

**ECONOMICS OF AGRICULTURAL LABOUR
IN INDIA WITH SPECIAL REFERENCE TO
WEST BENGAL**

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Economics of Agricultural Labour in India with Special Reference to West Bengal submitted by me for the award of the Degree of Doctor of Philosophy in Arts at Jadavpur University is based upon my own work carried out under the Supervision of **Prof. Amit Kundu** and that neither this thesis nor any part of it has been submitted before for any degree or diploma anywhere/elsewhere.

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Dated:

Candidate:
Dated:

*This thesis is dedicated to my grandfather late
Mukunda Murari Das. My heartiest tribute to him for
his hardship, endurance and struggle for girls'
education throughout his life.*

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Executive Summary of the Thesis

Agriculture plays a crucial role in the development of the rural economy of developing countries like India. Besides contributing food safety to the nation, the agricultural sector is the largest sector in economic activity and creating employment for a major section of the population [Tripathi & Prasad (2010)]. Around 54.6% of labourers of the total rural workforce are engaged in the Indian agricultural sector [70th Round NSSO data (2013)]. These labourers are engaged on another person's land either for wages in cash or kind or the combination of cash and kind [Census of India (2001) & (2011)]. They are one of the socially and economically backward classes in India [Unni (1988)]. The availability of fewer numbers of working days, low real wage rate, marginalization of landholdings, higher incidence of poverty, and indebtedness are the key economic challenges of these labourers. In the background, the thesis aims to investigate four economic challenges such as declining employment participation rate in agriculture, gender wage discrimination, high incidence of Poverty, and low accessibility of institutional credit of the agricultural labour households in India with special reference to West Bengal. The first three chapters of the thesis deal with the introduction, literature review, and research objectives respectively.

Chapter-4 of the thesis – ‘Push and (or) Pull? Drivers of Labour Force Participation in Indian Agriculture’ will observe that the labour force participation rate in the Indian agricultural sector is gradually declining. According to NSSO surveys on the Employment and Unemployment Situation in India, the labour force participation rate in agriculture in India has been declined from 74.1% in 1993-94 (50th round) to 61.39% in 2011-12 (68th round). This trend in the agricultural labour market is observed both at the state level as well as the national level. The average growth of the labour force participation rate in the agricultural sector is highly negative in some states such as Himachal Pradesh, Kerala, J&K, Bihar, U.P, Punjab, and Orissa. Except in Gujarat, the remaining states also have faced a negative average growth rate of workforce participation in agriculture. This chapter, therefore, wants to investigate the possible causes of the declining labour force participation rate in agriculture. Here both possible push and pool factors behind this decline are considered simultaneously. Six rounds of state-level NSSO data on the Employment and Unemployment Survey of India during 1993-94 to 2011-12 and its 20 major states are considered for the study. Applying the fixed effect panel data regression technique after considering state-specific possible factors, it is found that the gradual decline of per capita land holdings is the major push factor responsible for the gradual decline of the

labour force participation rate in Indian agriculture. An increase in the agricultural wage rate reduces the employment opportunity in the farming sector which may ‘push’ poor labourers towards the non-farming sector. The higher education (secondary and above) among the agricultural labourers encourage them to ‘push’ from the farming sector to comparatively high-paid non-farm activities. On the contrary, employment opportunities in the construction sector ‘pull’ the unskilled, uneducated, or poor labourers towards the non-farm sector for an additional income in the slack season of agriculture to cope up with the risk and uncertainty in agricultural production. The hike of non-farm real wage and Self-employment within the non-agricultural sector are noted to be significant pull factors for the gradual decline of the labour force participation rate in Indian agriculture.

Chapter-5 of the thesis- ‘Gender Wage Gap in The Agricultural Labour Market of India: An Empirical Analysis’ will try to understand the changing scenario of gender wage discrimination in the agricultural labour market in 18 major Indian states over time. In our male-dominated rural society, there is a belief that male labourers are much more productive than female labourers. Based on this belief the female agricultural labourers are paid less than their male counterparts. By analyzing the various rounds data of Agricultural wage income (AWI) in India, the chapter observes that the gradual enhancement of the male-female wage gap among the agricultural labourers is in the states like Kerala, Tamil Nadu, Andhra Pradesh. In Jharkhand, Gujarat, Bihar, and Uttar Pradesh, the absolute gender wage gap is observed low over the years. Out of the eighteen states considered here, only in three states, i.e. in Bihar, Himachal Pradesh, and Rajasthan, the absolute gender wage gap has shown a declining trend over 2010-11 to 2015-16. Concisely, the study shows the prevalence of substantial variations of the gender wage gap across states during our period of analysis. In this context, there is a need to examine the possible factors which are responsible for reducing gender wage discrimination in the Indian agricultural labour market. The investigation is based on the secondary data available in ‘Agricultural wage income (AWI) in India, which is provided by the Directorate of Economics and Statistics (DES), Government of India. The chapter considers the period between 2010-11 to 2015-16 and 18 major states of India. The possible factors which can create an impact on the gender wage gap are the expansion of MGNREGP, Self Help Group, primary education among rural women, expenditure on the social sector as a percentage of net state domestic products, and the cropping intensity. It initially assumes that the Cropping Intensity of a state at a specific time is very much dependent on the net irrigated area of that state at that time. Our endogeneity test supports our claim. So, the Instrumental variable method

is applied in our Fixed Effect panel regression. The result shows that an expansion of education among rural women and their participation in self-help groups can enhance their empowerment and bargaining strength during the time of deciding the agricultural wage rate. Cropping intensity through the improvement of irrigation facilities is another vital instrument to minimize the gender wage gap in rural areas. This non-farm employment opportunity enhances the demand of female labourers which help them to bargain for better wage and sometimes similar wage rate of that the male agricultural labourers. It can reduce male and female wage discrimination in the agricultural labour market in India. But the participation of women in MGNREGP and social sector expenditure as a percentage of NSDP fails to create any impact on the gender wage gap.

Chapter-6 of the thesis- ‘Survey Design and Sample selection for the empirical study’ will be discussed in detail about the design of the sample survey and field investigation of the district of East Medinipur of West Bengal. In the district, Bhagawanpur block-1 was purposively selected as it is one of the economically backward blocks as well as the largest block of the East Medinipur district of West Bengal. Among the ten Gram Panchayats, we have randomly chosen two large Gram Panchayats: Mahammadpur-I and Mahammadpur-II. Out of 22 villages of these two GPs, nine villages were chosen randomly from those two Gram panchayats. Information on demographic profile, family details (information on education, health, and standard of living), occupational condition, details of family wealth, and credit accessibility of the formal and informal sector were collected per agricultural household. The field survey was conducted between April and May 2019. Therefore, our reference period for this field study was from April 2018 to March 2019. The total sample for this investigation is 405 agricultural labour households and they are divided into two categories-(i) 120 landless labourers and (ii) 285 marginal farmers who have possessed only their farming land within 0.5 hectares. Based on the primary survey data, Chapter-7 and Chapter-8 are examined the relationship between poverty, and employment diversification, and the role of the credit market on the livelihood of the agricultural labour households respectively.

Chapter-7 of the thesis- ‘Occupational Diversification as Livelihood Strategy among the Agricultural Labour Households of West Bengal, India’ will be observed that employment participation in agriculture as an agricultural labourer is not enough to generate a decent earning for their survival throughout the year. Hence, the household head participates or (and) more than one able-bodied household members participate in various skilled and unskilled diversified activities for their subsistence level of income. Based on the field-based

investigation of the Bhagawanpur block-1 of the district of East Midnapur of West Bengal, this chapter initially tries to investigate the possible decision-making variables influencing more than one earning member of an agricultural labour household. Probit regression shows that if the sample agricultural labour household has operational holding, then the possibility of a single earning member of that household is much higher. But if the household head is aged and (or) the female member has taken loans from SHG for income-generating activity and (or) if any household member except the main earning member has some technical skill, then we observe multiple earning members among the agricultural labour households. The chapter then examines the role of occupational diversification as a livelihood strategy among the agricultural labour households of West Bengal to reduce their incidence of poverty. For this investigation, initially, the Simpson Diversification index and the Berry Diversification Index related to occupational diversification are calculated. Then the poverty status among the households is determined by calculating adult equivalent monthly per capita consumption expenditure. Using Probit regression with the instrumental variable analysis, the study confirms that the possibility to keep an agricultural labour household above the poverty line if more than one adult member of that household participates in different types of occupations throughout the year. The result further shows that the participation of household head in different occupations in the entire reference period apart from working as an agricultural labourer reduces the possibility of poverty of that household. The higher operational land and accessibility of self-help group loans for an income-generating activity of female member(s) of the household are another two key factors to play an important role to keep an agricultural labour household above the poverty line. On the contrary, the dependency ratio of the family, non-income generating loans from SHG, and the dependency of the informal loans are likely to enhance the possibility of the households falling into a high incidence of poverty.

Chapter-8 of the thesis- 'Accessibility of institutional credit among the agricultural labour households and its impact on their livelihood' will be addressed where it is observed that despite the major structural changes in the Indian credit system, landless and near landless agricultural labour households are still facing difficulties while accessing formal credit services [Kumar, Singh, and Sinha (2010)]. The Reserve Bank of India shows that the growth rate of agricultural credit was 3.8 percent in 2017-18, against 12.4 percent in 2016-17 [RBI (2018)]. The dependency of non-institutional credit has been increased from 36 percent in 1990-91 to 44 percent in 2012-13 [NSSO (2013)]. In this context, Chapter-8 tries to examine the possible factors influencing the accessibility of institutional credit factors which can increase the

probability of accessing the formal credit of the agricultural labour households. The study is based on a village-level field investigation in the district of East Medinipur, West Bengal. Probit regression analysis shows that the agricultural labour households belonging to backward classes (SC, ST, and OBC) have less possibility of receiving institutional credit than the general caste agricultural labour households. Land ownership enhances the possibility of getting institutional credit among agricultural labour households. The study also confirms that the membership of SHG, diversified farm and non-farm income, and higher financial literacy index are the significant determinants to increase the probability of institutional credit for these households. Using the two-stage least square method the study then investigates the role of institutional credit on the livelihood (or monthly per capita income) of poor households. It is observed that the monthly per capita income of the agricultural labour households can increase if they use institutional and non-institutional sources of loans in income-generating activities. A greater number of family labourers engaging in agriculture and its allied activities can enhance the monthly per capita income. The study also suggests that the younger age of the household head and the less dependency on the informal credits for consumption purposes of the households increases the possibility of improving the livelihood of the agricultural labour households.

Chapter-9 summarizes the major findings of the thesis and draws the concluding remark. Lastly, Chapter-10 suggests some possible policy recommendations for attaining livelihood security of the agricultural labour households by reducing financial risks and vulnerability.

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Chapter 1- Introduction

Chapter 1- Introduction

The role of agriculture is enormous in the context of the Indian economy. Although the share of agriculture in Gross Domestic Product (GDP) has been declining, agriculture and its allied sectors¹ (such as forestry and fishing) still provide 13.9 percent of GDP (at 2004-05 prices) in 2013-14 and about 11% of India's exports [FICCI (2015)]. Nearly 50 percent of the Indian population depend on agriculture for their livelihood [Periodic Labour Force Survey (PLFS) (2018-19)]. According to Schultz (1980), "most of the world's poor people earn their living from agriculture, so if we knew the economics of agriculture, we would know much of the economics of being poor." Among the rural workers, agricultural wage earners are the most vulnerable sections of the rural population [Dasgupta and Ray (1986)]. They are characterized by unorganized, less-educated, possessed low bargaining power, and little or no social protection. As these labourers are unskilled or less skilled and abundant in the supply of the agricultural labour market, their number of working days during a year is highly irregular. Sometimes monthly wage income of these agricultural labourers falls below the subsistence level of income and, more than 70 percent of their income is spent on food [ILO report (September 23, 1996)]. Due to low levels of education, landlessness, and lack of bargaining power, they are less privileged in employment participation in the labour market [Dasgupta and Ray (1986) & Unni (1988)].

1.1 Definition of Agricultural labourers

As per the first Agricultural Labour Enquiry Committee (1950-51), the agricultural labourers are mostly dependent on wages for raising crops and worked on another person's land and at least 50 percent of their total person-days for payment is in terms of wages or (and) kind comes due to working in agricultural operation. These labourers are classified into attached labourers² and casual labourers³. Casual labourers are again divided into small farmers⁴, landless labourers⁵, tenants⁶ and sharecroppers⁷. Besides wage employment in the farming sector,

¹ The Allied sector of agriculture is not included mining and quarrying.

² These labourers are attached to another farmer's household based on a written or oral agreement.

³ The labourers have received payment of daily wages after working on another person's land.

⁴ These farmers possess a tiny amount of land and a major part of their earnings come from working on another person's land.

⁵ They are completely dependent on another's land for their payment in terms of wages and (or) kind on daily basis.

⁶ They take leased-in land for cultivation as well as work on the land of others.

⁷ They are also working as agricultural labourers.

agricultural labourers must engage in allied activities such as animal husbandry, dairy, poultry, and piggery for earning their income [Second Agricultural Labour Enquiry Committee (1956-57)].

