Impact of Occupational Migration of Unskilled Labourers on Farm Business Income: A Study of Nagaon and Morigaon Districts of Assam

A Dissertation Submitted

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By

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(भारत के संसद के अधिनियम द्वारा वर्ष 2007 में स्थापित और नैक (एनएएसी) द्वारा वर्ष 2015 में प्रत्यायित केंद्रीय विश्वविद्यालय)
(A central university established by an Act of Parliament of India in 2007 and accredited by NAAC in 2015)

Date: 03/02/2020

DECLARATION

I, **Bodrul Islam**, hereby declare that the research work embodied in the dissertation titled **"Impact of Occupational Migration of Unskilled Labourers on Farm Business Income: A Study of Nagaon and Morigaon District of Assam"** submitted to Sikkim University for the award Master of Philosophy is my original work. This dissertation has not been submitted for any other degree of this University or any other University.

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CERTIFICATE

This is to certify that Dissertation titled **"Impact of Occupational Migration of Unskilled Labourers on Farm Business Income: A Study of Nagaon and Morigaon District of Assam"** submitted to the Sikkim University for partial fulfillment of the degree of Master of Philosophy in the **Department of Economics**, embodies the results of bonafide research work carried out by **Bodrul Islam** under my guidance and supervision. No part of this dissertation has been submitted for any other degree, diploma, association and fellowship.

All the assistance and help received during the course of investigation have been duly acknowledge by him.

I recommended this dissertation to be placed before the examiners for evaluation.

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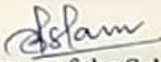
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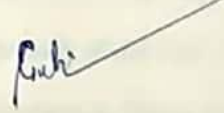
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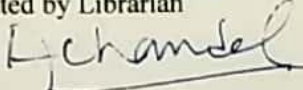
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Abbreviation

2SLS	Two Stage Least Square
3SLS	Three Stage Least Square
AG^2	Age Square of Household Head
AGM	Age of Migrant
AHH	Age of Households Head
CACP	Commission for Agricultural Cost and Price
CD	Community Development Block
CH	Cachar
D	Migration Network Dummy
DBSV	Distance to Bus Stands from Village
DCBV	Distance to Commercial Bank from Village
DEP	Depreciation on Implements and Farm Buildings
DFFV	Distance to Farm Fuel Store from Village
DFRV	Distance to Fertilizer Store from Village
DG	Dibrughar
DPRV	Distance to Pucca Road from Village
DR	Darrang
DWMV	Distance to Weekly Market from Village
EU	European Union
FBI	Farm Business Income
FICCI	Federation of Indian Chambers of Commerce and Industry
FIML	Full Information Maximum Likelihood
FL	Family Labour
FR	Fertilizer
FY	Family Income
GA	Golaghat
GDP	Gross Domestic Product

GL	Goalpara
GSDP	Gross State Domestic Product
ha	Hectare
HBL	Hired Bullock Labour
HL	Hired Human Labour
HML	Hired Machinery Labour
HS	Household Size
IC	Irrigation Charges
IFC	Interest on Fixed Capital
ILS	Indirect Least Square
INR	Indian Rupee
IP	Insecticides and Pesticides
IV	Instrumental Variables
IVF	Imputed Value of Family Labour
IWC	Interest on Working Capital
JH	Jorhat
KM	Kamrup
KR	Kokrajhar
LC	Land Per Capita
LIML	Limited Information Maximum Likelihood
LR	Land Revenue
MA	Manure
MEF	Miscellaneous Expenses in Farm
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Schemes
ND	Number of Dependent
NELM	New Economics of Labour Migration
NG	Nagaon
OBC	Other Backward Classes

OBL	Own Bullock Labour
OI	Others Income
OLS	Ordinary Least Square
OML	Own Machinery Labour
PPF	Production Possibility Frontier
RL	Rent Paid for Leased Land
RVL	Rental Value of Owned Land
S.D	Standard Deviation
SC	Schedule Castes
SE	Standard Error
SE	Seeds
SI	Self Employment Income
ST	Schedule Tribes
SURE	Seemingly Unrelated Regressions
SV	Sivsagar
TAV	Total Assets Value
TR	Total Revenue
USA	United States of America
VAHSH	Value of Assets Holding Status of Households
VF	Village Flood Dummy
WRV	Wage Rate of Agricultural Labourers in Village
YS	Years of Schooling of Households Head
YSM	Years of Schooling of Migrant

Chapter I

Introduction

1.1 Introduction

Despite the advancement of industry and services sector, the agriculture sector has continued to occupy an important position in Indian economy where a large section of population is directly or indirectly depending on it for their livelihood. Indian has global reputation as the largest producer of crops like pulses, rice, wheat, spices. Agriculture and its allied sector are one of the largest employments generating sectors in Indian economy, more so in the vast rural areas. Agricultural sector is primary source of livelihood for almost 60 per cent of the country's total population (Meghwal *et al.*2016). Despite the declining share of agriculture in Gross Domestic Product (GDP) from about 50 per cent in early 1950s to 14 per cent during 2011-12, agriculture continues to be an important sector of Indian economy which has engaged 52 per cent of country's total labour force (Arora, 2013).

One of the predominantly agrarian states of North East India is Assam. The share of agriculture and allied activities in Gross State Domestic Product (GSDP) of Assam at current price was 19.34 per cent during 2016-17 (Economic Survey Assam, 2017-18). As per Census (2011), about 49.45 per cent of the total workforce in the state was engaged in agriculture as farmer, agricultural labourer, or both for their livelihood. The agriculture in Assam is dominated by paddy farming both in terms of acreage coverage and production. The area under paddy cultivation during 2016-17 was 24.67 lakh hectares which was 92.5 per cent of the total area under food grain production of the state. The average size of land holding per household was only 1.10 hectares during 2014-15 and more than 85 per cent of farmer families were either small or

marginal farmers with average land holding was only 0.63 hectare (Economic Survey Assam, 2017-18). Paddy farming is practice in three seasons (winter, summer and autumn rice) in Assam. During 2016-17, the total area under winter, summer and autumn rice in Assam was 18.90 lakh hectares, 4.08 lakh hectares, and 1.68 lakh hectares respectively (Economic Survey Assam, 2017-18).

1.2 Statement of the Problem

There are many issues and challenges related to agricultural sector of India such as imperfect input market, imperfect credit market leading to sub-optimal investment decisions or input applications, poor human resource base, smaller access to suitable extension services and technological know-how, poor access of public irrigation, command area development, excessive dependency on rainfall and whether condition, electricity grids, negative externalities from poor quality land and water management (Dev, 2012). However, one of the major challenges faced by Indian agriculture in recent years that can become an overwhelming problem in the anticipated future is the scarcity of labour (FICCI, 2015). The portion of agricultural workers to the total workers has been declining over the years, while the corresponding ratio in the secondary and tertiary sectors has been increasing. Between 2004-05 and 2011-12, agricultural workforce declined by 30.57 million in India despite the total workforce in the country increased by 10 million; the share of agricultural work force in total workforce declined from 56.70 per cent to 48.80 per cent during the same period (FICCI, 2015). The labour shortage in agriculture has become a national phenomenon, which is clearly apparent across all the states of India. In this respect, Assam is no exception as the share of agriculture workforce to the total workforce in Assam has declined from 67.32 per cent (5,44,5620) in 1991 census to 52.49 per cent (4,99,4305) in 2001 census and further decreased to 49.45 per cent (5,90,6973) in 2011 census

(Census Report, 1991;2001;2011). Despite increase in total workforce by 1.5 million people between 1991 to 2001, the agricultural workforce in Assam declined by 0.45 million people during the reference period (Census Report, 2001); however, it has marginally increased almost by 0.9 million despite the total workforce increased by 2.5 million between the period 2001 to 2011 (Census Report, 2011). In census 1991 total labour force in Assam was 80, 88,935 where as the share of cultivator and agriculture labour was 54.75 per cent and 12.57 per cent respectively, however the share of cultivator decreased to 39.21 per cent and share of agriculture labour marginally increased to 13.28 per cent during 2001; despite the increase in total labour force to 95, 13,240 (Census Report, 2001). The share of cultivator continued to decrease to 33.93 per cent and share of agriculture labour marginally increased to 15.42 per cent during 2011; with total labour force in Assam further increased to 11,96,9690 (Census Report, 2011). Across the districts of Assam, the percentage share of total labour force was highest in Nagaon district during the preceding three censuses, while the percentage share of cultivator was highest in Dhemaji district during the reference period; however, Dhubri district was having largest share agricultural labour during the same period. Most of the districts of Assam have experienced a fall in the share of cultivator to the total labour force during the last three censuses, while except Kokrajhar, Nalbari and Bongaigaon district the share of agricultural labour to the total labour force has registered an increase during the reference period (Census Report, 1991;2001; 2011).

The occupational migration of labourer from agriculture has been subject of interest in the works of various scholars. Migration of labourer to other sector caused by occupational changes, people's mindset and government policies brought significant fall in the availability of labourer in agriculture across Indian states (Gunabhagya *et*

al. 2017). Despite, being second largest populous country of the world; the labour scarcity being felt more in the agricultural sector such as in terms of reduction in crop yield, reduction in cropping intensity and changes in traditional cropping pattern, increasing cost of cultivation due to rising wage rate of hired labour (Prabakar *et al.* 2011; Gunabhagya *et al.* 2017). As per theory of economic development as an economy matures, excess agricultural workforce starts moving to higher productive nonfarm sectors such as manufacturing and services, and thus from agriculture to non agriculture, from rural to urban, and from lower to higher wages. This indicates that fewer people are added to agricultural workforce, but it also highlights the net migration to the other sectors. While studying the problem of labour scarcity in Indian agriculture several scholars have identified various contributing factors for the problem. Low wages, seasonal nature of employment, lack of job security, poor job satisfaction, lengthy working hours, bad working conditions, growing opportunities of non farm sector have been cited as responsible for migration of labourer from agriculture to non agricultural sector in the studies of (Agasty and Patra, 2013; Babu and Gurunath, 2013; Gayathri, Kunnal and Kanamad, 2015; Quarterly Report on Indicators of Agriculture January-March, 2018). A study by Korra (2011) mentioned objective of debt settlement, larger earnings for easing daughter marriage and capital for agricultural investment also influenced such migration. Migration was also complemented by livelihood insecurity, adding to the existing imbalance between labour demand and supply of labourers (Deshingkar and Start, 2003). The advancement of technology, sectoral income differences also to some extent responsible for agricultural workforces to migrate (Barkley, 1990; Mundlak, 1987; Butzer, Larson and Mundlak, 2002). Government of India introduces various employment schemes to eradicates rural poverty and inequality, one of such scheme

was Mahatma Gandhi National Rural Employment Guarantee Act[1] (MGNREGA) which provides 100 days work guarantee to rural unskilled labour as an alternative source of income to agriculture which diverted agricultural workforce to non agricultural engagement (FICCI, 2015; Gayathri and Kunnal, 2014; Quarterly Report on Indicators of Agriculture January-March, 2018). Implementation of MGNREGA program during peak agricultural season which is backed by the higher wage and lesser workload has lead to the shortage of agricultural labourers (Gunabhagya *et al.*2017). Subsidization of food grains through public distribution system, and consumption of indigenous liquor almost on daily basis among tribal labourers, leading to reluctance for wage employment (Quarterly Report on Indicators of Agriculture January-March, 2018). Thus, most of the workers shifted to regular/permanent jobs as agricultural jobs were seasonal and did not ensure wage generation through-out the year. Instead of doing part time farming, they preferred permanent shifting to non-agricultural jobs to ensure through-out the year earnings. A study by Gayathri and Kunnal (2014) remarked ensured timely payment, less arduous off farm local jobs for limited working hour was more attractive among labourer rather than working as agricultural labour.

There is a popular perception about Indian agriculture, that agricultural sector is characterized by a high degree of disguised unemployment as if some amount of surplus labour is taken away from agriculture there would be no difference to output

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[1]National Rural Employment Guarantee Act 2005 later renamed as the MGNREGA is an Indian labour law and social security measure that aims to guarantee the 'right to work'. It was initially implemented in 200 selected backward districts in India on February 2, 2006. It aims to enhance livelihood security in rural areas by providing at least 100 days of wage employment in a financial year to every household whose adult members volunteer to do unskilled manual work.

and productivity. As such labour scarcity in agriculture is not a major problem. However in reality, many Indian states like Assam, Arunachal Pradesh, Bihar, Gujarat, Haryana, Jharkhand, Karnataka, Manipur, Meghalaya, Mizoram, Nagaland, Rajasthan, Tamil Nadu, Tripura, Uttarakhand and West Bengal experience the shortage of agricultural workforce (Quarterly Report on Indicators of Agriculture January-March, 2018). It has also begun to make an impact on Indian agriculture which is currently not being compensated by adequate measures to reduce the overall labour scarcity. As a result, the primary sector in many states is experiencing severe escalation in farm wages which are adversely impacting the profitability of the farmer (FICCI, 2015). Thus, the phenomena caused by occupational changes, people's mindset, and government policies that make it imperative to investigate labour migration from agricultural families or the scarcity of agricultural labour and its effect on farm income.

1.3 Significance of the Study

A study on farmer's income generation through cultivation of crops has important policy implications. The knowledge about how the outmigration of unskilled family members involved in domestic agriculture influences household incomes directly and indirectly by stimulating crop production or crop income may help the head of farm household in taking decision allowing occupational mobility of scared human capital involved in domestic agriculture. In addition, any understanding about does the inflow of remittances sent by them who left domestic agriculture partially compensate for the lost labour effects which in turn may contribute to increase in income level and uplifting of living standard of the farmers.

1.4 Theoretical Foundation

With the aim of the present study is to investigate the influence of occupational migration of labour from agricultural families on farm income, the conceptual framework of present study has been framed on the basis of the theory of New Economics of Labour Migration (NELM). The NELM theory was initially developed by Oded Stark and David E. Bloom (1985) and subsequently in the field of agriculture it was applied by Scott Rozelle, J. Edward Taylor and Alan de Brauw (1999; 2003). The theory states that migration decisions are often made jointly by the migrant and by some group of non migrants. Migrants play the role of financial intermediaries, enabling rural households to overcome credit and risk constraints on their ability to achieve the transition from familial to commercial production. The NELM theory asserts that wage differential alone does not determine an individual's decision to migrate. It is a collective decision that is made by households and not by individuals. Households attempt to maximize income and minimize risks resulting from market failures in unstable economies to improve their income relative to the rest of the community (Stark, 1991). The migration decisions result from the volatility or failures of local markets, as portrayed by lack of access to credit and livelihood risk insurance. These imperfect or incomplete markets typically characterize rural areas in developing countries. Therefore, as per NELM theory, households are hypothesized to use migration as a means to overcome missing markets or market failures locally, which compel households to self-finance investments in production and self-insure against income risk. Households send migrants out as part of a strategy to diversify income sources, obtain capital for investment and provide insurance against production and income risks for non-migrating household members. Taylor (1999) argued that remittances set in motion a development dynamic by relaxing production

and investment constraints that households face. Remittances may be used to boost production through financing of inputs, new production technologies and activities. They also act as insurance by providing households with income that may be uncorrelated, negatively correlated or not highly correlated with farm income. The NELM theory leads to specific hypotheses about effects of remittances on migrant-sending households. If credit and risk constraints are binding and migration help households to ease these constraints, then migration and remittances should have a positive effect on local production and incomes of migrant-sending households. The more liquidity-constrained a household has the greater is the marginal income effect of remittances. Several scholars has used the conceptual framework of NELM theory for studying the impact of migration and remittances on household income notably Rozelle *et al.* (1999) in China and subsequently by Kirimi and Sindi (2006) in Kenya, Quinn (2009) in Mexico, Zahonogo (2011) in Burkina Faso, Tuladhar *et al.* (2014) in Nepal and Loc and Grote (2015) in Vietnam.

As per NELM theory household income sources other than remittances being defined as the crop income, self employment income and other income (Taylor *et al.* 2003). The sum of remittances and the three income sources equals rural household income. All three sources of income are influenced by three factors such as migration (M), remittance (R) and household characteristics (X_Y). Given the aim of the present study is to investigate the impact of occupational migration from a farm household on crop income. Hence, the study shall concentrate only on crop income by excluding income from self employment and other income sources. Thus, following the NELM theory the relationship between crop income and M, R and X_Y being specified in the following functional form as in equation (i);

$$Y = f (M, R, X_Y) \qquad \text{(i)}$$

Where, Y stands for crop income of a farm household; M stands for member of the household who has migrated from household farm activity to outside household remunerative unskilled engagements; R stands for remittances received by the household from the migrated member who engaged outside in remunerative unskilled engagements; X_Y stands for household specific characteristics. The data on crop income for the present study will be estimated from Farm Business Income (FBI) generated by a household. The role of migrant in financial intermediation, enabling the farm household to get control of agricultural investment constraints and their ability to move from inherited to commercial production has been illustrated with Figure 1.1.
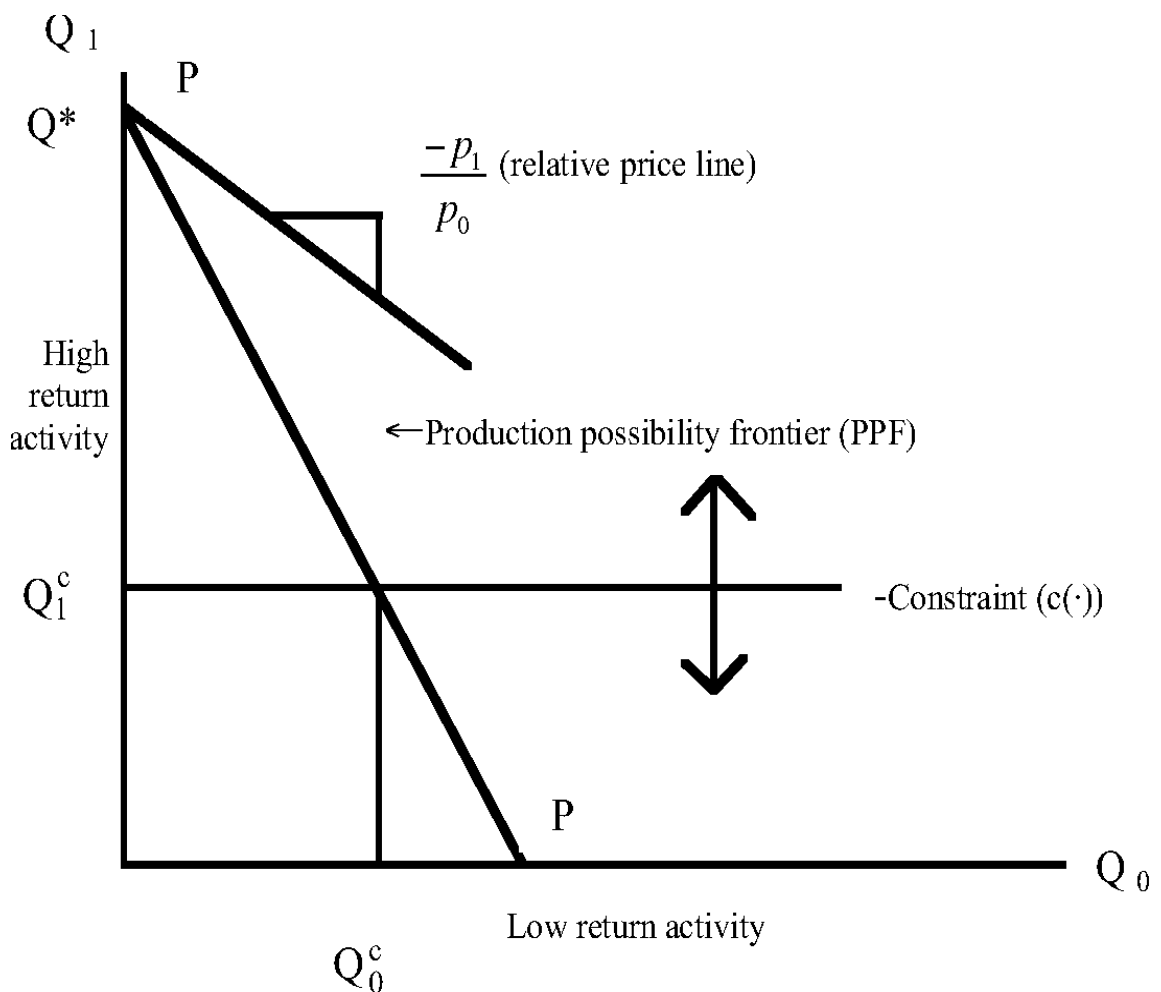
Figure 1.1 Migration Effects on Production Possibilities

