WP-2018-016

Short-term Migration in Rural India: The Impact of Nature and Extent of Participation in Agriculture

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June 2018

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Abstract

We analyse a nationally representative data set from India for the year 2013 in order to provide evidence on how short term migration is affected by household's ownership of land, and participation in agricultural activities. We estimate a recursive bivariate probit model recognizing the simultaneity between short term migration and decision to operate land. The results of the likelihood ratio test imply that it would be incorrect to ignore this simultaneity. Households with less than 1 hectare of land and those leasing out land are more likely to have a short term migrant (STM). Households leaving their land fallow, a common occurrence in south Asia, are more likely to have a STM. Moreover, choice of crops and livestock farming has a significant role to play in migration decision. Current initiatives to increase coverage of irrigation and facilitating access to formal finance could improve livelihoods of small and marginal farmers thereby reducing the probability of distress short-term migration.

Keywords: Short term migrants; Small-marginal farmers; Agricultural households; Mobility; Asia; India

JEL Code: O1, R2

Acknowledgements:

S Chandrasekhar is grateful for support from the research initiative Strengthen and Harmonize Research and Action on Migration in the Indian Context (SHRAMIC) which is supported by a grant from The Tata Trusts. Soham Sahoo is grateful for support from the research initiative System of Promoting Appropriate National Dynamism for Agriculture and Nutrition (SPANDAN). This work was undertaken when Soham Sahoo was part of the SPANDAN research team.

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Introduction

The potential offered by migration in achieving the Millennium Development Goals was not explicitly recognized. This lack of recognition was evident from the fact that indicators were not disaggregated by migratory status. However, the 2030 agenda for sustainable development marks a change with many of the 17 goals relevant for migration. Ten of the 169 targets include references directly to migration (IOM 2018). The focus is important since migration and in particular seasonal or short-term migration is today an integral strategy among poorer households in developing countries.

While it is true that short-term internal migration from rural areas is observed among the landless and small land holders, a review of the literature suggests that "patterns of landownership amongst migrants, well-documented in a range of studies, also illustrate diversity" (de Haan 2011 p. 393). Although the decision to migrate in the short-term and extent of involvement in agriculture (land use, cropping decisions etc.) are inter-related, this simultaneity is neglected in the empirical literature. In the absence of information on land use patterns, existing studies have only controlled for amount of land possessed by the households rather than whether it is also operated while modelling the decision of an individual to migrate. The recent literature on short-term migration from Indian rural households is based on National Sample Survey Organisation's (NSSO) survey of employment, unemployment and migration conducted in 2007-08[1]. This survey has no information on participation in agriculture. There are hardly any insights available on drivers of seasonal migration in the estimated 90 million agricultural households of rural India. Further, the fact that the Indian literature exclusively focuses on the individual, is surprising since the New Economics of Labor Migration (NELM) is premised on the fact that it is the

[1] See Keshri and Bhagat (2013), Agrawal and Chandrasekhar (2015), and Chandrasekhar, Das and Sharma (2015). A recent contribution using primary surveys is Dodd et al (2016).

household that collectively decides on migration decisions. It is the household characteristics that affect migration decisions and not solely the characteristics of the individual who migrates.

We analyze a nationally representative data from India for the year 2013 on over 34,000 rural households with information on land holdings, nature and extent of participation in agriculture and short-term migration from the household. We model the presence of a short-term migrant and household's decision to operate land using a recursive bivariate probit model. An important contribution of this paper is to establish that it would be incorrect to ignore the fact that these two decisions are likely to be determined simultaneously.

We provide support for the nuanced argument that migration is selective. Households that leave their land fallow are more likely to have a short-term migrant. The issue of fallow land and its implications for both cropping decisions and livelihoods is particularly important in context of south Asia. Further, we establish that households who have less than 1 hectare of land and those leasing out land are more likely to have a short-term migrant than those with more than 1 hectare of land. This finding is important in the context of recent resurgence in the literature on the viability of small farms. Declining size of land and the persistence of small farmers is observed in East, Southeast and South Asia. Hazell (2015) after examining the cross-country evidence concludes that while small farms might be efficient, the land sizes are "too small to provide an adequate income from farming" (p. 195). As we will point out later, monthly incomes of Indian farmers with less than 1 hectare of land is less than their monthly consumption expenditure. Further, it is wages and not income from cultivation which is the most important component of income of these households. Wages accounted for over 60 percent of household income. These facts are consistent with the observation by Rigg et al (2016) that small land holding leads to subsistence farming rather than market-oriented farming. This requires them to augment their income from other sources. The observed

patterns support the conjecture that these migrants fill labor shortages in the destination and do not stay on in the destination if they cannot find work. They take advantage of the different opportunities offered during peak agricultural seasons and also non-farm opportunities including construction work (Deshingkar 2017). Policy makers too have recognized that individuals from households engaged in subsistence farming migrate from rural areas for short-term without ever severing their link to the land (Government of India 2011a).

Background

The size of land holding has implications for sources of income and ultimately household decision making on short-term migration. In India, the share of marginal land holders, i.e. those with less than 1 hectare land, has increased from less than 51 percent in 1970-71 to over 67 percent in 2010-11. The marginal land holders accounted for only 22.50 percent of the operated area in 2010-11. The average area operated declined from 2.28 hectares in 1970-71 to 1.15 hectares in 2010-11. In 2010-11, the average area operated by the marginal land holders stood at 0.39 hectares (Government of India 2014a). This declining trend in the average operational holding has led to underemployment in rural areas. In the year 2009-10, among those who report that they are self-employed in agriculture, 13.1 percent of men and 13.9 percent of women stated that they did not work more or less regularly throughout the year (Government of India 2011b). Public works programs including the Mahatma Gandhi National Rural Employment Guarantee Scheme (MNREGS) are designed to provide employment to those who are unemployed or underemployed in rural India with the objective of reducing the need for them to migrate and in particular to stem distress migration. The recent empirical literature has found that while both MNREGS-participation and migration are strategies for improving livelihoods, the profiles of

households adopting the two strategies are different (Dodd et al 2017). Besides, the evidence on impact of social protection programs and in particular impact of MNREGS on migration is contextual and hence not generalizable (Hagen-Zanker and Himmelstine 2013, Das 2015).

