IMPACT OF REMITTANCES ON ESTATE SECTOR POVERTY: A STUDY ON THE TEA ESTATE SECTOR IN BADULLA DISTRICT

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Abstract

Availability of external employment and resulting migration play an important role in poverty reduction in the rural areas of developing countries. Estate sector continues to play a major role in the tea industry of Sri Lanka. As fine plucking is still considered to be important to maintain the quality of the final product, shrinkage of residential work force due to out-migration of skilled laborers from formerly residential work is identified as a major problem faced by the industry. From the household perspectives, remittances from migrated members would increase household income and ultimately affect the poverty level of the estate households. Therefore, this study was conducted to investigate the impact of labor migration on poverty in estate sector in Badulla District. Assuming that the remittances are a potential substitute for household earnings within the estate, counterfactual scenarios were built to understand what household poverty would have been in the absence of migration and remittances. Results reveal that poverty incidence, depth of poverty and severity of poverty of households are reduced by 13.19%, 3.81% and 1.37% respectively due to migration and remittances. Hence, the study concludes that labor migration is an important upward driver for households in tea estates to move out of poverty. Identifying skill levels of residential workers and a remuneration policy to encourage retention of high skilled workers to continue work in the estates can be recommended. This may help to have extra income for worker households and increase the labor productivity in the estates.

Keywords*: Badulla District, Migration and remittances, Poverty, Skilled based remuneration, Tea estate sector.*

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INTRODUCTION

Labor migration internally within the country or internationally is a pervasive feature of economic development in many developing countries in the world (Mendola, 2012). Policy makers, academia and researchers are showing great interest in this phenomenon as it creates a favorable condition for rural household due to the remittances. In fact, migration and remittances play an important role in the structure of the rural household income (Zhu & Luo, 2010) and in sustainable development while it has complex and profound effects on poverty reduction depending on the causes, patterns and scale of migration in rural areas (World Bank, 2007). Contribution by the remittances is so enormous that they help the household to increase the consumption levels, investment in household assets, land education, housing, relaxing credit constraints and improving living standard etc. Globally, 105 million people are working in a country other than their country of birth. Migrants earned 440 billion US$ in 2011. Out of this amount, 350 billion US$ were transferred in the form of remittances. Sri Lanka too earns more foreign exchange from the foreign employments. The remittances from international migrants was US$ million 6407 in 2013, which was an increase of US$ 442 million over the year 2012 (Central Bank, 2013). Overall contribution by the migrants' remittances to the Sri Lankan Gross Domestic Product is 8%. Apart from international migration, internal migration also plays a significant role in the rural economy of many countries in the world. Internal outmigration especially from rural areas to urban areas has increased for all provinces from 1996-07 to 2003-04 in Sri Lanka. It has doubled between 1996-97 and 2003-2004. Total internal migration has increased from 15 to 29 per 1000 households. In 2003-2004, 81% of internal migration had been undertaken to seek employment (World Bank, 2007).

Estate sector among the other sectors (rural and urban) contributes significantly to the development of the economy through its capacity to earn foreign exchange. The estate sector comes under the export agriculture sector and it handles the production of tea, rubber, coconut and other export crops such as spices. The estate sector is one of the biggest providers of employment, export earnings and export revenue and it occupies about 750,000 hectares of productive land which is 40% of the total land cultivated in Sri Lanka (Ministry of Plantation Industries, 2013).

Among the major three crops, tea as a cash crop has been given the top priority due to its recognition throughout the world. Ceylon tea is considered to be the cleanest tea in the world and its contribution to the Sri Lankan economy is more than one billion US$. Its significance clearly reflects through its labor force. More than one million people's living is directly or indirectly attached to Sri Lankan tea industry. Amidst the significant contribution to the Sri Lankan economy, the sector faces many problems. Low productivity, high cost of production, lack of quality improvement and marketing practices, low profitability and inability to generate sufficient surplus to maintain its long

term sustainability are among them. More importantly, one significant factor which affects the production, productivity and quality standard of tea is the labor shortage. The key reason for this is the labor outmigration while absenteeism also plays a significant role.

Tea as a cash crop is more labor intensive. The quality of the tea leaves is maintained by hand plucking of tender leaves. This is a high skilled activity and it is mainly done by the female workers in the estates. About 70% of worker days and more than 40% of total cost go to tea plucking. Therefore, labor outmigration may significantly affect this process. Most the male workers do the heavy work and hard work such as pruning in the estates. Regular pruning is necessary to maintain the crop vegetatively and a skilled operation. Pruning is a skillful operation. If skilled laborers migrate out of the sector, this process is disturbed and it ultimately leads to low productivity and low quality teas.

Tea sector is well known for its residential workforce. However, this workforce continued to shrink over last few decades. As stated, labor outmigration is the key issues in reducing the labor force. Researchers argue that it has become a major problem and affects the very existence of the sector (Illukpitiya et al., 2004). Estate youth does not like to work in the tea lands. Their parents are also reluctant to send their younger generation for estate work. Educated youth does not have any opportunity to find an employment to suit their education qualification within the tea estates. Therefore, out migration has also increased. Internal migration is high among estate youth. The migration for employment is most common among those in their twenties. As a result, there is now a manpower crisis which could be threatening the future existence of the estate sector (Illukpitiya et al., 2004). Young people prefer to work in towns and have been attracted to garments industry and other urban employment. Low profile stigma attached to the estate worker had also caused outflow of manpower from estates. According to Shivaram and Herath (1996), the overall labor deficit has been the result of slow but steady decline.

Besides those factors, poverty among the estate households has become one of the major factors affecting the outmigration decision of the estate households. Sri Lankan estate sector which is a unique feature of Sri Lankan economy trapped in long term poverty due to historical circumstances and a variety of other factors related to geography language and access to services. Apart from these, they have a poor health and education outcome relative to the rest of the economy (UNDP, 2012; World Bank, 2007). Poverty still exists and widespread in Sri Lanka especially in the estate sector. Access to market and road facilities in estate sector lags far behind the urban sector (Vijayakumar & Olga, 2012) leading to be more vulnerable to poverty. Workers in the sector live in a congested and unsanitary housing with little access to social services. In case of human development indicators, estate sector is lagging behind even those in rural areas (World Bank, 2007). Surprisingly, the decline of poverty in estate sector is very sharp. Poverty has reduced

from 38.4% in 1995/96 to 10.9% (National: 6.7%) in 2012/2013 (Department of Census and Statistics, 2015). However, estate sector still remains the poorest sector in Sri Lanka.