According to Rural Labour Enquiry Report [55th Round of National Sample Survey (NSS) (1999-2000)], a person considered as an agricultural labourer if anyone engaged in one or more agricultural occupations as a hired labourer is paid wholly in cash or kind or partly in cash and partly in kind. These occupations are (a) farming including cultivation, tillage, etc. (b) dairy farming (c) production, cultivation, growing, and harvesting of any horticultural commodity (d) raising of livestock, bee-keeping, or poultry farming (e) any practice performed on a farm as incidental to or in conjunction with farm operations (including any forestry or timbering and the preparation for market and delivery to storage or to market or to carriage for transportation to market of farm products). The agricultural labourers are generally engaged on the agricultural land owned by others either for wages in money or kind or the combination of money and kind [Census of India (2001) & (2011)]. Again, the 70th Round NSS (2013) defined the agricultural labour households who earn more than Rs 3000 from any agricultural activities such as the cultivation of field crops, horticultural crops, fodder crops, plantation, animal husbandry, poultry, fishery, piggery, bee-keeping, vermiculture, sericulture, etc. and having at least one member self-employed in agriculture either in the principal status or in subsidiary status during last 365 days.

In the thesis, we have focused only on the two types of agricultural labourers who prevail in the Indian labour market – one is pure wage earners who are suffering from landlessness or near landlessness and their major part of income in terms of wage payment comes from working on another person's land. Others are marginal farmers who cultivate a small amount of land as well as supplied themselves as the hired agricultural labourers to supplement their income [Bardhan (1973)].

1.2 Scenario of agricultural labourers in West Bengal and India

As per the Census of India (2011), out of the 1.21 crore population, 86.16 crore agricultural labourers are engaged in agriculture as a hired labourer on another person's land. Nearly 14.44 crore (around 12 percent) labourers out of 86.16 crore agricultural labourers have not possessed any operational landholdings. Table-1.1 provides the distribution of the agricultural labourers of total working population and growth of agricultural labourers in West Bengal as well as India.

Table 1.1 Distribution of the agricultural labourers of total working population and decadal growth of agricultural labourers in West Bengal and India

	West Bengal			India		
Total population & workers (in Millions)	2001	2011	Decadal growth (in Millions)	2001	2011	Decadal Growth Rate (in Millions)
Total Population	80.18	91.27	13.84	1,028.6	1,210.6	17.72
Workers	29.48	34.76	17.89	402.2	481.7	19.77
(% of total population)	(36.77%)	(38.08%)		(39.10%)	(39.79%)	
Cultivators	5.59	4.95	-11.34	127.3	118.7	-6.77
(% of total workers)	(18.94%)	(14.24%)		(31.65%)	(24.64%)	
Agricultural labourers (% of total workers)	7.24 (24.56%)	9.84 (28.32%)	35.95	106.8 (26.55%)	144.3 (29.66%)	35.17

Source: Census 2001, 2011 & Gupta, N. (2016).

In the Indian agricultural labour market scenario, Table-1.1 clearly shows that cultivators of the total working population have decreased from 31.65 percent to 24.64 percent, whereas, the agricultural labourers of the total working population have increased from 26.55 percent to 29.66 percent in the period between 2001 and 2011 [Census of India (2001, 2011)]. The growth rate of agricultural labourers in India has increased by 35.17 percent during this period. These labourers are resource-poor and not organized like industrial workers [Karan, Selvaraj (2008)]. Their subsistence wages are insufficient to get free from absolute poverty and malnutrition [Leibenstein (1957)]. The challenges such as marginalization of possessing land, stagnant job opportunities in agriculture, high gender wage gap, the incidence of poverty, and indebtedness are continued to be a cause of severe concern for the livelihood of agricultural labour households in India [Haque.T (2010)]. Some of their key economic challenges are discussed below.

1.2.1 Increasing marginalization of landholding

As per various rounds of Agricultural Census data, the number of marginal operational holdings (less than 1 hectare) has increased from 36.2 million in 1970–71 to 92.3 million in 2010–11 [Gupta (2016)]. Availability of a fixed factor (land) in agricultural productivity constraints the capacity of the farming sector to absorb the growing rural labour force [Foster & Rosenzweig (2007)]. The NSSO survey [70th round of Situation Assessment Survey of Agricultural Households (January – December 2013)] reveals that 56 percent of the agricultural

labourers possessed less than 0.01 hectare of land, which is far below the requirement to maintain a decent standard of living. Table-1.2 shows the percentage of agricultural households by size class of land possessed (hectare) of West Bengal (W.B.) and India during 1999-00 to 2011-12.

Table 1.2 Percentage of agricultural households by size of land cultivated (Hectare)

Possession of Landholdings	Percentage of rural households							
	1999-00		2004-05		2009-10		2011-12	
	W.B.	India	W.B.	India	W.B.	India	W.B.	India
Up to 0.40	77.7	58.9	74.3	58.3	86.1	62.5	86.7	63.5
0.41-1.00	14.3	18.9	17.9	18.6	10.4	17.3	9.8	16.7
1.01-2.00	5.7	11.2	6	12	2.8	10.3	2.8	10.9
2.01-4.00	1.9	7.1	1.6	7.5	0.6	6.9	0.6	6.3
4.01 & Above	0.4	3.9	0.2	3.6	0.1	3	0.1	2.6
All	100	100	100	100	100	100	100	100

Source: Different rounds of NSSO Survey of Employment and Unemployment Situation

Table-1.2 describes that country's marginalization of landholdings has increased from 58.9 percent to 63.5 percent of households who possessed up to 0.40-hectare land during the period between 1999-00 and 2011-12. Land fragmentation of Indian agriculture is very high due to imposition of ceiling on land owned, increasing rate of growing population, inheritance laws that an equal division of property among sons and daughters [Sharma, V. P. (2007)]. This high concentration of landlessness and marginalization of possessing land is not only a severe concern for poor livelihood but also hindered the economic stability in rural India [Haque (2008)].

1.2.2 Declining share of employment in farm sector of total rural workforce in India

Based on different rounds of NSSO surveys on the Employment and Unemployment Situation in India, it is observed that the labour force participation rate⁸ in agriculture has declined from 74.1% to 61.39% between 1993-94 and 2011-12. In West Bengal, it has declined from 64.7% to 58.74% during this period. The imbalance between the total number of labourers and the new work opportunities created in the agricultural sector has been increasing over the years. The immense portion of farmers want to move out of agriculture due to inadequate earnings,

⁸ The labour force participation rate is calculated by expressing the number of persons in the labour force as a percentage of the working-age population. The labour force is the sum of the number of persons employed and the number of persons unemployed [The 19th International Conference of Labour Statisticians, Geneva (October 2013)].

high input-output prices, and the vulnerability to food grain price fluctuations in domestic and international markets [Shah (2006)].

1.2.3 High Gender wage gap among the agricultural labourers

The gender wage gap, biased against female wage under similar productive work, can have a grave implication for society in form of poverty, social injustice, and vulnerability of female farm labourers. The number of female labourers has been increasing at a faster rate from 38.9 % to 41.1% (compared to an increase in male labourers from 26.6% to 29.7%) between 2001 and 2011. Despite the higher female labour participation as the hired labourers, gender wage disparity is high in the Indian agricultural labour market. It is observed that the female labourers are more dependent on agriculture for their livelihood, and hence they are bound to be more dedicated and productive towards their work [Mencher and Saradamoni (1982)]. The daily average wage income of female labourers is less than Rs. 250 per worker per day, and the number of days of their employment is less than 100 days in a calendar year [Agricultural wages of India (2015-16)]. The all India annual average daily wage rates for males and females are Rs. 147.91 and Rs. 115.02 in 2010-11 and Rs. 281 and Rs. 218 in 2015-16 respectively. In West Bengal the average daily male wage has increased from Rs. 130.04 to Rs 259.40; whereas, the wage of the female workers has increased from Rs.110.14 to Rs. 219.18 in the year between 2010-11 and 2015-16 [Several rounds of Agricultural Wages of India (AWI)]. Even if for the same category of work, the gender wage variation among the agricultural labourers is observed significant across major states of India. Without the ownership of any land, female labourers are not able to get any access to institutional sources of credit or taken any agriculture-related training, or purchased any inputs to the production. Moreover, due to lack of proper organization, less awareness of rights, and a low level of education, more than 90 percent of the rural females are treated as a cheap and secondary source of labourers [Javeed & Manuhaar (2013)].

1.2.4 High level of Poverty among the agricultural labour households

The principal source of livelihood of the agricultural labour households is wage employment. Though the concentration of poverty at the national level has significantly reduced from 50.1% to 20.7% between 1993-94 and 2011-12, the agricultural labour force is yet to cope-up to improve their livelihood [Bardhan (1989), Poverty Estimates (2011-12) & Planning Commission, GoI. (July 2013)]. High levels of poverty incidence, limited employment opportunities, and poor wage rates have encouraged agricultural labourers to look for alternate sources of income in several non-farming activities during the off-farm seasons to compensate

for their income deficit. Although rural non-farm employment opportunities in the informal sector are low productive with low wage rate, employment diversification towards non-farm sectors are gradually becoming the primary source of earnings for agricultural labourers [Reddy, (2014)].

1.2.5 Limited accessibility of institutional credit

Accessibility of institutional credit especially, among poor households, is crucial for fulfilling critical needs, financing income-generating activities, and improving their economic well-being [Bhattacharjee & et al. (2009)]. Since 1991 a large number of institutional financial services including, agricultural credit programmes such as Self-Help Group-Bank linkage program (1992), Kisan Credit Cards (1998-99), Doubling Agricultural Credit program (2004), Financial Inclusion Programme (2005), Interest Subvention Scheme (2006-07), Agricultural Debt Waiver and Debt Relief Scheme (2008), Swabhiman Scheme (2011), Jan Dhan Yojana (2014) have been launched to increase the flow of credit in rural India.

Despite the major structural changes in the Indian credit system, agricultural labour households, such as landless labour households, are still deprived of having institutional credits as they do not possess land or any other collateral which has any market value [Kumar, Singh, and Sinha (2010)]. The RBI shows that the growth rate of agricultural credit was 3.8 percent in 2017-18, against 12.4 percent in 2016-17 [Reserve Bank of India (2018)]. Due to the inadequate institutional credit services, the non-institutional credit services continue to play a key role in the delivery of credit to rural households, especially, to the marginal farmers and landless labourers [Kumar, Singh and, Kumar (2007)]. The dependency of rural non-institutional credit has been increased from 36 percent in 1990-91 to 44 percent in 2012-13 [All India Debt & Investment Surveys, NSSO (2013)]. Table-1.3 represents the share of institutional and non-institutional loans based on the possession of landholdings.

Table 1.3 Percentage distribution of outstanding loans⁹ by sources of loan taken for each size class of land possessed

size class of land possessed	Institutional sources			Non-Institutional sources					All
	Govt.	Co-operative society	Bank	Employer/Landlord	Agricultural/professional money lender	Shopkeeper/trader	Relative/friends	Others	
<0.01	0.4	1.6	12.9	0.6	63.7	1.4	17.5	1.8	100
0.01-0.40	1.3	14.6	31	0.8	32.4	2.5	14.2	3.1	100

⁹ This a loan which the consumers are legally obligated to repay.

0.41-1.00	1.7	13.9	37.6	0.8	27.4	6.6	10.6	1.4	100
1.01-2.00	2.6	14.7	47.5	0.7	23.3	1.5	7.6	2.0	100
2.01-4.00	1.9	15.6	50	1.4	23.8	1.2	5.8	0.3	100
4.01-10.00	3.8	17.5	50.2	0.4	18.7	1.4	6.5	1.5	100
10.00+	1.1	14.3	63.5	0	16.1	0.5	3.8	0.6	100
All sizes	2.1	14.8	42.9	0.8	25.8	2.9	9.1	1.6	100

Source: 70th Round (2013) Situation Assessment Survey of Agricultural Households in India

Table-1.3 shows that households who possess less than 0.01-hectares of land access 84.4 percent of non-institutional loans. On the contrary, the family with more than 10 hectares of agricultural landholdings access 79 percent of institutional loans.

In this context, risk and the vulnerability of livelihood, and the financial crisis among the agricultural labourers are needed to urgent consideration. The study has investigated four economic challenges of the agricultural labour households such as (i) declining share of employment in the farm sector of the total rural workforce (ii) gender wage discrimination (iii) high incidence of Poverty and (iv) low accessibility of institutional credit in the four-core chapters (chapter-4, chapter-5, chapter-7, and chapter-8) of the thesis and offered some economic policies to improve their social and economic opportunities. The outline of the thesis is described as below-

1.3 Outline of the thesis:

There are ten chapters in the thesis. The introductory part of the thesis is in the first chapter. Chapter 2 contains the literature review that helps to design the research questions of the study. In chapter-3, four research questions will be discussed elaborately. Chapter-4 will discuss the possible reasons for declining labour force participation in agriculture and will recommend some policies to regain the interest of the agricultural labourers to work more in the farming sector. To measure gender wage inequality in the agricultural labour market, Chapter-5 performs the state-level analysis over the period and investigates some policy-related factors that may reduce the male-female gender wage gap in the agricultural labour market. These fourth and fifth chapters will analyze on the basis of secondary data of different rounds of state-level National Sample Survey (NSS), Census of India, and Agricultural Wages of India (AWI) etc. But, Chapter-6 describes the survey design of the village-level field investigation in the district of East Medinipur of West Bengal as the succeeding two chapters are analyzed based on field investigation data. Chapter-7 examines the role of occupational diversification as a

livelihood strategy among the agricultural labour households of West Bengal to reduce their incidence of poverty. Chapter-8 tries to investigate the possible factors influencing the accessibility of institutional credit factors of these labour households. This chapter also examines the role of accessibility of formal credit on the livelihood (or monthly per capita income) of agricultural labour households. Chapter-9 summarizes the major findings of the thesis and draws the concluding remark. Finally, Chapter-10 will discuss some possible policy implications for improving the livelihood of the agricultural labour households.