Refer to Figure 1.1, if we consider family labour as fixed amount of resource ($\bar{L}$) which may be used for high or low productivity works (f_i) with i = 1, 0. Productivity in each activity is margined by an array of household characteristics (X_Y). The production possibility frontier is represented by the linear line PP. The household output $Q^* = f_i(\bar{L}, X_Y)$ will be arrived at with high productivity technology for relative price p_1/p_0. Family migrants (M) may contribute to farm production by relaxing the credit constraint through remittances (R) for the household facing investment constraint in high productive activity say agriculture at commercial basis. Predictions of NELM theory may be reversed as the potential effect of migration on production constraint, however, is not always positive. Let agriculture at commercial basis be high productive activity with FBI be defined as the difference between total revenue earned from crops selling and total cost incurred during the farm production process. In other words;

FBI = Gross Income from farm output of crop – Cost of Cultivation of the Crop

The cost of cultivation in agriculture has been well defined by the Commission for Agricultural Cost and Price (CACP) in 1979. There are nine different types of cost for agriculture as identified by CACP. These CACP specified cost concept are A1; A2; A2+ FL; B1; B2; C1; C2; C2*; C3. Where, FL stands for imputed value of family labour. Each of these cost functions includes specific type of agricultural expenditure as elaborated below.

Cost A1 = Includes all actual expanses in cash and kind incurred in production by owners which includes (i) value of hired human labour, (ii) value of hired bullock labour, (iii) value of owned bullock labour, (iv) value of owned machinery, (v) hired machinery charges, (vi) value of seed/ seedlings, (vii) value of manures, (viii) value of

fertilizers, (ix) value of plant protection chemicals, (x) irrigation charges, (xi) depreciation on farm buildings and implements, (xii) interest on working capital, (xiii) insurance premium, (xiv) land revenue, and (xv) miscellaneous expenses.

Cost A2 = Cost A1+ rent paid for leased in land.

Cost A2+FL = Cost A2+ imputed value of family labour.

Cost B1 = Cost A1+ interest on value of owned capital asset (excluding land)

Cost B2 = Cost B1+ rental value of own land (net of land revenue) and rent paid for leased-in Land

Cost C1 = Cost B1+ imputed value of family labour

Cost C2 = Cost B2+ imputed value of family labour

Cost C2* = Cost C2 estimated by taking into account statutory minimum or actual wage whichever is higher

Cost C3 = Cost C2*+ 10 per cent of cost of C2* on account of managerial functions performed by Farmers

With regional differences in farming the CACP cost concept is used in various studies such as Narayanmoorthy (2013), Goswami (2016), and Sharma and Guha (2018). Having defined the various form of cost concepts as per the existing literature the estimation of FBI needs differencing the figures of revenue from cost. The revenue figures of each farming households will be obtained by taking the product of average market price of rice (season specific) of the sampled household with the total rice output produced by the household. Present study shall consider the specific market price, for specific type of rice (asu, aman, and boro) variety which ever a household may produce during the preceding farming season of the survey period. Of course, given the possibility of a household producing only one variety of rice or multiple varieties, the researcher in the present study shall use variety specific market price of

the preceding farming season. Since, the market prices are likely to be different across geographical locations, for normalization and better comparability the study shall consider the variety specific average market price of the sampled locations of the study. The reason for considering market price are twofold, viz. it will be unrealistic to assume perfect competition in the market for agricultural products; secondly prices are likely to vary across geographical locations. Though there are variations in price of specific variety of rice across locations of Assam. However, such variations are not likely to be so high to substantially overstate or understate the value of rice in the study area. Also, it is expected that the regions where the price of rice slightly higher, the rental rates of the services of capital goods, wage rate of labour per day, cost of seeds, fertilizer are likely to be moderately higher. This actually cancels out the price effect. Nevertheless, present study considers the average of prices and rental rates at the village level in order to minimize the effects of variations in prices and rental rates on FBI, if not to eliminate it completely. Given the inadequacy of information as farmers in the study area may not able to provide the costs information on interest value of owned capital assets (excluding land). Therefore, given the difficulty of capturing the information's on interest value of own capital goods the present study will use only three cost concepts, viz. A1, A2 and A2+FL while measuring FBI. Thus, the FBI considered for present study will be;

FBI_1 = Gross Income from farm output – A1

FBI_2 = Gross Income from farm output – A2

FBI_3 = Gross Income from farm output – (A2+ FL)

The study shall consider household experiencing occupational migration of labour as those household where the unskilled member/members who previously worked on

household agricultural activities (as family labour) and has been absent for at least the six preceding months in household agricultural activities. A similar definition has been used by Sindi and Kirimi (2006) while studying the impact of migration on household income in Kenya. Since the study will concentrate occupational migration of unskilled labour from agricultural families in the study area so there is need for defining a labour that is unskilled. Unskilled labour in the present context will be those workers whose educational attainment is low and who does not have any special training or skill for performing his or her work. In agriculture, unskilled worker are those types of workers, who are involved in sowing, harvesting, weeding, ploughing (langal), winnowing and threshing including helper on agricultural field; however, workers involved in power tilting, tractor driver and persons handling machines relating to ploughing and other cultivation work is called as skilled worker (Minimum rate of wage for agricultural employment report, Govt. of West Bengal, 2018). Present study shall consider only unskilled household's member/members who migrated or absent in household agricultural activity for at least six preceding months. The study will consider migration period as minimum of six months other than three months or a whole year to investigate the impact on domestic agriculture because the location of the study area, agricultural season spread over maximum of six months in a year and the gestation period of various types of paddy viz. winter rice (Sali) is June/July to Nov/Dec; similarly summer rice (Boro) is November to April/May; autumn rice (Ahu) is March/April to July/August respectively (Ahmed *et al.*2018). With reference to the farm household income with migrant labour, present study will consider the crop income only for the period of absence of the household member. To control for the impact of household size on land holding pattern, present study shall consider land per capita. The concept of land per capita was used in the works of Rozelle *et al.*

(1999) in China; Kirimi and Sindi (2006) in Kenya; Damon (2010) in El Salvador, while studying the impact of occupational migration of labour from agricultural families on farm income.

Paddy is the dominating crop of Assam which was cultivated in 24.67 lakh hectares and it was 92.5 per cent of the total area under food grain production in the state during 2016-17 (Economic Survey Assam, 2017-18). Paddy farming is practiced in three seasons (winter, summer and autumn rice) in Assam. During 2016-17, the total area under winter, summer and autumn rice in Assam was 18.90 lakh hectares, 4.08 lakh hectares, and 1.68 lakh hectares respectively (Economic Survey Assam, 2017-18). As the location of the present study is Nagaon and Morigaon district of Assam. During 2017, the total area under winter, summer and autumn rice in Nagaon district was 1,43,783 hectares, 63,734 hectares and 32,879 hectares respectively (Agriculture Contingency Plan for Nagaon District, 2017). Similarly, the total area under winter, summer and autumn rice in Morigaon district was 44,115 hectares, 3,272 hectares and 42,535 hectares respectively during 2017 (Agriculture Contingency Plan for Morigaon District, 2017). In Nagaon and Morigaon districts, majority of farmers cultivate paddy only once or twice in a year[2] with gestation period of 6 months i.e June/July to November/December or November to April/May. Hence, present study shall consider a farm household member or members as migrant, who is or are absent for at least six preceding months in household agricultural activities with specific reference to Sali paddy or Boro paddy or Ahu paddy. The reference period of at least six preceding months in the study shall consider either March/April, 2018 till

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[2]According to Agriculture Contingency Plan for District (2017), reported that, gross crop area for agriculture in Nagaon District was 271,285 hectares and area sown more than once was 120,160 hectares. Hence 56 percent of total area was cultivated only once in a year. Same report for Morigaon district in 2017 revealed that total crop area for agriculture was 120,975 hectares and area sown more than once was 47,421 hectares. Hence 60.80 percent of total area was cultivated only once in a year.

July/August, 2018; or June/July, 2018 till November/December, 2018; or November/December, 2018 till April/May, 2019 depending upon whether the farm households have undertaken cultivation of Ahu paddy or Sali paddy or Boro paddy. If a household cultivated multiple paddy (or all variety) then the study shall consider the farm business income (FBI) for the period of any one particular variety of the previous farming seasons[3] during which time the unskilled household member was absent in household agricultural work and assisted the household with remittances.

Study by Maharjan *et al.* (2014) pointed out that the household experiencing migration of labour from agriculture to non agriculture are those if, at the time of survey it had at least one member involved in occupational migration for unskilled labour work and who had been absent in household agricultural activities for at least the six preceding months. The study has considered occupational migration as transfer of unskilled family member/members from household agriculture to unskilled labour works. However, it is possible that in some family member doesn't migrated to outside the village for remunerative work instead they stay with the household but engage themselves in activities other than family agricultural work and thereby they remain absent on household agriculture for at least six months. Thus, the household where at least one unskilled member/members who previously worked on household agricultural activities (as family labour) and has been absent for at least the six preceding months in household agricultural activities will be treated as the household experiencing migration of labour outside agriculture. Present study will consider only

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[3] Either March/April, 2018 - July/August, 2018; or June/July, 2018 - November/December, 2018; or November/December, 2018- April/May, 2019

small farming[4] households purposively, by dropping marginal and large farmers for maintaining homogeneity across the sample.

The study will consider remittances as the amount of money received from the unskilled migrant labour by the sampled households. Remittances may be received by sampled households in various time frames viz. daily, weekly, monthly, quarterly, half yearly and yearly basis. The remittances will be the any amount of money received by the farm household from the unskilled member (or members) with reference to the period of sowing till harvesting of a particular variety of paddy that would be cultivated by a farm household, during which the member (or member's) was/were absent in household agricultural work.

The household specific characteristics such as education of household head, farming experience of head, size of household, land per capita, no of dependents, agricultural assets, farm specific characteristics of the household, farm input intensity factor of the household, enabling factor, etc.

1.5 Review of Literature

The literature review for the present study has been grouped into three dimensions such as causes of occupational migration, studies on impact of occupational migration and remittances on farm activity and reviews covering general dimensions of occupational migration from agriculture.

1.5.1 Causes of Occupational Migration from Agriculture

There have been several attempts has made so far to study the factors responsible for migration of labour from agriculture. Babu and Gurunath (2013) found that low earnings, high unemployment rate, lack of employment security, poor job satisfaction,

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[4] Are those farmers who cultivate in 1-2 Hectares of land

lengthy working hours and bad working conditions led to transfer of labour outside agriculture while Korra (2011) observed that the issue of survival security, debt settlement, daughter marriage responsibility, investment in farm activity are the main factors driving out migration from farm household. Paris *et al.* (2005) found that wage gap differential between the sectors were responsible for migration of labourer from agriculture in Eastern Uttar Pradesh, but remittances have used for food, house construction, social obligations and farm inputs by the migrant families. Study by Agasty and Patra (2013); FICCI (2015) reported that employment opportunity under MGNREGA, unwillingness to work in dust and mud, higher wages and growing employment opportunities in alternate sectors was the prime cause of labour migration from agriculture. Low economic, educational and social status significantly induced temporary labour migration in India (Keshri and Bhagat, 2013). In order to evaluate the economic determinants of the migration in the USA Barkley (1990) found that technological growth and rising nonfarm labor return have been associated with the decreasing agricultural employment. Butzer *et al.* (2002) found that market forces and sectoral income gap has responsible factors for agricultural labour migration in Venezuela. Tocco *et al.* (2013) found that higher population density, lower unemployment, higher wages and higher employment in the non farm sector were important pull factors for migration out of agriculture in EU. In order to find the determinant of occupational migration Mundlak (1978), Larson and Mundlak (1997) found that income differential between agriculture and non agriculture sector, the composition of labour force, growth rate of labour force and some other related variables such as education, age etc. are the main determinant of off-agricultural migration. Hamilton (1951) shows that population pressure, age of farm labour and changes in crop acreages were highly correlated with migration from farm to other

sectors. For investigating the cause and consequences of migration from agriculture in Osun state of Nigeria study by Ayinde *et al.* (2014) found that absence of social amenities in the farming communities, poverty, search for better education were major cause of youth migration and drastic reduction in the level of food production in the state, reduction in farm size, high rate of hired labour were common consequence of youth migration. Anglo *et al.* (2014) found that agricultural productivity reduced considerably but there is no significant change in farm incomes and food availability due to outmigration of labour from agriculture in the Nanumba South District of Ghana. Peker (2004) observed that some of the causes of migration out of agriculture were economic, social and cultural factors from rural Turkey but still migration has no any negative effects on success of agribusiness in the country. Study by Faridi and Basit (2011) stated that level of education, material status, number of dependents, social overhead capital had positively influenced rural labour supply in rural Pakistan. Khandker *et al.* (2012) found that the probability of seasonal migration was high for households with a high dependency ratio, high dependency on wage employment, and in villages with high unemployment, but was low in villages with micro-credit access in Bangladesh. The study favored seasonal migration for consumption smoothing.

1.5.2 Impact of Migration and Remittances on Farm Production

While studying the impact of international migration on farm production in Nepal, Maharjan *et al.*, (2013) found that families recipient of high remittance used to spend more on leisure and consumption and less on farming and livestock, but it is opposite for families receiving low remittance. In an attempt to examine the impacts of migration on agricultural production in Canar Province of Ecuador, Jokisch (2002) found minimal use of remittances for agricultural improvements rather the farm

households spent it on education, health, repayment of debts, conspicuous consumption, purchased of land and construction of large house. While investigating the relationship between migration, remittances and agricultural productivity in China, Rozelle et al. (1999) observed that the net impact of migration and remittances on maize production is negative. While studying the impact of migration and income in source communities of China, Taylor et al. (2003) found that it negatively influences household cropping income, although it does not negatively affect crop yields. However, remittance sent home by migrant partially compensate for the lost labour effect, contributing to household incomes directly and also indirectly by stimulating crop production. Taylor and Wyatt (1996) found that income remittances sent home by family migrants stimulate household – farm incomes indirectly by relieving credit and risk constraints on household-farm production. While studying the impact of migration on farm production in China, Wang et al. (2014) observed that remittances helped farm households to finance for improved technology purchase, also substituting a reduction in leisure and other low return activities for lost labour. Li et al. (2013) argued that the loss resulting from losing family labour on lower-return grain crop production is likely to be offset by the gain from investing remittances in capital-intensive and profitable cash crop production in Northwest China. While studying the effects of migration and remittances on agriculture yield in Nepal, Tuladhar et al. (2014) found that migration negatively influenced agriculture yield, despite remittances helped in raising household incomes. Imran et al. (2016) observed that cotton productivity in Punjab province of Pakistan was inversely associated with migration, though remittance helped in the improving crop productivity through investing in seed, pesticides and other inputs. Study by de Hass (2001) found that migration induced the adoption of intensive cultivation patterns

among Oases agricultural households in the Meghreb region of Morocco, and remittance receiving households invested relatively higher amounts in agriculture. While investigating the impact of labour migration on social and economic development in southern Morocco, de Hass (2006) found that households in southern Morocco invested more in housing and agriculture following a rise in remittance income. Another study by Atamanov and van den Berg (2011) found that rural household benefited from remittances, which relieve liquidity and insurance constraints and stimulate crop production through higher productivity in rural Kyrgyzstan. In an attempt to study the net effect of migration and remittances on household income from rural Kenya, Sindi and Kirimi (2006) found that remittances do not offset labour loss effects as a result of migration, however, migration and remittances taken together, play a role in households income generation activities. While studying the impact effect of remittances on livelihoods in dry areas of Syria, Martini and Hamza (2014) remarked that migration has a positive impact on livelihoods and has the potential to support govt. initiatives in the development of rain fed agriculture. While examining the effect of labour migration on different types of investments made by households in the Chitwan district of Nepal, Mishra (2013) stated that remittances may significantly increase the accumulation of productive assets such as farming assets in the short term as well as long term. Manivong, Cramb and Newby (2014) remarked labour migration continue to be a common livelihood strategy for farming household members in Laos to support themselves independently in farm resources; while flow of remittance helped household's consumption and their capacity for investment though not necessarily in rice production. Study by Loc and Grote (2015) found that agricultural production and diversification depends on remittance transfers of migrant to their rural household in rural Vietnam. It was also

noticed that migration leads to specialization rather than diversification in rural areas, as upon transfer of remittance the migrant household shift from rice production to other crops and thereby attained higher levels of land productivity in Vietnam. However, non accessibility to remittance leads to decrease in labour productivity and crop diversification amongst the migrant households of the country. Another study by A. De Braw (2010) mentioned that migrant households in North Vietnam appear to move out of rice production and into the production of other crops. In addition, inputs have used by migrant households decrease relative to similar non migrant households in the country. To study the relationship between migration, remittances and assets accumulation among the Mexican rural poor households a study by Chiod *et al.* (2013) outlined that that remittances may help to alleviate credit constraints for poor households, thus allowing them to invest in productive assets. While studying the impact of migration on farm activity a study by Davis *et al.* (2010) pointed out that migration helps in facilitating a transition away from agriculture or to model of less labour intensive agriculture. In order for examining the effect of migration and remittances on agriculture by Damon (2010) in El. Salvador found that migration and remittances do not influence agricultural input use and may decrease the returns to land and labour on farm, as migrant households use their farm land less intensively than non migrant households. While exploring how influence of remittance on poverty and behavioral pattern in India Parida *et al.* (2015) stated that remittances recipient families move up the income ladder in terms of human capital formation, increase their spending on household durables reflects the improvement in the life standard of living households. Taylor (1999) mentioned remittances may be a positive factor in economic development.