World Bank (2007) indicated that the most successful way to move out of poverty is by diversifying the household livelihood portfolio beyond estate employment incorporating non farm sources of income; skilled and internal or external migration. Thus, they tend to diversify their income portfolio by incorporating non-farm income sources. Migration and remittances have become an important source to diversify the income in this regard. Based the data from Consumer Finances and Socio Economic Survey (CFSES, 2003-2004), World Bank (2007) shows the share of migrants from estate sector has been more than doubled; for example 90% of migrants to capital city has come from rural and estate sectors in 2002.

However, though researches argue that, rural to urban migration increases rural income levels, working outside the estates does not necessarily imply higher earnings. Therefore, their earnings are sufficient to compensate their living expenses only. As a result of this sending remittances home is limited. Therefore, the question arisen here is whether the remittances reduce the likelihood of being poor. Apart from this, World Bank (2007) finds that remittance from abroad migration has a negative correlation with the probability of being poor. However, World Bank (2007) itself emphasizes that this is not enough to say that remittance reduces the poverty. Therefore, inferring a migrant's counterfactual income i.e. the income the migrants would earn had they not migrated would help to have us a better picture of poverty and migration in the estate sector. Thus, the impact of migration on poverty is identified by reconstructing what a household's situation of earnings would have been if there was no migration.

Notwithstanding the importance of remittances to the estate households, their effects on the estate households are relatively unknown. To our knowledge, the studies on impact of migration and remittances on estate households are lacking. More attention is needed to find the relationship that exists between remittances and poverty. Therefore, this study is an attempt to estimate the impact of labor migration and remittances on the poverty of the estate sector.

REVIEW OF LITERATURE

Determinants of Migration

Migration process has been described using several economic theories such as Neoclassical Approach (Smith, 1776; Ravenstein, 1889), Human Capital Theory (Sjaastad, 1962), Family Migration (Mincer, 1978), Network Migration (Hugo, 1981), Push and Pull Migration (Zimmermann, 1995a) etc. Smith (1776) and Raveintein (1889) in their neoclassical approach of migration argue that wage differential between sectors

causes a migration flow from low wage to high wage regions. It states that migration mainly occurs because of geographical differences in the demand and supply of labor markets and wage differentials. This ends as soon as the wage differential between the two regions reflects the cost of movement from the low wage region to the high wage region. By dropping the neoclassical theory of full employment, the most influential model of rural urban migration was suggested by Todaro (1969). This model assumes that migration flows occur in response to urban rural differences in expected income rather than actual earnings. Migrants consider the various labor market opportunities available to them in the rural and urban sectors and choose one that maximizes their expected gains from migration. Human Capital Model introduced by Sjaastad (1962) treats migration as an investment decision of an individual and explains that the probability of obtaining a job in the destination country depends on the skill level of the migrants and their incentives to invest in destination specific human capital. Mincer (1978) represents a family migration model which explains family or household as a decision making unit about the migration. It does not emphasize individuals as migration decision making unit. The emphasis offered by the Network migration model is on the effect of social and information network on migration process and the reduction of the cost and risk of migration due to social and information network (Hugo, 1981). Larson and Mundlak (1997) find that migration is determined in response to income differentials. As such the choice between farm and off-farm employment is influenced by intersectoral income differentials. When income in non agriculture is sufficiently higher than in agriculture, labor will move out of agriculture.

Neoclassical theory of migration suggests that individual characteristics affect the decision to migrate while New Economics of Labor Migration (NELM) suggests that decision to migrate is affected by household variable indicating that the decision is a collective effort although both individual and household characteristics together can influence the migration decision. Among the household characteristics, educational level of household heads (Lewin et al., 2012) and experience of a particular work significantly influence the migration decision while household ownership also is found to be a major determinant. Root and Jong (1991) find that higher educational level of adult members with few real estates is related to migration for some family members in Philippines. As proposed by Lee (1966), push factors of migration are poverty, low income, small land holdings, lack of jobs and low wages whereas pull factors are higher wages for highly skilled laborers and strong network at the potential destination (World Bank, 2007). In a study carried out in Bangladesh, Ullah (2004) reveals that both push and pull factors affect the migration decision and the author indistinctly mentions those factors as the search for work, landlessness, extreme poverty, loss of income, easy access to informal sectors in cities and joining families or relatives. Lewin et al. (2012) indicate that probability of migration is negatively associated with age of the household head and being a female. Number of dependents defined as household members who are not currently employed

(Zhu & Luo, 2010) has a strong linkage with migration decision as they are the people who stay at home protecting their properties (Zhao, 1999).

Migration, Remittances and Poverty

This section provides a brief discussion on the impact of migration and remittances on poverty of the sending region and the households. Large amount of literature concentrates on this aspect and most of them show that impact of migration on poverty is positive implying that migration reduces poverty in the sending communities and households. In case of poverty in a country, international migration and remittances contribute to the reduction of the level, depth and severity of poverty in developing countries (Adams & Page 2005); whereas internal migration also could contribute immensely to the reduction of poverty. Zhu and Luo (2010) conclude that migration reduces rural poverty in rural China. Mendola (2008) showed that labor migration is often related to poverty but given its lumpy investment nature, poverty may constitute a motivation to migrate as well as a constraint to do it. Migration has the potential to efficiently allocate human resources and reduce poverty in remote lagging areas (World Bank, 2007). Migration outflows come along with certain monetary inflows. Remittances from migration increase the household welfare (Massey et al., 1993). Migrants could help relax the households' credit or liquidity constraint by sending back remittances (Taylor et al., 2003). However, in some instances remittances both from internal and international migration are observed to be predominantly used to meet daily expenses including food, farm and children's education. In the short term household may use migrant remittances primarily to supplement income. But in the longer term migration, the remittances of migrants may play a role in the household's development strategy (Taylor et al., 2003). Brown et al. (2014) indicate that remittances provide social protection for the poorest. However, Mendola (2012) sheds some lights on an important matter and highlights that the poorest are rarely found to be the major beneficiaries of remittances. Pernia (2008) considers the saving behavior of households of migrants and finds that remittances enhance household saving, spending on education and health care and help the poor out of poverty. The author further shows that overall increase in regional income do not contribute much to benefit low income households as much as upper income ones, thus widening income gap between the upper income and lower income households.