Chapter 2 - Review of Literature

Chapter 2 - Review of Literature

This chapter provides an overview of current knowledge of theoretical and empirical methodologies and their findings of the existing literature. An extensive literature review helps to identify the research gaps of the existing papers and provides guidelines to develop the research questions, conceptual framework, and methodologies for the study. This chapter attempts to review the theoretical and empirical literature related to four socio-economic challenges of the agricultural labourers are as follows-

1. Declining labour force participation in agriculture
2. Gender wage disparity in agriculture
3. Incidence of Poverty
4. Limited accessibility of institutional credit

The literature available at both national and international level relating to the above four situations of the agricultural labourers are summarized as-

2.1 Declining labour force participation in agriculture

Landless or near landless labourers are the most disadvantageous section in the rural labour market [Dasgupta and Ray (1986)]. The key obstacle to rural development in India is the gradual decline in the share of the employment participation rate in agriculture. Several rounds of NSSO data show that it was declined from 78.4% in 1993-94 to 54.6% in 2011-12. Some pieces of literature which are already explained the reasons behind the declining labour force participation rate in agriculture are given below.

2.1.1 Marginalization of landholdings and landlessness

The marginalization of possessing land has been increasing from 66.2 percent (in 1982) to 88.8 percent (in 2009-10) [Haque.T, (2010)]. Dasgupta and Ray (1987) explained that how landless are less privileged in employment participation in the agricultural labour market. As the landless labourers don't have any non-labour asset income to compensate their income deficit from agriculture, their efficiency wage per unit of labour-power of the landless labourers is high than the reservation wage. Baland & Ray (1991) analyzed the relationship between inequality in asset holding and the aggregate levels of output and employment. They argued that labour force participation in agriculture is unambiguously dependent on their possession of landholdings or other asset positions. The high concentration of landlessness is not only responsible for the possession of low productive assets, but also creates an impact on human

capital and the welfare of the rural economy adversely [Barrett & Dorosh (1996)]. Ravallion & Van de Walle (2006) examined the relationship between the rising landlessness and poverty reduction of the labour market in rural Vietnam. Their empirical analysis of occupational choice suggested that an increasing rate of rural landlessness impacts negatively on poverty as these labour households accept new opportunities of the non-farm sector. Laxminarayan, H. (1977) studied the labour force participation in agriculture among the agricultural labour households in three villages of Punjab, Haryana, and Eastern UP. More use of family labour or casual labour in their cultivation, crop sharing basis cultivation, and low possession of cultivable landholdings are three key reasons for declining demand for permanent labour in agriculture.

2.1.2 Variability of agricultural wage, income and output

Krishnaji (1971) studied the trends in employment and variation of wage rates for agricultural labourers across the Indian states. The decline in real wages of these labourers over the years is directly related to the declining labour force participation rate in agriculture. The growth rate of real wages for unskilled agricultural labour has decreased from 3.39 percent to 2.94 percent between 1982-83 and 1999-2000 [Narayanamoorthy and Kalamkar (2006)]. Unni (1988) observed that variation of wage rates for agricultural labourers adversely impacts their livelihood. Using the cointegration and error correction approach, Palmer-Jones & Parikh (1998) investigated the long-run relationship between agricultural money wages, prices, productivity, and land among the wage earners in Bangladesh. Agricultural wages impact positively on rice prices, farm productivity, and manufacturing wages. Bardhan (1979) found that the farm wage rate positively influences to production and consumption level of the rural workers in West Bengal. Bardhan (1973) & Unni, J. (1988) have tried to highlight the trend in employment, wages, and income of the agricultural labour households in India during 1956-57 to 1977-78. The fluctuations of agricultural earnings and output impact the standard of living negatively. These labourers must engage in non-farm activities and self-employment to stabilize their income flows and consumption. Moene, K. O. (1992) investigated the relationship between labour allocation, income distribution, and poverty among the rural workers. Redistribution of land ownership from large landowners to landless peasants helps to reduce poverty in the land-poor societies. In addition, the general equilibrium framework illustrates that the impact of land reform on production and poverty depends on the fertile per capita landholdings. Narayanamoorthy and Kalamkar (2006) observed that insufficient income from agriculture, inadequate institutional loans, and unavailability of modern equipment for

crop cultivation are three main reasons for the declining labour force participation in agriculture. Reardon and Escobar (2001) expounded that the risk involved in the farming sector, inadequate insurance market, and insufficient income are unable to maintain their living standard. Moreover, the imbalance between falling prices of agricultural products and rising prices of agricultural inputs are negatively influenced the lives of a large section of rural labourers (Vyas, 2007).

2.1.3 Role of Non-farm sector for declining labour force participation in agriculture

Mishra & Goodwin (1997) investigated the impact of farm income variability on the non-farm labour supply decisions among Kansas farmers in the U.S. Paper concluded that the risk-averse farmers are shifted to the off-farm sector to reduce the farm income variability. Developing a general equilibrium framework, Foster & Rosenzweig (2007) observed the agricultural productivity influences positively on rural non-farm sector's employment and incomes in a local area. Based on the Multinomial logit regression model, Lanjouw and Shariff (2004) argued that individual, household and, community characteristics are responsible for growing non-farm employment that may increase the agricultural wage rate in rural India. Expansion in heterogeneous non-farm sector activities in terms of labour and capital productivity are other strategies for strengthening the income of the marginalized section of rural people from the well-fare perspectives in rural areas [Vyas (2007) and Lanjouw & Lanjouw (2001)]. Gulati, Jain & Satija (2014) analyzed the impact of various push and pull factors on farm wages across the 16 states in India between 1990–1991 and 2011–2012. Agricultural growth rate, especially after 2006-07, is a push strategy and, the MGNREGA scheme pulls the labourers from agriculture which causes the shortages of labour supply in agriculture and increases the real farm wages. Barrett & et al. (2001) affirmed that the households endowed with the education, financial capital, or market access pull the labourers to comparatively high remunerative non-farm employment opportunities. In other words, the poor labourers are compelled to push to low return diversified activities to cope with limited risk-bearing capacity, seasonality of agriculture, and income shock. To study the nature of employment opportunities in India in the post-liberalization period, Jatav & Sen (2013) illustrated the push and pull factors that impact the rural workers to perform various economic activities. The study reveals that the high incidence of landlessness, joblessness and high-dependency ratios push the labourers into the non-farm sector. Besides, pull factors such as leverages, work experience of the farm and non-farm sector, possession of tiny amount landholdings, education, and efficiency are the significant determinants for the labour force participation of off-farm sector among the farmers.

Martin & Warr (1994) have shown that demand for food relative to other goods, differential rates of technological change between the sectors, changes in labour, and capital supply are the principal causes for declining employment participation in agriculture. Developing a general equilibrium model of the farm and rural non-farm sectors, Foster & Rosenzweig (2003) examined how the non-farm sector growth plays a vital role in enhancing agricultural productivity, and income among the rural households in India between 1968 and 1999. Their village level empirical study suggests that the non-tradable farm sector increases local demand by increasing agricultural development and reducing the intra-village inequality whereas, the non-tradable farm sector impacts growth in farm productivity negatively. Venkatesh & et al. (2015) investigated the impact of farm and non-farm sector growth on employment and output in rural India during 1990-2010. The multiple linear regression analysis has shown that skill, infrastructure development, agricultural productivity, and landholding size are the driving factors for accelerating the non-farm employment growth rate. Applying multinomial Logit estimation of panel dataset covering three quinquennial rounds of National Sample Survey data for 1987-88, 1993-94 and 1999-00, Kijima & Lanjouw (2005) observed that an expansion of the non-farm sector helps to reduce poverty indirectly through rising agricultural wage in rural India. Unni (1996) assessed the determinants of occupational choice in economic activity in 30 villages belonging to five districts of Gujarat state in India in 1988-89 in times of drought. Diversification of more than one economic activity is highly concentrated on rural agricultural households to cope with their risk and uncertainty of farming sector output.

2.2 High level of gender wage disparity in agriculture

Although women are actively involved in farming, livestock, fisheries and forestry, and other farming activities, a higher incidence of gender wage discrimination is a severe concern in the Indian agricultural labour market [Vepa (2005)]. Since 1951-52, many researchers have examined the various dimensions of the agricultural labourers and suggested economic policies to reduce the gender wage gap in agriculture. Some selected literature based on variations of wages in agriculture in specific states or regions of India and the factors influencing the reduction of wage discrimination between males and females in the agricultural labour market are discussed below-

2.2.1 The variations of wages in the agriculture across the states or regions in India

Agarwal (1984) examined the impact of HYV rice on the gender wage gap of the three rice-growing states of India like Andhra Pradesh, Tamil Nadu, and Odisha. Using Multiple Regression Analysis, the study shows that the demand for casual labour has increased with

HYV rice. But due to stagnant daily real wages, intra-household inequalities in income, consumption, and high workloads, women's participation in agriculture is not beneficial much to increase the livelihood of these agricultural labour households. Mahajan & Ramaswami (2017) investigated the relationship between the gender wage gap and female labour supply in the farming activities such as ploughing, sowing, transplanting, weeding, harvesting, etc. The paper constructed the gender segregation index and observed that greater female work participation decreases female wages relative to male wages. Mahajan (2017) studied the impact of rainfall shock on the gender wage gap in agriculture using the National Sample Survey (NSS) data during 1993 and 2007 across fourteen Indian states. Rainfall shocks influence the female-to-male wage ratio positively and, the female labourers have higher marginal values than the male counterparts in rice cultivation. Education and irrigation are two driving factors among the farmers to cope with the disbalances of the demand and supply sides of the agricultural labour market by reducing rainfall shocks. The study of Mencher & Saradmoni (1982) is based on an empirical analysis of six villages of India and examined the contribution of females in rice cultivation to the total household's income. Despite the gender wage gap is high in every stage of rice cultivation, female participation in agriculture is crucial to meet their basic needs in poor households. In another paper, Alvarez (2020) empirically examined the variations in male and female labour supply and gender wage differentials in agriculture across the Southern states of India. The ratio of female to male agricultural wages varies widely across regions ranging from 90% in Gujarat to 54% in Tamil Nadu in 2004-05. Acharya (1989) analyzed the pattern and sources of variation of the agricultural wage series in India between 1970 and 1985. The study concludes that the differential productivity, resources, and labour immobility are the possible reasons for persistent intra-state variation of wage rates across the regions over time. Usami (2011) studied the recent trends in wage rates for agricultural and rural labourers. Using two data sets - Agricultural wages in India (AWI) and Wage Rate in Rural India (WRRI), the study has compared the patterns of the wage differential between agricultural labourers and rural non-farm labourers and shown that the collection and compilation of the WRRI data are methodologically more reliable than AWI. The study again shows that the states with higher wage rates (Rs. 40 and above) are Kerala, J&K, Himachal Pradesh, Punjab, and Haryana while, states with lower wage rates (Rs. 15 and less) are M.P, Bihar, Orissa, UP and Karnataka. Jose (2013) has captured the fluctuations in both male and female wages in monetary and real terms across different states in India based on the various rounds of NSSO data between 1999-2000 and 2009-10. The paper shows that the concentration of gender wage disparity (above 75 percent) is high in the southern states such as Kerala, A.P,

Karnataka, and Tamil Nadu, whereas the states with low gender wage disparity (below 75 percent) are Haryana, Punjab, and Rajasthan.

