Small Farm Specialization and Risk in Indian Agriculture

Ashwini Chhatre
Lalmani Pandey
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Abstract: This paper highlights three important issues that aggravate the problems of small holder agriculture and their financial risks in India. These are allocation of land towards non-food commodity crops, sources of finance and indebtedness, and labour market and employment pattern. Fragmentation of land holdings reaches to a point where small holder agriculture leads way towards specialization and resource allocation towards capital intensive non-food commodity crops. Resource poor farm households with less than 1 hectares of land allocate more than 3/4th of their land to single crops like cotton and soybean. Dominance of a single commodity crops exposes small holder farm households to greater farm financial risk beyond their capacity and increase their food security concern. These farms acquire more than 60% of their credit needs from non-institutional finance sources. In addition, for more than 50% of these farming households, wages and labour is the major source of income and employment. Poor access to institutional finances and inadequate non-farm employment opportunities and income sources limit their capacity to withstand risks leading to indebtedness. Therefore, it is critical that the access to institutional credit and promotion of rural non-farm employment opportunities are improved to relieve farmers from indebtedness and distress. Further, development and promotion of low cost sustainable technologies is imperative to reinvigorate and revitalize small holder agriculture.

Keywords: Agriculture, Small Farms, Institutional finances, Specialization, Risk, Indebtedness, Food Security

1. Introduction

In India, small and marginal farmers constitute about 80% of land holdings and more than 90% of their land is rainfed (NSSO 2013). Majority of this resource poor small holder agriculture has been under severe distress for quite sometimes now (Radhakrishna 2007). With further growing population pressure on land, the concern for food security and welfare of farming community is aggravated as the small family farms are increasingly becoming uneconomical and unviable. Changed global economic and agricultural production environment raises cost of production and financial risk. In increasingly monetized rural economies, small farmers, in many instances, are attracted to production of non-food crops to meet their cash requirements (Li 2014). This also enabled them to access the food subsidy and subsidized food for their consumption requirements. At the same time, the supply of subsidizes rice and wheat through Public Distribution Systems (PDS) discourages crops like minor millet generally grown by resource poor in harsh agricultural environment. As a result, the area under food crops tend to decline fast in these farms jeopardizing their food self sufficiency and making them more food insecure and vulnerable.
Small and marginal farmers find themselves in a disadvantageous position to compete with their large farm counterparts in the market place. Generally, economies of scale and externalities operate both in agricultural production as well as inputs and output markets. In many instances, public price support and investment policies as well as financial institutions favour well endowed regions and resource rich large farmers (Binswanger 1993). Further, in spite of huge public support and subsidies in agriculture, farm profits of resource poor small and marginal farms squeezed the most under Indian economic reforms and trade liberalization, affecting seriously their ability and motivation to invest in farms (Li 2014). Collectively, the low farm income and poor net returns makes small holder agriculture difficult to meet the rising expenses on purchased market inputs and capital cost of new agricultural technologies and their changed production practices. Thus, in a situation of inadequate funds generated internally, farmers look for external sources of funding.

Problems of small holder agriculture is not only the problem of low income and land scarcity, many times they operate in an environment of incomplete and poor functioning markets (Timmer 1997). Imperfections in labour and credit markets are most common in rural areas. Added with this is underdeveloped rural infrastructure which leads to high transaction and transportation cost and limited access to input and output markets. Institutional finances are less favourable in rural areas in general and small holder agriculture in particular. Hence, small and marginal farmers seek assistance from private money lenders and traders for their credit requirements. These private and non-institutional sources of funds are very costly as they are acquired with high interest rates. High cost of borrowings from non-institutional sources to meet the requirements of capital intensive commercial agricultural production systems put many farmers in an inescapable “debt trap”. Also, along with financial crunch and costly private capital, inadequate non-farm work and alternative economic opportunities in rural areas force farmers to either sell or mortgage their land leading to landlessness, migration, and destitutions (Patil 2014).

