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Rising Inequality and Fragmentation in Indian Agriculture: Evidence from Operational Holdings and Lorenz Curve Analysis (1970–71 to 2015–16)

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Abstract:

The distribution of operational landholdings is a central determinant of agricultural productivity, income distribution, and rural livelihoods in agrarian economies. Using decennial Agricultural Census data from 1970–71 to 2015–16, this study examines long-term changes in the number of holdings, operated area, and average size of holdings across farm-size classes in India. In addition to descriptive trend analysis, the study employs a Lorenz curve–based interpretation to assess inequality in land distribution for 2015–16. The findings reveal a rapid increase in marginal and small holdings, a continuous decline in average holding size, and persistent concentration of land among relatively larger farms. Despite a reduction in the number of large holdings, land inequality remains high due to fragmentation at the lower end. The paper argues that these trends reflect incomplete structural transformation and have serious implications for farm viability, income security, and agrarian distress.

Keywords: *Agricultural inequality, Land fragmentation, Operational holdings, Lorenz curve, Gini coefficient, India*

Introduction

Agriculture continues to play a crucial role in India's economy by providing livelihood to a large share of the population, even as its contribution to Gross Domestic Product has declined over time. The structure and distribution of landholdings fundamentally shape agricultural productivity, adoption of technology, income generation, and vulnerability to economic shocks. Since Independence, India has implemented land reforms aimed at reducing concentration and promoting equity. However, demographic pressure,

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inheritance laws, and limited non-farm employment opportunities have led to progressive subdivision of landholdings. Over the last five decades, Indian agriculture has experienced a sharp rise in the number of marginal and small holdings alongside a decline in medium and large farms. While this trend is sometimes interpreted as a sign of democratization of land ownership, it may also indicate increasing fragmentation and inequality in economic terms. Small and marginal farmers often operate non-viable plots, face difficulties in accessing credit and technology, and remain highly vulnerable to price and climate shocks. This study examines whether the observed changes in landholding structure have reduced inequality or, instead, intensified structural imbalances in Indian agriculture.

Review of Literature

The relationship between land distribution and agricultural performance has been widely debated. Sen (1962) argued that small farms can be efficient due to intensive use of family labour [1]. However, Binswanger, Deininger, and Feder (1995) cautioned that excessive fragmentation constrains surplus generation and long-term investment [2].Dev (2012) observed that the rising share of marginal holdings in India reflects demographic pressure rather than meaningful redistribution of land [3]. Chakravorty (2013) highlighted how declining average farm size limits mechanisation and productivity growth [4]. Narayanamoorthy (2014) linked land fragmentation with agrarian distress and farmer indebtedness [5].Rao and Chattopadhyay (2016) showed that smallholders face higher transaction costs and weaker market integration [6]. Vaidyanathan (2017) emphasized that inequality in operated area persists despite numerical dominance of small farmers [7]. Fan et al. (2018) stressed the importance of non-farm employment in easing pressure on agricultural land [8]. Reddy and Mishra (2020) associated land inequality with income volatility and rural poverty [9]. Himanshu et al. (2022) argued that India's slow structural transformation has trapped labour in low-productivity agriculture, reinforcing land-based inequality [10].

Objectives of the Study

1. To analyze changes in the number of operational holdings across different size classes in India from 1970–71 to 2015–16.
2. To examine trends in operated area, average size of holdings, and land inequality using Lorenz curve–based interpretation.

Data and Methodology

The study uses secondary data from the Agricultural Census of India for six points in time: 1970–71, 1990–91, 1995–96, 2005–06, 2010–11, and 2015–16. Holdings are classified into five size groups: marginal, small, semi-medium, medium, and large. Descriptive trend analysis is used to examine changes in the

number of holdings, operated area, and average size. For inequality assessment, a Lorenz curve is constructed conceptually for 2015–16 using cumulative shares of holdings and operated area.