It was conjectured that the pressure on land and sluggish growth in non-farm employment would lead to large scale rural-urban migration (Sharma 2004 p.16). The states of Bihar, Rajasthan, and Uttar Pradesh, accounting for nearly 30 percent of India's rural population in 2001, were identified as the group of states with accelerating labour force growth and accelerating unemployment rate. A surge in rural-urban migration was expected from these states. However, there was no significant uptick in long term rural-urban migration either from these states or at the all-India level[2]. As it transpired, the size of short-term migrants within a year is greater than annual moves for work in the intercensal period 2001-11. Data from Census of India which captures permanent moves, indicates that in the period 2001-11, the number of individuals moving annually for work was 1.86 million. In contrast estimates from NSSO's survey of employment, unemployment and migration 2007-08, indicate that a total of 12.58 million individuals from 9.25 million rural Indian households stayed away from village for employment for a period of 1 to 6 months in the 365 days preceding the survey.

Although households undertake multiple activities (Table 1), the evidence from the Situation Assessment Survey of Agricultural Households 2013 is that households primarily have four major sources of income: wages /salary, cultivation, farming of animals and non-farm business. While we observe diversity in terms of activities, it has not translated into significant diversity in income.

Table 1 here

[2] In India, the contribution of rural-urban migration to urban population growth in the last two decades has been in the region 21-22 percent (Pradhan 2013).

Table 2 here

One stark fact that emerges from Table 2 is that among agricultural households with less than 1 hectare of land their consumption expenditure is greater than income. The literature on indebtedness in landless and marginal farmer households has established how these households have to borrow for consumption purposes. From Table 2, the importance of income from wages / salary is evident among those with less than 1 hectare of land. The share of income from wages or salary decreases with increase in size of land possessed. As a mirror image, the share of net receipt from cultivation increases. The share of net income from farming of animals is higher among the small and marginal land holders.

To summarize, we find the importance of size of landholding in determining the extent of diversification of livelihoods and income levels in rural households. Small and marginal farmers who constitute the majority of the population engaged in agriculture are unable to meet their consumption expenditure through earnings. We also observe that the share of income from cultivation is the least for them. This gives rise to the possibility that they would opt to stay away from home for short periods of time in order to find alternative sources of income for sustenance.

Data and Summary Statistics

We analyze NSSO's nationally representative 2013 Survey of Land and Livestock Holdings (For details see Government of India 2014b). Each household was visited twice: Visit 1 (January to July 2013) and Visit 2 (August to December, 2013). In the second visit, a shorter questionnaire was administered. A total of 35,604 households were surveyed in Visit 1 while 35,337 of the same set of households were re-surveyed in Visit 2.

In addition to information on demographic and other particulars of household members the survey has information on whether any member of the household stayed away

from the village continuously for 15 days or more for employment. This question was asked for household as a whole and not for each member of the household. The reference period for this question is 6 months preceding the survey. The definition of who is a migrant is consistent with that used in the literature on short-term and circular migration (de Brauw 2010, Nguyen & Winters 2011). In the survey, the question on short-term migrant was asked, only in the first visit, along with other detailed information on the operation of land. Therefore, we consider data only from the first visit. Among the households considered in the sample, 6.2 percent have a short-term migrant. Using the household weights given in the data, we estimate that 10.1 million rural households have at least one short-term migrant.

Table 3 here

In the sample, 76 percent of the households reported operating any land for agricultural activities in the last 365 days preceding the date of survey. Among households who operated land, 6.2 percent had a short-term migrant while among those not operating land 6.35 percent had a short-term migrant. These averages need to be interpreted in conjunction with the extent of land possessed by these two types of households and also their major source of income. The average area of land possessed is higher among those who operated agricultural land (1.55 hectares) than those who did not (0.065 hectares) and this difference is statistically significant at 1 percent level of significance. This difference would suggest that an individual from a household not operating land should migrate. Of the 24 percent of households that report not operating any land, the major source of income for 53 percent of these households is wage or salaried employment. This indicates that the possession of land, decision to operate land for agriculture and migrating for employment are simultaneously affected by a host of factors. These factors need to be taken into account, while drawing any inference about the relationship between participation in agriculture,

possession of land and short-term migration. We address this issue when deciding on the appropriate empirical model given this context.

In addition to information on the demographic characteristics, caste, religion, and the main source of income of the household, information is available on each plot of the land held or cultivated by a household: nature of possession, location of plot, duration of possession, land use and source of irrigation.[3] The richness of information allows us to explore the relationship between nature and extent of participation in agriculture and short-term migration.

Empirical Methods:

Our dependent variable is a household level variable which takes the value 1 if the household has a short-term migrant, else 0. Other papers in the literature too have focused on whether the household has a short-term migrant instead of focusing on the individual (de Brauw 2010, Nguyen & Winters 2011, Dodd et al 2016).