1.5.3 General dimensions of Occupational Migration from Agriculture

Yang *et al.* (2014) found neither migration nor local off farm employment has any negative impact on technical efficiency in grain production in China. However, migration and local off farm employment may allow farmers to use higher quality inputs for grain production. Sauer *et al.* (2013) found that migration significantly and negatively affected farm efficiency among migrant households, and the effect was larger for better educated and older migrants in Kosovo. While examining the technical efficiency of farm for migrant and non migrant family in Lesotho, Mochebelele and Winter-Nelson (2000) found that households of migrant workers benefited from remittances in the form of increased capacity to acquire capital goods required for enhancing farm management and production. Quinn (2009) found the evidence of endogeneity of migration and remittance with respect to agricultural technology decision. Nonthakot and Villano (2008) found that age, educational attainment of household head, remittances, proportion of maize income to total income, period of migration, age and education of migrant in the household have significant factors effects in decreasing inefficiency in Northern Thailand. Olper *et al.* (2013) found a strong positive correlation between the rate of off-farm migration and the convergence process in across – sector per capita productivity growth also found a strong U-shaped relationship between relative income gap and economic development across the countries and EU region.

1.6 Research Gap

Studies on agricultural labourer so far has covered several dimensions. The adverse effect of farm mechanization on labour demand in agriculture was investigated in few studies, while a group of scholars examined how the process of development leading to transformation of several countries of world from agrarian to industrial and service

led economies contributed in transfer of labour from farm to non farm sector. Under the progress of infrastructural development projects in several countries of the world leading to increased non-farm activities caused transfer of labour from agriculture to non agricultural activities contributing towards scarcity of labourer in agriculture has also been area of investigation in the works of several researchers. With the pioneering initiative of Stark (1991), various scholars have made an attempt to investigate the impact of occupational migration of labour on crop income, however studies attempting influence of occupational migration of unskilled labourer on farm business income of the agricultural families in the state of Assam is conspicuous by their absence. Present study is an attempt to bridge such research gap.

1.7 Objectives of the Study

Present study has been undertaken with following objectives:

1. To compare the temporal dimension of inter district employment pattern in agriculture and non-agricultural sector in Assam.

2. To identify the factors determining occupational migration of unskilled labourer from domestic agriculture across the farm household.

3. To examine the impact of occupational migration of unskilled labourer on farm business income of the agricultural families in the study area.

1.8 Research Questions

The research questions of the present study are:

1. What are the factors responsible for occupational migration of unskilled labourer from domestic agriculture across the farm household?

2. Does occupational migration of unskilled labourer significantly influence the farm business income of the agricultural families?

1.9 Data Source and Sample Design

1.9.1 Data Source

Present study will be based on secondary as well as primary data. Secondary data on district wise number of cultivators, agricultural labour and other types of labour in Assam has been collected for the period 1991, 2001, 2011 from Census Statistics, office of the Registrar General and Census Commissioner, Ministry of Home Affairs, Government of India. District wise Total number of job cards, employment demanded, employment provided and wages rate under MGNREGA in Assam has been collected for the period 2006-07 to 2018-19 from MGNREGA Statistics, Ministry of Rural Development, Government of India. The district wise land utilization, net sown area, and total crop area in Assam for 2016-17 has been collected from Ministry of Agriculture, Govt. of India. The district wise wages of agriculture labour in Assam covering the period 2005-06 to 2015-16 will be collected from Directorate of Economics and Statistics, Department of Agriculture and Co-Operation, Ministry of Agriculture, Government of India. In addition, daily wage rate of farm and non farm sector of Assam has been collected from Directorate of Economics and Statistics, Government of Assam for the period 2004-05 to 2017-18. Analysis of secondary data will give a broad picture of employment in agricultural sector in general, but trend in employment and wage rate in agricultural sector across the districts of the state in particular. The secondary data analysis will also help to compare the temporal pattern of inter district employment in agriculture and non agricultural sector in Assam. However, secondary data analysis will not be sufficient for studying the factors determining occupational migration of unskilled labourers from agricultural families and its impact on farm business income in the study area.

Therefore, for this purpose the researcher in the present study has collected primary data by conducting field survey.

1.9.2 Sample Design

Primary data for the study has been collected using multi stage random sampling method. In the first stage two district of the state has been selected for their relative importance in terms of percentage share of crop area out of the total land utilized area in the state of Assam. Thus, the primary data for the study has been collected from Nagaon and Morigaon district of Assam. In terms of percentage share of crop area out of the total utilized land in the state of Assam, the Nagaon district stands second position sharing 85.66 per cent of crop area out total utilized land of the district while Morigaon district rank fourth position sharing 84.16 per cent crop area out of total utilized land of the district during 2016-17 (Ministry of Agriculture, 2016-17). In the second stage seven non-contiguous community development (CD) blocks purposively has been selected from each district. As Morigaon district has seven CD blocks, so to maintain equi-proportionate sampling same numbers of blocks being selected from Nagaon district. In the third stage from each CD block minimum of two villages has been selected. Finally, from each of the sampled village 8 household has been selected with a break up of 4 farm household where occupational migration of unskilled labour from household agriculture has taken place and 4 household where no occupational migration of unskilled labour from household agriculture has taken place. In this way, a sample of 224 farm (cultivator) households from 28 villages have been decided at random as ultimate sample units for detailed observation. The map of the study area is shown in Map 1.1;
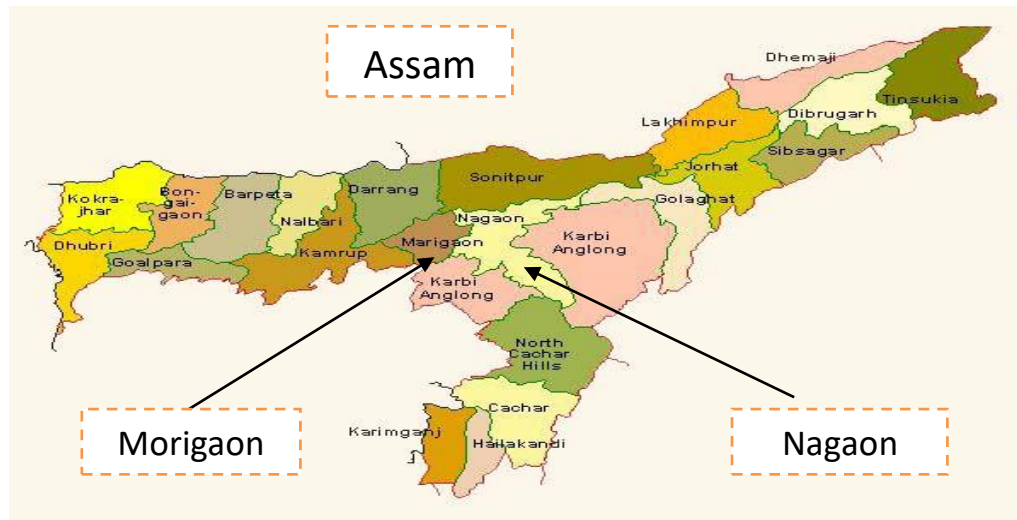
Map 1.1

Present study has administered field survey for those farm household who have initiated paddy cultivation in the study area. The reason for selecting the paddy farming household for field survey is that paddy is the dominating crop in terms of share of land area in both the sampled districts of the study area. Among the seven major crops in Assam, the percentage share of area under paddy farming is largest in both Nagaon and Morigaon district of Assam. Nearly 83.06 per cent of the total crop area being shared by paddy farming in Nagaon district of Assam while the figure was 82.88 per cent in Morigaon district of Assam during 2013-14 (Director of Economics and Statistics, 2014).

Primary data has been collected with an interview schedule through personal interview method with the head of the household. Primary data will be quantitative and qualitative in nature. Primary data has been collected on farm specific output, farmer's characteristics, land per capita, tenure status, input intensity, enabling factors and locational dummy, farm dummy. The variables of the study have been confirmed via pretesting of an open-ended interview schedule though few rounds of pilot survey in the study area. The sample design of the study is presented in Flow chart 1.2;
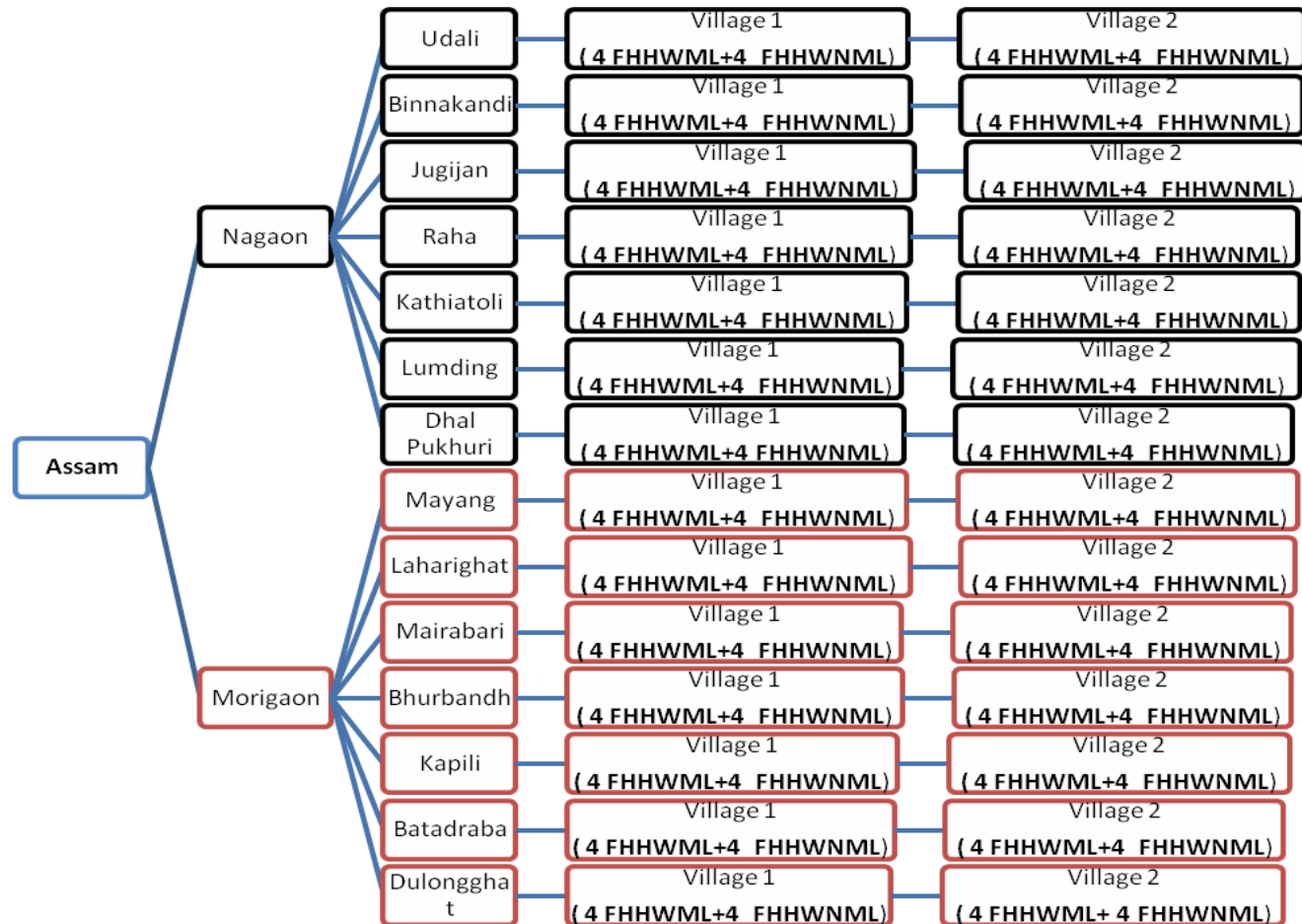
Flow Chart 1.2: Sample Design

Note: FHHWML stands for the farm household that has experienced occupational migration of labour from household agriculture; **FHHWNML** stands for the farm household that has not experienced occupational migration of labour from household agriculture

1.10 Analytical Framework

Present study has used descriptive and inferential statistics for examining the temporal pattern of inter district employment in agriculture and non agricultural sector in Assam. The study has also compared the real wage differential among the MGNREGA workers and cultivators across the districts of the state. The simultaneous equation regression model has been used for understanding the factors determining income of the farm household from various sources such as crop cultivation, self employment income and others income, migration and remittances. There are several standard estimation techniques available for simultaneous equation model; some are called single equation methods while there are other system equation methods. Single equation method estimates each equations of the system individually taking into account restriction put on an equation without worrying about restrictions on other equations of the system. Hence such a method is also called limited information method. Examples of single equation method of estimation are Ordinary Least Square (OLS), Indirect Least Square (ILS), and Two Stage Least Square (2SLS). In system method it estimates all the equations of the system simultaneously taking into account due restriction put on all the equations of the system. Hence such a method is called full information methods. Examples of system method are Three Stage Least Square (3SLS), Full Information Maximum Likelihood (FIML), and Limited Information Maximum Likelihood (LIML). Single equation method is less sensitive to specification error than system method.

Prior application of any particular estimation technique (single equation or system method) it is necessary to check the status of identification of the set of simultaneous equations. The identification problem states that whether numerical estimate of structural

coefficient is possible or not from reduced form of equation. If possible then equation is said to be identified otherwise under or over identification. There are two standard conditions for identification of set of simultaneous equations such as rank and order. The order condition is a systematic method of determining whether a particular equation in a simultaneous system has the potential to be identified. The order condition state that in a model of simultaneous equations, in order for an equation to be identified, the number of predetermined variables excluded from the equation must not be less than the number of endogenous variables included in that equation less 1. Order condition for identification is a necessary but not a sufficient condition (Kmenta, 1997); that is, even if it is satisfied, it may happen that an equation is not identified.

$$A\text{-}B \geq (G\text{-}1)$$

A is number of predetermined variables in the model; B is number of predetermined variables in a particular equation; G is the number of endogenous variables in a particular equation.

The rank condition is sufficient condition for identification, it state that an equation is identified if there is at least one non zero determinant of the order (T-1).

$$\text{Rank } (\Delta) = T\text{-}1$$

Δ is the matrix of excluded variable at the rest of the equation of the system; T is the number of endogenous variables in the model.

If Order condition is not satisfied, then an equation cannot be identified. If Rank condition is satisfied, then the equation will remain under identified (despite order

condition being satisfied). An equation is identified if both order and rank conditions are satisfied. If both order and rank conditions are satisfied with order condition being satisfied as exact equality, then the equations are just identified. If both order and rank conditions are satisfied with order condition being satisfied as exact inequality, then the equations are over identified. Though there are various estimation techniques available but the suitability of an estimation technique depends upon the status of identification of the system equations or single equation. Among the single equation method, the IV is applicable for over identified equation while ILS can only be applied if an equation is just identified. For over identified equation ILS gives multiple sets of estimates. 2SLS is applicable to both just and over identified equation. For just identified equation 2SLS = ILS. If $R^2 > 0.8$ the estimate provided by classical OLS closer to 2SLS. 2SLS = IV when the instrument for endogenous explanatory variable are the estimate obtained in the first equation. In the presence to simultaneity[5] the 2SLS will give estimators that are consistent and efficient.

The 3SLS being a system method can be applicable for over identified equation. If all regressors are in fact predetermined, then 3SLS reduces to seemingly unrelated regressions (SURE). In general, 3SLS gives consistent estimates with greater asymptotic efficiency than 2SLS in certain cases. Zellner and Theil (1962) was introduced 3SLS as a system method which takes into account all equation of the system at the same time. However, greater efficiency of 3SLS estimates is depends upon correct specification of

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[5]Application of ordinary least squares (OLS) in a system of simultaneous equation when explanatory variable is correlated with disturbance will no doubt produced biased estimate but also inconsistent estimate and this is called simultaneity bias.

the model, if there is any mistake in specification of the model 3SLS will be going to create more problems. If disturbances in different equation are correlated then 3SLS will not be equivalent with 2SLS. 3SLS cannot be applied to an equation unless that equation is over identified. Before estimating any equation in a simultaneous system, therefore must be address the identification problem. Once an equation is found to be over identified, then it can be estimated with 3SLS, but if an equation is not over identified, then 3SLS cannot be used no matter how large the sample.

The simultaneous equation models are subject to several types of estimation issues which need to be addressed prior to reporting of results; issues like status of identification (under or over identification), and problem of endogeneity needs to be addressed before deciding a particular estimation technique and obtaining the estimated coefficient. There are several standard techniques for addressing the issues relating to identification, and endogeneity. For determining the status of identification present study has used order and rank condition of simultaneous equations. Furthermore, migration and remittances are endogenously determined together with farmer's incomes; therefore, to check endogeneity problem Hausman test of endogeneity (Hausman, 1976) has been used for various instrument that identify migration and remittance. The simultaneity behavior of migration, remittance, and farmer's incomes makes the disturbances term across the equations are correlated, therefore to deal such endogeneity problem 3SLS has preferred over 2SLS (Rozelle *et at*., 1999; Quinn, 2009; Tuladhar *et al.*2014).

Model specification:

Let k includes income from cultivation of crop (c), self employment income (s), others income (o), then the functional specifications of the set of equations used in the present study are presented in following equations;

$$Y_{ki} = f(M_i, R_i, Z_i, F_i, V_j) \qquad \text{(ii)}$$

$$M_i = f(Z_i, V_j, T_q) \qquad \text{(iii)}$$

$$R_i = f(M_i, Z_i, V_j, T_q) \qquad \text{(iv)}$$

$$i = 1, 2, 3 \ldots\ldots\ldots224; \quad j = 1, 2, 3\ldots\ldots..28; \quad q = 1, 2, 3\ldots\ldots\ldots112;$$

Where, Y_{ki} represent the income from farming, self employment, and other activities. M_i is the number of migrant of the ith farm household; R_i stands for remittances received by i^{th} family; Z_i is a vector of household characteristics such as household size, number of dependent, experienced of household head, education of household head, land per capita, total assets value excluding land, family income of the ith farm household; F_i is a vector of farm characteristics of the ith farm household such as cost of hired labour, own machinery labour, hired machinery labour, seeds, insecticides and pesticides, fertilizer, irrigation charges, land revenue, rent paid for leased in land etc; V_j is the characteristics of jth village such as distance to pucca road, bus stands, weekly market, commercial bank, fertilizer store, fuel store and village wage rate and dummy of village flood; T_q represent socio-demographic characteristics such as age and years of schooling of qth migrant.