The population pressure on land coupled with policy lead transformation of agriculture and rural economy in contemporary India has created many social, economic, and environmental ill-effects in the process of wider economic diversification that needs serious scrutiny and attention. Thus the overall objective of this paper is to highlight and discuss three important phenomenon that aggravate the problems of small holder agriculture and their financial risks in India. These issues include allocation of land towards non-food commodity crops, sources of finance and indebtedness, and labour market and employment pattern. This paper deals with the issue of connectedness among trends in area share under non-food commodity crops, non-institutional sources of finance and indebtedness, and labour as alternative source of income for small holder agriculture in India. The findings from this research help agricultural policy makers to devise sustainable solution to the problem of small holder agriculture and facilitate rural agriculture and economic transformation in India.

2. Non-food Commodity Crops and Risk Portfolios of Indian Farmers

As households split, land holding size goes down. And, with smaller landholdings, even with no change in per capita land availability, the possibility of further crop diversification declines may be due to economies of scale and externalities operating for both productions as well as marketing mentioned above. Further, as Gollin and Rogerson (2014) argues, the technological features of agriculture include high trade and marketing costs due to its dispersed production across location. Its consumption and preference feature include that food is a necessity. Trade and marketing costs, therefore, play
important role in farmer’s decisions on whether or not to produce and what commodity to produce, i.e.; acquire goods through own production or through market exchange (Li 2015). Such production behavior play important role in determining resource diversification or specialization of farm households (Fafchamps 2012). And, somewhat counter-intuitively, in order to meet the cash requirements of the household, land devoted to security crops, mainly grown for self-consumption, also declines. This leads to a double crunch - food crops are removed from the portfolio and there are constraints to adding new cash crops. Thus, small and marginal farmers choose crop portfolios that carry risks disproportionate to their landholding. If this is true, then we should observe the following:

1. The size-class distribution of landholdings should shift downwards over time, with a greater concentration in the lowest land-size classes.
2. Proportion of land under food crops should decline the most for the lowest land-size classes.
3. Increase in the dominance of one commodity crop in a holding's portfolio should be greater for the lowest land-size classes.

### 2.1 Size-class distribution of landholdings:

Proportion of number of household and the area operated over size categories of land holdings increased under size category of holding less than 1 hectares during 2013 over 2003 (Table 1, figures 1 & 2). Similar trend is observed for the size category of land holdings between 1 to 2 hectares. In the size category of land holdings between 2 to 4 hectares, proportion of number of holdings has declined while the proportion of area operated by them increased during 2013 over 2003. During the same period, share of large farms in both proportion of number of holdings as well as the total area operated by them has declined. These trends indicate increasing concentrations of land holdings as well as the area cultivated towards small and marginal categories of farms in India.

### Table 1: Proportion of household and area owned over size categories of holdings in India, 2003 & 2013, %

<table>
<thead>
<tr>
<th>Size category of holdings, ha</th>
<th>Number of household</th>
<th>Area operated</th>
<th>Number of household</th>
<th>Area operated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2003</td>
<td>2013</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 1</td>
<td>79.67</td>
<td>23.02</td>
<td>82.82</td>
<td>29.76</td>
</tr>
<tr>
<td>1-2</td>
<td>10.81</td>
<td>20.38</td>
<td>10.00</td>
<td>23.53</td>
</tr>
<tr>
<td>2-4</td>
<td>6.03</td>
<td>21.97</td>
<td>5.01</td>
<td>22.07</td>
</tr>
<tr>
<td>&gt;4</td>
<td>3.49</td>
<td>34.63</td>
<td>2.17</td>
<td>24.64</td>
</tr>
</tbody>
</table>

Data source: NSSO, 2013
Figure 1: Proportion of number of households over size categories of holdings in India, 2003 & 2013
Data source: NSSO, 2013

Figure 2: Proportion of area operated over size categories of holdings in India, 2003 & 2013
Data source: NSSO, 2013

2.2 Area under non-food crops:

The process of fragmentation of land holdings and their concentration in to smaller size categories brings technological and pecuniary externalities and economies and diseconomies of scale in both agricultural production as well as input and output markets. Added with these are the increased financial requirements of farm households in increasingly monetized production relations and expansion
of markets in rural economies. Encouraged with agricultural policies and public provisions for goods and services, small holder agriculture attracted towards specialization and engage themselves with production of non-food crops leaving aside their motives of food security and production of food crops. The subsequent discussion in this section describes manifestation of such behavior of small holder agriculture in India and their resource allocation, food security, and financial risk implications.