We construct a dummy variable (OPLAND) indicating whether the household operated any land for agriculture in the last 365 days preceding the survey. We argue that the decision to have an individual migrate in the short-term (presence of short-term migrant (STM)) and decision to operate land (OPLAND) are likely to be determined simultaneously in the household. Ignoring this simultaneity may result in inconsistent estimates. Therefore,

[3] The nature of possession of a plot of land can be of three types: owned, leased in, or otherwise possessed by the household. A plot is located within the village, outside the village but within the district, outside the district but within the state, or outside the state. The duration of possession of the land is from one of these: less than one agricultural season, at least one agricultural season but less than one agricultural year, at least one agricultural year but less than two agricultural years, and two agricultural years or more. Each plot of land possessed by the household can be classified as a homestead land or used for crop production, livestock farming, or other agricultural and non-agricultural uses. Information on whether a plot of land was irrigated (canal, minor surface works, ground water, or any combination of these sources) is available.

we model both these decisions in a recursive simultaneous equations system as described below.

$$STM^*_{hds} = \beta_0 + \beta_1 OPLAND_{hds} + \beta_2 X_{hds} + \beta_3 Z_{ds} + \sigma_s + \varepsilon_{hds}$$
$$STM_{hds} = 1(STM^*_{hds} > 0) \ldots\ldots (1)$$

$$OPLAND^*_{hds} = \alpha_0 + \alpha_1 W_{hds} + \alpha_2 V_{ds} + \delta_s + u_{hds}$$
$$OPLAND_{hds} = 1(OPLAND^*_{hds} > 0) \ldots. (2)$$

The subscript *h* stands for the household while *d* and *s* reflects the place of residence viz. district, and state. The variables determining short-term migration can be grouped into three categories: characteristics related to land, agriculture, livestock, and other household level variables (X_{hds}), district specific factors (Z_{ds}), and state fixed effects (σ_s). The corresponding variables in the equation modeling decision to operate land are given by W_{hds}, V_{ds} and δ_s.

The first equation models the decision of short-term migration in the form of an unobserved latent variable STM^*_{hds}. We observe the binary outcome STM_{hds} indicating whether the household has a short-term migrant or not. Similarly, the propensity to operate any land for agriculture is represented by the latent continuous variable $OPLAND^*_{hds}$ whose observable counterpart is a binary variable $OPLAND_{hds}$ that takes the value 1 or 0 depending on whether the household operated any land for agriculture in the last one year. Equation 1 and 2 constitute a recursive system because $OPLAND_{hds}$ is included as an explanatory variable in the decision of short-term migration. We estimate this model using a bivariate probit specification which is based on the assumption of joint normality of the error terms as mentioned below:

$$\begin{pmatrix} \varepsilon_{hds} \\ u_{hds} \end{pmatrix} \sim N\left[\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix}\right]$$

For the purpose of identification, the OPLAND equation should include a variable which is validly excluded from the STM equation. We posit that the proportion of households with some amount of land in the district will have a positive effect on the probability that a randomly chosen household has an operational holding. Since we include the amount of land owned by a household as an explanatory variable, we believe that the proportion of landed households in the district is unlikely to have any additional effect on the STM equation. Hence, we include this additional variable in the OPLAND equation.

One can argue that even after controlling for owned land, living in a district with higher proportion of landless households can affect the decision of short-term migration. This essentially points to the possibility that districts with higher proportion of landless households may already have higher percentages of short-term migrants. This in turn may form a migrant network and pull more households into short-term migration. We acknowledge this possibility by including an additional control variable: lagged measure of district level proportion of households having a short-term migrant. This variable is calculated from the NSSO's Survey of Employment & Unemployment and Migration conducted in 2007-08.

A description of the control variables in the STM equation is as follows. First we discuss some of the key variables relating to land, individual and household characteristics included as the controls. The area of land possessed is an indicator of wealth; besides, it reflects the potential of the household to carry out agricultural activities. In accordance with the grouping of households by land size class in Agricultural Census, we categorize the area of land possessed by households into four groups: less than one hectare, between one and two hectares, between two and four hectares, and four hectares or more. Keeping the first category as base, we include three dummy variables to capture the effect of possessed land. A household does not currently possess the area of land that has been leased out – although it

adds to the wealth of the household. Therefore, we include the total amount of land leased out as a separate variable.

Next, we consider the nature of the possessed land. A plot of possessed land can either be owned, or it can be leased in with the purpose of carrying out agricultural activities. Since the type of activities carried out can vary with the nature of the possessed land, we include the share of leased in land to control for such effects. The share of land that is owned is omitted as the base category in this case.

To capture the type of operation carried out on the land, we consider homestead land as a separate category since no agricultural activities are carried out on it. The rest of the area can be used for the following operations: crop production, animal farming, or kept as current fallow. We define a plot to be current fallow when it is not used for any particular crop or livestock farming in the current visit of the survey. Considering the share of land used for crop production as the base category, we include the shares of homestead land, land used for animal farming, and current fallow in the regression.[4]

Keeping other things fixed, crop diversification can affect agricultural income, and can have a bearing on the decision to migrate. Therefore, we include the number of crops produced by the household as an explanatory variable. Similarly, what the household produces can also be important in the migration decision which is affected by the nature of agricultural production and the uncertainty associated with it. For example, existing evidence suggests that rice based system that depends on rain-fed irrigation faces uncertainty in production, causing households to look for other sources of employment and income (Paris et al., 2010). Hence, we categorize the crops into three groups: cereals, pulses and oilseeds, and

[4] Livestock land, which is part of the possessed land by the household, and not a common property resource or common grazing land, is used for farming of animals.

other crops. Keeping the other crops as base category, we include two dummy variables to reflect whether the household produced cereals, or pulses and oilseeds.

Other characteristics of land, viz. location and duration of possession are also included. We include the total number of plots that are irrigated as a control in the regression. Ownership of livestock not only reflects wealth of household but can also affect other decisions. We convert number of animals owned into animal unit equivalent and include it in the regression[5].

The survey also captures an interesting aspect of intra-household decision by asking each member whether he/she is associated with the operational holding. The total number of household members associated with the operational holding is included as a covariate in the regression. While on an average two individuals are associated with the operational holding, it is found that one-third of them are women. Existing literature suggests that the role of women in agriculture is intertwined with the nature of crops production that has gender roles assigned to specific tasks (Paris et al., 2010). Labour outmigration is likely to be observed in households where female members also take part in decision making regarding farm land. Hence, we also include the proportion of females among all the members associated with the operational holding.

