Income Generation and Inequality in India's Agricultural Sector: The Consequences of Land Fragmentation

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"How unequal is India?" Milanovic (2016) asked. "The question is simple," he wrote, "the answer is not." The findings in this paper partially answer this question. We analyse the NSSO's surveys of farmer/agricultural households in 2003 and 2013 using descriptive, decomposition tools, and estimate income inequality in the agricultural sector for India and its 17 largest states.

Recognising that there are differences in the way households were sampled in 2003 and 2013, we made adjustments to make the two surveys comparable. The survey has information on income from four sources: wages, net receipt from cultivation, net receipt from farming of animals, and net receipt from non-farm business. The share of wages in total income declines from 60% in households with less than 0.40 hectares of land to 3% among those with over 10 hectares. Conversely the share of net income from cultivation is highest among large landowners. This feature is the same in 2003 and 2013.

We find that inequality in per-capita incomes in 2013 (2003) as measured by Gini was 0.58 (0.63) while inequality in Monthly Per Capita Expenditure (MPCE) was 0.28 (0.27). Since the confidence intervals for inequality in income do not overlap, we can conclude that income inequality did reduce between 2003-2013. However, when we computed the half the-squared coefficient of variation, the confidence intervals overlapped, hence we could not conclude that income inequality declined over 2003-13. If there was indeed a reduction in income inequality, it may be partially attributable to changes in Madhya Pradesh, Chhattisgarh, Rajasthan where we observe the largest reductions in income inequality.

We compute state level estimates of inequality. The differences across states can be traced to state-level differences in the structures/patterns of income generation from agriculture. In order to highlight differences, we construct a Pen's Parade (Pen 1971) depicting how average incomes in each of 17 states changed over 2003-13 by land size class (those with up to 1 hectare of land and those with over 1 hectare of land). We construct the Parade for total income and for net income from cultivation. The Parade highlights the finding that landownership is the most important determinant of income and, therefore, income inequality. The relative lack of non-cultivation income sources in India's poorest states (Bihar, Jharkhand) is evident. In 2013, the total income of the larger landowners in these poorer states averaged less than that of smaller

landowners in states like Punjab, Kerala, Haryana, Tamil Nadu, Karnataka, and Gujarat. Madhya Pradesh and Chhattisgarh moved up in the Pen's Parade between 2003 and 2013. The average net income from cultivation of farmers with less than one hectare of land in these two states improved more than those of farmers with similar landholdings in other states with similar positions in the parade in 2003. We offer plausible explanations for the performance of Madhya Pradesh and Chhattisgarh.

Following Shorrocks (1982), we decompose total inequality in per-capita income and our key findings are as follows. First, the share of inequality accounted for by net income from cultivation increased from 39% in 2003 to 50% in 2013 while that of net income from farming of animals more than doubled from 7% to 16%. The share of the contribution of wages halved from 25% to 13% while the share of the contribution of non-farm business income reduced from 29% to 22% over 2003-2013.

In both years, the importance of per capita net receipts from cultivation as the driver of income inequality varies across states. The cross sectional findings are consistent with those by Davis et al (2011) who decomposed rural incomes in a cross section of countries.

Another question of interest pertains to decomposition of inequality across specific social groups. Similar to the findings in the literature on consumption inequality, we find that the "between" (social) group component does not account for more than 6% of total inequality in per capita incomes (and not more than 5% of total inequality in per capita cultivation incomes). This finding is true in both 2003 and 2013. Where we do indeed find a sizable contribution of the "between" group component of inequality is when we examine differences by size class of land owned by the household.

An additional insight comes from decomposing the contribution of landownership to inequality in the following three groups of states: (1) states that are part of the rice-wheat system (Punjab, Haryana, Uttar Pradesh, Bihar and West Bengal), (2) Chhattisgarh Madhya Pradesh and Odisha, and (3) the remaining nine large states. For the rice wheat system, the contribution of inequality between landownership groups to the total inequality in per capita net income from cultivation increased from 13% to 26% over 2003-2013. In Chhattisgarh, Madhya Pradesh, and Odisha too, the contribution of inequality between landownership groups to the total inequality in per capita net income from cultivation increased from 17% to 27%. It is only in the "other" group of states that we see that the share of inequality between landownership groups increased only marginally from 9% to 10%. We offer probable explanations for these differences.

Our estimates challenge the widely-held belief that India is a low-inequality country. Our findings reinforce the idea that the extreme fragmentation of agricultural land is the root cause of poverty in India. Deininger et al. (2017) show that the main impact of land fragmentation in India is to reduce the mean plot size below the threshold for mechanisation. Our finding that income inequality is driven by differences in landownership feeds into the larger on-going debate on whether small farm led development is a relevant strategy in Asia and Africa (Collier and Dercon 2014, Hazell 2015). Finally, authors have argued that a structural transformation of any significant magnitude is not evident in rural India (Kotwal et al.2011, Binswanger-Mkhize

2013). Our findings add to the gloomy conclusion that there has been little change—in structural or distributional terms—in India's agricultural economy.