2.2.2 The factors influencing the reduction of the gender wage discrimination in the agricultural labour market

Based on sex differential and caste differential indices, Krishnamurty (1988) examined the male and female wage differential in India between 1964-65 and 1974-75. The average daily wage rate of the female is much lower than the male counterpart in each operation in agriculture such as transplanting, weeding and, other agricultural activities. The study shows that social attitudes, biases, restrictions, and other market imperfections are the key reasons for high wage inequality between males and females in agriculture. Nirmala & Kumar (2016) investigated the patterns of female labour force participation in agriculture and its possible determinants in Andhra Pradesh between 2001 and 2011. In the paper, employment opportunity is captured by the participation gap, the remuneration gap, and the advancement gap. Using production function estimates, Quisumbing (1996) studied the gender differences in labour productivity and technical efficiency in agriculture. Chen (1989) analyzed the role of women as landless wage labourers and land-poor cultivators in six Indian agro-ecological zones. Gender wage discrimination is higher in the low-productivity paddy region and the high-productivity wheat region. These female labourers have to engage in several low-paid non-farm activities to reduce the negative income shocks. Bhattacharjee, Hnatkovska & Lahiri (2015) explored the pattern of gender gaps in terms of education, occupation choices, and wages during 1983 and 2010. Oaxaca-Blinder decomposition technique has been used to explain the observed changes in the mean and quantile gaps into explained and unexplained components. The result shows that female labourers are moved to blue and white-collar jobs from agricultural jobs, and, as a result, the socioeconomic gaps between rural and urban labourers are in a declining trend during the period. Jacoby (1991) has applied the Cobb-Douglas (C-D) and pseudo production function to estimate the productivity of men and women in the peasant agriculture of the Peruvian Sierra. The usage of animal traction and possession of landholdings are the two driving forces of the marginal productivity of male and female agricultural labourers. Based on the 55th and 61st round dataset of NSSO, Khanna (2012) examined the wage gaps across different quantiles of the wage distribution. The paper has used Machado-Mata-Melly's decomposition method and explored that the differences in characteristics (levels of covariates) or the unexplained (discrimination) component are the possible reasons for gender wage gaps. Differences in education, work experience, and skills are also responsible for differential wages between male

and female labourers. Singh (1996) examined the impact of female labour supply on the real wages of female agricultural labourers and the wage gap between male and female agricultural labourers in India. Cobb-Douglas Production function is applied to derive the labour demand function. Based on state-level data during 1966-67 and 1988-89, the pooled aggregate-level regression analyses reveal that the yield variable (YLD) and land productivity are positively significant on the female agricultural wage rate, whereas, the excess supply of female labour supply in agriculture decreases their wage rate. Rustagi (2005) also worked on gender discrimination of wages and incomes in the Indian labour market. The dimensions such as family labour, hired labour, sexual division of labour, traditional notion, and social deprivation are investigated to understand the nature of gender wage differential. The study observes that female participation as decision-makers is limited in the private and domestic spheres due to stereotypical patriarchal roles. The efficiency or (and) productivity of female labourers compared to their male counterparts within employed spheres is underestimated by the lack of opportunity for female participation in the labour market. Becker (1985) developed a model of an individual's allocation of energy to several activities. The model shows that an investment in specialized human capital and its increasing returns always encourage division of labour between married men and married women. Based on several rounds of NSS data from 1983 to 2000, Rao (2011) assessed the feminized agricultural labour force in Telangana and suggested that bargaining power could increase by increasing female participation in the agricultural labour market. Venkatesh (2013) studied the recent trends in rural employment and wages of male and female agricultural labourers of 20 major states based on various rounds (43rd and 66th) of NSSO survey and Wage Rate in Rural India (WRI) during 1987-88 to 2009-10. The result shows that the share of agricultural state domestic product and proportion of rural non-farm employment is positively significant on the agricultural wage rate, whereas, labour availability (land-labour ratio) and higher labour dependency on the farming sector have lowered the wage rate. Khanna (2012) has tried to explain the gender wage gap across the different quantiles of wage distribution for regular wage workers in India using the 66th rounds of employment and unemployment NSSO data (2009-10). OLS regression and quantile regression equation are employed to determine various factors such as education, union membership, and occupation that can affect within and between gender wage inequality. Berg (2012) analyzed the roles of MGNREGA on agricultural wages in India based on monthly wage data for the period of 2000-2010 in 249 districts across 19 major states in India. The paper has used male-female wage data separately for studying the impact of the public works program on the gender wage gap and applied the difference-in-difference method for estimating the

overall impact of NREGA on real agricultural wages. Battarai (2014) has explored the trend of the farm wage rate in 23 districts in Andhra Pradesh over 2000-11 and analyzed the differential impacts of MGNREGA on agricultural labour wage rates by gender. A fixed-effect panel data regression model shows that the role of MGNREGA, irrigation facility, and per capita income has a positive effect on the wage rate of agriculture. Using data from the 2004-05 NSSO survey, Dasgupta and Sudarshan (2011) observed that female participation in the NREGA has increased over the years. The study shows that female participation in NREGA is correlated negatively with the existing gender wage gap among unskilled agricultural labourers. Azam (2012) examined the impact of MGNREGA on labour force participation, public works participation, and casual real wages based on NSSO data during 1983-2004. The study has applied the difference-in-difference method and observed that the female wage rate is 8% higher in MGNREGA districts than in the non-MGNREGA area.

2.3 High incidence of poverty

One of the dominant features of rural poverty is near landlessness or actual landlessness. The poorer farm households are mainly unskilled labour suppliers of the rural non-farm sector [Ellis (1998)]. Using seven rounds of Family Income and Expenditure Survey (FIES) in the Philippines, Balisacan (1993) investigated the relationship between income distribution and rural poverty and assessed how possession of landholdings and productivity of agriculture impact the poverty level. The study suggests that the production of more labour-intensive goods is necessary for generating employment opportunities in the farm and non-farm sectors for the economic welfare of the rural people. To estimate rural poverty, Bebbington (1999) has constructed an analytical framework and discussed how the sustainability of rural livelihoods is enhanced. This framework stated that people get more meaningful lives and expand their assets and capabilities by participating in several activities governed by the state, market, and civil society. Based on 24 rounds of the National Sample Survey between 1958 and 1994, Datt & Ravallion (1998) explored the role of agricultural productivity on the poor. The study shows that higher farm yields and higher agricultural wages can reduce both absolute and relative poverty. Based on Pakistan's village survey Malik (1996) explained how landless labour households eliminate poverty incidence and make a sustainable livelihood. Based on the multi-variate log-linear regression model, the paper shows that unequal distribution of land, less education, high dependency ratio, low accessibility of productive assets, and lower participation rate in the non-farm activities are the critical factors to remain landless households in a low-income equilibrium trap. In this context, Employment diversity has strengthened the

economic well-being of the poor by reducing cyclical and insecurity threats in the agricultural labour market [Ellis, F. (2000)]. Some literature related to the relationship between poverty and employment diversification are discussed below-

2.3.1 Poverty, and farm & non-farm employment diversification

Schwarze & Zeller (2005) assessed the impact of employment diversification outside agriculture on the poor of Indonesia. Shannon equitability index is utilized here for measuring non-farm employment diversification. Tobit regression analysis shows that access to social capital, the endowment of more human resources, and crop failure are the crucial factors of the poor to move towards the non-farm sector. Asmah (2011) has used Probit regression based on Endogenous switching regression (or Mover or Stayer model) to examine the welfare effect among more and less diversified rural households in Ghana. The paper illustrates that more non-farm income permit farmers to purchase agricultural inputs for raising crop yield that indicates a strong linkage between farm and non-farm employment. Lanjouw & Murgai (2009) investigated the role of agricultural productivity and non-farm employment on the poverty of rural India. They have constructed the Datt and Ravallion framework and suggested that rural poverty can be alleviated through the combination of two ways-non-farm employment expansion with self-employment and rising demand for agricultural labourers by increasing the growth rate of non-farm employment. Besides land availability, education, social status, assets are important factors for gaining accessibility of casual non-farm jobs. In another paper, Lanjouw et al. (2001) have tried to explain the degree and nature of non-farm diversification in Tanzania. Based on a village-level field investigation, the probit regression model censored the least absolute deviation model (CLAD) and, the Quantile Regression model have been applied in the study. The result confirms that the scope of non-farm employment monotonically raises their earnings and per capita food consumption. The evidence also suggests that education and access to infrastructure, social connection or village association, trustworthiness, communal activities, and entrepreneurial activities are crucial in stimulating non-farm activities among the poor. Babatunde & Qaim (2009) analyzed a two-way causal relationship between employment diversification and household income in rural Nigeria. The two-stage least square technique has been applied on three models- the number of income sources (NIS), the share of off-farm income in total income (OFS), and the Herfindahl diversification index (HDI). Reduction in market imperfection through improving infrastructural endowment encourages income diversification among the poorest and helps to achieve a higher degree of specialization among the asset-rich households. Lay & Schüller (2008) have stated that

education, the number of women adults in the family, training and technical assistance, and credit facility in the formal sector encourage farm households to access more non-farm employment. Ellis & Freeman (2004) examined two objectives in the paper. The sustainable livelihoods framework is firstly developed based on micro-level study (cross-county data-2001) of the rural poor. Secondly, interlinkage between macro and micro views of the four African countries has been established to understand the circumstances and consequences of rural poverty. Economic policies such as local level working environment, sectoral expenditure targets in education, and social capital are essential to reduce the incidence of poverty and enable poor people to reach their secure lives over time. Based on both cross-sectional and longitudinal data Barrett et al. (2001) explored the impact of different policy shocks and currency devaluation on income diversification in rural Africa. Market accessibility, human capital, and working capital are required to access them higher return non-farm activities. Employment diversification among the poor towards skilled and self-employment create some new opportunities to accept more lucrative livelihood strategies and empowered them to move out of the dynamic stochastic poverty traps. Barrett & Reardon (2000) have discussed several 'pull' and 'push' factors behind high employment diversification in rural Africa. Pull factors such as investment in the local economy, market accessibility, asset endowment, and production flows of asset services can generate demand for non-farm goods and services that stimulate the diversification of the rural economy outside agriculture. On the contrary, climatic, epidemiological, and market variability and resource constraints push the African people to move out from the farm sector to non-farm diversified activities for their livelihood. Start (2001) has tried to find out whether non-farm employment diversification among the poor is a substitute for agriculture at all. He observes that diversification works in both positive and negative directions. Low-paid diversified activities outside agriculture are the coping strategies for their livelihood and safety net on a short-term basis. But in the long term, these informal activities might increase the vulnerability and insecurity of the poor through a low level of agricultural production, irregular labour arrangements, and entrepreneurial risk. Barrett, Reardon & Webb (2001) have shown that diversification towards off-farm employment increases income, reduces household risk, and improves other welfare indicators among unskilled labourers. Hence, the greater non-farm employment diversification is responsible for more rapid growth in earnings and consumption of the unskilled labourers in rural Africa. Using survey data (2001 and 2004) of Zambia, Bigsten & Tengstam (2011) assessed the mechanism of income diversification and its implication on income for smallholder households. The Multinomial logit regression model is used to capture the role of market

accessibility, transaction cost, and finance in the non-farm sector. The result shows that human capital, an endowment of land, transport, information of agricultural commodities, credit facilities, and local demand are the crucial factors in creating new income-generating activities in the non-farm sector. The study also suggests that the smallholders in rural Zambia can lift out from poverty if they allocate their resources efficiently and diversify into high-paid jobs during the slack season of agriculture.

2.3.2 Possession of landholdings & employment diversification

The nature of employment participation of rural households towards diversified activities is largely influenced by their possession of landholdings and other assets such as physical, human, and social capital influence [Unni (1996) & Schwarze & Zeller (2005)]. Bhaumik (2007) & Sujithkumar (2007) have extensively studied the pattern and determinants of employment diversification towards farm & non-farm sectors based on income and operational landholdings of rural households. Their studies show that the percentage of non-farm income to the total income is inversely related to possession of landholdings and, a higher degree of diversification is shown among the landless and near landless households. Using Household Integrated Economic Survey (2001-02), Qureshi & Ahmad (2004) have estimated the incidence of poverty through the Foster, Greer, and Thorbecke (1984) among the landless people of Pakistan. The disproportionate distribution of land ownership is one of the principal reasons for the prevalence of rural poverty. Their statistics also show that non-farm income is the only source of income that meets their consumption quintiles ranges from 45 percent to 74 percent. Davis & et al. (2010) have examined the impact of rural income-generating activities on the rural economy. They explain the relative importance of diversification versus specialization of income-generating activities at the household level. The Theil index and the Gini index are applied to estimate income inequality. The wealthier households are more diversified in non-farm activities and help to get a higher level of per capita income. Chaudhry & et al. (2012) have constructed the wealth index to analyze the poverty of rural Pakistan. The Bottom-up approach has been used in the empirical study to reduce the specification error. The paper prescribes that better wealth status in terms of health, education, and employment opportunities towards the non-farm sector irrespective of the gender of the rural households are the responsible factors to reduce the poverty level. Based on the Household Integrated Economic Survey (1996-97) at the household level, Arif & et al. (2000) have established the interlinkage between non-farm employment and poverty of rural Pakistan. The study shows that more labour-intensive activities within agriculture combine with a scope of non-farm activities help

to improve the GDP growth rate and achieve equality of wealth. Barrett et al. (2001) have tried to find out the answer to the reason for diversification at the household level and focused on the interhousehold heterogeneity of income to explain the diversification behaviors of rural Africa. Herfindahl, Simpson indices, Gini coefficients, Portfolio returns distributions, and Simple variance decomposition are applied in the study to measure employment diversification. In agriculture, cash crop and livestock income, non-farm employment and, wage goods boost agricultural productivity and play a vital role in reducing rural poverty in Africa.

2.4 Limited accessibility of institutional credit

Need-based credit to the farmers is an essential prerequisite [Rajeev, M., & Deb, S. (1998)]. The low levels of wage earnings barrier accessibility of institutional credit of the agricultural labour households to meet their subsistence needs [Sharma, H. R. (2009)]. The dependency of non-institutional credit has been increased from 36 percent in 1990-91 to 44 percent in 2012-13 [NSSO (2013)]. The literature related to the accessibility of credit constraints of the agricultural labour households and the role of institutional credit on their livelihood are discussed below-

2.4.1 Indebtedness and the poor

Weaker section categories such as SCs, STs, and OBCs and smallholders are much dependent on non-institutional loans with a high rate of interest that may fall them into chronic poverty [Rajeev and Deb (1998), and Kumar, et al. (2010)]. Sharma (2009) analyzed the pattern of daily wage earners and the incidence of indebtedness among agricultural labour households across seventeen major states of India. Non-farm employment and net state domestic product of agriculture impact their indebtedness negatively. Tulasi & et al. (2017) studied the demand-side constraints of the usage of formal financial services in the Delhi slum. The indicators such as employment opportunities, education, and empowerment of women have increased the probability of demand for financial services among the poor. Bhattacharyya (2005) investigated the differentiated structure of formal and informal credit markets in two agroclimatic regions of the Bankura district. Due to the government's anti-poverty program, the backward region is received a high degree of institutional credit compared to the advanced region. Barslund & Tarp (2008) have shown that the marketability of the collateral influence negatively on the rate of interest in the informal market. Institutional loans are mostly used in income-generating activities and asset accumulation, whereas, informal loans are utilized for

consumption smoothening among the poor. Bhende (1986) studied the financial markets in the three agroclimatic zones of peninsular South India. Tobit regression analysis shows that the age of the household head, family size, dependency ratio, schooling years, caste, risk aversion, and education are the key factors to increase the probability of receiving loans significantly and positively. On the contrary, the households with less education who have cultivated land are more dependent on informal credit, and borrowers from the institutional sources are the largest defaulters.