Adams (1989) also concludes that international remittances have a harmful effect on rural income due to the fact that remittances are mostly earned by upper income villagers. Portes (2009) explains in his research on remittances, poverty and inequality, remittances received by the migrants increase the income of the poor households. Migration not only provide household with inflows of resource to invest in farming activities, but also serve as an insurance system to reduce income fluctuations (Stark, 1980). Migration also provides the possibility for the households with low marginal labor productivity in rural

areas to diversify their production in urban sector and hence increase their income (Zhu & Luo, 2010). Esquivel and Pineda (2007) explain using their results on remittances and poverty in Mexico, receiving remittances as an important mechanism to help rural households to get out of poverty. Brown and Jimenez (2012) calculated and compared the impacts of remittances on both the extent and depth of poverty using the standard Poverty Headcount Ratios and Poverty Gap Ratios and estimates show a substantial reduction in poverty rates with migration and remittances.

In literature, remittances from migration are considered as exogenous transfers (Adams, 1994) and potential substitute for home earnings (Adams, 1989; Barham & Boucher, 1998). If remittances are considered as exogenous transfers, they are treated independently from home earnings. As the participation in migration is long term alternative choice of participation in farm activity for households, the notion that household income is increased by the same amount of remittances could be true if the migration compensate for short term income shock (Zhu & Luo, 2010). On the other hand, if remittances are considered as potential substitute for home earnings, we compare observed income distribution with counterfactual income distribution in the absence of migration. However, identifying the impacts of migration is difficult because of the nature of the choice of migration; the decision whether or not to migrate. The very reason for this is that it is hard to measure a credible counterfactual of what the persons and their households would have been doing had migration not occurred (McKenzie & Yang, 2010). Due to the non randomness of the migrant sample, a simple comparison of movers and stayers is biased and misleading (McKenzie et al., 2010). The fundamental problem in identifying the impact of migration is the lack of counterfactuals. Therefore, the researchers have to construct a counterfactual manually (McKenzie & Sasin, 2007).

A counterfactual income approach was first developed by Adams (1989) in his study of the effects of remittances on poverty and inequality in a sample of households in Egypt. However, he has not considered the self selection problem that arises due to non randomness of the migrant subsample of the population. A similar methodology was used by Rodriguez (1998) to study the impact of migration in the Philippines. Moreover, he considers the self – selection bias in this study. Barham and Boucher (1998) use counterfactual scenarios to analyze the impact of labor migration on income distribution. They examine net effect migration and remittances on income distribution under two counterfactual scenarios i.e. one that simply replaces remittance flows in observed household incomes with imputed values of migrants' home earnings; and a second that also allows for the potential effects of the return of migrants on the participation decisions and earnings outcomes of other family members. Adams and Cuecuecha (2010) use two counterfactuals to represent the expenditure that households that chose to receive internal remittances from Guatemala would have had without the receipt of remittances and the expenditure that the household that chose to receive international remittances from USA

would have had without the receipt of remittances. To find out the impact of migration on rural poverty and inequality in China, Zhu and Luo (2010) present counterfactual scenarios of what rural income and poverty would have been in the absence of migration. However, Xing (2010) uses counterfactual income densities to find the impact of migration on income distribution. Brown and Jimenez (2008), and Brown and Jimenez (2012) also use counterfactual scenarios to estimate the effect of migration on poverty and inequality in Fiji and Tonga. In constructing counterfactuals Brown and Jimenez (2008) use propensity score matching technique while Adams (2006) and Acosta et al. (2008) also use counterfactual scenarios in their researches. In the estimation process of counterfactual income, many researchers use Heckman two step approach in which they first estimate a probit model and then they estimate the income equations including the selection control variables (inverse mills ratios) in the second step. This provides unbiased consistent estimate for the outcome of interest. Thus, most widely used methodology to find the impact of migration of poverty is to build the counter factual scenarios of what household poverty would have been in the absence of migration and compare observed and simulated income distribution and poverty status in a community.

EMPIRICAL STRATEGY

Study Area

Tea is cultivated in six (06) provinces in Sri Lanka; Western, Central, Southern, Uva, North Western and Sabaragamuwa Provinces. Out of this, the largest land area under tea is in Central Province and the extent is about 77,995 ha. Uva Province consists of about 31,561 ha of tea which is 14.8% of total tea extent in Sri Lanka. Most of the tea estate concentrates in Uva and Central Provinces. Total area under tea estate in Uva province is 25,876 ha and it is the second largest extent of land that belongs to tea estates in Sri Lanka. Badulla district plays a major role in tea estate sector in Uva Province and its extent of tea cultivation is 25,024 ha. Badulla is also one of the poorest districts in Sri Lanka apart from the districts in Northern and Eastern provinces (World Bank, 2007). Therefore, Badulla district was selected for the study.

There are more than 70 tea estates in Badulla District. The estates for the survey are selected based on the remoteness and extent of cultivation. The number of labor families in estates depends on the extent of cultivation. The larger the extent larger will be the number of labor families. To have a better understanding of the migration, the estates should be selected based on the remoteness as well, because it could be expected that closer to towns and cities more will be migration. On the other hand, households in marginal tea estates may show higher rate of poverty incidences due to the difficulties in accessibility to towns and cities as a result of poor infrastructure development in remote areas.

Data

The data used in this study come from a field survey which was done in Tea estates in Badulla district, collected in late June to mid-July in year 2014. The survey contained 288 estate labor households with complete information. The surveyed households are located in nine Tea estates which belong to four Regional Plantation Companies (RPC's) out of seven RPC's in Badulla district. Each Tea estate consists of two to five tea growing divisions. Therefore, we used cluster sampling technique to draw labor households for the sample by considering each division as a cluster.

Information on the demographics of each member, household income and expenditure, household assets and other necessary information were gathered using pre tested questionnaire. When collecting information about household income, the actual income earned from working in the estate, income earned from other agricultural and non agricultural activities were recorded. As well as household expenditure for food, electricity, education, health and other expenses were collected for each household.

As migration plays an important role in this study, information was also recorded on whether any household member had ever gone out of Badulla district in search of work during the past three years (2011, 2012 and 2013). Information was also collected on work place and occupation of the migrant, reason(s) for migration, and on remittances to household income. The selected sample (288 labor households) consisted of 1492 household members out of which 152 household members are migrants. These migrant household members belong to 112 estate households (38.9%) while the rest of the household members belong to 176 estate households (61.1%). Studied sample comprised with three main ethnic groups in Sri Lanka where about 87.8% were Tamil, 7.9% were Sinhala and rests (3.8%) were Muslims.