The area share of non-food crops have increased during 2013 over 2003 in all size categories of farms (Table 2, figures 3, 4, 5, and 6). For all classes of holding size, proportion of area under non-food crops increased from around 40% during 2003 to more than 50% during 2013. As farm size declines, the area shares of non-food crops increases. During 2013, non-food crops occupied around 80% of operated area under farm size category of less than 0.5 hectares and 45% of operated area under the size category of farm of more than 4 hectares.

Table 2: Proportion of area under crops to area operated under size categories of holdings, India, 2003 & 2013, %

<table>
<thead>
<tr>
<th>Size categories of holdings, ha</th>
<th>Non-food crops</th>
<th>Cotton</th>
<th>Soybean</th>
<th>Groundnut</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.5</td>
<td>0.80</td>
<td>0.80</td>
<td>79.6</td>
<td>83.6</td>
</tr>
<tr>
<td>0.5 - 1</td>
<td>0.64</td>
<td>0.70</td>
<td>61.5</td>
<td>73.3</td>
</tr>
<tr>
<td>1 - 2</td>
<td>0.54</td>
<td>0.58</td>
<td>54.8</td>
<td>58.4</td>
</tr>
<tr>
<td>2 - 4</td>
<td>0.44</td>
<td>0.51</td>
<td>45.2</td>
<td>51.6</td>
</tr>
<tr>
<td>&gt;4</td>
<td>0.37</td>
<td>0.45</td>
<td>35.8</td>
<td>42.5</td>
</tr>
<tr>
<td><strong>All classes</strong></td>
<td><strong>0.42</strong></td>
<td><strong>0.51</strong></td>
<td><strong>41.6</strong></td>
<td><strong>49.5</strong></td>
</tr>
</tbody>
</table>

Data source: NSSO, 2013

More disaggregated and commodity level analysis shows the dominance of a single commodity crops in the portfolio of lower size classes of holdings of small and marginal farms. Considering all size classes of farm holdings, between 2003 and 2013 the trend is similar for the three selected non-food crops namely cotton, soybean, and groundnut. Overall, cotton and soybean occupied around 50% and 60% of operated area during 2013 and their shares in operated area increases as the size of holdings declined. For the size class of holdings less than 0.5 hectares, cotton and soybean each occupied around 84% of operated area during 2013. For groundnut, area share to operated area has increased during 2013 over 2003 under size category of holdings more than 4 hectares while the same have declined in other holding size categories. However, as the holding size decreases, area share of groundnut increases like in cases of cotton and soybean. Area share of groundnut to operated area was more than 70% for size class of holdings less than 0.5 hectares during 2013. These choices by small holder agriculture have financial risk as well as food security implications. They are capital intensive, involved costly market inputs, more vulnerable to weather and other natural calamities, and also only 20-30% operated area is left for food crops.
Figure 3: Proportion of area under non-food crops over land posed in size categories of holdings in India, 2003 & 2013
Data source: NSSO, 2013

Figure 4: Proportion of area under cotton over land posed in size categories of holdings in India, 2003 & 2013
Data source: NSSO, 2013
Figure 5: Proportion of area under soybean over land possessed in size categories of holdings in India, 2003 & 2013
Data source: NSSO, 2013

Figure 6: Proportion of area under groundnut over size categories of holdings in India, 2003 & 2013
Data source: NSSO, 2013
2.3 Trend in area under food crops:

As the small holder agricultural productions is specializing towards a single and non-food commodities, the proportion of area under food crops is declining (Figure 7). The decline is more pronounced in the lowest holding size classes of holdings.