Besides, the NELM highlights the importance of strategic decision about migration within the family, where intra-household agency of individuals and their position in the lifecycle play a key role. To capture these aspects, we control for the household's gender and age composition by including the following demographic variables: proportion of female members, number of members in 15-64 years age group, average age of the household members, and two dependency ratios, defined as the proportion of children (0-14), and

[5] See Manual on Cost of Cultivation Surveys by CSO, India http://mospi.nic.in/Mospi_New/upload/manual_cost_cultivation_surveys_23july08.pdf

elderly persons (65 years or above) in the household. We also control for the following characteristics of household head: whether the person is a woman, age and educational attainment.

The regression includes the social group (scheduled tribe, scheduled caste, other backward class, others) and religion (Hinduism, Islam, Christianity, others) of the household. For three reasons, it is important here to consider social group. First, poverty is higher among the scheduled caste and scheduled tribe households. Second, there are differences in average area of operational holdings across the social groups. From Agricultural Census (2010-11), we find that in case of scheduled tribes it is 1.52 hectares while it is 0.80 hectares among scheduled caste as against the average of 1.15 hectares across all social groups. The scheduled tribe and scheduled caste households account for 11.4 percent and 8.6 percent of operated area. Third, there are specific rules that govern the leasing in and leasing out of land by scheduled tribe households.

Whether the household has a short-term migrant may depend on the major income source of the household. We include binary indicators to reflect whether the household depends mainly on agriculture, non-agricultural enterprises, wage/salaried employment, or other sources (pension, remittance etc.) for income. Here, self-employment in agriculture is considered as the omitted base category.

Access to irrigation, agricultural credit, and rainfall patterns can have a major impact on the livelihood of rural households. Lack of irrigation or shortage of rainfall can affect the agricultural produce, and hence force the household to take up short-term migration in search of additional income opportunities. In such a scenario, access to credit can mitigate the destitution and reduce the probability of short-term migration. Therefore, we include the following district level controls: percentage of un-irrigated land and proportion of households having access to institutional credit, i.e. Kisan Credit Card (KCC) with a credit limit of Rs.

50,000 or above. We get this data from India's Socio Economic and Caste Census of 2011. The set of covariates also includes the average deviation in rainfall from the long term mean rainfall in the district over the last one year. This information is sourced from the Indian Meteorological Department. Finally, to control for state specific differences in land-lease laws, climatic differences affecting agricultural production, and other unobserved factors affecting the livelihood choice of households, we include state specific dummy variables.

Variables pertaining to land use are available only for those who operate land. So in the OPLAND equation we do not include land use variables. In addition to the other household variables and state dummies, we include three district level controls: viz. proportion of households with land, proportion of unirrigated land, and relative deviation of rainfall from long term average in the district.

Results and Discussion

The determinants of whether the household operated any land for agriculture are presented in Table 4a while Table 4b reports the results where the dependent variable is whether the household has any short-term migrant. The likelihood ratio test shows that the covariance (ρ) between the two error terms is statistically significant at the 5 percent level, indicating that it would be incorrect to ignore the simultaneity issue (Table 4b).

Table 4a 4b here

At the outset, we discuss the factors that determine the probability that a household operated any land for agriculture (OPLAND). We briefly discuss specific results of interest. It does not come as a surprise that a household is more likely to operate any agricultural land if it belongs to a district which has higher proportion of landed households. Possession of larger amounts of land significantly raises the probability of operating the land. A household is less likely to operate land when it has leased out more of its land. Having more household

members in the working age-group or presence of more women increases the likelihood of operating agricultural land. As compared to the households from other social groups, scheduled caste households are less likely to engage in operation of agricultural land. On the contrary, scheduled tribe households and those from other backward class are more likely to operate land. This is because the average area of operational holding for scheduled tribe households is higher than other categories, while that of scheduled caste households is the lowest (Agricultural Census 2010-11). As expected, households whose main source of income is other than agriculture are less likely to operate land.

Turning to the results on short-term migration, we find that the coefficient on whether the household operated land is significant, i.e. households which operated land are more likely to have a short-term migrant. We argue that it is households with less than one hectare of land that are driving this result. In the equation modeling short-term migration we could have interacted the variable operated land with the three dummies reflecting extent of land possessed. However, inclusion of the interaction terms would lead to three more terms that are part of recursive choice model since the decision to operate land and presence of short-term migrant are being estimated within the recursive bivariate probit model. Hence, such a model would follow a multivariate probit structure. Multivariate probit models are computationally difficult to estimate especially when the sample size is considerable. Therefore, in order to support our conjecture that it is those with less than one hectare of land who drive the sign of the coefficient on operated land, we estimate a probit model where the dependent variable is whether the household has a short-term migrant (Equation 3). In this model, in addition to the variables included in the bivariate probit model, we include the interaction terms between whether the household operated land and dummies reflecting extent of land possessed:

$$STM^{*}_{hds} = \beta_0 + \beta_1 OPLAND_{hds} + \beta_2 X_{hds} + \beta_3 Z_{ds} + \sum_{k=2}^{4} \gamma_k OPLAND_{hds} * LAND\_POSS_{khds} + \sigma_s + \varepsilon_{hds}$$

$$STM_{hds} = 1(STM^{*}_{hds} > 0) \text{ ….. (3)}$$

We find that the marginal effect of operated land is positive and significant only for households possessing land less than one hectare (results are available on request). So our interpretation of which households drive the result on operational holding is defensible.

Data from Situation Assessment Survey of Agricultural Households in India 2013 provides useful insights into why we would observe migration from the small land holders. The total income of households with less than one hectare of land is less than consumption expenditure (Table 2). In fact, total net income from cultivation, animal farming and non-farm business is less than a third of the total consumption expenditure for households with less than 0.40 hectare land. In the first two land size classes, income from wage or salary accounts for the largest share of total income of households. The fact that small and marginal farmers did not find farming profitable and given an option they would quit farming and instead pursue other opportunities is well known (Government of India, 2005). Therefore, short-term migration is more likely in the 70 percent of agricultural households who possess and operate less than 1 hectare of land.