2.4.2 Impact of institutional credit on welfare of the poor

Using the Probit regression analysis, Laha & et al. (2011) have shown that a higher degree of economic status, level of education, possession of landholdings, non-farm employment, and social security schemes significantly influence the accessibility of formal financial services among the farm households. Rajeev & Deb (1998) assessed the contribution of two institutional loans, such as commercial banks and Cooperative banks on agricultural production in the Hugli district of West Bengal. Co-operative banks can work more efficiently, particularly, in a need-based manner among the farmers. But the repayment rate of the Cooperative bank is observed to be lowest among the farmers who possessed the land between 6 to 10 Bighas, whereas, the repayment rate seems to be better in the commercial bank. Mohan (2006) suggested some policy recommendations from his empirical study that strong and viable agricultural financial institutions are essential for the disbursement of adequate credit in different segments of agriculture such as agro-industry: horticulture, aquaculture, pisciculture, dairying, sericulture, poultry, vegetables, meat, food processing, other agro-processing, etc. for the welfare of farmers. With the disbursement of credit, these institutions must be evaluated the performance of agricultural credit by agricultural credit as a proportion of net state domestic product (NSDP). Pagura & Kirsten (2006) tried to understand whether strategic linkages between public and private institutions can enhance the accessibility of formal financial services among the rural poor. Based on eleven countries, they have analyzed twelve case studies and observed that the microfinance institutions gain more strength and can disburse more funding for the welfare of the poor after combining several formal and informal financial institutions. Based on household survey data, Chaudhuri & Cherical (2012) & Bhattacharjee & Rajeev (2013) & Tang & Guo (2017) examined some possible socio-economic factors to influence the household's choice to access institutional loans. The determinants such as family size, landholdings, education of household heads increase the probability of borrowing significantly, whereas, less opportunity in non-farm employment, landlessness, and high transaction costs

are three main constraints to access the formal credit among the farmers. Mullineux & Murinde (2005) observed that the age of the household head, the household size, land ownership, and savings, and the availability of credit at the village level are crucial indicators to influence household borrowing that impacts the economic welfare of poorer households positively. Using the General equilibrium model, Levine & et al. (2010) studied the labour and credit markets to examine the cost and benefit of informality among the poor. To assess the impact of accessibility of seasonal credit on non-farm labour supply, Fink & et al. (2014) established a model of agricultural production based on survey data and administrative data of rural Zambia. The study reveals that short-term institutional credit availability increases the potentiality of the labourers by increasing resource availability during the cropping season. It also helps to reduce consumption constraints and increase the net income of the family through enhancing local wage rates. A high degree of effective credit rationing is observed in Puri when there is limited accessibility as well as the high demand for institutional credit among the farmers [Swain, R. B. (2002)]. Based on cross-section data of rural Vietnam, Quach, Mullineux & Murinde (2005) have constructed a framework to assess the impact of household credit on economic welfare. The study shows that household credit plays a vital role in the economic welfare of households positively in terms of per capita expenditure, per capita food expenditure, and per capita non-food expenditure. Again, Chowhan & Pande (2014) & Kumar et al. (2017) suggested that formal credit helps to improve farm income and monthly per capita household expenditures of the poor.

Chapter 3: Origin of the research problems and objectives of the Thesis

Chapter 3 - Origin of the research problems and objectives of the Thesis

3.1 Origin of the research problem

Existing works of literature mainly focused on some particular issues of the agricultural labour market. There is hardly any study examining the key issues of the socio-economic conditions of the agricultural labourers to have a deeper understanding from different perspectives. To overcome the research gap, this thesis will focus on their four crucial problems such as declining labour force participation in agriculture, gender wage disparity, the incidence of the poverty level, and indebtedness, and prescribed some important policy recommendations in the thesis to improve their livelihood.

3.2 Objectives of the Thesis

Agricultural labourers are generally engaged on another person's land for wages or (and) kind [Census of India (2001 & 2011)]. More than 57.8% of the total rural population constitutes the agricultural labourers in India [70th round NSS data (2012-13)]. They are one of the economically backward classes in rural India. Most of them are landless or may possess a small amount of land. These labourers are highly unskilled and casual in nature. NSSO (2006a) reports that the marginalization of landholding has been increasing from 66.2 percent (in 1982-83) to 88.8 percent (in 2009-10). Due to the lack of accessibility of enough cultivable land, the farm sector may not be a viable income strategy for them [De Janvry, A., & Sadoulet, E. (2001)]. Diversified low-paid jobs towards non-farm sectors over the year may provide the means of survival by reducing the gap between irregular farm income and consumption requirements [Ellis (1999)]. Resultantly, it is observed that the employment participation rate in agriculture has decreased from 78.4% to 61.39% during 1993-94 and 2011-12 [50th & 68th round NSSO data]. It is, therefore, needed to examine which 'push' and (or) 'pull' factors truly work for structural change of the Indian agricultural labour market. Any proper investigation has yet to be done on the gradual changes of the labour force participation rate in the rural labour market of India considering all possible 'pull' and 'push' factors over time. Based on the background, the research objectives of the fourth chapter of the thesis are as follows-

- (i) To investigate the nature of variation of labour force participation in Indian agriculture across 20 major states during the period between 1993-94 and 2011-12.
- (ii) To identify possible 'push' and 'pull' factors responsible for the gradual decline in labour force participation rate in the agricultural sector of India.

The gender wage discrimination among the agricultural labourers of all stages of the production process is significant across all Indian states [Directorate of Economics and Statistics (2010-11) & (2015-16)]. In rural India, around 39 percent of women and 21 percent of men as agricultural labourers are dependent on agriculture for their livelihood [Census of India (2011)]. Except ploughing, female labourers actively participate in every aspect of cultivation, such as transplantation, harvesting, weeding, sowing, etc., and allied activities such as beekeeping, mushroom production, and goat and poultry rearing, etc. Despite performing equal or equivalent work, female agricultural labourers do not enjoy an equal or equivalent wage rate compared to their male counterparts. More than 90 percent of the rural females are treated as a cheap and secondary source of labourers [Javeed and Manuhaar (2013)]. Even if women's contribution to Indian agriculture is about 32 percent, they paid less than 22 percent than their male counterparts [Minister of Agriculture and Farmer's Welfare (2017)]. Due to unaware of constitutional rights and low bargaining power, the female labourers are still largely discriminated against from the male labourers in terms of wage rates [Union agriculture minister (2018)]. In this context, the study puts an effort to determine the possible factors responsible for which gender wage disparity in agriculture is high in some states, whereas, wage inequality is low in some other states. Research objectives, therefore, in the fifth chapter of the thesis are as follows-

- (i) To investigate the nature of variations of the money wage gap between male and female agricultural labourers across 18 major states in India over the period between 2010-11 and 2015-16.
- (ii) To examine various possible factors that can reduce this gender-based wage discrimination among the agricultural labourers in India.

Agricultural labour households are less privileged in employment participation in the rural labour market [Dasgupta and Ray (1986)]. Around 40.9 percent of the total rural workforce in West Bengal is engaged as agricultural labourers who are either landless or marginal farmers [Census of India (2011)]. Due to the marginalization of landholding, the prevalence of marginal farmers in West Bengal has become 82.81 percent among all the agricultural households [Agricultural Census (2015-16)]. As the farming sector is not enough to meet their necessities, these resource-poor households continuously face a divergence between irregular income and daily consumption requirements. To mitigate the economic vulnerability, the labourers accept a diverse set of low-skilled job opportunities in the non-farm sector during the off-season of agriculture. In rural India, occupational diversification through participating in different types

of skilled and unskilled work among the agricultural labour households is observed either only of the household head or among more than one able-bodied adult member of the household. The existing literature hardly investigated the effectiveness of two types of occupational diversification such as only of the main earning member of the sample household and among all the working household members of the household to reduce the incidence of poverty. Based on the field investigation in the district of East Midnapur of West Bengal, the seventh chapter of the thesis tries to study the following research objectives are as-

- (i) To identify, the possible situation(s) in which only the head of the family is the sole earning member of the household or apart from household head other able-bodied member(s) also have become earning members to supplement family income.
- (ii) To assess the role of occupational diversification among the earning member(s) of an agricultural labour household as livelihood strategy for tackling the incidence of poverty of those households.
- (iii) Besides occupational diversification, the chapter will also try to identify the other possible determinant(s) which can eradicate or reduce the intensity of poverty among the agricultural labour households of West Bengal.

Need-based credit to agricultural households is an essential prerequisite [Rajeev, M., & Deb, S. (1998)]. As the farm and non-farm activities in rural areas typically are seasonal, these households require formal credit to adjust the seasonal fluctuations in irregular income and expenditure. During the 1990s, the Govt. of India introduced several economic policies of financial inclusion for empowering the poor. Despite the major structural changes in the Indian credit system, landless and near landless agricultural labour households are still facing difficulties while accessing formal credit services [Kumar, Singh, and Sinha (2010)]. The 70th round of the NSS survey shows that agricultural loans decreased from 66.3 percent in 1991 to 64 percent in 2013 [NSSO (2013)]. The dependency of informal credit on the rural poor has been increased from 36 percent to 44 percent during 1990-91 and 2012-13 [NSSO, All India Debt & Investment Surveys (2013)]. The average rate of interest charged by the non-institutional sector has been increased from 36 percent per annum in 1991-92 to 42 percent in 2002-03 and further increased exorbitantly to about 48 percent in 2012-13 [Kumar & et al. (2007) & Debt & Investment Surveys (2013)]. A well-developed financial system is therefore essential to bring the poor labourers into the purview of the formal financial system that allows them to participate in the mainstream economy [Ramji (2009)]. Although many researchers are tried to highlight several issues of the rural credit market hardly focused on constraints of

the accessibility of institutional loans among the agricultural labour households. Moreover, there is no significant study regarding the role of accessibility of institutional credit utilizing income-generating activities on their livelihood. Based on the context, the eighth chapter of the thesis aims to shed some light by examining the following research objectives are as-

- (i) To examine the demand side constraints for receiving institutional credit among the agricultural labour households and identify the possible factors which can increase the probability of accessing the formal credit after addressing these constraints.
- (ii) To examine whether institutional credit taken for income-generating activity help the borrower to improve their livelihood.

Chapter 4 - Push and (or) Pull? Drivers of Labour Force Participation in Indian Agriculture

Chapter 4 - Push and (or) Pull? Drivers of Labour Force Participation in Indian Agriculture

4.1 Introduction

In India, agriculture is still the largest primary sector in economic activity and providing employment to a major section of the rural population. The labourers who are engaged in crop production and (or) other agricultural occupations like dairy farming, horticulture, nurturing of livestock, poultry etc. on payment of wages (only in cash or in kind or a combination of cash and kind) are considered as agricultural labourers in India. This type of labourers is basically unskilled in nature. An agricultural labour household is one where more than half of the household income in a certain period comes from the above-mentioned agricultural activities. The household may be landless or may belong to marginal farmer household class. Agricultural labourers are at present casual in nature. Attached or permanent agricultural labourer (a landless labourer who is attached to a particular landlord for certain period) is now almost absent in Indian agricultural labour market [Kundu (2006)]. Census report of 2011 has also shown that 54.6% of the total workforce in India is part of the agricultural sector with a decline of 3.6% as compared to 2001. There may happen due to 'push' and(or) 'pull' factors operating in Indian rural labour market. This chapter will try to identify the possible push and (or) pull factors responsible for gradual change of overall labour force participation rate in agricultural sector of India.

4.2 Review of literature

Landless or near landless labourers are the most vulnerable section in rural labour market [Dasgupta and Ray (1986)]. Dasgupta and Ray (1987), in another paper, had established how landless are less privileged in employment participation in agricultural labour market. It was noted that efficiency wage per unit of labour power is high enough than the reservation wage as landless labourers don't have any non-labour asset income to compensate their income deficit from agriculture and resultantly they are ignored by the employers during the time of hiring of labourers. Baland & Ray (1991), in their theoretical paper, had improved the earlier general equilibrium framework to analyze the relationship between inequality in asset holding and the aggregate levels of output and employment. They recognized that employment participation in agriculture is unambiguously dependent on their possession of landholdings or other asset positions. Moene (1992) based on Dasgupta-Ray (1986, 1987) had built a theoretical model and investigated how land ownership significantly can create an impact on labour allocation, income distribution and poverty in the developing countries. They had shown that small

landholders are in an advantageous position during the time of getting employment in commercial land rentals over landless. Earnings from commercial plot are not enough to pull the landless labourers above poverty line as minimum wage rate lies below efficiency wage rate. Hence, high concentration of landlessness and marginalization of land holding are not only responsible for the possession of low productive asset including human capital, but also creates impact on welfare of the rural economy adversely [Barrett & Dorosh (1996)].