The econometric formulations of above functional form of equations are presented as follows;

$$Y_{ci} = \lambda_0 + \lambda_1 M_i + \lambda_2 R_i + \lambda_3 Z_i + \lambda_4 F_i + \lambda_5 V_j + \varepsilon_{Yc} \qquad \text{(v)}$$

$$M_i = \delta_0 + \delta_1 Z_i + \delta_2 V_j + \delta_3 T_q + \delta_4 D + \varepsilon_m \qquad \text{(vi)}$$

$$R_i = \gamma_0 + \gamma_1 M_i + \gamma_2 Z_i + \gamma_3 V_j + \gamma_4 T_q + \varepsilon_R \qquad \text{(vii)}$$

Where $\lambda_i > 0$; $\delta_i > 0$; $\gamma_i > 0$; $\varepsilon_{Yc} \sim \text{IIND}(0, \delta^2\varepsilon)$; $\varepsilon_M \sim \text{IIND}(0, \delta^2\varepsilon)$; $\varepsilon_R \sim \text{IIND}(0, \delta^2\varepsilon)$

Y_{ci} stands for crop income for i^{th} farm households;

D stands for migration network dummy such that

D = 1 for network influence encourages the labourer to migrate from domestic

    agriculture.

  = 0 otherwise.

With reference to the self employment income of ith farm household (Y_{si}) the above set simultaneous equations being redefined as;

$$Y_{si} = \beta_0 + \beta_1 M_i + \beta_2 R_i + \beta_3 Z_i + \beta_4 V_j + \varepsilon_{Ys} \qquad \text{(viii)}$$

$$M_i = \delta_0 + \delta_1 Z_i + \delta_2 V_j + \delta_3 T_q + \delta_4 D + \varepsilon_m \qquad \text{(ix)}$$

$$R_i = \gamma_0 + \gamma_1 M_i + \gamma_2 Z_i + \gamma_3 V_j + \gamma_4 T_q + \varepsilon_R \qquad \text{(x)}$$

Where $\beta_i > 0$; $\varepsilon_{Ys} \sim \text{IIND}(0, \delta^2\varepsilon)$;

Finally for the income of the ith farm households from other sources (Y_{oi}) the above set simultaneous equations being redefined as;

$$Y_{oi} = \alpha_0 + \alpha_1 M_i + \alpha_2 R_i + \alpha_3 Z_i + \alpha_4 V_j + \varepsilon_{Yo} \qquad \text{(xi)}$$

$$M_i = \delta_0 + \delta_1 Z_i + \delta_2 V_j + \delta_3 T_q + \delta_4 D + \varepsilon_m \qquad \text{(xii)}$$

$$R_i = \gamma_0 + \gamma_1 M_i + \gamma_2 Z_i + \gamma_3 V_j + \gamma_4 T_q + \varepsilon_R \qquad \text{(xiii)}$$

Where $\alpha_i > 0$; $\varepsilon_{Yo} \sim \text{IIND}(0, \delta^2\varepsilon)$;

The empirical models estimated in the present study are as follows;

$$\ln Y_{ci} = \lambda_0 + \lambda_1 \ln M_i + \lambda_2 \ln R_i + \lambda_3 \ln HS_i + \lambda_4 \ln ND_i + \lambda_5 \ln AG^2_i + \lambda_6 \ln YS_i + \lambda_7 \ln LC_i +$$
$$\lambda_8 \ln TAV_i + \lambda_9 \ln HL_i + \lambda_{10} \ln OML_i + \lambda_{11} \ln HML_i + \lambda_{12} \ln SEi + \lambda_{13} \ln IP_i + \lambda_{14} \ln FR_i$$
$$+ \lambda_{15} \ln IC_i + \lambda_{16} \ln LR_i + \lambda_{17} \ln RPL_i + \lambda_{18} \ln MEF_i + \lambda_{19} \ln DFRV_j + \lambda_{20} \ln DFFV_j +$$
$$\lambda_{21} \ln WRV_j + \lambda_{22} VF_j + \varepsilon_{Yc} \hspace{3cm} \text{(xiv)}$$

$$\ln M_i = \delta_0 + \delta_1 \ln HS_i + \delta_2 \ln ND_i + \delta_3 \ln YS_i + \delta_4 \ln LC_i + \delta_5 \ln TAV_i + \delta_6 \ln FY_i + \delta_7 \ln DPRV_j$$
$$+ \delta_8 \ln DBSV_j + \delta_9 \ln DWMV_j + \delta_{10} \ln DCBV_j + \delta_{11} \ln VF_j + \delta_{12} \ln YSM_q + \delta_{13} \ln AGM_q$$
$$+ \delta_{14} D + \varepsilon_M \hspace{3cm} \text{(xv)}$$

$$\ln R_i = \gamma_0 + \gamma_1 \ln M_i + \gamma_2 \ln HS_i + \gamma_3 \ln ND_i + \gamma_4 \ln YS_i + \gamma_5 \ln LC_i + \gamma_6 \ln TAV_i + \gamma_7 VF_j +$$
$$\gamma_8 \ln YSM_q + \gamma_9 \ln AGM_q + \varepsilon_R \hspace{3cm} \text{(xvi)}$$

With reference to the self employment income of ith farm household (Y_{si}) the above empirical formulation being redefined as;

$$\ln Y_{si} = \beta_0 + \beta_1 \ln M_i + \beta_2 \ln R_i + \beta_3 \ln HS_i + \beta_4 \ln ND_i + \beta_5 \ln AG^2_i + \beta_6 \ln YS_i + \beta_7 \ln LC_i +$$
$$\beta_8 \ln TAV_i + \beta_9 \ln DPRV_j + \beta_{10} \ln DBSV_j + \beta_{11} \ln DWMV_j + \beta_{12} \ln DCBV_j +$$
$$\beta_{13} \ln WRV_j + \beta_{14} VF_j + \varepsilon_{Ys} \hspace{3cm} \text{(xvii)}$$

$$\ln M_i = \delta_0 + \delta_1 \ln HS_i + \delta_2 \ln ND_i + \delta_3 \ln YS_i + \delta_4 \ln LC_i + \delta_5 \ln TAV_i + \delta_6 \ln FY_i + \delta_7 \ln DPRV_j +$$
$$\delta_8 \ln DBSV_j + \delta_9 \ln DWMV_j + \delta_{10} \ln DCBV_j + \delta_{11} VF_j + \delta_{12} \ln YSM_q + \delta_{13} \ln AGM_q +$$
$$\delta_{14} D + \varepsilon_M \hspace{3cm} \text{(xviii)}$$

$$\ln R_i = \gamma_0 + \gamma_1 \ln M_i + \gamma_2 \ln HS_i + \gamma_3 \ln ND_i + \gamma_4 \ln YS_i + \gamma_5 \ln LC_i + \gamma_6 \ln TAV_i + \gamma_7 VF_j +$$
$$\gamma_8 \ln YSM_q + \gamma_9 \ln AGM_q + \varepsilon_R \hspace{3cm} \text{(xix)}$$

Finally for the income of the ith farm households from other sources (Y_{oi}) the above empirical formulation being redefined as;

$$\ln Y_{oi} = \alpha_0 + \alpha_1 \ln M_i + \alpha_2 \ln R_i + \alpha_3 \ln HS_i + \alpha_4 \ln ND_i + \alpha_5 \ln AG^2_i + \alpha_6 \ln YS_i + \alpha_7 \ln LC_i +$$
$$\alpha_8 \ln TAV_i + \alpha_9 \ln DPRV_j + \alpha_{10} \ln DBSV_j + \alpha_{11} \ln DWMV_j + \alpha_{12} \ln DCBV_j +$$
$$\alpha_{13} \ln WRV_j + \alpha_{14} VF_j + \varepsilon_{Yo} \hspace{3cm} \text{(xx)}$$

$$\ln M_i = \delta_0 + \delta_1 \ln HS_i + \delta_2 \ln ND_i + \delta_3 \ln YS_i + \delta_4 \ln LC_i + \delta_5 \ln TAV_i + \delta_6 \ln FY_i + \delta_7 \ln DPRV_j +$$
$$\delta_8 \ln DBSV_j + \delta_9 \ln DWMV_j + \delta_{10} \ln DCBV_j + \delta_{11} VF_j + \delta_{12} \ln YSM_q + \delta_{13} \ln AGM_q +$$
$$\delta_{14} D + \varepsilon_M \qquad \text{(xxi)}$$

$$\ln R_i = \gamma_0 + \gamma_1 \ln M_i + \gamma_2 \ln HS_i + \gamma_3 \ln ND_i + \gamma_4 \ln YS_i + \gamma_5 \ln LC_i + \gamma_6 \ln TAV_i + \gamma_7 VF_j +$$
$$\gamma_8 \ln YSM_q + \gamma_9 \ln AGM_q + \varepsilon_R \qquad \text{(xxii)}$$

Where, HS_i stands for household size; ND_i stands for number of dependent; AG^2_i stands for of age square of household head; YS_i stands for years of schooling of household head; LC_i stands for land per capita; TAV_i stands for total assets value; FY_i stands for family income; HL_i stands for cost for hired labour; OML_i stands for cost for own machinery labour; HML_i stands for cost for hired machinery labour; SE_i stands for cost for seeds; IP_i stands for cost for insecticides & pesticides, FR_i stands for cost for fertilizer, IC_i stands for cost for irrigation charges, LR_i stands for land revenue, RPL_i stands for rent paid for leased in land, MEF_i stands for miscellaneous expenses in farm, $DPRV_j$ stands for distance to pucca road in village, $DBSV_j$ stands for distance to bus stands in village, $DWMV_j$ stands for distance to weekly market in village, $DCBV_j$ stands for distance to commercial bank in village, $DFRV_j$ stands for distance to fertilizer store in village, $DFFV_j$ stands distance to farm fuel store in village, WRV_j stands for prevailing wage rate of agricultural labourer in the village;

VF_j is a dummy variable such that;

$VF_j = 1$ if the village is having exposure to flood threat

$\qquad = 0$ otherwise

YSM_q stands for years of schooling of migrant, AGM_q stands for age of migrant and D stands for migration network dummy such that;

D = 1 for network influence encourages the labourer to migrate from domestic

   agriculture.

   = 0 otherwise.

1.11 Organization of study

The study will be comprised of five chapters as follows:

Chapter 1: Introduction

This chapter will cover the introduction, statement of the problem, theoretical foundation, literature review, research gap, objectives of the study, research questions, data source, sample design and analytical framework.

Chapter 2: Inter District Pattern of Employment in Agriculture and Non – Agricultural Sector of Assam

This chapter has made a comparative analysis of the temporal dimension of inter district employment pattern in agriculture and non agricultural sector in Assam besides wages rate for farm and nonfarm sector. The district wise total job cards issued, employment demanded, employment provided, and total person days generated under MGNREGA has been discussed in this chapter. The chapter has also covered the comparison of real wage differential among the MGNREGA workers and cultivators in the state. In addition, district wise real wage rate of agricultural labourer in Assam has also been discussed in this chapter.

Chapter 3: Factors Determining Occupational migration of Unskilled Labourers and Its Impact on Farm Business Income

This chapter has made a comparative analysis of differences in farm business income (FBI) between the household experiencing occupational migration of unskilled family

member out of domestic agriculture and those households who have no such experienced. The chapter has also made an attempt to discuss the factors determining occupational migration of unskilled labourer from agricultural families in the study area. Finally, the chapter covers an empirically evaluated the impact of migration and remittances on FBI of the sampled households in the study area

Chapter 4: Findings and Conclusion of the Study

The major findings, conclusion, limitations and thrust areas for future research have covered in this chapter.

Chapter II

Inter District Employment Pattern in Agriculture and Non-Agricultural Sector of Assam

Present chapter broadly consists of four sections. The section 2.1 has made an attempt to analyse the spatiotemporal dimension of employment pattern in agricultural and non-agricultural sector of Assam during the last three censuses; an attempt also being made to compare the wage differential across the districts of the state during 2004-05 till 2017-18 in this section. The trend and pattern of employment under MGNREGA being covered in section 2.2. The section 2.3 of this chapter summarized the real wage differential between MGNREGA workers and agricultural labourers in Assam. Conclusion of the chapter has been summarized in final section.

2.1 Inter District Wage and Employment Pattern in Agricultural and Non-Agricultural Sector of Assam

An overview of employment scenario in agricultural sector of Assam has been discussed in this section.

Agriculture and its allied sector is one of the largest employment generating sectors in Indian economy, more so in the vast rural areas. Despite the declining share of agriculture in Gross Domestic Product (GDP) from about 50 per cent in early 1950s to 14 per cent during 2011-12, agriculture continues to be an important sector of Indian economy which has engaged 52 per cent of country's total labour force (Arora, 2013). Agricultural sector is primary source of livelihood for almost 60 per cent of the country's total population (Meghwal *et al.*2016). Assam, being the predominantly agrarian states of North East India, where the share of agriculture and allied activities in Gross State Domestic Product

(GSDP) of state at current price was 19.34 per cent during 2016-17 (Economic Survey Assam, 2017-18). In Assam 49.45 per cent of the total workforces in the state were engaged in agriculture as farmer, agricultural labourer, or both for their livelihood and rest was employed in non-agriculture sector (Census, 2011).

It has seen that as economy of a country progress towards development, workforce tends to move away from agriculture sector of the economy, even in India, the percentage of people employed in agriculture has been consistently declining (FICCI, 2015). The portion of agricultural workforce to the total workforce in India has been declined over the years, while the corresponding ratio in the secondary and tertiary sectors has been increased (FICCI, 2015). In between 2004-05 and 2011-12, the agricultural workforce has declined by 30.57 million in India despite the total workforce in the country increased by 10 million; the share of agricultural work force in total workforce declined from 56.7 per cent to 48.8 per cent during the same period (FICCI, 2015). The labour shortage in agriculture has become a national phenomenon, which is clearly apparent across all the states of India. In this respect, Assam is no exception as the share of agriculture workforce to the total workforce in Assam has declined from 67.32 per cent (544,5,620) in 1991 to 52.49 per cent (499,4,305) in 2001 and further decreased to 49.45 per cent (590,6,973) in 2011 (Census 1991; 2001; 2011). Despite increase in total workforce by 1.5 million people between 1991 to 2001, the agricultural workforce in Assam declined by 0.45 million people during the same period (Census, 2001); however, it has marginally increased almost by 0.9 million despite the total workforce increased by 2.5 million between the period 2001 to 2011 (Census, 2011). The engagement pattern of workforce in agricultural and non-agricultural sector across the districts of Assam during last three

censuses has been reported in Table 2.1. It can be observed that the share of workforce engaged in agriculture has continued to decline consistently during the last three censuses across the districts of Assam while the engagement of workforce in non agriculture sector of the state has increased during the reference period.

Table: 2.1 District wise percentage share of agriculture and non agriculture work force out of total work force in Assam for different census

District/Year	1991	2001	2011	District/Year	1991	2001	2011
Kokrajhar	82.07(17.93)	65.73(34.27)	62.46(37.54)	Karbi Anglong	83.93(16.07)	73.67(26.33)	74.06(25.94)
Dhubri	74.64(25.36)	61.38(38.62)	56.20(43.80)	Dima Hasao	62.87(37.13)	52.54(47.46)	57.98(42.02)
Goalpara	76.39(23.61)	55.29(44.71)	55.81(44.19)	Cachar	57.52(42.48)	36.16(63.84)	31.08(68.92)
Barpeta	77.59(22.41)	56.82(43.18)	54.14(45.86)	Karimganj	61.61(38.39)	39.92(60.08)	40.42(59.58)
Morigaon	83.84(16.16)	72.84(27.16)	66.52(33.48)	Hailakandi	65.9(34.10)	49.75(50.25)	45.24(54.76)
Nagaon	74.43(25.57)	58.40(41.60)	55.33(44.67)	Bongaigaon	76.38(23.62)	54.82(45.18)	51.14(48.86)
Sonitpur	63.41(36.59)	46.83(53.17)	47.23(52.77)	Chirang	0	0	59.59(40.41)
Lakhimpur	80.41(19.59)	75.57(24.43)	65.87(34.13)	Kamrup	49.36(50.64)	33.78(66.22)	45.36(54.64)
Dhemaji	88.21(11.79)	81.30(18.70)	79.26(20.74)	Kamrup (M)	0	0	8.60(91.40)
Tinsukia	45.90(54.10)	37.21(62.79)	35.39(64.61)	Nalbari	73.87(26.13)	53.5(46.50)	34.76(65.24)
Dibrugarh	43.73(56.27)	36.80(63.20)	35.03(64.97)	Baksa	0	0	59.95(40.05)
Sivasagar	56.31(43.69)	42.88(57.12)	38.41(61.59)	Darrang	79.12(20.88)	61.07(38.93)	64.98(35.02)
Jorhat	54.23(45.77)	45.26(54.74)	39.91(60.09)	Udalguri	0	0	57.25(42.75)
Golaghat	67.47(32.53)	54.27(45.73)	53.59(46.41)	Assam	67.32(32.68)	52.49(47.51)	49.45(50.65)

Source: Self Estimated based on data collected from Office of the Registrar General and Census Commissioner, India. Notes: Figures off the bracket are agricultural workforce and non agricultural workforce in the bracket.

All the districts of Assam experienced fall in labour employment in agriculture during the decade of 1991-2001; and the trend continued during 2001-2011 in most of the districts of the state except Darrang, Kamrup and Dima Hasao (refer Table 2.1). Notably, the employment in non-agricultural work such as carpentry, blacksmith and other construction works has consistently increased in all the districts of Assam during the last three censuses. The share of non agricultural workforce to total workforce in Assam has increased from 32.68 per cent (2,643,315) in 1991 to 47.51 per cent (4,518,935) in 2001 and again to 50.65 per cent (6,062,717) in 2011 (Census, 1991; 2001; 2011).