Corroborating the importance of landholding, the amount of land possessed is found to be a significant and strong predictor of short-term migration. As compared to marginal farmers having less than 1 hectare of land, households that have 1–4 hectares of land are 1.3 percentage points less likely and households that have 4 hectares or more land are 2.3 percentage points less likely to have a short-term migrant. Households having higher area of leased out land are more likely to have a short-term migrant as they are less likely to be

involved in agricultural operation on that land. We do not find any significant effect of the share of land that has been leased in.

We find that if the share of homestead land is higher as compared to the share of land used for crop production, then the probability of short-term migrant is higher. This result is plausible because having an unproductive piece of homestead land does not contribute to the income of the household. Land used for livestock has no significantly different effect than the land used for crops. We find that the share of land kept as current fallow significantly increases the probability of stepping out of village for employment. This finding is consistent with various other studies reflecting on the importance of fallow land as a determinant of migration in the agrarian economy of South Asia (Shah 2005). Thus, the results indicate that crop production or land use plays an important role in determining short-term migration in rural households. Further, we find that while the number of crops produced has no significant effect, the choice of crop does. Households that produce cereals are significantly more likely to have a short-term migrant. This result corroborates the fact that households engaged in production of cereals, such as rice, have lower growth and higher volatility in earnings. Paris et al. (2010) find that rice producing households are more likely to suffer from abiotic stresses, limited yield potential, and lower profitability. Hence these households seek to diversify their livelihood through migration. We do not find duration of possession, location of land, or the number of plots irrigated to have any significant impact. However, ownership of animals measured in animal unit equivalent is significant and negative, indicating that livestock farming is an important livelihood strategy that mitigates the need for short-term migration by rural households.

Turning to the household specific characteristics, we find that if there are more members available to take decision about the land, then it increases the likelihood of a member migrating in the short-term. But the gender composition of the members making

decision on land does not affect short-term migration. As expected, we find that in households with higher proportions of women and children, the probability of having a STM is lower. However, more number of working-age (15–64 years) members does increase the chance that one will migrate. Average age of household members has a negative effect, indicating that it is the young individuals who are more prone to migrate.[6]

Social group is a significant determinant of short-term migration and our results are consistent with the findings in the literature (Dodd et al 2016, Keshri and Bhagat 2013). Households belonging to scheduled caste and scheduled tribe groups are more likely to be poor. Although the average size of land possessed by scheduled tribe households is higher, it also true that schedule tribe households are more likely to be overrepresented in the bottom two deciles of distribution of consumption. Summary statistics from Situation Assessment of Agricultural Households reveals that among agricultural households in the bottom-most decile of consumption, nearly 31 percent are from scheduled tribe households.

The regression shows that scheduled tribes are also more likely than households from other social groups to have a member who stays away from the village for employment. For similar reasons, Muslim households are more likely than Hindu households to have a short-term migrant. In terms of household type, those who depend on agriculture as their main income source (omitted category) are least likely to migrate for alternative employment outside the village. Others, who have non-agricultural enterprise, wage/salaried employment or some other activity as main source of income, are all significantly more likely to have short-term migrant. This is again explained by the fact that most of the land possessed by the household is located within the village; hence those engaged in agricultural production remain inside village to work on their land.

[6] We also find that short-term migrants are less likely to belong to households where the head is more educated. Household head's gender and education related variables are included in the regression but not reported in the table; they are available on request.

The coefficients on the district level variables are statistically significant. As expected, higher the proportion of households with access to agricultural credit in the district and greater the proportion of irrigated land, the lower is the chance of observing a short-term migrant. To better understand this relationship, we plot the predicted probabilities of having a short-term migrant as a function of access to credit and irrigation. In the recent past, there have been many innovations in delivery of credit to the farmer using the KCC. One of the innovations is to convert the KCC into a Smart Card cum Debit Card. The government and the central bank are also seeking to increase the coverage of this card across the districts of India. While presenting the union budget for 2017-18, the union finance minister set explicit targets for availability of credit to farmers. What could be the plausible impact of these measures is a question of interest. Figure 1 shows that better access to credit, captured by the proportion of households with KCC, leads to lower probability of short-term migration. Moreover, the relationship is convex, suggesting greater marginal benefit at lower levels of credit availability.

Figure 1 here

Investments in irrigation and last mile projects are another priority area of the Indian government. Large budgetary provisions have been made for supporting micro-irrigation and watershed development projects with the objective of irrigating the field of every farmer. Short-term migration is higher in districts with larger proportion of unirrigated land (Figure 2). Unlike agricultural credit, the relationship between STM and access to irrigation is found to be linear, indicating that the need for irrigation remains an equally pressing issue across all the districts.

Figure 2 here

Rainfall has the expected sign: higher rainfall, possibly by helping agricultural production, lowers the incidence of short-term migration in a district. We also find that the lagged proportion of short-term migrants in the district positively affects the probability of short-term migration at the household level in the current period. The state specific dummies are mostly significant and have a negative effect, indicating that Bihar (the omitted state) has the highest proportion of households with short-term migrants. Rajasthan, Madhya Pradesh and West Bengal are the only states that are as likely as Bihar to have a short-term migrant in the household. This should not come as a surprise since cultivation income in farmer households declined in real terms in Bihar and West Bengal over the period 2003-13. In addition, in West Bengal, nearly 53 percent of income of farmer households is from wage income (Chakravorty et al 2017). There are substantial variations in agro-climatic conditions and access to irrigation within Madhya Pradesh and in particular Rajasthan which in turn are drivers of short-term migration. In Rajasthan, Uttar Pradesh, Bihar, and West Bengal, which account for 50 percent of India's rural poor and bulk of seasonal migrants, the share of households reporting remittances as their principal source of income is higher than the national average (Government of India 2014c).