Several researchers have investigated how fluctuation of real wage rate is one of major factors behind declining participation rate of labourers in agriculture. Narayanamoorthy and Kalamkar (2006) have extensively examined the impact of an agrarian crisis on wage and employment of agricultural labourers in India. Krishnaji (1971), Unni (1988) and Jha (2006) have tried to capture trends in employment and variation of wage rates for agricultural labourers across major states in India. They have concluded that increase of real wages of agricultural labourers over the years have been reflected in agricultural output and commodity prices and consequently has an adverse impact on the rural employment as well as in economy. Sheikh and Iqbal (1989) has been found that population density and an increase in real wages are two responsible factors which have turned out to be a negative and significant impact on employment participation rate in agriculture.

Much research has been done and is still going on, how education influences the structural changes in the rural economy with falling share of agricultural sector employment and rising proportion of non-agricultural sector (industry and service sector) job opportunity. Micevska & Rahut (2008) examined the differential role of education on low return and high return non-farm activities in the Himalayan region of states, such as Sikkim and West Bengal in 2004. They observed that households with lower level landholding (less than 0.5 acres) and less education (less than primary school) are engaged in unskilled wage employment and self-employment in a microenterprise. On the contrary, higher educated households are more interested in participating in high skilled non-agricultural activities and self-employment in small enterprises. According to Tao Yang (1997), the marginal productivity of household depends on years of schooling. It is confirmed in his study that the higher-educated households can contribute to managerial decision making in farming sector in addition to remaining involved in the off-farm wage activities. Jolliffe (2004) examined the returns to education of a farm household in the farm and non-farm activities. His theoretical model shows that higher returns to education offer more remunerative off-farm activities including reallocation of family labour away from the farming sector in the Ghanaian economy. Huffman (1980)

analyzed the impact of investment in education to reallocate the workers from agriculture to non-agricultural sector. Overall, most of the literatures are of the belief that higher the education level, better the chances of getting higher remunerative employment outside agriculture more is the possibility of switching of labour force from agriculture to non-agriculture sector.

Although researchers have long been analyzed the process of structural transformation towards rural economy, there has still been a debate among development economists about the relative importance of various "push" and "pull" factors which may influence agricultural labour market of India. For example, Jha (2006) explained both "push" (low growth rate of employment and income in agriculture) and "pull" factors (employment opportunity outside agricultural sector both in the native village and outside) responsible for employment diversification among the agricultural labourers. Reardon & Escobar (2001) identified riskiness in the farming sector, lower level of landholding, inadequate insurance market and insufficient income to maintain their living standard as major "push" factors while more remunerative income than the agricultural sector is found to be a "pull" factor. Alvarez & Poschke (2011) have performed a comparative study to determine the leading driving force behind technological improvements in the agricultural (push effect) and manufacturing sectors (pull effect) which led to the transformation of economic structure over two centuries in the pre-and post-World War II periods in the United States. But still, there is no proper investigation has done on changes of labour force participation rate in the labour market in the agricultural sector of India after considering all possible 'pull' and 'push' factors together on the basis of which one can identify the possible factor(s) responsible for gradual change of labour force participation in the agricultural labour market in India over time.

4.3 Research Objectives

In this background, the chapter initially tries to investigate the nature of variation of labour force participation in Indian agriculture across 20 major states during the period between 1993-94 and 2011-12.

Secondly, the study tries to identify the possible 'push' and 'pull' factors¹⁰ responsible for the gradual decline in labour force participation rate in the agricultural sector in India after considering 20 major states of India as cross-sectional unit.

¹⁰ All possible factors are considered simultaneously

4.4 Labour force participation in Indian Agriculture: An Inter-State Comparison

Based on different rounds of NSSO surveys on Employment Unemployment situation in India, it is observed that there is a decline in the labour force participation rate in agriculture in India. It has declined from 74.1% (in 1993-94 i.e. 50th round) to 62.8% (in 2009-10 i.e. 66th round of NSSO). It even declined further to 61.39% in 2011-12 (68th round). This trend in agricultural labour market is observed both at state level as well as national level. Table-1 indicates that labour force participation in agriculture as a percentage of total rural labour force has declined gradually in almost all states over the period 1993-94 to 2011-12¹¹. The average growth of the labour force participation rate in the agricultural sector are highly negative in some states such as Himachal Pradesh, Kerala, J&K, Bihar, U.P, Punjab and Orissa. The remaining states also have faced negative average growth rate except in Gujarat where no significant change in average growth rate of workforce participation in agriculture is observed during last two decades and the average growth rate is just 0.0675%.

Table 4.1 State-wise Labour Force Participation Rate in Agriculture (in percentage)

States	1993-94	1999-00	2004-05	2007-08	2009-10	2011-12	Average growth rate of labour Force participation rate in agriculture
Andhra Pradesh	75.6	74.4	66.4	64.58	63	61.43	-2.835
Assam	78.2	64.7	69.6	68.05	66.6	65.15	-2.61
Bihar	82	79	75.8	67.13	65	62.88	-3.825
Gujarat	71.1	71.4	69.3	71.36	71.4	71.44	0.0675
Haryana	60.9	59.6	49.4	52.15	50.9	49.65	-2.25
Himachal Pradesh	65.8	53.8	49.4	45.07	42.1	39.14	-5.3325
J & K	61.3	66.9	53.8	47.13	45.1	43.08	-3.645
Karnataka	78.8	78.5	77.7	73.38	72.6	71.83	-1.395
Kerala	53.2	42.8	37.1	35.35	32.8	30.25	-4.59
Madhya Pradesh	87.2	84.2	79.1	80.81	79.9	78.99	-1.6425
Maharashtra	75.3	73.8	71.4	71.54	71	70.46	-0.9675
Manipur	66	78	69.4	61.36	60.7	60.04	-1.1925
Meghalaya	82.5	86	79.2	70.95	69.3	67.65	-2.97
Orissa	78.7	77	65.9	65.84	64	62.16	-3.3075
Punjab	68.1	63.7	54.7	55.06	53.2	51.34	-3.3525
Rajasthan	69.6	67.3	60.2	58.58	57	55.43	-2.835
Tamil Nadu	64	62.2	58.7	58.7	57.5	56.69	-1.4625

¹¹ The information is collected from different rounds of state level NSSO report on Employment – Unemployment situation in India.

Tripura	45.5	45.3	42.4	37.01	35.8	34.59	-2.1825
Uttar Pradesh	76.3	71.8	66.3	66.3	60.9	58.98	-3.465
W. Bengal	64.7	66.4	63.9	63.9	59.4	58.74	-1.1925
India	74.1	71.4	66.5	64.21	62.8	61.39	-2.5425

Source: Compiled from different NSSO round and calculation of column 8 is done by authors.

4.5 Application of Panel data regression technique to identify possible ‘push’ and ‘pull’ factors behind the cause of gradual decline of labour force participation rate in Indian agriculture.

To identify the possible causes behind the gradual decline of labour force participation rate in agriculture one should consider more than two time periods because ‘decline’ is a flow concept. Hence this investigation is based on the secondary data on Employment and Unemployment situations in rural India, provided by National Sample Survey Organization (NSSO) in its different rounds. Simple panel data regression is here applied to evaluate the influence of different pull and push factors responsible for gradual decline of labour force participation rate in agriculture.

Longitudinal data of 20 states in six-time points¹² (1993-94 to 2011-12) are here considered. Seven possible factors including two types of non-farm employments such as construction and self-employment are here taken for this investigation. The possible pull and push factors are considered for this investigation are given below and the theoretical logic for considering these factors is also explained properly.

(i) Average agricultural real wage rate (realw):

The average agricultural real wage rate is an inflation-adjusted wage rate and it plays as push factor in the labour market. Higher real wage will reduce the employment opportunity of labourers in the agricultural sector. Initially, average money wage rates of ploughing, sowing, transplanting and harvesting of i^{th} state in the t^{th} time period is calculated. It is then transformed into real wage on the basis of consumer price index of agricultural labourers in that states in that time period considering 1986-87 as base period.

(ii) Labour force participation rate in the construction sector in percentage form (cons):

The construction industry is the second largest source of employment in the informal sector of India (3.2 percent in 1993-94 and 12.31 per cent in 2011-12 as reported by NSSO) after

¹² Value of different variables of 20 major states of India is collected from six rounds of NSSO report on Employment Unemployment in India. All the considered variables are macro level state specific variables.

agriculture. This sector provides employment opportunities to most vulnerable and marginalized people of society and is therefore considered a possible determinant in this study. It is actually treated here as pull factor. It will be investigated whether gradual decline of labour force participation in agricultural sector is due to gradual migration of the unskilled labour force from agricultural activity to the construction sector.

(iii) General educational attainment (Primary education and above) (edu):

After the economic liberalization (1991), the Indian economy has become more market oriented and competitive. With the new market trend, the non-farm sector has been growing as a major source of rural employment. Sometimes those employers seek educated workers. After the expansion of Sarba Siksha Abhijan Scheme initiated by Government of India and no retention policy, enrolment of both boys and girls in rural primary schools has increased much. Thus, it is important to examine whether advancement of general educational attainment (primary education and above), creates any impact on the labour force participation rate in the agricultural sector or not. Actually, after being educated, a labourer will always want to seek job as skilled labourer where the wage is much higher than the wage rate of an agriculture labourer. It is considered here as push factor.

(iv) The average area of land possessed per household (landp):

In India, marginal land holdings in proportion to total land holding have increased from 50.62 percent (in 1970-71) to 61.58 percent (in 1995-96) [Source: CMIE, Agriculture (March 2006)] even further to 80.8 percent in 2009-10 [NSSO (2006a)]. It is reflected in Table-2. Gradual decline of 'landp' means dominance of marginal farmers in India agriculture. This may transform a rural landholder into agricultural or non-agricultural labour. Previously it was already proved that marginal farmers are not enjoying comparative advantage during the time of seeking employment in India. But it may shrink the employment opportunity for the hired agricultural labourers in the farm sectors. Besides that, the NSSO survey reveals that 56 percent of the agricultural labourers still possess less than 0.01 hectare of land, which is far below the requirement to maintain a minimum standard of living [70th round of Situation Assessment Survey of Agricultural Households (January – December 2013)]. Most of the times they cultivate their own land mainly in the rainy season with the help of family labour force. These marginal farmer households are not generally interested to hire labour during the time of their agricultural activity. High cost of cultivation and 'moral hazard' problem of the hired agricultural labourers are major causes behind it. Therefore, it is investigated whether low per

capita ownership of land holdings is responsible for declining labour force participation rate in the agricultural sector?

(v) The average daily real wage rate for non-farm occupations (nonfw):

It is a pull factor. Average daily real wages (calculated at 1986-87 prices) of unskilled non-farming labourers are smoothing income over years and that may have some impact on employment participation in the agricultural sector.

(vi) The share of non-farm employment in the total employment (nonf):

Rural non-farm employment includes construction, manufacturing, processing, repairs, mining and quarrying, convey, trade, communication, community and personal services, etc. in rural areas¹³. Actually, in rural India, there exist multiple sources of income from various non-agricultural activities at different times in a year [Sujith Kumar (2007)]. Therefore, we have used this parameter as an important indicator of our study. It will be tried to find out whether these non-farm employment opportunities play as pull factor in providing an alternative income to rural households. This may be considered as a possible cause behind decline of labour force participation rate in agriculture.

(vii) Employed by self-employment within non-agriculture (selfe):

One can expect that 'remunerative' income per month from self-employment in real terms, may create a significant impact on the decline in the employment participation rate in the agricultural sector.

4.6 Sources of Data

Employment and Unemployment State wise data for six NSSO quinquennial rounds (1993-94, 1999-2000, 2004-05, 2007-08, 2009-10 and 2011-12) for twenty major states are considered here.

The details of the sources of datasets used in this work are mentioned below:

The share of agricultural employment to total rural employment (both principal status and subsidiary status) is here represented as labour force participation rate in agricultural occupation. Share of construction labour force in total employment (both principal status and subsidiary status), general educational level (primary education and above) per 1000

¹³ This variable includes the construction workers

distribution of rural male, average area of land possessed per household, self-employment within non-agricultural sector (usually per 1000 distribution of household employed) and share of non-farm employment of the total employment have taken from 50th round (1993-94), 55th round (1999-2000), 61st round (2004-05), 66th round (2009-10) and 68th round (2011-12) survey of NSSO.

Furthermore, data related to the agricultural wage rate and non- farm unskilled wage rates for the years 1999-00, 2004-05, 2007-08, 2009-10 and 2010-11 [used as proxy year of 68th round (2011-12)] are taken from Indian Labour Journal, published by the Labour Bureau, Government of India.