As, agricultural workforce in India is classified as cultivators and agricultural labourer; where cultivator is a person who engage himself in cultivation of either owned land or government land or private land on rental basis or institutions for payment in money, kind or share. Cultivation also includes effective supervision or direction in cultivation. The agricultural labourers are those persons who work on another person's land for wages in cash or kind or share. She/he has no risk in the cultivation, but merely works on another person's land for wages. However, present study has focused on family labourers who have occupationally migrated from domestic agriculture to outside agriculture engagement or activities; therefore, main focus of the present study is cultivators. The district wise engagement of agricultural workers has been reported in Table 2.2. It can be observed that total labour force in Assam was 8,088,935 in 1991 where as the share of cultivator and agriculture labour was 54.75 per cent (4,428,787) and 12.57 per cent (1,016,833) respectively, however the share of cultivator decreased to 39.21 per cent (3,730,773) and share of agriculture labour marginally increased to 13.28 per cent (1,263,532) during 2001; despite the increase in total labour force to 9,513,240 (Census, 2001). The share of cultivator continued to decrease to 33.93 per cent (4,061,627) and share of agriculture labour marginally increased to 15.42 per cent (1,845,346) during 2011; with total labour force in Assam further increased to 11,96,9690 (Census, 2011). Such trend can be traced as one of the reason for increasing labour scarcity in agricultural sector of the state in recent years.

Table: 2.2 District wise percentage share of total cultivators and agriculture labourers out of total workforce in Assam

District/Year	1991	2001	2011	District/ Year	1991	2001	2011
Kokrajhar	65.8 (16.27)	43.12(22.61)	45.95(16.51)	Karbi Anglong	77.00 (6.93)	59.68(13.99)	58.16(15.90)
Dhubri	52.71(21.93)	37.44(23.94)	30.65(25.55)	Dima Hasao	60.00 (2.87)	48.06 (4.48)	52.31(5.67)
Goalpara	57.55(18.84)	36.97(18.32)	34.90(20.91)	Cachar	39.03(18.49)	22.84(13.32)	19.79(11.29)
Barpeta	59.98(17.61)	40.87(15.95)	36.53(17.61)	Karimganj	44.27(17.34)	24.92(15.00)	23.63(16.79)
Morigaon	72.00(11.84)	52.96(19.88)	44.88(21.64)	Hailakandi	48.00(17.90)	35.30(14.45)	30.65(14.59)
Nagaon	58.38(16.05)	38.48(19.92)	35.31(20.02)	Bongaigaon	59.00(17.38)	37.63(17.19)	32.61(18.53)
Sonitpur	51.96(11.45)	33.87(12.96)	32.32(14.91)	Chirang	0	0	41.42(18.17)
Lakhimpur	74.68 (5.73)	68.54(7.03)	55.66(10.21)	Kamrup	39.75 (9.61)	24.72 (9.06)	29.54(15.82)
Dhemaji	83.40 (4.81)	73.92(7.38)	73.21 (6.05)	Kamrup (M)	0	0	5.14 (3.46)
Tinsukia	39.34(6.56)	31.06(6.15)	26.82 (8.57)	Nalbari	53.06(20.81)	39.12(14.38)	21.69(13.07)
Dibrugarh	36.07(7.66)	29.17(7.63)	24.11(10.92)	Baksa	0	0	36.70(23.25)
Sivasagar	49.64(6.67)	35.87(7.01)	28.43 (9.98)	Darrang	67.04(12.08)	45.63(15.44)	39.85(25.13)
Jorhat	48.37(5.86)	37.51(7.75)	29.25(10.66)	Udalguri	0	0	36.17(21.08)
Golaghat	57.79(9.68)	44.20(10.07)	39.71(13.88)	Assam	54.75(12.57)	39.21(13.28)	33.93(15.42)

Source: Self Estimated based on data collected from Office of the Registrar General and Census Commissioner, India. Notes: Figures off the bracket are cultivators and agricultural labourers in the bracket.

Refer to Table 2.2; it can be observed that the percentage share of cultivator was highest in Dhemaji district during the last three censuses, while the share of agricultural labour was highest in Dhubri district during the same period. There has been a continuous fall in the share of cultivators to the total labour force in most of the districts of Assam during the last three censuses, while except Kokrajhar, Nalbari and Bongaigaon district the share of agricultural labourer to the total labour force has registered an increase in rest of the districts of Assam during the reference period (Census, 1991; 2001; 2011). The fall in the number of cultivators during 1991-2011 was approximately 367,160 in Assam. Thus, the absolute decline in agricultural labour force has tightened the rural labour market resulting in shortage of labour for farm operations. Furthermore, the tightened labour market has offered, better bargaining power to agricultural labourers, better treatment at the place of work, ability to negotiate the duration of the working day and has initiated a growing shift towards piece rate or contract work on agriculture facilitating change in the

number of working days (Reddy *et al.* 2014). One of the reasons for dominating higher wages in nonfarm sectors may be declining availability of labourer in agricultural sector of Assam in recent years. Similarly, to capture the effect of such wage rate of nonfarm labour force on agricultural wage rate, present study has used the existing wage rate of carpenter and blacksmith as a proxy for wage effect of nonfarm labour forces on farm labourers. The wage rate of farm and nonfarm sector in Assam has been reported in Table 2.3. With reference to the nominal wages in farm and nonfarm sector in Assam, it can be observed that wages in non-farm sectors has remained consistently higher during 2004-05 till 2017-18 (Table 2.3) and increased at a faster pace in the state. The average daily wage rate for carpenter and blacksmith was INR 369 and INR 313 respectively during 2017-18 in Assam, while it was INR 268.75 for farm labourers during the same period.

Table: 2.3 Comparison of average Wage Rate (INR) of Farm and Non-Farm laboureres in Rural Areas in Assam

Year	Farm	Non-Farm	
	Agriculture Labourer	Carpenter	Blacksmith
2004-05	57.5	109	88
2005-06	60.25	114	95
2006-07	63.75	121	101
2007-08	70.5	124	97
2008-09	83.5	134	105
2009-10	88	147	121
2010-11	109	150	131
2011-12	114.25	155	133
2012-13	160.75	196	189
2013-14	192.25	220	217
2014-15	213.5	305	249
2015-16	225.5	325	283
2016-17	243.25	349	289
2017-18	268.75	369	313

Source: Economic Survey Assam 2018-19, Directorate of Economics and Statistics, Assam.

While studying the problem of labour scarcity in Indian agriculture several scholars have identified various contributing factors for the problem. Low wages, seasonal nature of employment, lack of job security, poor job satisfaction, lengthy working hours, bad

working conditions, growing opportunities in nonfarm sector have been cited as responsible for migration of labourer from agriculture to non agricultural sector in the studies of (Agasty and Patra, 2013; Babu and Gurunath, 2013; Gayathri, Kunnal and Kanamad, 2015; Quarterly Report on Indicators of Agriculture January-March, 2018). A study by Korra (2011) mentioned objective of debt settlement, larger earnings for easing daughter marriage and capital for agricultural investment also influenced such migration. Migration was also complemented by livelihood insecurity, adding to the existing imbalance between demand and supply of labourers (Deshingkar and Start, 2003). The advancement of technology, sectoral income differences also to some extent responsible for agricultural workforces to migrate (Barkley, 1990; Mundlak, 1987; Butzer, Larson and Mundlak, 2002). Government of India introduces various employment schemes to eradicates rural poverty and inequality, one of such scheme was Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) which provides 100 days work guarantee to rural unskilled labour as an alternative source of income to agriculture which diverted agricultural workforce to non agricultural engagement (FICCI, 2015; Gayathri and Kunnal, 2014; Quarterly Report on Indicators of Agriculture January-March, 2018). Implementation of MGNREGA program during peak agricultural season which is backed by the higher wage and lesser workload has lead to the shortage of agricultural labourers (Gunabhagya *et al.*2017). The available literature has also indicated that the shift of agricultural labour forces from agriculture to non-farm sector is one of the major reasons for recent increase on agricultural labour wage rate in India (Gulati, *et al.*2013; Reddy *et al.*2014).

There is a popular perception about Indian agriculture, that agricultural sector is characterized by a high degree of disguised unemployment as if some amount of surplus labour is taken away from agriculture there would be no difference to output and productivity. As such labour scarcity in agriculture is not a major problem. However in reality, many Indian states like Assam, Arunachal Pradesh, Bihar, Gujarat, Haryana, Jharkhand, Karnataka, Manipur, Meghalaya, Mizoram, Nagaland, Rajasthan, Tamil Nadu, Tripura, Uttarakhand and West Bengal experience the shortage of agricultural workforce (Quarterly Report on Indicators of Agriculture January-March, 2018). It has also begun to make an impact on Indian agriculture such as in terms of reduction in crop yield, reduction in cropping intensity and changes in traditional cropping pattern, increasing cost of cultivation due to rising wage rate of hired labourer (Prabakar *et al.* 2011; Gunabhagya *et al.* 2017) which is currently not being compensated by adequate measures to reduce the overall labour scarcity. As a result, the primary sector in many states is experiencing severe escalation in cost of cultivation which has adversely impact the profitability of the farmer (FICCI, 2015). Thus, occupational migration of labourers from farm have pushed up farm wages which led to increased cost of cultivation as a result it has minimized economic gain of farmers across the country.

2.2 MGNREGA in Assam since its Inception

The present section made an attempt to discuss the trends of rural employment pattern under MGNREGA in Assam. National Rural Employment Guarantee Act 2005 later renamed as the MGNREGA is an Indian labour law and social security measure that aims to guarantee the 'right to work'. On February 2, 2006 it was initially implemented in 200 selected backward districts of the country in which seven districts of Assam were also

incorporated. In the year 2007, the second phase of MGNREGA had started where five districts of Assam were also included. The third phase started on April 1, 2008 where remaining 14 districts of Assam came under the purview of the Act. The main aims of the Act were to enhance livelihood security in rural areas by providing at least 100 days of wage employment in a financial year to every household whose adult members volunteer to do unskilled manual work. The trends in job cards issued and work demanded in job cards during 2006-07 to 2017-18 in Assam has been reported in Table 2.4. It can be seen that during the reference period, the issue of job card has increased significantly in Assam (Table 2.4). Notable that the number of households demanded work against job cards has also shown increased from 7.98 lakh in 2007-08 to 21.55 lakh in 2008-09; thereafter that it has declined to 12.47 lakh during 2012-13; which again started increasing from 13.21 lakh in 2013-14 to 19.01 lakh during 2017-18.

Table: 2.4 Trends in the Number of Job Cards Issued and Work Demanded Against Job Cards over Time in Assam

Year	No. of job cards issued (in lakhs)	No. of households demanded work in job cards (in lakhs)	% change in the no. of job card issued	% of households demanded work in job cards
2006-07	9.17	7.98	-	87.05
2007-08	15.66	14.48	70.80	92.48
2008-09	29.71	21.55	89.72	72.55
2009-10	36.12	21.39	21.59	59.22
2010-11	43.70	18.08	20.99	41.37
2011-12	39.14	13.54	-10.43	34.59
2012-13	39.85	12.47	2	31.29
2013-14	41.48	13.21	4.09	31.85
2014-15	42.99	13.87	3.64	32.26
2015-16	45.88	16.68	6.72	36.36
2016-17	42.15	17.85	-8.13	42.35
2017-18	43.63	19.01	3.51	43.57

 Source: Self Estimated based on data collected from various report on Economic Survey Assam, Directorate of Economics and Statistics, Assam.

In between 2010-11 and 2011-12 there has been sharp decline in the demand for work in job cards. The percentage of households demanded work in job cards has increased from 87.05 per cent in 2006-07 to 92.48 per cent during 2007-08; with a substantial fall to

Table: 2.5 District wise job cards issued, no. of households demanded work in job cards, no. of households provided work in job cards and total employment generated during 17-18

Year		2017-18			
Sl. no	District	Total No. Job Cards Issued	No. of Household demanded work in job cards	No. of Households provided work in job cards	Total employment generated (person days) [in no.]
1	Kokrajhar	165868 (3.80)	61404(3.23)	56280(3.34)	2195282(4.56)
2	Dhubri	174511(3.99)	78243(4.11)	71662(4.25)	3640452(7.56)
3	Goalpara	134840(3.08)	42906(2.25)	37032(2.19)	691910(1.44)
4	Barpeta	278095(6.37)	116693(6.14)	101415(6.02)	4165278(8.65)
5	Morigaon	158453(3.63)	69925(3.67)	64576(3.83)	1693486(3.52)
6	Nagaon	200116(4.58)	108617(5.71)	94741(5.62)	2622955(5.45)
7	Sonitpur	148824(3.41)	63206(3.32)	54498(3.23)	1228201(2.55)
8	Lakhimpur	178160(4.08)	71031(3.74)	65170(3.86)	1904843(3.95)
9	Dhemaji	106804(2.45)	61529(3.24)	54429(3.23)	1706858(3.54)
10	Tinsukia	145154(3.32)	56083(2.94)	51457(3.05)	1413942(2.93)
11	Dibrugarh	165386(3.78)	71578(3.76)	65164(3.86)	1437166(2.98)
12	Sivasagar	96088(2.01)	34238(1.80)	30907(1.83)	649237(1.35)
13	Jorhat	129710(2.97)	51430(2.70)	43814(2.59)	1017624(2.11)
14	Golaghat	155473(3.56)	84069(4.42)	77307(4.58)	1853921(3.85)
15	KA	126896(2.91)	67700(3.56)	64143(3.81)	1039568(2.16)
16	Dima Hasao	29090(0.66)	18935(0.99)	18004(1.06)	546357(1.13)
17	Cachar	210980(4.83)	88406(4.65)	70345(4.17)	2031502(4.22)
18	Karimganj	173065(3.96)	72212(3.79)	60314(3.57)	1383957(2.87)
19	Hailakandi	116949(2.67)	61477(3.23)	53652(3.18)	1723082(3.58)
20	Bongaigaon	108550(2.48)	41221(2.16)	36380(2.15)	1083772(2.25)
21	Chirang	104831(2.40)	39771(2.09)	36117(2.14)	1028371(2.14)
22	Kamrup	242585(5.56)	81629(4.29)	71036(4.21)	2060702(4.28)
23	Kamrup(M)	43062(0.98)	6037(0.32)	5354(0.32)	101505(0.21)
24	Nalbari	118392(2.71)	55550(2.92)	49425(2.93)	1631295(3.39)
25	Baksa	194065(4.45)	80291(4.22)	68843(4.08)	1388516(2.88)
26	Darrang	150615(3.45)	56958(2.99)	47911(2.84)	1449094(3.01)
27	Udalguri	155874(3.57)	100609(5.29)	90253(5.35)	2728445(5.67)
28	Majuli	36269(0.83)	22064(1.16)	19599(1.16)	520023(1.08)
29	SS	38033(0.87)	10803(0.56)	9761(0.58)	369530(0.77)
30	Biswanath	127992(2.93)	57084(3.00)	51748(3.07)	1124491(2.33)
31	Charaideo	59441(1.36)	29174(1.53)	27119(1.61)	641466(1.33)
32	Hojai	89749(2.05)	40505(2.13)	36829(2.18)	1046454(2.17)
	Assam	4363920	1901378	1685285	48119285

Source: Economic Survey Assam 2018-19, Directorate of Economics and Statistics, Assam
Notes: KA stands for Karbi Anglong ; SS stands for South Salmara
Figures inside bracket are the percentage share of Total Assam

31.29 per cent in 2012-13 and then marginally increased to 31.85 per cent during 2013-14 and then 43.57 per cent in 2017-18. The implication of the variation has noticed in percentage of households demanded work under MGNREGA in Assam may be that the Act has failed to meet the aspiration of the target group to a large extent (Goswami and Dutta, 2014).

The district wise employment generation under MGNREGA during 2017-18 in Assam has been reported in Table 2.5. The total number of job cards had issued, and total number of households demanded work with job cards was 4,36,3,920 and 1,90,1,378 respectively during 2017-18 in Assam. However, total employment provided to households with job cards was 1,68,5,285 during the reference period which was only 89 per cent of total households demanded work with job cards in the state. For the period under consideration the highest number of job cards being issued in Barpeta district followed by Kamrup district with number of job card issued was least in Majuli district. The number of households demanded work with job cards and employment provided with job cards was highest in Barpeta district followed by Nagaon district; with number of households demanded and absorbed work with job card was least in Kamrup (Metro) district during 2017-18. With reference to the number of person days of employment generated during 2017-18 in various districts of Assam, the Barpeta district ranked top by generating 41.65 lakh person day's employment for rural people while Dhubri district took the second position by generating 36.40 laks person days employment and Udalguri ranked third by generating 27.28 lakh person days employment for rural people. The number of person day's employment generated was least in Kamrup (Metro) district

during the reference period. The number of total person days generated in Assam during the reference period was 481.19 lakh person days.

2.3 Real Wage Rate Differential of MGNREGA worker and Agricultural Labourers in Assam

Present section has made an attempt to provide an overview of real wage differential between agricultural labourer and MGNREGA workers in Assam. The Impact of Mahatma Gandhi National Rural Employment Guarantee Schemes (MGNREGS) on agricultural labour supply and agricultural wage rate has been an enraged debated public policy concern in India. A significant number of scholars and studies has claimed that one of the reason for increase in agricultural wage in recent years is owing to job security and assured wage under Mahatma Gandhi National Rural Employment Guarantee Program, with the scheme being diverted the agricultural workforces towards rural constructions work, which otherwise would be available for agricultural practices (Gulati, *et al.*2013; Azam, 2012; Chand and Srivastava, 2014). The argument has forwarded that MGNREGA Program has pushed up the average wage of casual workers, distorted the rural labour markets by diverting rural farm labours to non-farm rural jobs. As a result of MGNREGA; a net decline in labour availability for agriculture, there has been a steep rise in wages of various agricultural professions since 2006-07. Owing to the shortage, farmers end up paying higher wages in order to attract labour to their farm (FICCI, 2015). Thus, creating artificial labour shortage and raising the cost of production of agricultural commodities (Gulati, *et al.*2013; Berg *et al.*2012). Around the time of initiation of MGNREGS in 2005-06, the real wage rate of unskilled agricultural labour has also just started to increase across the states of India, after its stagnation for over more than 20 years (Bhattarai *et al.* 2014). As nominal wage rate is not appropriate for comparison of

heterogeneous groups of labourer; so, for better comparison the relative wage rate was estimated by deflating the nominal wage by CPI of agricultural labours force. The figures of real wage rate were arrived by using the Consumer Price Index for Agricultural labourers (CPIAL) with (1986-87 = 100), the real wage differential between MGNREGA worker and agricultural labourer irrespective of gender in Assam during 2006-07 to 2014-15 being reported in Table 2.6.