Conceptual Model

There are four (04) methodological challenges faced in a migration research namely; simultaneity, reverse causality, selection bias and omitted variable bias. As many decisions are made at the same time the problem of simultaneity arises. Remittances sent by the migrants may help to reduce poverty whereas the level of poverty may influence the amount of remittances received by a particular household. This is called the reverse causality. Migrants in the population are not a random sample as they self select into migration and this may lead to bias estimation. On the other hand, we may not be able to find why households produce migrants and why migrants send remittances. They may send remittances; say for example, due to the poverty and low income of the households left behind. But this decision may be influenced by some other unobserved factors. If we do not take these into account seriously, it may lead to so called statistical problem of endogeneity. Therefore, to build up counterfactual with selection control, we borrow the methodology proposed by Zhu and Luo (2010). They use Heckman type two step

approach or what is known as treatment effect model by which self selection biases could be corrected.

The strategy of estimating household incomes with selection control involves two steps. First a model which predicts the determinants of migration is estimated. Second, an income equation which determines the household income conditional upon the migration and receipt of remittances is estimated. Here, we should first estimate a probit model to predict participation in the migration (the Probit first-step equation). Thereafter, a control variable, which captures all unobserved differences between the migrant and non migrant groups due to selection, is added in the second step (the substantive equation). This control variable will remove the variance from the error term due to selection, so as the coefficient on the treatment term can be correctly estimated (Antonakis et al., 2010).

First, we define two regimes;

Regime – 0; households without migrants

Regime – 1; households with migrants

Next, we need to define the household incomes in regime 0 and regime 1.

$$Y_{0i} = \text{Household income in regime} - 0$$

$$Y_{1i} = \text{Household income in regime} - 1$$

When households without migrants are considered, this is their observed income($\boldsymbol{Y_i}$)**.** However, this is the predicted income of households with migrants, which they would earn if none of the households migrated. The following procedure is applied in the estimation and prediction of incomes of each household in regime – 0.

1. Estimate household income equations from observed values
2. Use the income equations to simulate what household incomes would have been if the household didn't participate in migration
3. Compare the income distribution of the simulated income with that of the observed income in regime – 0.

As the migrant households may be systematically different from non-migrant households and migrant households are not uniformly and randomly distributed among the population (This implies that sub sample of the migrant households is not a random sample), estimation of the household earnings in regime – 0 is done with a standard selection model to correct the problem of sample selection and endogeneity issues.

Step 1

Estimation of probit equation for all households *i* in the collected sample

$$P_i^* = \alpha Z_i + \varepsilon_i \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where;

$P_i = 1\ if\ P_i^* > 0$

$P_i = 0\ if\ P_i^* \leq 0$

$P_i^* = non\ observed\ continuous\ latent\ variable$

$P_i = observed\ binary\ variable$

$P_i = 1\ for\ migrant\ households$

$P_i = 0\ for\ non\ migrant\ households$

$logY_{0i} = \beta_0 X_i + \mu_{0i}$; This is observed for $P_i = 0$

$Z_i\ and\ X_i$ are vectors of independent variables of participation and income equation. ε_i and μ_{0i} are unobserved terms and assumed to be have a *bivariate normal distribution* with zero means and correlation coefficient of ρ. This distributional assumption implies that;

$$E(logY_{0i}/P_i) = \beta_0 X_i + \beta_\lambda \lambda_i$$

$$with\ \lambda_i = E(\varepsilon_i/P_i) = \begin{cases} -\varphi(\alpha Z_i)/1 - \Phi(\alpha Z_i)\ P_i = 0 \\ \\ \varphi(\alpha Z_i)/\Phi(\alpha Z_i) \qquad P_i = 1 \end{cases} \quad \ldots\ldots\ldots\ldots\ldots\ (2)$$

$\lambda_i = Inverse\ Mills\ Ratio\ (IMR)$ – The expected value of the contribution of unobserved characteristics to the decision to participate in migration

Step 2

By replacing α with its estimated value $\hat{\alpha}$ in equation (2), we can calculate IMR ($\widehat{\boldsymbol{\lambda_\iota}}$) . The log income in regime – 0 can be estimated on the group $P_i = 0$.

$$logY_{0i} = \beta_0 X_i + \beta_\lambda \widehat{\boldsymbol{\lambda_\iota}} + \mu_{0i} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ (3)$$

$$E(\mu_{0i}/P_i) = 0, var(\mu_{0i}/P_i) = \sigma_0^2$$

By using the parameters estimated from equation (3), we can now estimate the income of all households in the regime – 0. i.e. log income of all households *i.* on the other hand we can calculate the simulated income by using the above equation. This is the simulated counterfactual income. When looking at the equation (3), we can identify two parts.

(1) A conditional expected value

$ElogY_{0i} = \beta_0 X_i + \beta_\lambda \widehat{\boldsymbol{\lambda_\iota}}$

(2) An unobserved term

μ_{0i}

If we use only the above equation (3) to predict the income, it can underestimate the values in the predicted income. Therefore, we need to generate a random value for the unobserved residual in the migrant subsample. We use the following equation (equation 4) to generate the unobserved residual.

$$\hat{\mu}_{0i} = \hat{\sigma}_0 \Phi^{-1}(\mathrm{r}) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

$\hat{\sigma}_0 = estimated\ Standard\ Error\ of\ for\ non\ migrant\ households$

r = random number

$\Phi^{-1} = inverse\ of\ the\ Cumulative\ Density\ F\ function\ of\ the\ standard\ normal\ distribution$

However, for non migrant households we can use the observed residual. But for migrant households we need to use $\hat{\mu}_{0i}$. Finally, we can estimate the log income equations for all households in regime – 0.

$$log\hat{Y}_{0i} = \begin{cases} logY_i = \hat{\beta}_0 X_i + \hat{\beta}_\lambda \hat{\lambda}_i + \mu_{0i} & for\ P_i = 0 \\ ElogY_i + \hat{\mu}_{0i} = \hat{\beta}_0 X_i + \hat{\beta}_\lambda \hat{\lambda}_i + \hat{\mu}_{0i} & for\ P_i = 1 \end{cases}$$

Corresponding predicted income is equal to $\hat{Y}_{0i} = exp(log\hat{Y}_{0i})$

Having simulated the income obtained if a household did not participate in migration, we can study the effects of migration on rural poverty.

