productivity across farm-size groups helps to understand the differences in the use of land and other farm resources and provides an indication of the production performance of paddy farmers in the study area.

Table 1: Distribution of Production of Paddy Farmers in different farm size (Quantity in Quintal)

S.N.	Particulars	Size of Group				Overall
		Marginal	Small	Medium	Large	
1	Total Area (ha)	14.58	61.64	51.49	28.12	155.83
2	Total Production (Quintal)	491	1874	1567	940	4872
3	Per Hectare production (q/ha)	33.68	30.40	30.43	33.43	31.26

The table indicates that the total area under paddy cultivation among the selected farmers was 155.83 ha, with the highest area reported under the small farm-size group (61.64 ha), followed by the medium group (51.49 ha), large group (28.12 ha) and marginal group (14.58 ha). Correspondingly, the total paddy production was 4,872 quintals. The small farmers recorded the highest total production of 1,874 quintals, followed by medium farmers (1,567 quintals), large farmers (940 quintals) and marginal farmers (491 quintals). The higher total production among small farmers was mainly due to their larger share in the total cultivated area.

The overall productivity of paddy was 31.26 q/ha. The highest productivity was observed among marginal farmers (33.68 q/ha), followed by large farmers (33.43 q/ha), while medium farmers recorded 30.43 q/ha and small farmers recorded the lowest productivity of 30.40 q/ha. This

indicates that productivity did not necessarily increase with farm size. Marginal and large farmers achieved relatively higher productivity per hectare, whereas small and medium farmers recorded comparatively lower productivity. The variation may be attributed to differences in production practices, input use, resource management and other farm-level factors. Overall, the results indicate considerable variation in paddy productivity across different farm-size groups.

Production, utilization and marketable surplus of Paddy

Production and utilization of paddy determine the quantity available for marketing. A part of production is retained for family consumption, seed, storage losses and wages, while the remaining quantity constitutes the marketable surplus. The analysis examines these components across different farm-size groups.

Table 2: Farm Size-wise Production, Utilization and Marketable Surplus of Paddy (Quantity in Quintal per Farm)

S. N.	Particulars	Size of group				Overall
		Marginal	Small	Medium	Large	
1	Total production	18.88 (100.00)	44.61 (100.00)	92.17 (100.00)	188.00 (100.00)	54.13 (100.00)
2	Family consumption	7.23 (38.29)	8.30 (18.61)	10.23 (11.10)	10.60 (5.54)	8.48 (15.67)
3	Seed retained	0.15 (0.79)	0.38 (0.85)	0.69 (0.75)	1.22 (0.65)	0.42 (0.78)
4	Storage loss	0.20 (1.06)	0.48 (1.08)	0.73 (0.79)	1.60 (0.85)	0.51 (0.94)
5	Wages paid in kind	0.00 (00.00)	0.00 (00.00)	1.11 (1.20)	3.80 (2.02)	0.42 (0.78)
6	Total Retention	7.59 (40.20)	9.17 (20.56)	12.78 (13.87)	17.22 (9.16)	9.84 (18.18)

*Figures in parenthesis indicate percentage

The table shows the production and utilization pattern of paddy across different farm-size groups. The overall paddy production was 54.13 quintals per farm, of which 15.67 per cent was used for family consumption, 0.78 per cent was retained as seed, 0.94 per cent was lost during storage and 0.78 per cent was paid as wages in kind. Thus, the overall total retention was 18.18 per cent of total production.

Among the farm-size groups, family consumption was highest among marginal farmers (38.29%) and lowest among large farmers (5.54%). Seed retention ranged from 0.65 to 0.85 per cent, while storage losses varied from 0.79 to 1.08 per cent. Wages paid in kind were reported only among medium and large farmers, accounting for 1.20 and 2.02 per cent, respectively. The highest total retention was observed among marginal farmers (40.20%), followed by small farmers (20.56%), medium farmers (13.87%) and large farmers (9.16%). This indicates that larger farmers retained a relatively smaller proportion of their production

for farm and household requirements, leaving a greater proportion available for marketing.

Marketable and marketed surplus of paddy on sample farm

The marketable and marketed surplus of paddy indicates the quantity of produce available with farmers for sale and the quantity actually disposed of through the market. Marketable surplus is determined after meeting the various farm and household requirements from total paddy production, whereas marketed surplus represents the actual quantity sold by the farmers. The table presents both total and per-farm marketable and marketed surplus across different farm-size groups. The comparison helps to assess the variation in surplus availability with changes in farm size and to understand the extent to which farmers convert their marketable surplus into actual market sales. This analysis also provides an indication of the marketing behaviour of paddy farmers in the study area.

The table indicates that the overall marketable surplus of paddy was 3,985.65 quintals, with an average of 44.28 quintals per farm. Among the different farm-size groups, small farmers recorded the highest total marketable surplus of 1,488.45 quintals, followed by medium farmers with 1,349.70 quintals, large farmers with 853.90 quintals, and marginal farmers with 293.60 quintals. The higher total surplus among small and medium farmers can be attributed mainly to their larger representation in the sample. However, when considered on a per-farm basis, the marketable surplus showed a clear increasing trend with farm size. It increased from 11.29 quintals per farm among marginal farmers to 170.78 quintals per farm among large farmers, indicating that farmers with larger landholdings

generally had greater quantities of paddy available for marketing.