Figure 7: Proportion of area under food crops over land possed in size categories of holdings in India, 2003 & 2013
Data source: NSSO, 2013

3. Agricultural Credit and Indebtedness of Farm Household

As discussed above in the Introduction section, phenomenon of concentration of land towards small holder agricultures is operating and specialization towards non-food single commodity crops in lower size class of holdings is more pronounced. The process also involves heavy financial risk as these highly specialized single commodity crops are capital intensive and involve purchase inputs. They are also more susceptible to natural calamities and weather risks under climate change being experienced worldwide. Resource poor small holder agriculture generally acquires funds externally which are costly as well. As the small farms expose themselves to financial risk beyond their capacity to withstand adversity, they put themselves in to the trap of indebtedness. The additional dimension of exposure to risk also comes from the sources of financing farming business as their terms and conditions as well as cost of funding differ and might be one of the major causes for indebtedness to a particular size class of farms, specially small and marginal farmers.

While, indebtedness of Indian farmers and inadequate cash returns from agriculture to serve their debt is a major concern for the agriculture policy, Radhakrishna 2007 argues for a strategy for long term credit and more invest in agriculture. Amongst the various credit institutions, cooperatives can play better role in capital formation in agriculture through better and more effective utilization of its capital
and other resources. Panchayat Raj institutions and local government can also be strengthened through better policy environment and decentralized planning to enable them to play better role in making cooperative credits more effective (Sini and Mani 2015). Under these backdrops, the link among credit sources and indebtedness in size categories of farm and their risk exposure implications are described in the subsequent discussion of this section.

3.1 Indebtedness and institutional sources of credit:

Indebtedness in rural India has increased during 2013 over 2003 (Figure 9). Similarly, during the same period, the magnitude of indebtedness has also increased. More than 80% of farm households were indebted with more than 10 thousand rupees during 2013 compared to around 50% during 2003. During the same period, proportion of household indebted with more than 50 thousand rupees increased from around 8% during 2003 to around 43% during 2013.

![Figure 9: Trend in extent of indebtedness in Indian agriculture, 2003 & 2013](image)

Data source: NSSO, 2013

Considering the all size class of holdings, share of number of households availed or have access to institutional sources of credits have increased from around 46% during 2003 to around 54% during 2013 (Table 4, figure 10). Commercial banks and cooperative societies are major sources of credit to farmers with their combined share of more than 50% in total number of farm household having access to borrowed funds. Under the non-institutional sources of credit, professional money lender is major supplier of credit with their share around 21% farms household.
Table 4: Sources of credit for rural households in India, 2003 & 2013, %

<table>
<thead>
<tr>
<th>Particular</th>
<th>2003</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>3.4</td>
<td>3.3</td>
</tr>
<tr>
<td>Cooperative societies</td>
<td>20.5</td>
<td>18.1</td>
</tr>
<tr>
<td>Banks</td>
<td>21.8</td>
<td>32.1</td>
</tr>
<tr>
<td>Professional money lender</td>
<td>23.9</td>
<td>20.8</td>
</tr>
<tr>
<td>Shop keepers/ Traders</td>
<td>10.5</td>
<td>6.9</td>
</tr>
<tr>
<td>Relatives &amp; friends</td>
<td>15.6</td>
<td>15.1</td>
</tr>
<tr>
<td>Other</td>
<td>4.2</td>
<td>3.7</td>
</tr>
</tbody>
</table>

Data source: NSSO, 2013

Figure 10: Sources of loans in Indian agriculture, 2003 & 2013
Data source: NSSO, 2013