To ascertain the impact of migration on poverty, poverty levels of labor households in each regime were computed using Poverty line at national level for the month of June 2014. In this, separately calculated the Poverty Headcount Index (HCI), Poverty Gap Index (PGI) and Squared Poverty Gap Index (SPGI) for the non-migrant households, migrant households and migrant households when they would not have migrated, respectively using following equations.

$$HCI = \frac{1}{N}\sum_{i=1}^{q} N_i = \frac{N_q}{N} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

$$PGI = \frac{1}{N}\sum_{i=1}^{q} \frac{(Z - y_i)}{Z} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

$$SPGI = \frac{1}{N}\sum_{i=1}^{q} \left(\frac{Z - y_i}{Z}\right)^2 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

Where N is the total population, N_q is the population whose per capita income is below the poverty line, Z - poverty line, and y_i is the per capita income of each household in which that value is below the poverty line.

Empirical Model Specification

We estimate the impact of migration on changes in poverty by estimating the participation equation and the income equation jointly. This is so done as this process is conditioned upon whether an estate household participate in migration and on how migration changes household income.

Choice of the variables follows the standard literature in which basic human capital variables are considered to be likely to affect the migration. Initially, in the early stages of migration studies, literature suggests that migration is affected by individual characteristics. However, New Economics of Labor Migration (NELM) revealed that household characteristics are major determinants of migration. The latter highlights the fact that the migration is a collective decision making process. Thus, it could be emphasized here that household as well as individual characteristics affect the decision to migrate. As our unit of analysis is the estate households, we use household level variables and human capital variables in two equations; participation and income equations. In participation equation, we introduce the variables in Table 1.

Table 1: Variable Definitions

Characteristics of household head	
X_1	Age of household head in years
X_2	X_1^2
X_3	Gender of household head (dummy where 1= male, 0=otherwise)
X_4	$X_1 * X_3$ (Age * Gender)
X_5	Educational level of household head in years
X_6	X_5^2
Household characteristics	
X_7	Number of children under age 6
X_8	Number of schooling children
X_9	Number of males over age 15
X_{10}	Number of females over age 15
X_{11}	Number of Dependents
Human capital characteristics	
X_{12}	dummy variable 1 = presence of members with 0-5 years of education, 0 = otherwise
X_{13}	dummy variable 1 = presence of members with 6-11 years of education, 0=otherwise
X_{14}	dummy variable 1 = presence of members with ≥ 12 years of education, 0=otherwise
Model Identification Variables	
X_{15}	Distance to the nearest city in kilometers
X_{16}	Distance to the nearest bus-stop in kilometers
X_{17}	Availability of public transport in the estate (dummy var 1= available, 0 otherwise)
X_{18}	$X_{16} * X_{17}$

We identify several categories of variables. They are characteristics of household head, other household characteristics, human capital variables and model identification variables. Age, education level and the gender of the household head are used to denote the variables of household head. Age of the household head provides a proxy for work

experience (Hadinott, 1994; Lewin et al., 2012) while the likelihood of migration among the workers has been found to have an inverse U-shaped associated with age. Age is also a proxy for an individual's accumulated skills in the labor market and on the estates. Gender also affects the probability of migration and the economic opportunities of the individuals (Lewin et al., 2012). It is also noted in the migration literature that education levels of migrants and other household members positively influence the migration decision. Educational level of household heads is found to be a major determinant in migration (Lewin et al., 2012). Root and Jong (1991) also find that higher educational level of adult members with few real estates is related to migration for some family members in Philippines.

Adams (2006) points out that that migration is a life-cycle event in which households with older heads and more males and females over age 15 are more likely to participate. Therefore, we include these two explanatory variables in our model as well.

Number of dependents defined as household members who are not currently employed (Zhu & Luo, 2010) has a strong linkage with migration decision as they are the people who stay at home protecting their properties (Zhao, 1999). However, some other studies (Lewin et al., 2012) show that propensity to have a migrant in families is reducing with the increase in number of dependents due to the fact that dependents should be taken care of. Number of children under age 6 has also been used as an important determinant in migration literature (Zhu & Luo, 2010). We also include this variable as an important determinant in our participation equation. Moreover, we use cut off age as 6 years and considers children under age 6. Children belonging to age 6 and above are considered as schooling children. We use number of school children also as a predictor variable. Lewin et al. (2012) also have used this variable in their study. According to the basic human capital model (Sjaastad, 1962) human capital variables are likely to affect migration, because better educated people enjoy greater employment and expected income-earning possibilities in destination areas (Adams, 2006). Adams (2006) assumed that number of household members with preparatory, primary, secondary or university education of household members affect the probability of migration and receiving remittances. In our study, we also assume that the presence of household members with 0-5 years education, 6-11 years of education and 12 years and above education level affect the probability of migration. Apart from these explanatory variables, we use distance to the nearest city, distance to the nearest bus-stop and availability of public transport within the estate. We use these variables to identify the participation and income equation to for the two step Heckman estimation. We assume that these variables affect the migration decision while it does not affect the income of the households.

RESULTS AND DISCUSSION

Descriptive Statistics

The following (Table 2) shows the summary statistics of the sample. It reveals that gender difference is significant in two types of households.