Table: 2.6 Trend in average real wage rate (INR) of agriculture labourer and MGNREGA worker over time in Assam. (1986-87 =100)

Year	Real wage rate of MGNREGA labourer	Real wage rate for agricultural labourer
2006-07	16.92	17.42
2007-08	18.40	18.94
2008-09	17.43	19.55
2009-10	18.58	16.91
2010-11	22.37	19.93
2011-12	21.03	24.54
2012-13	19.77	25.40
2013-14	18.56	26.75
2014-15	20.69	29.28

Source: Self Estimated based on data collected from Directorate of Economics and Statistics Department of Agriculture and Co-Operation Ministry of Agriculture Government of India New Delhi, www.mgnrega.com

In between 2006-07 till 2014-15 there has be an increase in real wage rate of both MGNREGA workers and agricultural labourer in Assam. However, the increases in real wage rate of agricultural labourers were steadier than MGNREGA workers during the reference period (Table 2.6). The wage rate of agricultural labourer has increased from INR 17.42 in 2006-07 to INR 29.28 in 2014-15, while that of MGNREGA labourer has increased from INR 16.92 in 2006-07 to INR 20.69 in 2014-15. However, considered the real wage rate of agricultural labourer for selected districts in Assam, it has noticed across the districts it has gradually increased from 2005-06 to 2008-09; thereafter during

2009-10 it has decreased in most of the districts (Table 2.7). Although, real wage rate for agricultural labourer across the district has rapidly increased since 2010-11. Thus considered 2006-07 to 2014-15 periods, the real wage rate of agricultural labourer has remained consistently higher than MGNREGA labourers though the real wage of agricultural labourer was lower than MGNREGA labourer during 2009-10 (Table 2.6). Hence, MGNREGA may not be traced sole responsible for occupational migration of farm labourer though complemented the boost in agricultural wage rate in Assam in recent years.

Table: 2.7: Selected district wise average real wage rate (INR) of agricultural labourers in Assam   (1986-87=100)

District / Year	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
CH	22.34	20.51	19.98	21.67	20.58	21.56	23.45	23.15	26.14	26.74
DR	19.55	17.95	15.98	16.23	13.84	16.78	19.13	19.68	26.14	25.59
DG	14.31	15.04	21.41	22.87	14.76	21.51	28.66	30.95	30.18	31.14
GL	14.66	16.54	16.58	17.43	19.52	23.75	23.65	24.10	22.55	25.07
GA	17.74	16.32	15.89	15.31	13.01	13.76	19.15	21.60	24.38	34..72
JH	16.25	14.10	18.01	17.03	16.42	19.79	24.03	26.46	26.14	27.37
KM	16.75	15.61	18.36	18.34	16.68	21.85	22.83	25.05	24.78	34.36
KR	13.44	14.10	14.69	17.18	15.95	17.21	31.5	30.16	27.12	29.92
NG	19.55	17.94	20.79	22.15	20.57	22.03	22.97	29.36	27.45	33.89
SV	21.64	20.3	20.58	18.52	15.33	16.91	21.38	20.85	21.24	23.94
ASSAM	17.77	17.42	18.94	19.55	16.91	19.93	24.54	25.40	26.75	29.28

Source: Self Estimated based on data collected from Directorate of Economics and Statistics Department of Agriculture and Co-Operation Ministry of Agriculture Government of India New Delhi.
Notes: CH stands for Cachar, DR stands for Darrang, DG stands for Dibrughar, GL stands for Goalpara, GA stands for Golaghat, JH stands for Jorhat, KM standes for Kamrup, KR stands for Kokrajhar, NG stands for Nagaon, SV stands for Sivsagar

In addition, across the selected districts in Assam, average real wage rate was highest in Cachar district during 2005-06 to 2010-11, after that it had increased slowly compared to other districts; whereas average real wage rate was lower in Goalghat among the selected districts during the same period, though it had increased very fast after that period (refer

Table 2.7). In the year 2014-15, average real wage rate seems to be highest in Golaghat district followed by Kamrup district; however, lowest wage rate appeared in Sivsagar district among the selected district during the same period (see Table 2.7).

A study by Bhattarai *et al.* (2014) mentioned that, besides MGNREGA the migration of labour forces out of agriculture to urban areas for higher wages in nonfarm sectors to some extent being responsible for increased in the farm wages in India in recent years. Similarly, rising Gross State Domestic Product (GSDP), increasing construction activity together with lower growth rate in agriculture sector to some extent motivated labourers to move out of agricultural activities (Reddy *et al.* 2014; Chand and Srivastava, 2014). In addition, increased per capita income with rising GDP growth in one hand, dominating growth in service sector over primary sector, fast peace of urbanization with continuous infrastructural development has pushed the labourer towards construction and other nonfarm activities which might have influenced the availability of labourer in agriculture and their wage rate.

2.4 Conclusion

It has observed that share of agricultural workforce gradually decreased into total workforce while share of non agricultural workforce had increased since 1991 to 2011 censuses in Assam. Though agricultural labour share has marginally increased within agricultural workforce but share of cultivators has rapidly decreased in the state during last three censuses. The possible cause might be that nominal wage rate in nonfarm profession such as carpentry, blacksmith   has grown faster than farm sectors in the state.

Importantly, since at the time of MGNREGA has initiated in Assam wage rate for agricultural labourer has gradually increased, many studies have claimed that after its

implementation rural workforce has moved out from farm to do work in MGNREGA. Anyway, it has noticed that share of employment demanded with job cards has decelerated over the years; for example, 92.48 per cent of job card holders demanded work with job cards during 2007-08 but it has decreased to 31.29 per cent during 2012-13. Likewise, real wage rate of agricultural labourers has seen higher than MGNREGA workers in the state since its inception.

Notably, across the selected district of Assam, average real wage rate has slowly increased during 2005-06 to 2010-11; though it was negatively grown in the 2009-10 across the districts. Moreover, average real wage had increased very fast since 2011-12 across the selected districts of Assam.

Factors Determining Occupational Migration of Unskilled Labourers and Its Impact on Farm Business Income

Present chapter has made a comparative analysis of differences in farm business income (FBI) between the household experiencing occupational migration of unskilled labourer out of domestic agriculture and those households who have not experienced any occupational migration of unskilled labourer from domestic agriculture. The chapter has also analyzed the factors determining occupational migration of unskilled labourer from agricultural families in the study area. An attempt has also been made in this chapter to evaluate the impact of occupational migration and remittances on FBI of the sampled households in the study area. The chapter consists of four broad section and two sub sections. Section 3.1 covers the representing socio-demographic and economic overview of the farm household and their income from domestic agriculture, income from self employed and other sources also their farm expenditure. The section 3.2 consists of two sub sections, section 3.2.1 covers the discussion on determinants of migration, remittances and their effect on FBI while the section 3.2.2 summarizes the discussion on impact of migration, remittances on self employment, and others income. Conclusion of the chapter has been summarized in final section.

3.1 Socio-Economic, Demographic Characteristics of Sampled Household

Overview of Revenue, Cost and Earnings in Domestic Agriculture

The descriptive statistics of socio-economic, demographic and other characteristics of sampled households of present study are summarized in this section. With reference to the results of descriptive statistics in Table 3.1, it has been observed that taking account

of price differential in paddy in different location, the mean value of total revenue (TR_a) earned by the sampled household was INR 87,541 with the revenue earned by families having occupational migration of labourer from agriculture was higher than those where no labour migration outside agriculture had taken place. Again, considering uniform price of paddy across the locations of study area, it has been found that mean value of total revenue (TR_b) earned by the sampled household was INR 87,667 with households having no labour migration outside agriculture was higher than those where labour migration outside had taken place. The variability in agricultural revenue was low among the households with occupational migration of labourer outside agriculture relative to them with no migration outside agriculture. There is no clear-cut reason behind such differential in agricultural revenue, except assumption of price differential.

Given the inappropriateness of obtaining information about interest value of own capital assets (excluding land) used in farming, present study used three CACP cost concepts, A_1, A_2, A_2+FL. The average value of A_1 across the sampled household of present study was INR 41,393, with the value of A_1 was higher among the household with no occupational migration of labour outside agriculture. Again, the mean value of A_2 across the sampled household was INR 41,887; with similar expenditure pattern being found in A_2 like A_1 was being noticed while taking account status of occupational migration of labourer among the sampled farm households. However, taking account of average expenditure on (A_2+ FL) among the sampled households was INR 61,501, with the figure of household with labour migration outside agriculture was higher than those farm households where no migration took place outside agriculture. The agricultural cost seems to have low variability among the sampled households with the variability was

relatively lower among the households having occupational migration of labour from agriculture. Such result reflects families where from labourer being migrated must have been subject of similar cost structure in agriculture which possibly for identical land size; and cost of hired labourer and machinery.

With reference to the earning from FBI_1, it has been observed that the mean income of the sampled households was INR 46,148 with the figure of household having labour migration outside agriculture was higher than those farm households where no migration took place outside agriculture. Again, taking account of FBI_2, it has noticed that the average income across the sampled household was INR 45,654 with similar average pattern being noticed among the households from the point of view of status of migration. However, considering FBI_3, it has seen mean income was INR 26,040 across the sampled households, with the figure of households having no occupational migration outside agriculture was higher than those where migration has taken place. The average value of FBI_4 across the sampled households was INR 46,275; with the figure of household having occupational migration of labour outside agriculture was higher than those households where no such migration took place. Moreover, as seen to FBI_5, the mean income was INR 45,781 across the sampled households, it has seen identical income pattern among the households from point of view of occupational migration. Similarly, average income FBI_6 across the sampled households was INR 26,166; it has observed that average income with the households having no occupational migration of labour outsides domestic agriculture was higher relative to those households who reported migration. The FBI has indicated low variation among the sampled households; with variation was comparatively higher among the households where no occupational migration of

labourers outsides agriculture than those households where migration has taken place. The perusal of six different FBI and their pattern as seen in Table 3.1, it has clearly expressed without take into account contribution of family labourers, occupationally migrant families acquired more FBI compared to households with absent of such migration. This result may be for identical investment in relatively smaller land fragment and comparatively higher yield. On the other hand, considered value of family labourer it has seen households with no experienced of occupational migration of labourer outside domestic agriculture had been earned more FBI relative to those households having such experience, this had happened may be for variation in wage rate and difference in male-female wage rate across different location in the study area.

Meanwhile total family income had consisted with FBI, self employment income and others income, however, taking into account of total family income across the sampled households it has been observed that mean income across the sampled households was INR 10, 2,906 for Y_a and INR 10, 3,032 for Y_b; with figure of mean income was higher among the households experiencing no occupational migration of labourers outside agriculture than those families where such migration took place. This had been happened for that household with on occupational migration have more family labourers relative to migrant families and allocated them for work to other nonfarm activities such as wage work, trade and business, animal husbandry etc. after sowing period of paddy to earned money.

While subject to self employment income (SI), it has been observed that mean income across the sampled households was INR 49,092; it has observed the figure was higher among the households where no migration of labourer outside agriculture than those

households where reported such migration. However, taking into account of others income (OI), it has been found that mean value of income from other sources across the sampled households was INR 27,775; with OI was higher among the households having no migration of labour outside agriculture relative those households where migration had taken place. The self employment and others income seem to have high variability among the sampled households; though variability was higher in self employment income and lower in others income among the households where occupational migration of labourer took place outsides agriculture than those households where no reported case of migration. Meanwhile households with on occupational migration may be for their more family laboueres relative to migrant households allocated them for non farm work such as wage work, trade and business; animal husbandry etc. after sowing period as a result these families had earned higher SI and OI compared to occupational migrant families.

Taking into account value of assets holding status of households (VAHSH), average VAHSH across the sampled households was INR 340,613; it has seen that mean VAHSH was higher in the households where occupational migration of labourer took place outside agriculture than those households where reported no such migration. The variability has seen high among the sampled households in VAHSH; however, low variability has been observed across the households where no occupational migration outside agriculture relative to households where such migration took place.

Table: 3.1 Descriptive Statistics of Agricultural, Self Employed and Other Income and Expenditure (INR)

Revenue/ Cost/FBI	Variables	Non Migrant Household (N= 112)				Migrant Household (N= 112)				Overall Sampled Household (N=224)			
		Mean	Std. Dev	Min	Max	Mean	Std. Dev	Min	Max	Mean	Std. Dev	Min	Max
Revenue	TR_a	87359.38	74806.74	14400	572000	87722.08	47659.6	19600	336000	87540.73	62579.04	14400	572000
	TR_b	87744.94	74409.04	13979.04	572523.6	87589.52	45954.3	18216.6	312285.6	87667.23	61701.89	13979	572523.6
Cost	A_1	41724.64	31309.25	4372.5	236175	41060.83	23489.04	6837.5	152700	41392.73	27616.62	4372.50	236175
	A_2	41976.43	31183.84	4372.5	236175	41797	24468.62	6837.5	152700	41886.71	27965.30	4372.50	236175
	A_2+FL	60940.54	34370.89	9622.6	248675	62061.5	27629.12	21750	184000	61501	31117.82	9622.50	248675
Farm Business Income	FBI_1	45634.73	53229.85	3060	411500	46661.25	34614.77	3180	199250	46147.99	44799.83	3060	411500
	FBI_2	45382.95	53278.53	3060	411500	45925.09	33439.54	3180	199250	45654.02	44380.23	3060	411500
	FBI_3	26418.84	47109.89	-19850	351500	25660.58	27764.7	-19850	152000	26039.71	38581.73	-19850	351500
	FBI_4	46020.3	53109.71	5295.52	412023.6	46528.7	33698.78	1496.16	175535.6	46274.5	44377	1496.16	412023.6
	FBI_5	45768.51	53144.16	4795.52	412023.6	45792.54	32639.85	1496.16	175535.6	45780.53	44001.25	1496.16	412023.6
	FBI_6	26804.41	46722.48	-26656.4	352023.6	25528.03	27281.88	-21503.2	128285.6	26166.22	38177.1	-26656.4	352023.6
Total Income	Y_a	115990.3	91931.10	13500	493975	89821.29	78293.27	495	413350	102905.8	86196.64	495	493975
	Y_b	116375.8	91981.30	15547.6	492023.6	89688.74	76916.52	2730.52	385516.6	103032.3	85644.43	2730.52	492023.6
SI		59290.18	55537.04	0	250000	38892.86	61438.99	0	320000	49091.52	59318.26	0	320000
OI		30281.25	55781.05	0	320000	25267.86	39238.93	0	230000	27774.55	48181.87	0	320000
VAHSH		235548.2	311387.60	5000	1514500	445676.8	1402100	12000	14289500	340612.5	1018767	5000	14289500

Source: Self Estimate based on Field Survey Data, June- August, 2019

Notes: TR_a= Total revenue estimated through existing household price of paddy in different locations. TR_b= Total Revenue estimated through a uniform price of paddy in different locations.

A_1= sum of different cost which are hired human labour, hired bullock labour, own bullock labour, own machinery labour, hired machinery charge, seeds, insecticides and pesticide, manure, fertilizers, depreciation on implements and farm building, irrigation charges, land revenue, cesses and other taxes, miscellaneous expenses. A_2= sum of coat A_1 plus value of rent paid for leased in land. A_2+FL= sum of cost A_2 plus imputed value of family labour.

FBI_1= farm business income estimated through $TR_a - A_1$. FBI_2= $TR_a - A_2$. FBI_3= $TR_a - A_2+FL$. FBI_4= $TR_b- A_1$. FBI_5= $TR_b- A_2$. FBI_6= $TR_b- A_2+FL$

Y_a = Total income of the households which includes self employment income, wage and others income and FBI_3. Similarly, Y_b includes self-employment income, wage and others income and FBI_6.

SI stands for self employment income which included income from self employment, agriculture other than paddy, trade and business, poultry and animal husbandry. OI stands for other incomes which included income from wage work, govt. benefit including money and goods income from other sources.

VAHSH stands for value of assets holding status of household.

The perusal of Table 3.2 shows, there has been statistically significant mean difference between average farm business income (FBI) and self employment income (SI) among the households with occupational migration of labourers outsides domestic agriculture relative those households with no reported case of such migration. There seems to statistically significant difference in farm income between the farm households who have reported case of family members migrated outside domestic agriculture and those who have no such reported cases for the previous farming season in the study area, with FBI has been found to be higher for those household who have no reported case of family members migrated outside domestic agriculture. The observation seems to be similar between the two groups of households in case of self employment income. The mean difference in farm business income was INR 10,483 between those households who have reported case of family members migrated outside domestic agriculture and those who have no such reported cases; while it was INR 20,397 in case of self employment income among the two groups of households.

Table: 3.2 Test of significance in Different Income (INR)

Income	Variables	Mean H_1	H_2	Mean difference	t (SE)
Different incomes	FBI	45792.54	56275.21	-10482.67	-1.73* (6048.21)
	SI	38892.86	59290.18	-20397.32	-2.60** (7825.73)
	OI	25267.86	30281.25	-5013.39	-0.77 (6444.28)

Source: Self Estimate based on Field Survey Data, June- August, 2019

Notes: *** $p < 0.01$; ** $p < 0.05$, *$p < 0.10$. Figures in the parenthesis are the Standard Error (SE)

H_1 stands for farm household who have reported case of family members migrated outside domestic agriculture; H_2 stands for farm household who have no reported case of family members migrated outside domestic agriculture.

However, statistically no significant difference being found in case of other income between the farm households who have reported case of family members migrated outside domestic agriculture and those who have no such reported cases for the previous farming season in the study area.

Socio-Demographic Characteristics of the Households

With subject to the descriptive statistics results reported in Table 3.3, it can be noticed that, the mean years of schooling of household heads across sampled households in the study area was about 7 years; however, it has indicated household head were more educated among the households with no occupational migration outside agriculture than those households where migration took place. The average family size of the sampled households was about 7; with average size of households seemed to be larger among households experienced occupational migration outsides domestic agriculture relative to those households with no such experienced. The average age of the household head was 49 years; hence household head in the study area are middle-aged adults. The households head with labourer migrated outside agriculture reported to have elderly population.

Table: 3.3 Summary statistics of Socio- Economic and Demographic Characteristics of Households

Variable	Unit	Non Migrant Household (N= 112)				Migrant Household (N= 112)				Overall Sampled Household (N=224)			
		Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
YS	Years	6.79	3.58	0	15	6.33	3.46	0	15	6.56	3.52	0	15
HS	No	6.16	2.78	2	15	7.12	3	2	20	6.63	2.92	2	20
AHH	Years	45.93	8.65	22	65	51	10.37	21	68	48.48	9.87	21	68

Source: Self Estimate based on Field Survey Data, June- August, 2019
Notes: YS stands for years of schooling of household head; HS stands for household size; AHH stand for Age of HH Head.

Considered the results of summary statistics in Table 3.4, it has noticed that majority of the sampled household were general caste and belonging to Muslim community. The paddy farming practices were mostly initiated by male farmers across the sampled households in the study area. In addition, majority of sampled household practices paddy cultivation in their own land.