The overall marketed surplus was 3,935.20 quintals, with an average of 43.72 quintals per farm. Small farmers accounted for the highest total marketed surplus of 1,476.15 quintals, followed by medium farmers with 1,324.00 quintals, large farmers with 852.00 quintals, and marginal farmers with 281.05 quintals. On a per-farm basis, marketed surplus also increased substantially with farm size, rising from 10.80 quintals among marginal farmers to 170.40 quintals among large farmers. This indicates that larger farmers not only had greater marketable surplus but also sold a larger quantity of paddy in absolute terms.

Table 3: Farm Size-wise Distribution of Marketable and Marketed Surplus of Paddy (Quantity in Quintal)

S.N.	Farm Size	Paddy				Overall
		Marginal (below 1)	Small (1-2)	Medium (2 to 4)	Large (4-10)	
1	Marketable surplus	293.60	1488.45	1349.70	853.90	3985.65
2	Per farm Marketable Surplus	11.29	35.43	79.39	170.78	44.28
3	Marketed surplus	281.05	1476.15	1324.00	852.00	3935.20
4	Per farm Marketed Surplus	10.80	35.19	77.88	170.40	43.72

The difference between marketable and marketed surplus was relatively small across the farm-size groups, indicating that farmers sold a major proportion of the paddy available for marketing. The close relationship between the two measures suggests that most farmers participated actively in the paddy market rather than retaining a substantial quantity after meeting their household and farm requirements. Overall, the findings demonstrate a positive relationship between farm size and per-farm marketable as well as marketed surplus. Thus, larger landholdings were associated with greater availability of paddy for sale and higher actual market disposal, while marginal farmers had comparatively limited surplus because of their smaller production base and greater relative household requirements.

Factor affecting Marketable Surplus

Marketable surplus of paddy refers to the quantity of paddy that remains available for sale after meeting the farm

family's requirements for consumption, seed, wages paid in kind, and allowances for storage losses. The quantity of marketable surplus is influenced by various production and farm-level factors. In the present study, factors such as paddy production, landholding size, family consumption, seed retained, storage losses, and wages paid in kind were considered to examine their influence on marketable surplus. Generally, higher paddy production and larger landholdings are expected to increase the quantity of paddy available for marketing, while greater household consumption, seed retention, storage losses, and payment of wages in kind may reduce the quantity available for sale. Understanding these factors is important for identifying the major determinants of marketable surplus and for developing appropriate measures to improve the market participation and income of paddy farmers in Gadchiroli district.

Table 4: Factor Affecting Marketable Surplus of Paddy in Gadchiroli

S. N.	Variables	Coefficients
1	Interception	-0.11
2	Production (X_1)	0.99***
3	Consumption (X_2)	-0.06NS
4	Land holding (X_3)	1.47***
5	Seed Retain (X_4)	-0.11***
6	Storage loss (X_5)	-0.07**
7	Wages (X_6)	-0.10**
8	Family members (X_7)	-0.16**
9.	R^2	0.98

Note: *** Indicates Significant at 1%, **Indicates Significant at 5%, Not significant (NS)

The regression analysis was conducted to identify the factors influencing the marketable surplus of paddy among the selected farmers. The coefficient of determination (R^2) was 0.98, indicating that 98 per cent of the variation in marketable surplus was explained by the variables included in the regression model, namely production, consumption, landholding size, seed retained, storage loss, wages paid in kind, and family members. The remaining 2 per cent

variation may be attributed to other factors not included in the model. Thus, the model had a very high explanatory power and provided a good fit to the data.

The coefficient of production (X_1) was 0.99 and statistically significant at the 1 per cent level, indicating a positive and significant effect on marketable surplus. This suggests that an increase in paddy production results in an increase in the quantity available for marketing. Landholding size (X_3) had

a positive coefficient of 1.47 and was significant at the 1 per cent level, showing that farmers with larger landholdings tend to have higher marketable surplus due to their greater production capacity.

In contrast, consumption (X_2) had a negative coefficient of -0.06 but was non-significant, indicating that although higher family consumption tends to reduce marketable surplus, its effect was not statistically significant. Seed retained (X_4) had a coefficient of -0.11 and was significant at the 1 per cent level, indicating that retaining more paddy for seed purposes reduces the quantity available for sale. Similarly, storage loss (X_5) had a negative coefficient of -0.07 and was significant at the 5 per cent level, suggesting that higher storage losses reduce marketable surplus.

The coefficient of wages (X_6) was -0.10 and significant at the 5 per cent level, indicating that paddy paid to labourers as wages reduces the quantity available for marketing. Family members (X_7) had a coefficient of -0.16 and was significant at the 5 per cent level, suggesting that larger family size is associated with lower marketable surplus because a greater quantity of paddy may be required to meet household requirements.

Overall, the results indicate that production and landholding size were the major positive and significant factors affecting marketable surplus, while seed retention, storage losses, wages paid in kind, and family size had significant negative effects. Family consumption showed a negative but non-significant relationship. The high R^2 value of 0.98 confirms that the selected variables collectively explained most of the variation in marketable surplus among the sampled paddy farmers.

Conclusion

The paper concludes that paddy production, marketable surplus and marketed surplus varied across farm-size groups in Gadchiroli district. The overall marketable surplus was 3,985.65 quintals, while marketed surplus was 3,935.20 quintals, indicating that farmers sold a major proportion of their marketable surplus. Per-farm surplus increased with farm size, with large farmers recording the highest and marginal farmers the lowest surplus. Regression results showed that production and landholding size had positive and significant effects on marketable surplus, whereas seed retention, storage losses, wages paid in kind and family size had significant negative effects. Family consumption had a negative but non-significant effect. The R^2 value of 0.98 indicates that the model explained 98 per cent of the variation in marketable surplus.

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