4.7 Model and Discussions

Before moving to our investigation, initially the summary statistics of the concerned variables in all the concerned NSSO rounds are given below-

Table 4.2 Summary Statistics of the explanatory variables including outcome variable

Time-Period	1993-94				1999-00			
Variables	Max (State)	Min (State)	Mean	S. D	Max (State)	Min (State)	Mean	S. D
EPA (%)	87.2 (M.P)	45.5 (Tripura)	70.24	10.401	86 (Meghalaya)	42.8 (Kerala)	68.34	11.66
Realw(Rs)	44.15 (Kerala)	9.143 (A.P)	17.61	7.42	48 (Kerala)	12.57 (Odisha)	19.63	7.751
cons (%)	11.9 (H.P)	0.8 (J&K)	4.68	2.22	17.2 (H.P)	1.3 (Manipur)	5.94	4.34
edu (%)	20.7 (Manipur)	4.7 (Meghalaya)	10.83	4.06	21.7 (Manipur)	3.1 (Meghalaya)	12.95	4.9307
landp (%)	2.64 (Rajasthan)	0.3 (Kerala)	1.014	0.535	2.38 (Rajasthan)	0.28 (Kerala)	0.825	0.4831
Nonf(%)	58.3 (Tripura)	16.7 (M.P)	35.3	9.606	60.6 (Tripura)	20.8 (Meghalaya)	38.11	11.32
nonfw (Rs.)	43.79 (Kerala)	15.54 (Tripura)	26.72	9.17	48.67 (Kerala)	18.17 (Tripura)	28.21	9.25
Selfe(%)	20 (Tripura)	6.3 (M.P)	12.925	3.85	22.3 (W.B)	5.7 (Meghalaya)	13.09	3.85
	2004-05				2007-08			
EPA (%)	79.2 (Meghalaya)	37.1 (Kerala)	62.98	12.08	80.81 (M.P)	35.35 (Kerala)	60.79	12.19
Realw(Rs)	50 (Kerala)	15 (A.P)	22.2	8.33	52.15 (Kerala)	13.5 (M.P)	22.302	8.811
cons (%)	18.3 (H.P)	3 (J&K)	7.925	4.78	28.18 (Tripura)	3.68 (J&K)	11.788	6.402
edu (%)	24.4 (H.P)	5.7 (Meghalaya)	14.9	5.24	33.91 (Manipur)	11.18 (Tripura)	19.723	6.591
landp (%)	1.87 (Rajasthan)	0.25 (Kerala)	0.765	0.398	1.44 (M.P)	0.21 (Tamil Nadu)	0.681	0.3571
Nonf(%)	63.2 (Kerala)	24.3 (M.P)	41.59	11.15	68.84 (Kerala)	23.18 (M.P)	44.76	11.878
nonfw (Rs.)	50.67	21.05	30.68	8.66	54.62	20.12	29.97	9.064

	(Kerala)	(A.P)			(Kerala)	(M.P)		
Selfe(%)	21.5 (W.B)	9.4 (M.P)	16.18	3.83	23.77 (Manipur)	8.75 (M.P)	15.97	4.354
	2009-10				2011-12			
EPA	79.9 (M.P)	32.8 (Kerala)	58.91	12.51	78.98 (M.P)	30.25 (Kerala)	57.49	12.94
Realw(Rs)	53.5 (Kerala)	13.77 (M.P)	23.407	9.064	59.53 (Kerala)	15.13 (M.P)	25.691	10.19
cons (%)	31.2 (Tripura)	4.1 (J&K)	12.805	6.976	34.21 (Tripura)	4.512 (J&K)	13.819	7.559
edu (%)	35.8 (Manipur)	11.4 (U.P)	20.99	7.03	37.68 (Manipur)	11.21 (Tripura)	22.245	7.514
landp (%)	1.81 (Rajasthan)	0.18 (W.B)	0.6585	0.4028	1.53 (Rajasthan)	0.17 (W.B)	0.639	0.3503
Nonf(%)	71.7 (Kerala)	24.1 (M.P)	46.11	12.38	74.56 (Kerala)	25.03 (M.P)	47.463	12.931
nonfw (Rs.)	60.27 (Kerala)	18.87 (M.P)	30.59	10.016	63.32 (Kerala)	20.1 (M.P)	32.712	10.948
Selfe(%)	24.9 (Manipur)	9.1 (M.P)	16.405	4.675	24.5 (Manipur)	10.5 (Maharashtra)	16.77	4.373

Source: calculated by the authors.

For the econometric exercise part, initially Multi-co linearity test is used to check whether the above-mentioned explanatory variables have any correlation or not. We can calculate the Variance Inflation Factor ($VIF=1/(1-R^2)$) to detect the multicollinearity or inter-correlations among all explanatory variables. Based on the observed VIF values, the variables can be categorized as collinear (VIF values above 4) or non-collinear (otherwise). From this test, it is observed that average agricultural real wage (10.44) and non-farm unskilled real wage (10.75) are highly inter-correlated as their observed VIF values are more than 4 [as 5 or 10 is considered to be the threshold limit to measure the multi-collinearity, Montgomery (2001)]. Furthermore, it is expected that two pairs of variables such as ('nonf', 'nonfw') and ('nonf', 'cons') are collinear with each other, although their VIF values are less than 4.

Hence, to address our research objective and to avoid the problem of multi-collinearity among the regressors, we have to consider four Regression Equations separately to identify the possible factors responsible on employment participation rate in agriculture (EPA). Here both cross-sectional and time dimensions are considered simultaneously. Hence, for this investigation, Panel data regression technique is used¹⁴. The Equations are as follows.

$$EPA_{it} = f(\text{realw}_{it}, \text{cons}_{it}, \text{edu}_{it}, \text{landp}_{it}, \text{selfe}_{it}) \dots \dots \dots (1)$$

¹⁴ Panel data is used to deal with heterogeneity among the cross-sectional units; here 20 states of India. Though using panel data model, either fixed effect or random effect, the heterogeneity among the states can be taken care of.

$$EPA_{it} = f(\text{realw}_{it}, \text{landp}_{it}, \text{nonf}_{it}, \text{selfe}_{it}) \dots \dots \dots (2)$$

$$EPA_{it} = f(\text{cons}_{it}, \text{edu}_{it}, \text{nonfw}_{it}, \text{selfe}_{it}) \dots \dots \dots (3)$$

$$EPA_{it} = f(\text{edu}_{it}, \text{landp}_{it}, \text{nonfw}_{it}, \text{selfe}_{it}) \dots \dots \dots (4)$$

To estimate the parameters mentioned in Equation (1) to Equation (4), we have to depend on panel data regression technique. Initially through Hausman test in each above-mentioned equation it is proved that fixed effect approach is appropriate for all the four panel data regressions¹⁵. Table-4.3 provides the results of Equations (1), (2), (3) and (4) and in each model EPA is explained variable.

Table 4.3 Fixed effect results: Dependent variable- Employment Participation rate in Agriculture (EPA)

	Equation (1) (Fixed Effect)	Equation (2) (Fixed Effect)	Equation (3) (Fixed Effect)	Equation (4) (Fixed Effect)
Observations	120	120	120	120
Variables	Value of the Coefficient	Value of the Coefficient	Value of the Coefficient	Value of the Coefficient
realw	-0.3677*** (0.0975)	-0.2064*** (0.0662)	-	
cons	-0.3631*** (0.0811)	-	-0.3936*** (0.0918)	
edu	-0.29470*** (0.08909)	-	-0.4518*** (0.08109)	-0.47886*** (.08895)
landp	3.805** (1.957)	2.4022*** (1.296)	-	5.1312*** (2.0989)
nonf	-	-0.7744*** (0.0579)	-	-
nonfw	-	-	-0.23438** (0.1201)	-0.46066*** (0.109792)
selfe	-0.59304*** (0.1018)	-0.1757** (0.07886)	-0.6134*** (0.1072)	-0.57214*** (0.11404)
R ² (with in)	0.7736	0.7739	0.7417	0.6740
F statistics (goodness of fit)	97.19***	272.34***	105.84***	91.77***
Value of Hausman Test (χ^2)	12.93***	18.03***	43.73***	22.74***

Note: *** indicates 1% level of significance and ** indicates 5% level of significance level. Standard errors of the coefficients are written in parenthesis.

¹⁵ Here 'state' is used as cross-sectional unit in different rounds of NSSO data which itself is a geographical unit. We have considered 20 states of India, which means the cross-sectional units cannot be chosen randomly. Hence, fixed effect panel regression is appropriate here.

4.8 Discussions

On the basis of the results shown in Table-4.3, we can draw the following interpretations:

- (i) In Equation (1) and Equation (2), it is observed that enhancement of real agricultural wage is significantly related to the gradual decline of the labour force participation in agricultural sector. This is a push factor. It is obvious that higher real wage rate in agriculture reduces the demand for labour as well as employment generation. As a result of which, labour force participation rate in agriculture is gradually declining.
- (ii) It is observed that expansion of labour force participation rate in construction work (which is a pull factor) is also responsible for gradual decline of labour force participation rate in agricultural activity. Most of the construction activities do not require skilled labour and sometimes they offer higher daily wage than cash wage offered to an agricultural labourer to extract labour from agricultural activity. As a result of which agricultural labourers are possibly migrating from agricultural sector for earning more.
- (iii) Expansion of education among the agricultural workers creates a negative and significant effect on employment participation rate in agricultural sector. Actually, in India, direct cost of education is low and there is still no retention policy still class VIII. A section of people belongs to agricultural labour households not only become literate but also want to continue their education beyond secondary level and probably not interested to work as an agricultural labourer. This result clearly indicates that 1% increase in the literacy rate of primary education (and above) among the rural agricultural workforce results decline of labour force participation rate in the agricultural sector by 0.478 to 0.294 percentage points.
- (iv) It was shown in Table-2 that 80% of the land holding class in India is marginal farmer households. Most of the time, they have to cultivate their own land mainly with the help of family labour force and hire very few labourers from outside. This reduces the employment opportunity in agricultural occupation. According to the results given on Equation (1), Equation (2) and Equation (4) it is observed that this is the major push factor responsible for gradual decline of labour force participation rate in agricultural occupation. Actually, limited employment opportunity is the major reason behind

switching of labour force from agricultural sector¹⁶.

- (v) Gradual expansion of non-farm employment opportunities encourages the agricultural labourers to move towards different non-agricultural activities and with this employment participation rate in the agricultural sector has declined over time. This is a pull factor
- (vi) The average daily real wage rate for rural male non-agricultural workers (unskilled labour) is negatively related to the Employment participation rate in agricultural sector.
- (vii) Similarly, Self-employment within the non-agricultural sector is noted to be significantly negatively related to employment participation rate in the agricultural sector.

4.9 Conclusion

With the development of an economy, there is a natural movement of labour force from agricultural sector. Labourers may move to secondary sector or in non-farm sector. This may be due to better wage in alternative employment opportunities or decline of employment generation in the agricultural sector. In all over India, gradual decline of labour force participation rate in agricultural sector is observed. Both landless and marginal farmer households are generally working as agricultural labourer in India. Due to gradual decline of per capita land holdings, the demand for hired agricultural labourers in agricultural activity is declining which ultimately reduces the labour force participation rate in the agricultural sector. According to our analysis, this is the strongest among both pull and push factor responsible for gradual decline of labour force participation in agricultural activity. Besides that, enhancement of real wage rate in agricultural sector and expansion of education among the agricultural labour households also plays a significant role for gradual decline of labour force participation in agricultural activities. It is also identified that labourers are switching over to construction work and/or other private non-farm activities. Another factor which may possibly play an important role for this gradual decline of labour force participation in agriculture is NREGS. But this is not addressed here because NREGS is applied from 2005 and the beginning time period of this investigation is 1993-94. This may be considered as a limitation of our study.

¹⁶ The sign of the coefficients in all the situations are positive. This is obvious because over time per capita land holding is declining and with this labour force participation rate in agriculture is also declining.

Chapter 5 - Gender Wage Gap in The Agricultural Labour Market of India: An Empirical Analysis

Chapter 5 - Gender Wage Gap in The Agricultural Labour Market of India: An Empirical Analysis

5.1 Introduction

The gender wage gap, the difference between male and female average wage rate has long been noted and debated in the Indian agricultural labour market. It is observed that the female agricultural labourers do not enjoy an equal or equivalent wage rate for the same or equivalent work as compared to the male agricultural labourers. In 1976, the Equal Remuneration Act was adopted for equal pay both of male and female agricultural labourers for the "same work or work of a similar nature" to protect the rights of the female labourers against unfair wage practices. Still, it is observed that the female wage rates are not yet equal or equivalent to the male wage rates. Instead, an absolute gender wage disparity has been observed over time. As per census 2011, among the total rural workforce, female labourers classified as farm labourers is 38.9 percent compared to the 20.8 percent male agricultural labourers. Mencher and Saradmoni (1982) have observed that the female labourers, mainly among the landless (or marginal farmer) households contribute more than half (or close to half) of the total family income and most importantly without the women's income; these households might not be able to fulfill their basic needs¹⁷. Despite performing similar work under the same working condition, the female labourers are mostly unorganized and unaware of their constitutional rights. Therefore, more than 90 percent of the rural females are treated as a cheap and secondary source of labourers [Javeed & Manuhaar (2013)].

In Indian agricultural labour market, it is believed that female agricultural labourers cannot do heavy work due to their low muscle strength and malnutrition¹⁸. It is often argued that the male labourers due to their greater physical strength and energy are more productive and efficient than the female labourers and hence from the point of view of the employer; the male labourers deserve to have better wage rates and more person-days compared to the female labourers even for the same agricultural task [Kundu (2013)]. It is observed in every state of India that the female agricultural labourers are not employed during the time of ploughing. Even for the gender-neutral tasks such as weeding, sowing, transplanting, and harvesting, the female

¹⁷Agriculture is seasonal. The male members of the household who are unskilled sometimes migrate to other areas or join any better paid non-farm job. The women must stay with the family and supplement the family income they vigorously work as agricultural labourers even at a low wage.