Conclusion:

Increasingly, a majority of rural agricultural households are deriving a significant portion of their income from activities other than cultivation. This is true in the Indian context too and in particular for households with less than 1 hectare of land. We contribute to the burgeoning literature on drivers of internal migration and in particular from agricultural households. Much of the literature in the context of developing countries including India has used data from surveys on employment and migration. A relatively under researched issue is drivers of migration within cultivator households, i.e. households who either own or possess

or lease in land and grow crops. Deshingkar (2017) has articulated the need for making informed policy by taking into account the specificities of migration patterns. Hence, this paper is an important incremental contribution to the literature on short-term migration in South Asia and India in particular.

Using a rich dataset with detailed information on participation in agriculture and short-term migration in rural India, we establish that the decision to have an individual migrate in the short-term and decision to operate land are likely to be determined simultaneously in the household. We find that households who have less than 1 hectare of land and those leasing out land are more likely to have a short-term migrant. Households that leave higher share of their possessed land as current fallow are also more likely to have a short-term migrant. This result suggests that the issue of fallow land and its implications for both cropping decisions and livelihoods is particularly important in the context of south Asia. Our results also support insights from NELM that household characteristics are important correlates of decision to migrate.

This paper identifies specific areas for future research. The first issue pertains to two key policy targets of Government of India: making credit available to farmers at an affordable rate of interest and expansion in irrigation. Our analysis suggests that these two initiatives could improve livelihoods and reduce the probability of short-term migration driven by inadequate income from cultivation. Additional micro level studies are needed in this regard. Second, due to data limitations we are not able to examine the impact of national rural employment guarantee scheme on decision to migrate for short periods of time. Third, how does the time allocation of household members change following the out-migration by an individual? Since men are more likely to out-migrate, would it imply that women assume more responsibilities in addition to domestic duties? Additional insights on this front will

help in unpacking the intra-household mechanisms related to the decision of short-term migration.

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Table 1: Additional Activities Undertaken by Agricultural Households in India

Principal Source of Income	Additional Activities
Cultivation	No additional Activity (12%), Livestock (34%), Livestock and Wage/Salaried Employment (17 %), Wage / Salaried Employment (8 %), All other combinations (29%)
Livestock	No additional Activity (13%), Cultivation (30%), Wage/Salaried Employment (14 %), Cultivation and Wage / Salaried Employment (12 %), All other Combinations (31%)
Non-Agricultural Enterprises	Cultivation (22%), Livestock (12%), Cultivation and Livestock (24%), Cultivation, Livestock and Wage/Salaried Employment (10%), All other Combinations (32%)
Wage / Salaried Employment	Cultivation (20%), Livestock (14%), Cultivation and Livestock (37%), All other Combinations (29%)

Source: Authors' calculations.

The four sources of income given in the first column constitute the principal source of income for 94 percent of rural agricultural households.

Table 2: Average monthly income (Rs.) from different sources and consumption expenditure (Rs.) per agricultural household during July 2012- June 2013 for each size class of land possessed

Size of Land Possessed	Income from Wages /Salary	Net Receipt from Cultivation	Net Receipt from Farming of Animals	Net Receipt from Non-Farm Business	Total Income	Total Consumption Expenditure
<0.01	2902	30	1181	447	4561	5108
	63.6	*0.7*	*25.9*	*9.8*	*100*	
0.01-0.40	2386	687	621	459	4152	5401
	57.5	*16.5*	*15.0*	*11.1*	*100*	
0.41-1.00	2011	2145	629	462	5247	6020
	38.3	*40.9*	*12.0*	*8.8*	*100*	
1.01-2.00	1728	4209	818	593	7348	6457
	23.5	*57.3*	*11.1*	*8.1*	*100*	
2.01-4.00	1657	7359	1161	554	10730	7786
	15.4	*68.6*	*10.8*	*5.2*	*100*	
4.01-10.00	2031	15243	1501	861	19637	10104
	10.3	*77.6*	*7.6*	*4.4*	*100*	
10.00+	35685	2622	1770	41388	14447	6987
	3.2	*86.2*	*6.3*	*4.3*	*100*	
All Sizes	2071	3081	763	512	6426	6223
	32.2	*47.9*	*11.9*	*8.0*	*100*	

Source: Government of India, December (2014c)
Figures in italics are the percentage shares

Table 3: Summary Statistics		
Variable	Mean	Std. Dev.
Whether household has a short-term migrant	0.06	0.24
Whether operated any land for agriculture	0.76	0.43
Land possessed:		
< 1 hectare	0.54	0.50
>= 1 hectare but < 2 hectares	0.25	0.43
>= 2 hectares but < 4 hectares	0.16	0.37
>= 4 hectares	0.05	0.21
Total land leased out	0.04	0.35
Nature of possessed land:		
Share owned or otherwise possessed	0.91	0.26
Share leased in	0.09	0.26
Share of possessed land used for:		
Homestead	0.29	0.41
Livestock farming	0.02	0.09
Current fallow	0.06	0.19
Cropping	0.64	0.44
Share of area possessed for the duration:		
< 1 season	0.02	0.12
>= 1 season but < 1 year	0.02	0.14
>= 1 year but < 2 years	0.02	0.13
>= 2 years	0.94	0.22
Share of plot area located:		
within village	0.92	0.23
outside village but within district	0.08	0.23
outside district but within state	0.003	0.05
outside state	0.002	0.04
Number of plots irrigated	1.07	2.15
Animal units equivalent	0.96	1.56
Number of crops produced by the household	0.96	0.82
Household produces:		
cereals	0.52	0.50
pulses/oilseeds	0.11	0.32
other crops	0.27	0.45
Total number of household members associated with operational holding	2.14	1.84
Proportion of females among all associated with operational holding	0.31	0.28
Proportion of female household members	0.495	0.19
Number of household members in 15-64 age-group	3.20	1.85
Dependency ratio: 0-14 children in total household size	0.25	0.23
Dependency ratio: 65 and above in total household size	0.09	0.20
Average age of the household members	31.64	13.48
Whether household head is female	0.12	0.33
Age of household head	48.95	14.35
Head's education:		
Illiterate	0.37	0.48