3.2 Distribution of outstanding loans:

Overall, around 60% outstanding loans were from institutional sources while share of non-institutional sources of outstanding loans were around 40% during 2013 (Table 5, figure 11). Share of commercial banks in total outstanding loan was around 43% while outstanding loans to private money lenders was around 27% in all size class of holdings. Comparing the total outstanding loans across size class of holdings, it increases with higher holding size, from a low of around 38% for the size class of holdings less than 1 hectare to a high of around 75% for size class of holdings more than 4 hectares. Reverse is the case for outstanding loans from non-institutional sources. The total outstanding loan from non-institutional sources decreases as the size class of holding increases. It varied from a high of around 62% for the size class of holding less than 1 hectare to a low of around 25% for size class of holding more than 4 hectares. It indicate that large farmers have better access to institutional sources of finances while small and marginal farmer are more dependent on non-institutional sources of borrowings. For
the size class of holdings less than 1 hectare, the share of private money lenders was around 42% during 2013. As the financing from Private money lenders might be more costly, small and marginal land holders expose themselves further to higher financial risks along with their characteristics of production specialization and dominance of a single non-food commodity crop

Table 5: Distribution of outstanding loans by source in India, 2013, %

<table>
<thead>
<tr>
<th>Particular</th>
<th>&lt;1</th>
<th>1 - 2</th>
<th>2 - 4</th>
<th>&gt;4</th>
<th>All Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>1.1</td>
<td>2.6</td>
<td>1.9</td>
<td>2.5</td>
<td>2.1</td>
</tr>
<tr>
<td>Cooperative society</td>
<td>10.0</td>
<td>14.7</td>
<td>15.6</td>
<td>15.9</td>
<td>14.8</td>
</tr>
<tr>
<td>Banks</td>
<td>27.2</td>
<td>47.6</td>
<td>50</td>
<td>56.9</td>
<td>42.9</td>
</tr>
<tr>
<td><strong>Institutional</strong></td>
<td><strong>38.3</strong></td>
<td><strong>64.9</strong></td>
<td><strong>67.5</strong></td>
<td><strong>75.2</strong></td>
<td><strong>59.8</strong></td>
</tr>
<tr>
<td>Private money lenders</td>
<td>41.9</td>
<td>24</td>
<td>25.2</td>
<td>18.2</td>
<td>26.6</td>
</tr>
<tr>
<td>Shopkeepers/ traders</td>
<td>3.5</td>
<td>1.5</td>
<td>1.2</td>
<td>1.0</td>
<td>2.9</td>
</tr>
<tr>
<td>relatives and friends</td>
<td>14.1</td>
<td>7.6</td>
<td>5.8</td>
<td>5.2</td>
<td>9.1</td>
</tr>
<tr>
<td>Others</td>
<td>2.1</td>
<td>2</td>
<td>0.3</td>
<td>1.1</td>
<td>1.6</td>
</tr>
<tr>
<td><strong>Non-institutional</strong></td>
<td><strong>61.6</strong></td>
<td><strong>35.1</strong></td>
<td><strong>32.5</strong></td>
<td><strong>25.3</strong></td>
<td><strong>40.2</strong></td>
</tr>
</tbody>
</table>

Data source: NSSO, 2013

Figure 11: Institutional and non-institutional sources of credit availed by size categories of farm household in India, 2013

Data source: NSSO, 2013

4. Labour Markets and Rural Non-farm Employment

Farmers diversify their income sources to cope with the adversities as well as supplement household income with extra earnings. The sections that follow discuss the trends in sources of employment in India and how they differ across size classes of holdings.
Proportion of adult rural population self employed in own work and their involvement in domestic household works remain almost unchained during 2003 to 2013 (Figure 12). Only a small proportion of working population gets regular salaried job. There has been a little new addition in their employment through MNREGA. So, employment opportunities and additional income sources in rural areas remain largely unchanged and might not have helped in coping with risk due to crop failures during adverse climatic conditions.