Table 2: Descriptive Statistics

Variable	All Households	Non Migrant Households	Migrant Households	T test (Non Migrant Households versus Migrant Households)
Age of the household head	50.50	50.23	50.93	-0.44
Gender of the household head	0.82	0.90	0.69	4.64**
Maximum level of the education of the household head	6.37	6.59	6.04	1.31
Distance to nearby city	7.12	7.24	6.95	0.69
Distance to nearest bus-stop	0.87	0.81	0.97	-1.32
Availability of public transport facilities	0.70	0.72	0.69	0.51
Number of dependents	2.94	3.00	2.84	-0.85
Number of children under age 6	1.30	1.39	1.15	1.54
Number of school children	1.07	1.22	.82	2.85**
Number of males over age 15	1.80	1.83	1.75	0.77
Number of females over age 15	1.46	1.56	1.31	2.49**
Presence of members with 0-5 years of education	0.74	.73	0.76	-0.59
Presence of members with 6-11 years of education	0.88	.86	0.91	-1.21
Presence of members with 12 years and above education	0.24	.28	0.17	2.29**
Total Income (Rs)	28021.99	27233.58	29010.91	-0.91
Home Income (Rs)	24126.15	27233.58	19243.17	4.10**
Remittances (Rs)	3895.83	-	9767.86	-
Per capita income without remittances (Rs)	5330.67	5727.00	4707.87	2.74**
Per capita income with remittances (Rs)	6445.25	5727.00	7511.42	-3.86**
Per capita remittances (Rs)	-	-	3326.94	-

*, **, *** Significant at 10, 5 and 1 percent probability level

About 82.29% of the household heads are males while 17.71% of the households are headed by females. Moreover, when non migrant households are concerned, about 90.34% of the households are headed by male when migrant households are considered, this value is less than that of non-migrant households (69.64%). This is an indication that more males than females tend to migrate. Results also suggest that there is a significant difference between two types of households with respect to number of school children, number of males over the age 15, and presence of members having 12 years and above education level. Average income of all households is Rs. 28021.99 while average incomes of non-migrant and migrant households are Rs. 27233.58 and Rs. 29010.91 respectively. Remittances play a major role in migrant household income. Mean remittance level is Rs. 9767.86 in migrant households while it is Rs. 3895.83 in relation to all households. Home income (Rs. 27233.58) of non-migrant households is significantly higher than that of migrant households. So is the per capita income without remittances. However, when remittances are included in the household income of the migrant households, per capita income is significantly greater in migrant households. Per capita remittances level of the migrant households is Rs. 3326.94.

Results of Probit Regression

In this section we present the results of the participation equations. Table 3 below represents the regression coefficients of the estimated model. The Z-statistics are in the parenthesis.

According to the estimates, overall model is significant at 99% significant level and the pseudo R^2 is 0.20. According our results, the age of the household head is negatively associated with probability of migration at 10% significant level. This finding implies that probability of migration of household members decreases when the age of the household head increases. Similar findings for the variable age have recorded in the studies of Kaimba et al. (2011) and Lewin et al. (2012).

It could be expected that with increase in the age of the household heads the family may become a stable one and therefore there can be less number of migrants in the family. Highlighting from the literature, Adams (2006) emphasizes that households with older household heads produce more migrants as they have more members that have ability to migrate. It is also a fact that age of the household head is a proxy for experience of household heads in estate work.

Therefore, we could expect either negative or positive association of migration with the age of the household head. Akhter and Bauer (2014) also argue that the sign of the age of the household heads can be positive or negative.

Table 3: Determinants of Migration – Results of the Probit Regression

Variable		Coefficient
Characteristics of household head		
X_1	Age of household head in years	-0.09*
X_2	X_1^2	0.00
X_3	Gender of household head (dummy where 1= male, 0=otherwise)	-1.61***
X_4	$X_{1*} X_3$ (Age * Gender)	0.07***
X_5	Educational level of household head in years	-0.03
X_6	X_5^2	-0.01
Household characteristics		
X_7	Number of children under age 6	-0.22*
X_8	Number of schooling children	-0.27**
X_9	Number of males over age 15	-0.21
X_{10}	Number of females over age 15	-0.15
X_{11}	Number of Dependents	0.24**
Human Capital		
X_{12}	dummy variable 1 = presence of members with 0-5 years of education, 0 = otherwise	-0.05
X_{13}	dummy variable 1 = presence of members with 6-11 years of education, 0 = otherwise	0.69**
X_{14}	dummy variable 1 = presence of members with 12 years and above education, 0 = otherwise	-0.18
Model Identification		
X_{15}	Distance to the nearest city in kilometers	-0.13**
X_{16}	Distance to the nearest bus-stop in kilometers	0.25**
X_{17}	Availability of public transport within the estate (dummy variable, 1=available, 0=otherwise	0.16***
X_{18}	$X_{16} * X_{17}$	-0.58
	Constant	4.44***
	Log likelihood	-153.96
	Chi-square (18)	76.98
	Significance level	0.0000
	N	288
	Pseudo R^2	0.20

*, **, *** Significant at 10, 5 and 1 percent probability level.

The migration literature that education levels of migrants and other household members positively influences the migration decision. This is highlighted by Sjaastad (1962), Adams (1989), Larson and Mundlak (1997), Mora and Taylor (2006), and Matsumoto et

al. (2006). Almost all the authors stress that propensity to migrate increases with higher education levels of migrants while educational level of household heads (Lewin et al., 2012) significantly influence the migration decision. Surprisingly, our results indicate that education level of the household head is not a significant determinant of propensity to migrate. The sign of the education level of the household head is negative. This may be due to the fact that higher education levels of the household head may reflect better household resources and income opportunities so that they may not need to depend on the migration and remittances (McDonald & Valenzuela, 2012). Kaimba et al. (2011) and McDonald and Valenzuela, (2012) also highlight that education attainment of the household head does not correlate with the probability of having a migrant in the households in Kenya and Philippine respectively.

Literature suggests that gender of the household head as an important predictor of the migration decision (Kaimba et al., 2011). Therefore, we also use the gender of the household head as a predictor. Our findings reveal that gender of the household head significantly and negatively affects the migration decision at 1% significant level. The reasons behind these findings could be that most of the households surveyed are headed by males (82.29% out of which 69.64% migrant households are headed by males and 90.34% households are headed by male in non-migrant families). Therefore, we can argue that gender of the household heads is a significant determinant of migration because most cases households are headed by males in Sri Lankan Societies. On contrary to our findings, Kaimba et al. (2011) indicate that gender of the household head has a positive association with the migration decision.

Apart from characteristics of the household head we hypothesize five other household characteristics as determinants. Out of these variables, number of children under the age six, number of schooling children and number of dependents are significant determinants at 10%, 5% and 5% significant levels respectively. The signs of the two variables; number of children and schooling children are negative. In other worlds, the greater the number of children they have, their tendency to remain in the estate is greater. This finding further proves from the descriptive statistics that most of the migrants (about 61%) are not married. i.e. they do not have children. Syafitri (2012) also argues the fact that having children tends to become a burden and therefore discourages migration. Cox and Ureta (2003) found in El Salvador that the decision regarding international migration is influenced by household characteristics such as family income, parental schooling and number of schooling children.