Table 3: Summary Statistics		
Variable	Mean	Std. Dev.
Below primary	0.14	0.35
Primary	0.12	0.33
Middle	0.15	0.36
Secondary	0.11	0.31
Higher secondary	0.05	0.22
Graduate or above	0.05	0.23
Caste:		
Other	0.26	0.44
Scheduled Caste	0.16	0.37
Scheduled Tribe	0.18	0.39
Other Backward Class	0.40	0.49
Religion:		
Hindu	0.80	0.40
Muslim	0.10	0.29
Christian	0.06	0.24
Other	0.04	0.20
Main income source:		
Agricultural activities	0.60	0.49
Non-agriculture enterprise	0.09	0.29
Wage/Salaried employment	0.25	0.43
Other	0.07	0.25
Proportion of unirrigated land in the district*	0.45	0.20
Proportion of households having Kisan Credit Card with credit limit of Rs 50,000 or above in district*	0.03	0.04
Proportion of households with land in the district	0.44	0.18
Average deviation in rainfall**	-0.27	0.36
Past migration rate in district	0.06	0.17
N=34429		
Source: Authors Calculations		
*Socio-Economic and Caste Census 2011		
** India Meteorological Department		

Table 4a: Marginal effects of factors determining whether household operated any land for agriculture – bivariate probit estimates

	(1)	(2)
	Operated any land for agriculture	
Variables	Marginal effect	Standard error
Proportion of households with land in district	0.102***	(0.018)
Land possessed:		
>= 1 hectare but < 2 hectares	0.213***	(0.005)
>= 2 hectares but < 4 hectares	0.194***	(0.007)
>= 4 hectares	0.203***	(0.011)
Total land leased out	-0.016***	(0.004)
Nature of possessed land:		
Share leased in	-0.001	(0.007)
Proportion of female household members	0.026***	(0.009)
Number of household members in 15-64 age-group	0.025***	(0.002)
Dependency ratio: 0-14 children in total household size	0.048***	(0.013)
Dependency ratio: 65 and above in total household size	-0.011	(0.012)
Average age of the household members	-0.0003	(0.0003)
Caste:		
Scheduled Caste	-0.023***	(0.006)
Scheduled Tribe	0.035***	(0.007)
Other Backward Class	0.011**	(0.006)
Religion:		
Muslim	-0.009	(0.008)
Christian	0.015	(0.011)
Other	0.007	(0.012)
Main income source:		
Non-agricultural	-0.290***	(0.007)
Wage/Salary	-0.274***	(0.005)
Other	-0.333***	(0.009)
Proportion of unirrigated land in district	0.014	(0.015)
Relative deviation of rainfall from long term average in district	0.014	(0.008)
Past migration rate in district	0.023	(0.015)
Other Control Variables	Yes	
State Fixed Effects	Yes	
Observations	34,429	

Standard errors clustered at the village level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Other control variables include gender, age and education level of the household head.

Table 4b: Marginal effects of the determinants of whether household has any short-term migrant (STM) – bivariate probit estimates

Variables	Marginal Effect	Standard Error
Whether operated any land for agriculture	0.033***	(0.012)
Land possessed:		
>= 1 hectare but < 2 hectares	-0.013***	(0.004)
>= 2 hectares but < 4 hectares	-0.013***	(0.005)
>= 4 hectares	-0.023***	(0.006)
Total land leased out	0.008***	(0.003)
Nature of possessed land:		
Share leased in	-0.004	(0.006)
Share of possessed land used for:		
Homestead	0.025**	(0.010)
Livestock farming	-0.008	(0.018)
Current fallow	0.018*	(0.009)
Share of area possessed for the duration:		
>= 1 season but < 1 year	0.012	(0.018)
>= 1 year but < 2 years	0.001	(0.019)
>= 2 years	0.009	(0.015)
Share of plot area located:		
outside village but within district	0.007	(0.006)
outside district but within state	0.038	(0.025)
outside state	0.050	(0.032)
Number of plots irrigated	-0.001	(0.001)
Animal unit equivalent	-0.002*	(0.001)
Number of crops produced by the household	0.002	(0.003)
Household produces cereals	0.013**	(0.005)
Household produces pulses/oilseeds	0.004	(0.006)
Total number of household members associated with operational holding	0.005***	(0.001)
Proportion of females among all associated with operational holding	0.010	(0.008)
Proportion of female household members	-0.023***	(0.008)
Number of household members in 15-64 age-group	0.003**	(0.001)
Dependency ratio: 0-14 children in total household size	-0.035***	(0.010)
Dependency ratio: 65 and above in total household size	0.015	(0.013)
Average age of the household members	-0.002***	(0.000)
Caste:		
Scheduled Caste	0.011**	(0.006)
Scheduled Tribe	0.017***	(0.006)
Other Backward Class	0.004	(0.004)
Religion:		
Muslim	0.024***	(0.007)
Christian	0.010	(0.011)
Other	0.008	(0.013)
Main income source:		
Non-agricultural	0.029***	(0.010)
Wage/Salary	0.044***	(0.008)
Other	0.047***	(0.014)
Proportion of unirrigated land in district	0.036***	(0.014)
Proportion of households with KCC in district	-0.264***	(0.069)
Relative deviation of rainfall from long term average in district	-0.033***	(0.007)
Past migration rate in district	0.057***	(0.011)
Other Control Variables, State Fixed Effects	Yes	
ρ	-0.147**	0.063

N = 34429 Standard errors clustered at the village level are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Other control variables include gender, age and education level of the household head.