![Sources of employment in rural households in India, 2003 & 2013](image)

Figure 12: Sources of employment in rural households in India, 2003 & 2013
Data source: NSSO, 2013

Data on sources of employment and income across size class of holdings suggests that the major source of employment and income for large farmers was self-employment whereas labour and wages were major source of employment and income for farmers with less than 1 hectares of land (Table 6). During 2011-12, more than 90% of farmers in the size class of holdings more than 4 hectares were self employed while only self employment was only around 37% in the size class of holdings less than 1 hectare. During the same period, more than 50% of employment was in wages and labour markets in size class of holdings less than 1 hectare. Constraints in labour market and inadequate employment in non-farm sector in rural areas might have limited scope to help small and marginal farmers to cope with production and financial losses during adversities and needs to be strengthened.
Table 6: Type of employment for size classes of land owned, 2011-12, India

<table>
<thead>
<tr>
<th>Size class of holdings</th>
<th>Self employed</th>
<th>Regular wages/salaries</th>
<th>Casual labour</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agriculture</td>
<td>Non-agriculture</td>
<td>All</td>
<td>Agriculture</td>
</tr>
<tr>
<td>&lt;1</td>
<td>21.3</td>
<td>16.1</td>
<td>37.4</td>
<td>13.2</td>
</tr>
<tr>
<td>1 – 2</td>
<td>78.3</td>
<td>6.2</td>
<td>84.5</td>
<td>5.4</td>
</tr>
<tr>
<td>2 -4</td>
<td>85.8</td>
<td>5.3</td>
<td>91.0</td>
<td>4.7</td>
</tr>
<tr>
<td>&gt;4</td>
<td>87.0</td>
<td>4.4</td>
<td>91.5</td>
<td>4.9</td>
</tr>
<tr>
<td>All sizes</td>
<td>34.3</td>
<td>15.5</td>
<td>49.8</td>
<td>9.6</td>
</tr>
</tbody>
</table>

Data source: NSSO, 2013

5. Summary

Population pressure on land coupled with policy lead transformation of agriculture in India, especially after 2003-04, influencing development pathway, livelihood choices, and exposure of small farm families to financial risk. Fragmentation of land holdings reaches to a point where small holder agriculture leads way towards specialization and resource allocation towards capital intensive non-food commodity crops. Dominance of a single commodity crops exposes small holder farm households to greater farm financial risk beyond their capacity and undermine their food security concern.

Resource poor farm households with less than 1 hectares of land allocate more than 3/4th of their land to single crops like cotton and soybean. These farms acquire more than 60% of their credit needs from non-institutional sources. And, for more than 50% of these farming households, wages and labour is the major source of income and employment. Poor access to institutional finances and inadequate non-farm employment opportunities and income sources limits their capacity to withstand risk under adversities leading way towards indebtedness and severe crisis. This makes imperative for the policy to devise sustainable solutions to reinvigorate and revitalize small holder agriculture and improve their food security and economic conditions. Systematic innovation and promotion of low-cost, holistic and sustainable farming systems along with improved access to institutional credit and promotion of rural non-farm employment may be the right way to relieve farmers from indebtedness and distress. Efforts should be made to make cooperative credits and Panchayati Raj institutions and local government more effective and play larger role in helping and revitalizing agriculture sector in general and small farming households in particular.

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References


Revitalising Rainfed Agriculture Network (RRAN) was established in 2010 as a pan India platform to engage government agencies, researchers, civil society and CSR teams. The purpose of bringing different stakeholders together was to establish a case for integrated interventions in rainfed areas that demonstrate the impact of focussed innovations and public investments.

**Mission:** “RRAN aims to influence reconfiguration of public systems, policy and investments for productive, prosperous and resilient rainfed agriculture by building synergies between diversity of ecosystems and the development aspirations of our people.”

**CONTACT US:**

Revitalising Rainfed Agriculture Network (RRAN) Secretariat
N-199, Greater Kailash Part-I, New Delhi-110048

Revitalising Rainfed Agriculture Network (RRAN) Research Node
Indian School of Business, Hyderabad

For more information, visit www.rainfedindia.org