Our results further suggest that the propensity to migrate increases with the increase in the number of dependents. According to the literature, this variable can have both positive and negative sign on the migration decision. Based on the literature, we can argue that adult members might be willing to migrate to the city for earning extra income due to additional expenditure of the young members. At the same time, they can stay with their

family to look after the young members on the household that is negative influence on the migration.

The results regarding the human capital variables reveal that presence of members with 6-11 years of education is significantly associated with migration. However, presence of members with higher education levels is not associated with sending their members to external employment. The coefficient for this indicator is negative. This is contrary to the general arguments proposed by human capital theory as the relationship between education and sending migrants away from tea estate in Badulla District is not a strong one. Maximum number of years of education in migrant households is 6.67 whilst in non-migrant it is 6.34.

Estimation of Income Equations

We estimate the income equations in the presence of the inverse mills ratio and the in the absence of the inverse mills ration. We use total number of variables including the model identification variables in the regression first. We then estimate the model removing the model identification variables. Finally, we use regression 4 in the simulation.

Table 4 indicates that age, gender and education level of the household heads are not significant in all the regression meaning that they do not have any effect of the household income. The presence of people with 0-5 years education, 6-11 years education and presence of members with 12 years and above education level have no effect on the household income. However, presence of members with 6-11years education has a negative sign meaning that their contribution to total household income is negative. The household income is calculated based on the home earnings and migration decision is positively affected by this variable. Therefore, their contribution to the home earnings is reduced with occurrence of more migration.

Table 4: Results of the OLS Regression – Dependent Variable Logarithm of the Household Per Capita Income

		In the Absence of Inverse Mills Ratio		In the Presence of Inverse Mills Ratio	
		Regression 1	Regression 2	Regression 3	Regression 4
X_1	Age of household head (Years)	0.03	0.03	0.04	0.04
X_2	X_1^2	-0.00	-0.00	-0.00	-0.00
X_3	Gender of household head (dummy where 1= male, 0=otherwise)	0.83	0.71	1.12	1.05
X_4	$X_{1*} X_3$ (Age * Gender)	-0.01	-0.01	-0.01	-0.01

*, **, *** *Significant at 10, 5 and 1 percent probability level*

Table 4: Continued ……

		In the Absence of Inverse Mills Ratio		In the Presence of Inverse Mills Ratio	
		Regression 1	Regression 2	Regression 3	Regression 4
X_5	Educational level of household head in years	-0.01	-0.01	-0.02	-0.02
X_6	X_5^2	0.00	0.00	0.00	0.00
X_7	Number of children under age 6	0.17***	0.18***	0.18**	0.20***
X_8	Number of schooling children	0.08*	0.07	0.09	0.09
X_9	Number of males over age 15	0.19***	0.20***	0.20***	0.21***
X_{10}	Number of females over age 15	0.10	0.11*	0.11	0.12*
X_{11}	Number of Dependents	-0.28***	-.29***	-0.30***	-0.31***
X_{12}	dummy variable 1 = presence of members with 0-5 years of education, 0 = otherwise	0.08	0.09	0.09	0.10
X_{13}	dummy variable 1 = presence of members with 6-11 years of education, 0 = otherwise	-0.04	-0.05	-0.06	-0.08
X_{14}	dummy variable 1 = presence of members with 12 years and above education, 0 = otherwise	0.14	0.14	0.16	0.16
X_{15}	Distance to the nearest city in kilometers	-0.01		-0.00	
X_{16}	Distance to the nearest bus-stop in kilometers	-0.05		-0.07	
X_{17}	Availability of public transport within the estate (dummy variable, 1=available, 0=otherwise	0.03		0.02	
X_{18}	$X_{16} * X_{17}$	-0.21		-0.16	
	Inverse Mills Ratio			-0.09	-0.11
	Constant	7.40***	7.27***	7.21***	7.02***
	R^2	0.26	0.26	0.26	0.23
	Number of observations	176	176	176	176

*, **, *** Significant at 10, 5 and 1 percent probability level

Therefore, bias resulting from estimation only through OLS estimation is very small. Adams (2006) and Burham and Boucher (1998) also find no selection bias in their studies. However, the common assumption in migration literature is that the migrant self-select so that they are not a random draw from the population. Therefore, it is important to find reasons for this issue. We can argue that although the literature suggests that migrants self-select based on skill, education etc., we cannot expect such thing in the tea estate households as most of the households have not gained satisfactory secondary and higher education. As shown their mean education level is about six years. Therefore, education level is not a significant factor to self-select into migration.

Remittances and Poverty

We use regression 4 to stimulate the counterfactual income of what household income and poverty would be in the absence of migration for all households.

Table 5 shows the comparison of FGT poverty indexes between observed income and the simulated income. It reveals that per capita income would have been 20.67% in estate households in the absence of migration. In other words, the results imply that household per capita income increases if estate households participate in migration. If they did not participate in migration poverty incidences would have been 37.15%. Moreover, the depth of poverty and severity of poverty would have been 10.45% and 4.09% in the absence of migration. However, poverty incidences, depth of poverty and severity of poverty have decreased by 13.19%, 3.81% and 1.37% respectively due to migration.

Table 5: FGT Indices of Simulated and Observed Incomes

	In the absence of migration (Simulated Income)	In the presence of migration (Observed Income)	Difference
FGT Index			
Head Count Index – Poverty Incidences	37.15	23.96	13.19
Poverty Gap Index – Poverty Depth	10.45	6.64	3.81
Squared Poverty Gap Index – Severity of Poverty	4.09	2.72	1.37
Average Per capita Income	5093.58	6420.94	-1327.36*** (-4.79)
Number of Observations	288	288	

Note: Poverty line equals to Rs. 3886.00 for the month of June 2014 (DCS, 2014)

Migration of estate households has become one of the major challenges in tea estate in Badulla District. The major reason is the poverty prevailed among the estate households. World Bank (2007) also shows that most successful way to move out of poverty is to diversify livelihood portfolio beyond estate employment. It further reveals that if they are able to diversify income sources it is associated with welfare gains and lower poverty for households. Although the same literature highlights that internal migration and remittances are not sufficient to lift out of poverty, it is clear from this study that poverty levels of the estate households reduced due to migration and remittances.