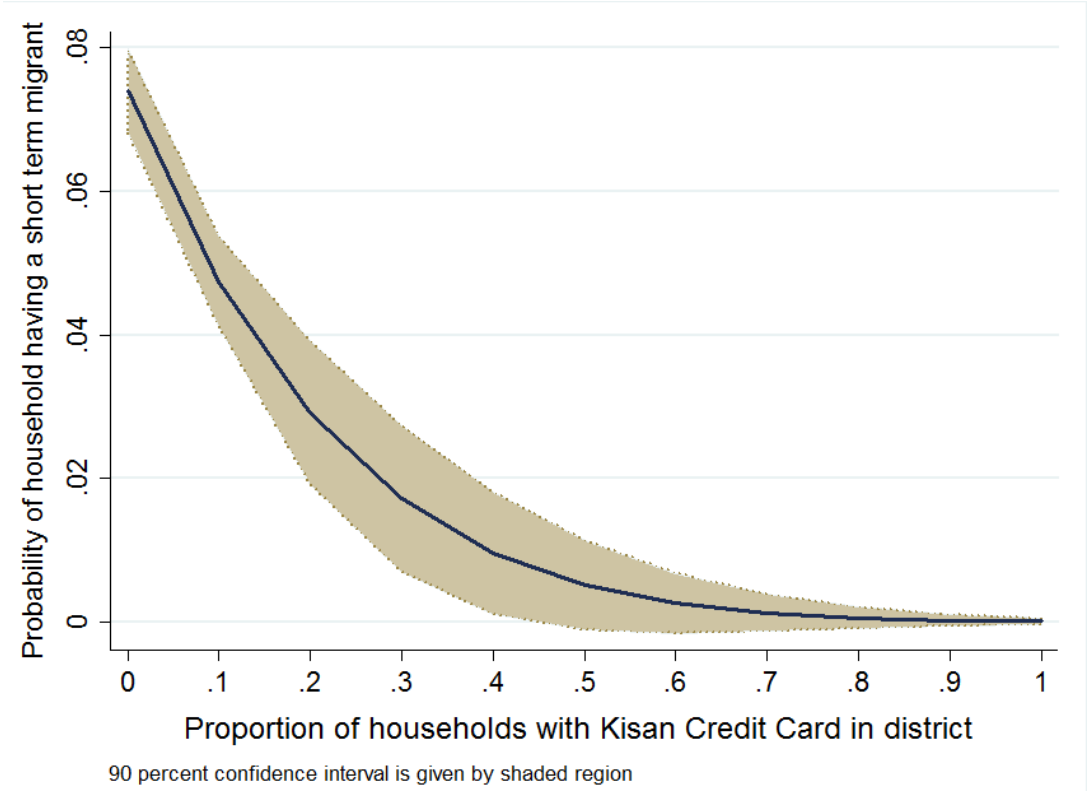

Figure 1: Change in predicted probability of short-term migration in household with respect to access to credit in district (proportion of household with Kisan Credit Card – KCC)

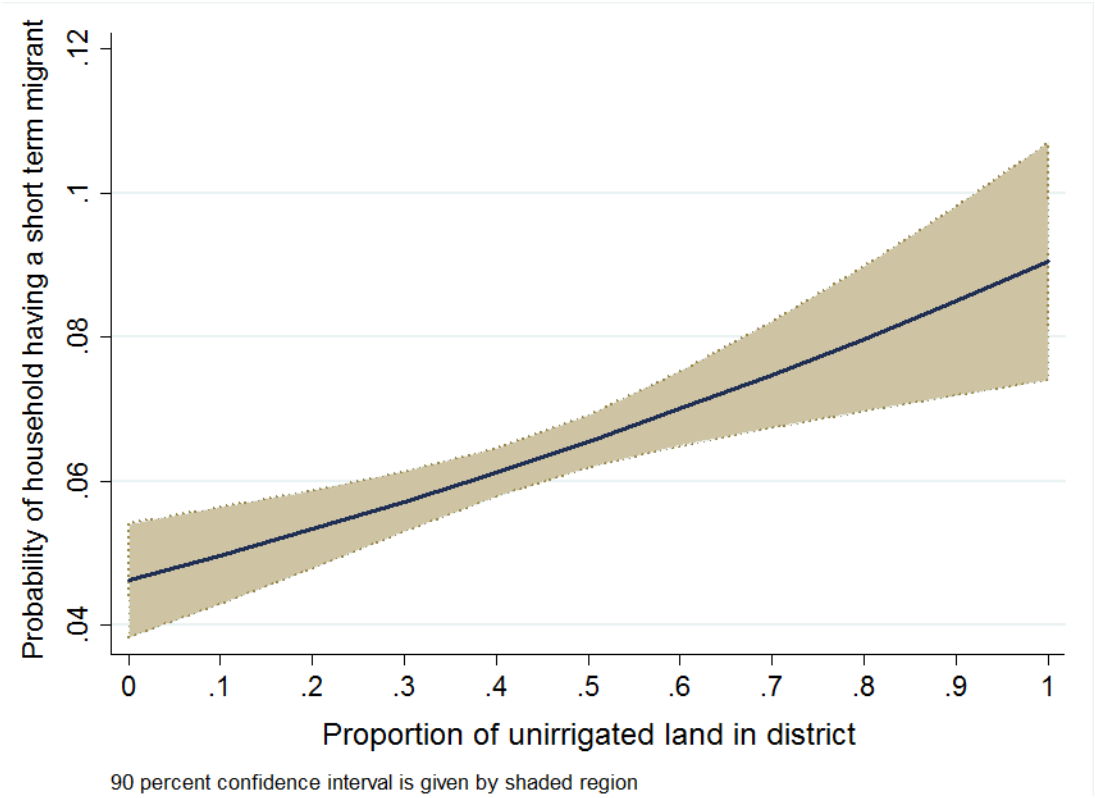

Figure 2: Change in predicted probability of short-term migration in household with respect to access to irrigation in district