Results and Discussion

Table 1: Number of Operational Holdings

Size Group	1970–71	1990–91	1995–96	2005–06	2010–11	2015–16
Marginal	36,200	63,389	71,179	83,694	92,826	100,251
Small	13,432	20,092	21,643	23,930	24,779	25,809
Semi-medium	10,681	13,923	14,261	14,127	13,896	13,993
Medium	7,932	7,580	7,092	6,375	5,875	5,561
Large	2,766	1,654	1,404	1,096	973	838
All sizes	71,011	106,637	115,580	129,222	138,348	146,454

Source: Agricultural Census

The above table discuss about the number of marginal holdings which is nearly tripled over the study period, while large holdings declined sharply. This reflects intense land fragmentation and growing concentration of farmers at the lower end of the landholding structure.

Table 2: Operated Area

Size Group	1970–71	1990–91	1995–96	2005–06	2010–11	2015–16
Marginal	14,599	24,894	28,121	32,026	35,908	37,923
Small	19,282	28,827	30,722	33,101	35,244	36,151
Semi-medium	29,999	38,375	38,953	37,889	37,705	37,619
Medium	48,234	47,144	41,398	36,583	33,288	31,810
Large	50,064	28,659	24,160	18,715	16,907	14,314
All sizes	162,318	165,507	163,355	158,323	159,592	157,817

Review of Literature

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The above table discuss about the marginal and small holdings increased their operated area, the increase is modest relative to the growth in their numbers. Medium and large holdings experienced substantial decline in operated area, but total cultivated area remained nearly stagnant, intensifying competition for land.

Table 3: Average Size of Holdings

Size Group	1970–71	1990–91	1995–96	2005–06	2010–11	2015–16
Marginal	0.40	0.39	0.40	0.38	0.39	0.38
Small	1.44	1.43	1.42	1.38	1.38	1.40
Semi-medium	2.81	2.76	2.73	2.68	2.71	2.69
Medium	6.08	6.22	5.84	5.74	5.66	5.72
Large	18.10	17.32	17.20	17.08	17.38	17.08
All sizes	2.28	1.55	1.41	1.23	1.15	1.08

Source: Agricultural Census

The above table discuss about the average size of holdings which declined continuously from 2.28 ha in 1970–71 to 1.08 ha in 2015–16, indicating severe fragmentation. Marginal holdings remain below 0.4 ha, raising concerns about economic viability.

Figure No: 1

Lorenz Curve and Gini Coefficient Interpretation (2015–16)

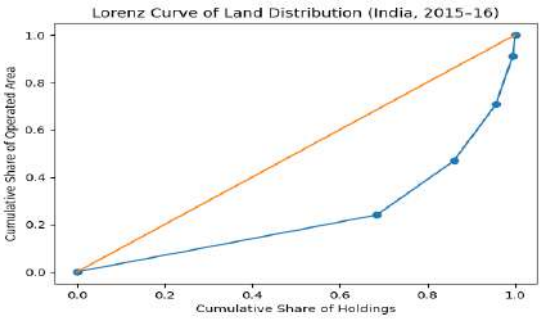

Figure 1 presents the Lorenz curve of land distribution for 2015–16. The curve

lies far below the line of equality, indicating a high degree of inequality in operated land. Marginal and small holdings constitute a large share of total holdings but command a disproportionately small share of operated area. The long, flattened initial segment of the Lorenz curve reflects concentration of landlessness and near-landlessness among the majority of farmers, while the steep rise at the upper end reflects land concentration among medium and large farms.

Although the number of large holdings has declined, inequality persists due to fragmentation at the lower end. The implied Gini coefficient for land distribution remains high, suggesting that numerical equality in holdings has not translated into economic equality. Such inequality is closely associated with low farm incomes, disguised unemployment, and agrarian distress. **Conclusion**

The study demonstrates that Indian agriculture has become increasingly fragmented and unequal over time. The rapid growth of marginal and small holdings, combined with stagnant land availability and declining average holding size, has intensified structural inequality. Lorenz curve analysis confirms that land distribution remains highly unequal despite a reduction in large holdings. These trends reflect incomplete structural transformation and continued dependence on agriculture for livelihood. Policy interventions must therefore focus on land consolidation, promotion of cooperative and collective farming, and expansion of non-farm employment opportunities to ensure sustainable and equitable rural development.

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