Table: 3.4 Caste, Religion, Gender and Land Tenure   **(in % share)**

	Variable	Non Migrant household (112)	Migrant household (112)	Overall Sampled Household (N=224)
Caste	General	82.14	84.82	83.48
	SC	0.89	0	0.44
	ST	8.93	5.36	7.14
	OBC	8.04	9.82	8.93
Religion	Hindu	24.11	22.32	23.21
	Muslim	75.89	77.68	76.79
Gender	Male	100	99.11	99.55
	Female	0	0.89	0.45
Land Tenure systems	Own	66.96	73.21	70.08
	Leased	0.89	0.89	0.89
	Share cropping	8.03	5.35	6.69
	Own and Leased	8.03	10.71	9.37
	Own and Share cropping	16.07	8.03	12.05
	Leased and Share cropping	0	1.78	0.89

Source: Self Estimate based on Field Survey Data, June- August, 2019

Farm Characteristics of Sampled Households

The results regarding farm characteristics presented in Table 3.5, average land holding among sampled households was 1.45 hectare; however, it has noticed that households with no occupational migration of labourer outsides agriculture were more land holder than those families where reported such migration. The variation in land holding between the sampled households was high, with low variability among households had experienced occupational migration of labourer outside agriculture than those households with no such migration. Again, average operational land holding, and area cover under paddy cultivation across sampled household was 1.27 and 1.15 hectare respectively;

however, among households had experienced occupational migration of labourer outside domestic agriculture has seemed lower operational land holding and area under paddy than those households have not reported such migration. Moreover, average area under other crop was 0.13 hectare across the sampled household but it has noticed that among households with no occupational migration of labourer outside agriculture was more area under other crops than those households where such migration took place.

Table: 3.5 Summary statistics of Farm Characteristics

Variables	Non Migrant Household (N= 112)				Migrant Household (N= 112)				Overall Sampled Household (N=224)			
	Mean	S.D	Min	Max	Mean	S.D	Min	Max	Mean	S.D	Min	Max
Homestead land (ha)	.14	.043	.07	.27	.15	.06	.07	.4	.15	.05	.07	.40
Owned land (ha)	1.02	.82	0	5.76	1.03	.68	0	4.02	1.02	.75	0	5.76
Fixed rent (ha)	.004	.051	0	.54	.03	.19	0	1.61	.02	.14	0	1.61
Share cropping (ha)	.27	.83	0	7.36	.16	.40	0	1.87	.22	.65	0	7.36
Mortgage (ha)	.03	.11	0	.67	.05	.17	0	1.07	.04	.15	0	1.07
Others (ha)	.01	.13	0	1.34	0	0	0	0	.005	.08	0	1.34
Operational land (ha)	1.32	.93	.54	7.36	1.24	.58	.33	4.02	1.27	.78	.33	7.36
Area under paddy (ha)	1.16	.94	.20	7.36	1.14	.56	.33	4.02	1.15	.77	.20	7.36
Area under other crops(ha)	.15	.35	0	1.87	.09	.28	0	2.14	.13	.32	0	2.14
Total land holding (ha)	1.48	.95	.67	7.63	1.42	.61	.54	4.28	1.45	.80	.54	7.63

Source: Self Estimate based on Field Survey Data, June- August, 2019

Socio- Demographic Characteristics of Migrant

From the Table 3.6, it has seemed male members across the sampled households in the study area were occupationally migrated outside domestic agriculture where majority of them were unmarried. It has also noticed that 39 per cent of the migrant have decided their own decision to occupationally migrate. However, 37 per cent of the sample households reported that their household head or father has decided about their migration; moreover, rest of the sample household has informed that their families have jointly

decided about occupational migration of their family member. Migrant who has occupationally migrated outside agriculture have engaged in many non agricultural profession such as business, mason, carpenter, driver etc. but it has observed that 36 per cent of migrant engaged in daily wage earner followed by business. A very few migrants were employed as manager and carpenter.

Table: 3.6 Socio- Demographic Factors of Migrant Household

Variables		% share
Gender	Male	100
	Female	0
Marital status	Married	24.11
	Unmarried	75.89
Decision maker for migration	Self	39.28
	Father	36.60
	Family	24.10
Occupation of migrant	Business	23.21
	Carpenter	2.67
	Manager	2.67
	Daily wage earner	35.71
	Service	14.28
	Mason	14.28
	Self-employed	6.25

N= 112, Source: Self Estimate based on Field Survey Data, June- August, 2019

Note: Occupation of migrant: Business which includes hardware business, fishery business, hotel, SIM card business, LPG business, rice business, local shopkeeper, tailor shop. Manager includes company manager, showroom manager. Daily wage earner includes daily wage labour in hotel, shop and company. Service includes private and government school teachers, driver, security guard, forest guard, home guard. Self employment includes home tutor, painting, and plantation.

Remittances Utilization Pattern

Considered to utilization pattern of remittance, with subject to the results of descriptive statistics in Table 3.7; it has seemed on an average migrant family have received INR 78,839 as remittances during agricultural season from the family member who have occupationally migrated outside agriculture. However, it has noticed high variation among the remittances receiving families. Besides the results of Table 3.7; it has seen that occupational migrant families on an average invested highest amount of remittances in

their daily consumption INR 27,512 then followed by investment in farm production INR 24,093. However, it has observed, they have least invested in purchased of homestead land which was only INR 357.

Table: 3.7 Summary statistics of Utilization pattern of Remittances (INR)

Variables	Mean	Std. Dev	Min	Max
Daily consumption	27511.61	34096.84	0	300000
Education of family members	1274.10	3294.10	0	20000
Health and medical	2758.92	5926.34	0	30000
Payoff loan	9982.08	59761.92	0	600000
Purchased of homestead land	357.14	3779.64	0	40000
Mortgage in agriculture land	2455.36	11682.66	0	75000
Mortgage out agriculture land	446.42	3325.68	0	25000
Construction and development of house	5535.71	23397.82	0	200000
Farm production (haired labour/ seeds/ etc)	24092.86	20392.08	0	110000
Others	4495.53	10443.65	0	79000
Total remittance	78839.29	92982.28	0	900000

N= 112, Source: Self Estimate based on Field Survey Data, June- August, 2019

Causes of Occupational Migration

It has noticed that family member from agricultural families has occupationally migrated outside agriculture for multiple reasons which has also mutually inclusive. By looking at the Table 3.8, it has been presented the causes of migration with their per cent share and rank. However, per cent figures in the Table denoted that how many families reported for a particular cause for occupational migration of labourers outside agriculture among total sampled households.

Table: 3.8 Causes of Occupational Migration

Variable	% share	Rank
Small land holding	72.32	I
Migration for better employment opportunity	62.50	II
Higher wage rate	45.54	III
Seasonal nature of agricultural Work	35.71	IV
Networking influence in migration	32.14	V
Family size	27.67	VI
Migration due to improvement in educational status	25	VII
Low wage rate	23.21	VIII
Migration because lack of advancement in agriculture	16	IX
Job offer from local engagement in construction sector	12.50	X
Migration to finance agricultural activity	12.50	X
Migration because of agricultural Boredom	8	XI
Indebtedness	2.67	XII
Due to crop failure	0.89	XIII

Source: Self Estimate based on Field Survey Data, June- August, 2019

It has been observed that 72 per cent of the migrant household reported that 'small land holding' has the rank I cause for occupational migration of their family member outside agriculture then followed by 'better employment opportunities' at the destination with percent share 63 and rank II. Similarly, 'higher wages' at destination and 'seasonal nature of agricultural work' was in rank III and IV respectively causes for such migration. The crop failure was the lowest ranking reason for which occupational migration outside agriculture has been taken place.

3.2 Determinants of FBI, Self Employment Income and Others Income

Present section consists of two sub sections, the section 3.2.1 covers discussion on determinants of migration, remittances and their effect on FBI while the section 3.2.2 focuses on analysing the impact of migration and remittances on self employment, others income.

3.2.1 Determinants of Migration, Remittances and their Effect on FBI

With reference to the simultaneous regression model as fitted in equation (xiv) to (xvi) in chapter I of this dissertation which has been simultaneously estimated the determinants of crop income, migration of unskilled labourer and remittances using three stage least square (3SLS) method, the results being reported in Table 3.9. The estimated result shows that except number of migrants, the coefficient of the household characteristics such as remittances, household size, land per capita, total assets value have turned out as significant with positive elasticity in crop income equation. Again, coefficient of farm inputs such as seeds, insecticides and pesticides have shown positives and significant relationship with crop income. Hence, an incremental use of these inputs helped in enhancing the crop income of the sampled farm households in the study area.

The positive significant coefficient of remittances in the crop income equation implies that, inflow of remittances has helped in rising crop income of the farm household by 0.02 per cent. As per the results of the summary statistics, the farm households reported to use significant percentage of their remittances in domestic agriculture relative to expenditure on other heads; it might help the farm household in making appropriate use of farm inputs which might have complemented the income of the sampled household in the study area. However, the negative significant coefficient of number of migrants in crop income equation implies that migration of an unskilled labourer from domestic agriculture lowered the income of the farm household by 0.68 per cent. Such result may be because of the fact that migration of labourer from domestic agriculture compelled the farm household to depend on hired labour for continuation of farming activity thereby

raising the total production cost; in addition, imputed manpower absence in domestic agriculture could have contributed towards output loss thereby lowering the crop revenue.

Table: 3.9 Determinants of migration and remittances and their effects on households FBI

Variables/ Constant /others	Crop Income	Migration	Remittances
Farm Characteristics and Enabling Factors			
lnM_i	-.675 (.278)**		4.06(.796)***
lnR_i	.016(.007)**		
lnHS	1.104(.176) ***	.236(.072) ***	-.383(.524)
lnND	-.150(.095)	-.046(.043)	.707(.327)**
$lnAG^2$	.009(.084)		
$lnYS_i$	-.013(.060)	-.013(.025)	-.033(.187)
$lnLC_i$	.756(.107) ***	.061(.045)	.427(.303)
$lnTAV_i$	.097(.039)**	.107(.018) ***	-.342(.122) ***
$lnFY_i$		-.184(.024)***	
$lnYSM_q$		.001(.061)	.215(.451)
$lnAGM_q$		.013(.044)	2.96(.331) ***
D		.144(.042)***	
$lnDPRV_j$		.050(.032)	
$lnDBSV_j$		-.024(.031)	
$lnDWMV_j$		-.041(.031)	
$lnDCBV_j$		.057(.029)*	
$lnDFRV_j$	.578(.417)		
$lnDFFV_j$	-.374(.411)		
$lnWRV_j$	.189(.141)		
VF_j	-.004(.079)	.073(.040)*	.249(.221)
Farm inputs			
$lnHL_i$	-.035(.009)***		
$lnOML_l$	-.080(.012) ***		
$lnHML_i$	.008(.020)		
$lnSE_i$	.359(.075) ***		
$lnIP_i$	.174(.080) **		
$lnFR_i$	-.067(.023)**		
$lnIC_i$	-.095(.016) ***		
$lnLR_i$	-.003(.022)		
$lnRL_i$	.016(.014)		
$lnMEF_i$	-.075(.030)**		
Constant	6.13(1.26) ***	.531(.265)**	4.39(1.47) ***
Number of Observation (N) = 224			
R- squared	0.675	0.402	0.914
Chi-2	514.73	151.91	2477.08
(p-value)	(0.00)	(0.00)	(0.00)

Source: Self Estimate based on Field Survey Data, June- August, 2019
Notes: *** p < 0.01; ** p < 0.05, *p <0.10. Figures in the parenthesis are the Standard Error.

Present results are consistent with findings of Rozelle *et al*. (1999), Kirimi and Sindi (2006), Tuladhar *et al*. (2014) who reported presence of inverse relationship between outmigration of labourer from domestic agriculture and crop income of the farm household. Such finding supports the predictions of NELM theory, that migration is associated with lost-labour effects and remittances loosen capital constraints on farm production in general. Hence, remittances enhance crop income and migration reduced crop income of the household in the study area.

The positive significant coefficient of household size implies income from domestic agriculture was higher among the larger size families which may be because of the fact that larger families normally have larger army of labourer assisting domestic agriculture which can complement output and income, of course not ignoring the possibility of disguised unemployment. The land per capita has been found to have positive significant association with crop income of the farm household. In general, an increase the land holdings, normally anticipated to increase crop income. The, large land size of land holding has helped the farm households in the study area to produce more crops which enhanced their income. The value of asset holding of the household found to have significant positive association with farm income of the sampled households. Thus, households with more members engaged domestic in agriculture, higher land per capita and asset holdings managed to earn larger crop revenue in the study area. The statistically significant and positive elasticity of seeds, insecticides and pesticides implies that incremental use of these inputs has helped the farm household in generating higher earnings from crop sale. However, negative and significant coefficient of hired labourers, own machinery labour, fertilizer, irrigation charges, and other explicit cost occurred in

farming signifies that crop income seen to inversely associated with incremental use of these inputs across the sampled farm households in the study area. Probable explanation may be migration of family labourer increases the dependency on hired labour there by raising the total cost of cultivation and lowering the FBI. In addition, the own machinery labour such as cost of maintaining water pump, tractor, electric motor etc. has negative and significant relationship with crop income among the sampled farm household of present study. This may be because of higher expenditure in own machinery lowering the farm income in the study area. Furthermore, cost of fertilizers, irrigation, land revenue and others explicit cost occurred during the time of farming has also significant and inversely associated with FBI. The incremental use of these inputs might be lowered FBI among the sampled households.

With reference to the estimated coefficient of determinants of migration in the study area it has been observed that the coefficient of household size, total value of assets, information network dummy, distance to commercial bank from village, and flood dummy have turned out to be positively significant. Thus, farm household with larger family size, greater amount of asset holding are few non categorical factors positively influencing migration of labourer outside domestic agriculture in the study area, while information networking, distance to commercial bank and threat of flood in village are categorical factors encouraging outmigration of unskilled labourer from domestic agriculture in the study area (see Table 3.9 and 3.10).

Probable explanation for such findings could be the fact that families with larger family members has less difficulty in releasing the additional unskilled family members engaged in domestic agriculture for their engagement in gainful and remunerative occupation

outside domestic agriculture. Interestingly, information networking by a predecessor migrant has signaling possible vacancy of job has played an important role in pulling the unskilled labourer of the farm household to migrate outside agriculture in non-farm activities for financial security in the study area. The distances of commercial bank to village have significantly induced labourer migration from agriculture. Under the present wave of financial inclusion via no-frill account and improved financial literacy among member of households in rural areas as allowing the unskilled members to apply for small loan; which might be motivated them engaging in self employment activity such as grocery store, vegetables store, hardware store, rice mill, electronic repairing shop etc. The crop damage caused by flood forced the unskilled member of the farm household to migrate outside domestic agriculture as per estimated regression result for the sampled households in the study area. However, aggregate family income from all sources seen to have significant inverse relationship with occupational migration outside agriculture. Families with larger farm size earning higher income managed to maintain a decent standard of living thereby able to retain their family member in indigenous farming activities.

Taking account of determinants of remittances obtained from simultaneous estimation of system equations as in Table 3.9 and 3.10 reveals that coefficient of number of migrants, number of dependent and age of migrant has turned out positive and significant relationship with remittances. Thus, age of the migrant, large number dependents and larger army of family out-migrant from domestic agriculture contributed towards higher inflow of remittances across farm households. Remittance is the cost of migration, when a family labour has occupationally migrated outsides agriculture, family has lost its

labour and received remittances as a compensation of lost labour. The estimated results reflect that outmigration of an additional member from domestic agriculture increased the inflow of remittances by 4.06 percentage points while remittances stimulate crop income by 0.02 percentage points in the study area (see Table 3.9). In addition, coefficient of number of dependents has turned out positive and significantly related to inflow of remittance; which might be due to the fact that larger the number of dependent the higher will be the cost of living thereby urging the unskilled migrant labourer to remit more money for family. As per estimated regression results, increased service experience with age of labourer, enhances the skills and capabilities of labourer which allowing them in earning higher salaries and enabling them in sending greater amount of remittances towards their family member. However, value of assets across the sampled farm household found to have significant inverse relationship with the amount inflow of remittances towards the farm households in the study area. The possible reason behind such result may be due to the fact that rich households rely less on remittances from migrant, allowing them higher propensity to save with less to remit towards their family.

3.2.2 Impact of Migration, Remittances on Self Employment, and Others Income

With reference to the simultaneous regression model as fitted in equation (xvii) to (xix) in chapter I of this dissertation which has been simultaneously estimated the determinants of self employment income, migration of unskilled labourer and remittances using three stage least square (3SLS) method, the results being reported in Table 3.10. The results reflect that the coefficient of household size, total assets value, distances of village to pucca road and flood threat has turned out to be significant with positive elasticity.

Hence, an increment in such factors complemented towards higher self employment earnings of the farm households in the study area.

Some of the sources of self employment income include income from poultry, animal husbandry, income from agriculture other than paddy farming and trade and business income. As per estimated results it was found that outmigration of labourer from domestic agriculture reduced the self employment income by 11.27 percentage points. Although, remittance has increased self employment income by 0.09 percentage point, but it has not been found to be significant. The coefficient of total assets value has turned out to be positively elastic and significantly related with self employment income. The reason behind that may be the fact that an increase the number of assets such as water pump, power tiller, tractors and commercial vehicles etc. boosted self employment income of the households.

Similarly, the village infrastructures play an important role for development of village economy. Distances to pucca road from village has positive and significantly related to self employment income. Better access of pucca road to a village helped in raising self employment income of the households by reducing the transportation cost and by facilitating the farm households to open new trade and business as a result. Surprisingly, the threat of flood in the villages has found to be positive and significantly associated with self employment income. This may be due to the fact that vulnerability of flood decreases the crop income in the villages and people may diversify their income toward the self employment activities including trade and business, poultry and animal husbandry for their livelihood.