Table 6 presents the distribution of household income under different scenarios that we employed in the study. In the absence of migration (regime – 0), per capita income of the migrants would have been less than that of the non-migrant households. However, the per capita income of migrant households in regime – 1 is greater than the simulated per capita income of migrant households. Here, we have included the remittances as well in the income. Moreover, it is clearly visible that income distribution between the two types of households getting widened due to remittance effect. Gini index of these two income categories further proves that the distribution is getting widened. It is a fact that the income distribution and inequality in tea estates is considered to be more or less equal with regards to the earning potential of estate households. Although the case is like this, income gap between migrant and non-migrant households widen due to migration. One can argue that it could be better to have widened income gap between these two types of households as it will lead to low income group to consider that they also should involve in some kind of extra income generating activity. On the other hand, one can argue that it will lead to more social problems in the estate community due to this income gap. However, it was seen from our results that the poverty level of the estate community decreases due to migration.

Table 6: Per Capita Incomes of Different Regimes

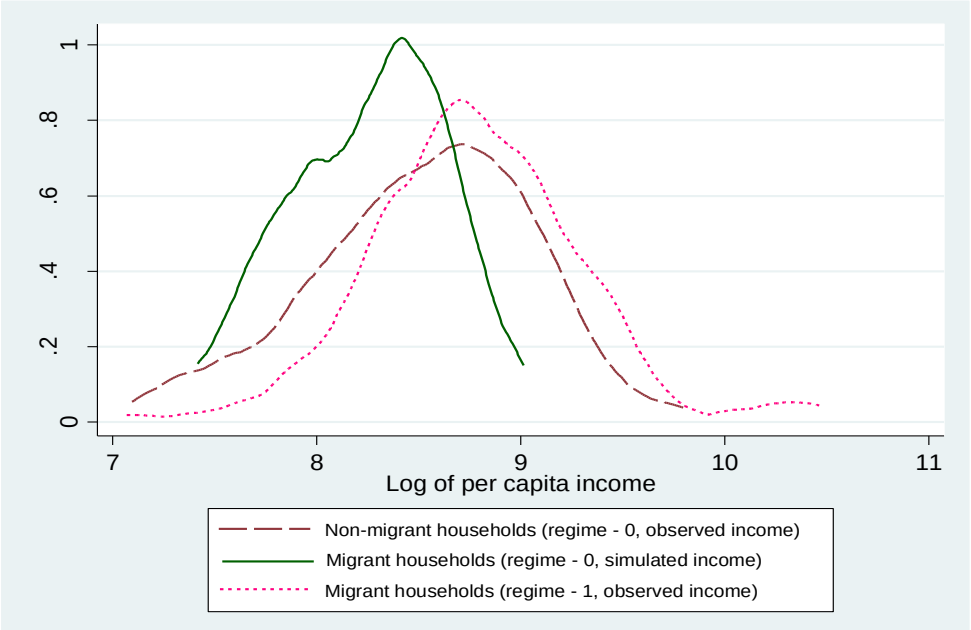
Variable	Number of Observations	Mean	Regime	Gini index
Per capita observed income of non-migrant households	176	5727.00 (Y_0)	Regime – 0 ($P_i = 0$)	0.20
Per capita simulated income of migrant households	112	4098.19 ($\hat{Y}_0$)	Regime – 0 ($P_i = 1$)	0.27
Per capita observed income of migrant households	112	7511.42 (Y_1)	Regime – 1 ($P_i = 1$)	0.29

Moreover, it is clearly visible that income distribution between the two types of households getting widened due to remittance effect. Gini index of these two income categories further proves that the distribution is getting widened. It is a fact that the

income distribution and inequality in tea estates is considered to be more or less equal with regards to the earning potential of estate households. Although the case is like this, income gap between migrant and non-migrant households widen due to migration. One can argue that it could be better to have widened income gap between these two types of households as it will lead to low income group to consider that they also should involve in some kind of extra income generating activity. On the other hand, one can argue that it will lead to more social problems in the estate community due to this income gap. However, it was seen from our results that the poverty level of the estate community decreases due to migration.

We finally present the income distribution of two types of families using the Kernel density plot. The density curve for simulated income is steeper than the other two curves presented in Figure 1. Moreover, the level of log income with highest density is closer to the right for simulated income than the other incomes. This implies that in the absence of migration, the income distribution of households that participate in migration would be left of that of non-migrant households. The average income of former is lower than the latter. When households in the regime 0 participate in migration, the center of the distribution of their income moves to right beyond that of non-migrant households. As a result of this their income inequality declines.

Figure 1: Kernel Density Plots of Distribution of Per Capita Income of Estate Households



CONCLUSIONS AND RECOMMENDATIONS

The main objective of this study was to estimate the impact of migration and remittances on the poverty of the tea estate sector in Badulla district of Sri Lanka. Indeed, the analysis suggests that migration and remittances play a significant role in increasing household income and reducing poverty in estate households in Badulla District. Employment outside estates has become one of the major sources of household income in estate households. Poverty incidences of estate households are reduced from 37.15% to 23.96% while depth and severity of poverty is reduced from 10.45% and 6.64% to 4.09% and 2.72% respectively. Hence, the study concludes that labor migration is an important upward driver for households in tea estates to move out of poverty. However, researchers and policy makers should pay more attention on the tea estate sector as it is highly labor intensive production. If more and more skilled labor migrates, that may badly affect the productivity of the tea estate sector. One solution for this would be to introduce machineries like plucking shears. But, the main problem arises is whether we would be able to maintain the quality of tea, as selective plucking is limited if machineries are used. If a selective tea leaf harvester, light weight plucking basket and other tools are introduced, labor productivity could be improved and thereby the daily earnings of laborers could also be improved.

Moreover, a very important policy question arises as to how we should manage migration without giving any opportunity to collapse the industry. For that, identifying skill levels of residential workers and a remuneration policy to encourage retention of high skilled workers to continue work in the estates can be recommended. This may help to have extra income for worker households and increase the labor productivity in the estates. If migration trend continues the estate sector would face a crisis in the future due to aggravating labor shortage. As such, the estate sector should look for other strategies which are effective in labor shortage situation. One strategy would be to outsource services and hire outside laborers and retired persons as causal and temporary laborers. However, this would not be a viable solution for long term shortage of labor. As the migration and remittances have a significant poverty reducing effect on the estate households, policy makers, estate management and other affected party should take great care in initiating a balance strategy in managing the migration and improving the estates. It is also a fact that we should implement strategies to manage the vulnerability to estate production shocks. Hence the future researches are needed in this regard.

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