Table: 3.10 Determinants of migration, remittances and their effects on self employment, and others income

Variables/ Constant/others	Self employment income	Others income	Migration	Remittances
Farm Characteristics and Enabling Factors				
lnM_i	-11.27(2.85) ***	-12.81(3.32) ***		4.06(.796) ***
lnR_i	.093(.078)	.313(.091)***		
$lnHS_i$	3.21(1.55)*	4.37(1.80)**	.236(.072) ***	-.383(.524)
$lnND_i$	-2.14(.944)**	-1.27(1.09)	-.046(.043)	.707(.327)**
$lnAG^2$	-.870(.726)	.856(.844)		
$lnYS_i$	.947(.596)	.859(.692)	-.013(.025)	-.033(.187)
$lnLC_i$	-.049(.894)	1.54(1.03)	.061(.045)	.427(.303)
$lnTAV_i$	1.68(.376) ***	-.321(.437)	.107(.018) ***	-.342(.122) ***
$lnFY_i$			-.184(.024) ***	
$lnYSM_q$			.001(.061)	.215(.451)
$lnAGM_q$			.013(.044)	2.96(.331) ***
D			.144(.042) ***	
$lnDPRV_j$	2.09(.732) **	-.008(.859)	.050(.032)	
$lnDBSV_j$	-.964(.677)	1.16(.794)	-.024(.031)	
$lnDWMV_j$	.238(.714)	-2.05(.839)**	-.041(.031)	
$lnDCBV_j$	-.441(.668)	1.46(.784)*	.057(.029)*	
$lnWRV_j$	.322(1.25)	1.19(1.46)		
VF_j	3.24(.880) ***	-1.11(1.03)	.073(.040) *	.249(.211)
Constant	- 9.28(7.55)	-2.17(8.79)	.531(.265)**	4.39(1.47) ***
Number of Observation (N) = 224				
R- squared	0.109	-0.139	0.402	0.914
Chi-2	88.12	28.31	151.91	2477.08
(p-value)	(0.000)	(0.008)	(0.000)	(0000)

Source: Self Estimate based on Field Survey Data, June- August, 2019

Notes: *** p < 0.01; ** p < 0.05, *p <0.10. Figures in the parenthesis are the Standard Error

The income from other sources of the farm household includes income from wage work, government benefit including money and goods and others income (selling of betel nut, fruits etc). With reference to the simultaneous regression model as fitted in equation (xx) to (xxii) in chapter I of this dissertation which has been simultaneously estimated the determinants of others income, migration and remittances using three stage least square (3SLS) method, the results being reported in Table 3.10. The results reflect that the coefficient of remittances, household size and distance of commercial bank to village has

positive and significant association with wage and others income while their relationship with migration has been found to be significantly negative (see Table 3.10). Such result may be because of the fact that occupational migration of unskilled labourer outside domestic agriculture has contributed towards decrease in number of wage earner of family thereby reducing others income of family though remittance helped in increasing in the form of wage and other incomes.

3.3. Conclusion

Present chapter made an attempt to analysis of descriptive statistics, it has indicated that majority of the sample households are general caste and belonging to Muslim community. Moreover, average age and years of schooling of household head has found about 49 years and 7 years respectively; likewise, average sampled farm households have consisted of about 7 members. Agriculture in the source areas were dominated mostly by male farmers with their average land holding was 1.45 hectare however; it seemed that households with no experienced of occupational migration labourers outside agriculture have occupied more plot of land relative those households where such migration took place. Again, it has evidenced that average total revenue across sampled households was almost INR 80,000; similarly, average cost of cultivation (A_2+FL) was higher in households where occupational migration outside agriculture took place in source area. With looked at farm business income (FBI_2 and FBI_4) excluding the value imputed family labourer, it has observed that households with experienced of occupational migration were acquired higher crop income than those households with no such migration. But if considered farm business income (FBI_3 and FBI_6) by taking value of imputed labourers it has noticed households had no experienced of occupational

migration of labourer outside agriculture were earned more FBI than those households where such migration took place. However, take into account total family income; it has seemed that households with no occupational migration outsides agriculture were richer than those households where such migration exists.

It has been observed that mostly unmarried male family member of sampled households has been occupationally migrated outsides agriculture for most of reasons with priority basis in order of rank such as small land holding as major reason, followed by better employment opportunity and higher wages in nonfarm sector, seasonal nature of farming, large family size in descending order of rank. Interestingly, it has been noticed that out migrants from farm households in descending order of rank mostly engaged themselves as daily wage earners in destination, engaged in personal business, services (private and government school teachers, driver, security guard, forest guard, home guard), mason, carpenter and many others profession to earned money for their livelihood. On an average, migrant families in study area have received INR 79,000 as remittances from migrant during the farming seasons but it has been noticed that major proportion of remittance has invested in household daily consumption expenses then farm production activities respectively; however, they have least utilized in the head of purchasing of homestead land.

Notably, from the empirical analysis of section 3.2, it has been concluded that the transfer of labour resulting from occupational migration of unskilled labourer outside domestic agriculture has negatively influenced the farm income of the household though its influence has not been found to be negative on crop yield. However, migration of unskilled labourers outside domestic agriculture seems to have inversely related with self

employment income and others income in the study area. The estimated results provide evidence that inflow of remittances sent by the unskilled migrant labourer partially compensate for this lost labour effects, contributing to household incomes directly and indirectly by stimulating crop production or crop income. Again, the results also supported that remittances directly and positively influenced self employment income and others income across households. Such findings in the study offer evidences in support of the NELM theory that remittances loosen constraints on production in the imperfect labour market characterizing rural areas in developing countries.

Chapter IV

Findings and Conclusion of the Study

Present study was undertaken with twine objectives in mind. The first objective was to understand the inter district employment pattern in agriculture and non agricultural sector in Assam. The study also made an attempt to examine the factor determining occupational migration of unskilled labourer outside domestic agriculture and its impact on farm business income. The major finding of the study has been covered in two broad sections. The section 4.1, covered discussion on inter district employment pattern in agricultural and non-agricultural sector of Assam, the chapter also elaborates the inter district wage differential between farm and non farm sector of Assam. An attempt also has been made in this chapter to analyse the real wage differential between MGNREGA and agricultural laboureres in Assam. The section 4.2 has been sub divided into two sub sections, section 4.2.1 has summarized socio-demographic characteristics of farm household, FBI and expenditure on farm input, income from self employed and other sources, remittances utilization pattern of farm households besides factors determining occupational migration. The section 4.2.2 made an attempt to jointly determine factors influencing migration, remittances and their impact on FBI, self employment and others income of the farm households in the study area. The limitation and thrust areas for future research are covered in section 4.3 of this chapter.

4.1 Inter District Employment Pattern and Wage Rate in Farm and Nonfarm Sector of Assam

Analyses of census data (1991, 2001 and 2011) at disaggregate level reveals that the share of agricultural labourer in total workforce has gradually decreased in Assam while

that in non agricultural sector has steadily increased during the last three decades. All the districts in the state have witnessed an inverse trend in labour employment in agriculture and non agriculture sector during the last three censuses. Notably, it has noticed that among the district of Assam, Nalbari district was experienced highest fall the share of agriculture labourer in total workforce then followed by Bongaigaon district respectively; though lowest fall of agricultural workforce in total workforce has found in Dima Hasao district in last three censuses. Moreover, the share of non agricultural workforce in total workforce has found highest in Kamrup (M) district then followed by Cachar district respectively in last three censuses; however, Dhemaji district has found least share of non agricultural workforce in total workforce among the district of Assam in last three censuses.

Though agricultural labour share has marginally increased within agricultural workforce but share of cultivators has rapidly decreased in the state in last three censuses. Notably, share of cultivator in agricultural workforce among the districts of Assam has found highest fall in Darrang district then followed by Morigaon district respectively; however, lowest fall has been found in Dima Hasao district in last three censuses. Even though, the share of agricultural labourer in agricultural workforce among the districts of Assam in last three censuses has found highest increased in Darrang district then followed by Morigaon district, however, lowest increased appeared in Kokrajhar district. Interestingly, present study has found evidenced that the rapid increase in nominal wage rate in nonfarm profession such as carpentry, blacksmith compared with agricultural sectors in the state may be the reason for such findings.

Though, several studies have traced MGNREGA to some extent responsible for transfer of labourer from agriculture to nonfarm engagements in rural areas of the country. The findings of present study suggest that MGNREGA cannot be blamed for outmigration of labourer from domestic agriculture. From the present study it has been found that share of employment demanded with job cards have decelerated over the years in Assam; in addition, the real wage rate of agricultural labourers has remained higher than MGNREGA workers in the state since the inception of MGNREGA. Interestingly present study found that wage rate for agricultural labourer has gradually increased since the inception of MGNREGA in Assam.

4.2 Socio-Economic, Demographic Status and Determinants of Migration, Remittances, Incomes of Farm Households

4.2.1 Socio-Economic and Demographic Status of Farm Households

The analysis of socio-economic and demographic characteristics of the sampled farm households in the study area has been covered in this section**.**

Present study has observed that majority of the sample households are general caste and belonging to Muslim community. Moreover, average age and years of schooling of household head has found about 49 years and 7 years respectively; likewise, average sampled farm households have consisted about to 7 members. Interestingly, agriculture in the source areas were dominated mostly by male farmers with their average land holding was 1.45 hectare, however; it seemed that households with no experienced of occupational migration of labourers outside domestic agriculture have occupied more plot of land relative those households where such migration took place. Notably, present study has found evidenced that farm business income of the households with no experienced of

occupational migration outside domestic agriculture has statistically and significantly higher than those households where such case of migration has been reported. However, take into account total family income; it has observed that households with no occupational migration outsides agriculture were richer than those households where such migration exists.

Form the analysis of qualitative data it has been noticed that mostly unmarried male family member of sampled households has occupationally migrated outsides agriculture for most of reasons with priority basis in order of rank such as small land holding as major reason, followed by better employment opportunity and higher wages in nonfarm sector, seasonal nature of farming, large family size in descending order of rank. Interestingly, it has been noticed that out migrants from farm households in descending order of rank mostly engaged themselves as daily wage earners in destination, engaged in personal business, services (private and government school teachers, driver, security guard, forest guard, home guard), mason, carpenter and many others profession to earned money for their livelihood. The average amount of remittances has received by the farm household experiencing migration of family member outside agriculture being found to be INR 79,000 during the farming seasons. The farm households in the study area seen to utilized major proportion of remittance in their household daily consumption expenses then farm production activities respectively; however, they have least utilized in the head of purchasing of homestead land.

4.2.2 Determinants of Migration, Remittances and its Impact on Farmer's Incomes

This section made an attempt to jointly determine factors influencing migration, remittances and their impact on FBI, self employment and others income of the farm

households in the study area. It has been observed that household size, total value of assets, information networking encouraged migration, distance of commercial bank from the village, and exposure to flood threat in village has significantly influenced the unskilled labourer of farm household to migrate outside domestic agricultural works while the number of migrant, number of dependents of the farm household and age of the migrant have significantly influenced inflow of remittances towards the sampled farm household in the study area.

In line with the NELM theory present study has found that migration of unskilled labourer outside domestic agriculture has negatively influenced the farm business income of the household though its influence has not been found to be negative on crop yield. Consistently, migration of unskilled labourer outside domestic agriculture also found to have significant inverse association with self employment and others income across the sampled households in the study area. The study provided evidence that inflow of remittances sent by the unskilled migrant labourer partially compensate for the lost labour effects, contributing to household incomes directly and indirectly by stimulating crop production or crop income. The study also established that remittances sent the unskilled migrant outside domestic agriculture has positive significant influence on self employment and others income across sampled households.

4.3 Research Limitations and Thrust of Future Research

One of the major drawback of the present study is that focus on single crop (Paddy). The study also restricted geographically only in two contiguous districts of Assam with a sample of 224 farm households only. Resource and time constrained the researcher in collection of longitudinal data with revisit to the farm household before and after

migration of the unskilled on household agricultural output and farm income. Future research should be mindful of the above limitations with thrust in collection of longitudinal information about impact of migration and remittances on farm income from a larger set of crop cultivation for larger sample of farmer in geographically non-contiguous districts of Assam.

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APPENDIX

Appendix: A Determinants of migration and remittances and their effects on households FBI (2SLS)

Variables/ Constant /others	Crop Income	Migration	Remittances
Farm Characteristics and Enabling Factors			
lnM_i	-.668 (.296)**		3.77(.819)***
lnR_i	.015(.007)**		
$lnHS$	1.148(.187) ***	.234(.075) ***	-.350(.536)
$lnND$	-.154(.101)	-.041(.045)	.669(.335)**
$lnAG^2$	.044(.092)		
$lnYS_i$	-.001(.064)	.012(.026)	-.032(.191)
$lnLC_i$	.786(.115) ***	.058(.047)	.404(.310)
$lnTAV_i$	.095(.042)**	.106(.018) ***	-.326(.125) ***
$lnFY_i$		-.185(.025)***	
$lnYSM_q$		.022(.065)	.149(.463)
$lnAGM_q$		-.003(.047)	3.02(.331) ***
D		.160(.047)***	
$lnDPRV_j$		.041(.035)	
$lnDBSV_j$		-.015(.034)	
$lnDWMV_j$		-.040(.034)	
$lnDCBV_j$		.051(.032)	
$lnDFRV_j$	.590(.457)		
$lnDFFV_j$	-.381(.450)		
$lnWRV_j$	.206(.153)		
VF_j	-.022(.076)	.061(.043)	.254(.226)
Farm inputs			
$lnHL_i$	-.033(.009)***		
$lnOML_l$	-.082(.012) ***		
$lnHML_i$	.007(.022)		
$lnSE_i$	.329(.082) ***		
$lnIP_i$	.183(.087) **		
$lnFR_i$	-.069(.025)**		
$lnIC_i$	-.099(.018) ***		
$lnLR_i$	-.010(.022)		
$lnRL_i$	.014(.016)		
$lnMEF_i$	-.080(.033)**		
Constant	6.13(1.38) ***	.539(.279)*	4.15(1.51) ***
Number of Observation (N) = 224			
R- squared	0.677	0.403	0.916
F-Stat	20.01	10.09	262.69
(p-value)	(0.00)	(0.00)	(0.00)

Source: Self Estimate based on Field Survey Data, June- August, 2019

Notes: *** $p < 0.01$; ** $p < 0.05$, * $p < 0.10$. Figures in the parenthesis are the Standard Error

Appendix: B Determinants of migration, remittances and their effects on self employment, wage and others income (2SLS)

Variables/ Constant/others	Self employment income	Others income	Migration	Remittances
Farm Characteristics and Enabling Factors				
lnM_i	-11.89(2.97) ***	-13.20(3.42) ***		3.77(.819) ***
lnR_i	.094(.081)	.311(.094)***		
$lnHS_i$	3.38(1.55)**	4.68(1.86)**	.234(.075) ***	-.350(.536)
$lnND_i$	-2.21(.999)**	-1.47(1.15)	-.041(.045)	.669(.335)**
$lnAG^2$	-.174(.882)	1.51(1.01)		
$lnYS_i$	1.21(.635)*	1.17(.731)	-.012(.026)	-.032(.191)
$lnLC_i$	-.033(.927)	1.60(1.06)	.058(.047)	.404(.310)
$lnTAV_i$	1.62(.392) ***	-.417(.452)	.106(.018) ***	-.326(.125) ***
$lnFY_i$			-.185(.025) ***	
$lnYSM_q$			.022(.065)	.149(.463)
$lnAGM_q$			-.003(.047)	3.02(.331) ***
D			.160(.047) ***	
$lnDPRV_j$	2.12(.785)* **	-.051(.904)	.041(.035)	
$lnDBSV_j$	-.765(.796)	1.65(.916)*	-.015(.034)	
$lnDWMV_j$	-.011(.776)	-2.38(.893)**	-.040(.034)	
$lnDCBV_j$	-.276(.726)	1.48(.836)*	.051(.032)	
$lnWRV_j$	1.03(1.49)	2.43(1.72)		
VF_j	3.09(.880) ***	-1.46(1.11)	.061(.043)	.254(.226)
Constant	- 20.42(11.45)*	-20.51(13.19)	.539(.279)*	4.15(1.51) ***
Number of Observation (N) = 224				
R- squared	0.089	-0.143	0.402	0.914
F-Stat	5.50	2.18	151.91	2477.08
(p-value)	(0.000)	(0.007)	(0.000)	(0000)

Source: Self Estimate based on Field Survey Data, June- August, 2019

Notes: *** p < 0.01; ** p < 0.05, *p <0.10. Figures in the parenthesis are the Standard Error

Appendix: C Results of Endogeneity Test (Wu-Hausman)

Variable	Crop income	Self employment income	Others income
Migration	3.439 (0.0651)	17.37 (0.000)	16.48(0.000)
Remittances	0.0789 (0.789)	0.3732 (0.541)	0.745(0.389)

Figures in off bracket are Chi2 and p value in brackets. H_0= the variable is exogenous,

The Wu-Hausman test of endogeneity suggest the that migration and remittance are exogenous; however estimated results of migration have appeared as significant across the different income equation which has rejected the hypothesis, though remittance

coefficient reject the endogeneity as p value has turned out insignificant. Thus, due to endogeneity behavior of migration with different income equation suggest 3SLS is superior for the present dataset over 2SLS.

Appendix: D Summary statistics of different costs (in INR)

Variables	Non Migrant households (N=112)				Migrant households (N=112)				Total households (N=224)			
	Mean	S.D	Min	Max	Mean	S.D	Min	Max	Mean	S.D	Min	Max
HHL	21001.38	21908.3	0	150000	20365.18	16834.18	0	100000	20683.28	19495.4	0	150000
HBL	0	0	0	0	0	0	0	0	0	0	0	0
OBL	83.03	657.03	0	6300	58.92	455.30	0	4200	70.98	564.1	0	6300
OML	1084.82	2369.10	0	8500	1037.5	2306.16	0	10000	1061.16	2332.72	0	10000
HMC	7625	4991.76	0	30000	8084.82	4615.64	0	27000	7854.91	4802.12	0	30000
SE	928.57	775.22	150	5500	951.34	580.48	200	3500	939.95	683.37	150	5500
IP	829.01	940.83	0	6000	722.76	358.35	0	3500	775.89	712.28	0	6000
MA	0	0	0	0	0	0	0	0	0	0	0	0
FE	5508.48	4968.96	0	35000	4934.82	2992.43	0	20000	5221.65	4102.41	0	35000
DEP	89.28	944.91	0	10000	0	0	0	0	44.64	668.15	0	10000
IC	743.03	2122.99	0	10080	925.80	3500.86	0	20700	834.41	2890.04	0	20700
LR	140.04	146.28	0	1075	153.77	142.55	0	1000	146.90	144.27	0	1075
IWC	0	0	0	0	0	0	0	0	0	0	0	0
RPL	251.78	1620.08	0	14000	736.16	4496.93	0	42000	493.97	3381.01	0	42000
IFC	0	0	0	0	0	0	0	0	0	0	0	0
RVL	0	0	0	0	0	0	0	0	0	0	0	0
IVF	18964.11	12145.5	5250	67500	20264.51	11734	6250	50000	19614.31	11932.5	5250	67500
ME	3691.96	2630.38	0	20000	3825.89	2756.63	0	15000	3758.92	2689.03	0	20000

Source: Self Estimate based on Field Survey Data, June- August, 2019

Note: HHL= Hired human labour, HBL= Hired bullock labour, OBL= Own bullock labour, OML= Own machinery labour, HMC= Hired machinery charge, SE= Seeds, IP= Insecticides and Pesticide, MA= Manure, FE= Fertilizers, DEP= Depreciation on implements and farm building, IC= Irrigation charges, LR= Land revenue, cess and other taxes, IWC= Interest on working capital, RPL= Rent paid for leased in land, IFC= Interest on value of fixed capital assets(excluding land), RVL= Rental value of owned land, IVF= Imputed value of family labour in INR, ME= Miscellaneous expenses.