¹⁸During the time of agricultural production; still, a large section of landlords gives more importance on the physical capacity of the hired labourers.

labourers are still largely discriminated from the male labourers in terms of wage rates. In this background, we shall try to understand the trends in the wage gap between the male and female agricultural labourers during 2010-11 to 2015-16 and identify the possible factors which are mainly responsible for this gender-related wage discrimination in the agricultural labour market of India. Besides that, we want to identify some policies which can reduce or remove this gap among the hired labourers in the farm sector.

5.2 Literature Review

There has already been a substantial amount of research studies on various dimensions of agricultural labourers since the first Agricultural Census initiated by the Government of India in 1970-71. Unni (1988) has tried to capture the trends in employment and wages for agricultural labourers across 14 major states in India. The paper has explained how the fluctuations in real wages and agricultural output have adversely reflected on the living standards of the labourers over the years. Although the annual money and real wage earnings for female labourers have been increasing at a faster rate than that of the male labourers, average female earnings have remained much lower than that of the male labourers during the period between 1956-57 and 1977-78. Chavan and Bedamatta (2006) have analyzed that the long-term trends of the real agricultural wages of male and female labourers based on secondary data from agricultural wages of India (AWI) and Rural Labour Enquiry (RLE) across 17 major states in India during the period between 1964-65 and 1999-2000. By deflating money wage series into real wage series using both the retail price index of cereals and Consumer Price Index of Agricultural Labourer, their study has found that the real wages of male labourers have been increasing at a much faster rate than that of the female labourers.

Consequently, male-female gender wage disparity has widened across states between 1987-88 and 1993-94. Furthermore, the paper has also compared the male and female real agricultural wage rate with the statutory minimum wage rate and concluded that the male agricultural wage rate exceeds the minimum wage rate whereas the female agricultural wage rate is far below the statutory minimum wage rate. Using two data sets - Agricultural wages in India (AWI) and Wage Rate in Rural India (WRRI), Usami (2011) has compared the patterns of the wage differential between agricultural labourers and the rural non-farm labourers. She has also captured the regional variation of the real wage rates and identified the states with higher wage rates (Rs. 40 and above) are Kerala, J&K, HP, Punjab, and Haryana while, states with lower wage rates (Rs. 15 and less) are M.P, Bihar, Orissa, UP and Karnataka. Jose (2013) has tried to capture the fluctuations in both the male and female wages in monetary and real terms across

different states in India based on the various rounds of NSSO data during 1999-2000 and 2009-10. His study has measured the gender wage disparity by calculating the ratio of women's wage to that of men's. It was shown that the concentration of gender wage disparity (threshold is above 75 percent) is high in the southern states such as Kerala, A.P, Karnataka and Tamil Nadu, whereas, the states with low gender wage disparity (below 75 percent) are Haryana, Punjab, and Rajasthan.

Inter-state comparison of agricultural wages between male and female labourers at an aggregate level is not easily amenable during a specific time frame as the states are experiencing various agro-climatic conditions and crop cultural practices. It is better to understand some of the explanatory factors subject to the wage variation at a state level which can explain the observed gender wage inequality in agriculture [Jose (1988), (2013)]. In this field, Acharya (1989) has attempted to analyze the disaggregated wage series of male and female separately over 320 districts in the country during 1970-85 and used the semi-logarithmic regression equation to determine the growth and trend in the agricultural wage rate. He has shown that migration, distribution of land asset and occupational diversifications have driven the farming wage rate to reduce regional wage variation. Several empirical studies have observed that the MGNREGA impacts positively on women workers in the rural labour market [Chandrasekhar & Ghosh (2011)]. Using data from 2004-05 NSSO survey, Dasgupta and Sudarshan (2011) have also found that that women's participation in the MGNREGA has been increasing over the years and is negatively correlated with the existing gender wage gap in the unskilled agricultural labour market. This relationship can be explained adequately if we consider at least six financial years. But that is absent in the above analysis. To identify the impact of MGNREGP on the labour force participation, Azam (2012) has examined two additional factors such as public works participation and casual real wages on the gender wage gap based on the NSSO data during 1983-2004. By applying the difference-in-difference method, the paper has observed that the female wage rate is 8% higher in the districts where MGNREGA has been implemented than the districts where it is yet to be functioning. MGNREGP that pay the minimum wage, targeting women during post rainy season can help to reduce the gender wage gap in the agricultural labour market. Narayan (2008) based on her research in rural Tamil Nadu observed that this public work program has benefitted rural women. Mahajan (2017) explained that cultural restriction on female labour supply and influence of non-farm employment opportunities among male labourers in the rural area is the reason behind the gender wage gap in the agricultural labour market. Their study identified

55% on gender wage differential among the northern and southern states of India, and they got 45% variation as unexplained. In another critical study, Jose (2013) has recognized several possible variables such as growth rate of NSDP (Net State Domestic Product) per capita, demographic dividend and migration, MGNREGA and social spending as determinants of the rural wages, which can explain the differential growth rates of wages over time. But no specific study has yet to be done to determine the possible factors due to which in some states the gap is wider, and, in some states, it is not so wide. Here, we have considered some of the potential factors such as female's employment participation in MGNREGA, female education along with three additional factors namely the land use cropping intensity, the total number of self-help group in the state and social expenditure as a percentage of NSDP in order to investigate whether these can play a significant role in explaining the variations of the gender wage discrimination across Indian states.

5.3 Research Objectives

In this chapter initially, we want to investigate the nature of variations of the money wage gap between male and female agricultural labourers across 18 major states in India over the period between 2010-11 and 2015-16.

Secondly, we shall try to identify the possible factors which can reduce this gender-based wage discrimination among the agricultural labourers in India. Here, state is considered as a unit.

5.3.1 Variations of the gender wage gap: Inter-state comparison

This investigation is based on the secondary data available in 'Agricultural wage income (AWI) in India, which is provided by the Directorate of Economics and Statistics (DES), Government of India. The longitudinal data for 18 major states at six-time points (2010-11 to 2015-16) is considered here¹⁹. To understand the changing scenario of the gender wage discrimination of agricultural labourers during the mentioned period, two indicators— ranking of states based on average daily money wage and absolute gender wage gap are initially considered.

Initially, the average money wage rate of the agricultural labourers (both male and female) in 18 major Indian states in the concerned periods are considered. Then, the rank of 18 major states in India on average money wages has separately been constructed for male and female agricultural labourers over 2010-11 to 2015-16.

¹⁹ We consider this time-period because from 2010 onwards there is a tremendous expansion of MGNREGP in almost all the districts of India. Besides that, we have observed the increase of Self-Help Group among village women in all the states.

Table 5.1 Ranking of Indian States by Average Daily Money Wage of Male and Female Agricultural Labourers

State	2010-11		2011-12		2012-13		2013-14		2014-15		2015-16	
	M	F	M	F	M	F	M	F	M	F	M	F
Andhra Pradesh	4	6	5	6	5	7	5	9	6	7	5	11
Assam	13	12	11	13	11	11	9	11	9	10	10	10
Bihar	10	8	12	12	8	5	12	10	12	8	13	9
Chhattisgarh	18	18	17	18	17	18	17	17	16	17	16	17
Gujarat	12	10	13	9	16	13	15	13	15	13	17	15
Haryana	2	2	2	2	2	2	2	2	2	2	2	2
Himachal Pradesh	6	4	7	5	7	4	10	5	8	4	7	3
Jharkhand	14	11	18	14	18	17	16	14	17	14	15	14
Karnataka	8	5	8	4	9	6	7	4	5	3	8	5
Kerala	1	1	1	1	1	1	1	1	1	1	1	1
Madhya Pradesh	15	13	14	11	14	12	13	12	14	12	14	12
Maharashtra	17	16	16	17	13	14	18	18	18	18	18	18
Orissa	16	17	15	16	15	15	14	15	13	15	12	13
Rajasthan	7	14	6	10	6	8	6	6	7	5	4	4
Tamil Nadu	5	15	4	15	4	16	4	16	3	16	3	16
Tripura	3	3	3	3	3	3	3	3	4	6	6	6
Uttar Pradesh	11	7	10	8	10	9	11	8	11	9	11	8
West Bengal	9	9	9	7	12	10	8	7	10	11	9	7

Source: Calculated by authors.

Table-5.1 shows the ranking of average money wage rate (both male and female) of 18 major states of India between 2010-11 to 2015-16. Due to substantial variations of the money wage rate, it is quite difficult to observe any definite trends of ranking across states over the years. As for male agricultural wage rate, among the eighteen states, only in three top-ranking states- Kerala, Haryana and Tripura and the three bottom-ranking states- Chhattisgarh, Maharashtra, and Jharkhand have invariably shown their same ranking position throughout the period. The ranking of the above states as reported by female wage rate is also shown a similar pattern that of male labourers.

5.3.2 Gender disparities in average money wage rate

Now the gender wise wage gap in the agricultural sector in our concerned periods (between 2010-11 to 2015-16) in 18 major states of India is considered. It is presented in Table-5.2. The gender wage gap in absolute magnitude is calculated as the difference between male and female average money wage rate. It is calculated as the difference between average money wage rate

of the male agricultural worker in a state in any particular time and the average money wage rate of the female agricultural labourer of that state in that period. Here we have considered the money wage rate instead of the real wage rate because the farming labourers are suffering from money illusion due to their illiteracy and ignorance about the real purchasing power of commodity bundle. So, during the time of wage determination, both male and female agricultural labourers give more importance to money wage rate [Kundu (2006)]. This measurement is also better because, during the time of comparing gender wage gap of different states in a particular time or same state in different periods, this gender-based wage gap in monetary terms can be utilized as an indicator in a much better way.

Table 5.2 Gender Wage Gap in The Agricultural Sector in the 18 Major States of India in Different Years (in Terms of Rupees)

State	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Andhra Pradesh	38.29	53.02	68.12	66.78	82	95.53
Assam	22.33	28.8	39.15	42.95	52	44.83
Bihar	17.39	25.31	18.37	20.11	10	12.4
Chhattisgarh	18.76	29.75	36.69	45.68	52	46.84
Gujarat	11.85	14.25	15.72	16.9	24	20.3
Haryana	39.89	51.58	46.63	49.22	64	66.72
Himachal Pradesh	30.13	28.92	25.08	20.19	19	23.83
Jharkhand	6.15	4.5	8.75	14.08	16.72	11.9
Karnataka	5.01	18.58	19.59	22.2	44	27.36
Kerala	70.04	81.14	96.86	111	130	149.44
Madhya Pradesh	11.37	14.62	17.97	22.53	25	29.34
Maharashtra	20	28.12	50	25.46	52	60
Orissa	22.72	30.67	33.31	43.63	47	51.2
Rajasthan	58.11	65.25	51.89	48.91	58	53.01
Tamil Nadu	77.01	98.21	133.4	130.57	173	192.66
Tripura	47.3	62.86	72.63	70.87	68	62.94
Uttar Pradesh	8.3	19.53	25.49	22.87	35	22.3
West Bengal	19.9	25.52	29.74	32.91	45	40.22
All India	32.89	45.03	49.14	50.3	64	63.56

Source: Calculated by the authors.

Table-5.2 shows gradual enhancement of the male-female wage gap among the agricultural labourers in the states like Kerala, Tamil Nadu, Andhra Pradesh. In Jharkhand, Gujarat, Bihar,

and Uttar Pradesh, the absolute gender wage gap is observed low over the years. Out of the eighteen states considered here, only in three states, i.e. in Bihar, Himachal Pradesh, and Rajasthan, the absolute gender wage gap has shown a declining trend over 2010-11 to 2015-16. The most obvious fact from the Table-5.2 is that there is no clear, definite trend towards an increase or decrease of wage disparity in absolute monetary terms showing the prevalence of substantial variations of gender wage gap across states during our period of analysis. To explain this paradoxical situation of gender wage gap, Chen (1989) has examined the variation of female labour force participation rate based on six agro-ecological conditions in India and observed that female labour force participation rate is higher in the rice-growing belt of the eastern and southern states compared to wheat growing belt of the North-Western states. The structural constraints of each specific state such as gender biases and caste linked social barrier restrict the women's employment participation in the agricultural labour market especially in rain-fed paddy growing states such as West Bengal, Orissa, and Bihar. Agarwal (1984, 1986) has also shown that female labour force participation rate is higher in high productive paddy growing states like Andhra Pradesh.

5.4 Investigating the possible factors for reducing the gender wage discrimination in agriculture

In these circumstances, there is a need to examine the possible factors which are responsible for gender wage discrimination in the Indian agricultural labour market. Panel data regression is applied here to evaluate the influence of different factors possibly responsible for reducing the gender wage gap in agriculture.

Before going for this investigation, we initially calculate the Gender Wage Gap Index (GWPI) of each state in each period in the Agricultural Labour Market²⁰. This is used here as an explained variable in this investigation. Gender Wage Gap Index²¹ of the i^{th} state in the t^{th}

²⁰ Absolute value of the gender wage gap can take identical value both at the higher mean value of the male wage rate as well as the low value of mean male wage rate. To overcome this difficulty, we have calculated the Gender Wage Gap Index of each state in each time-period.

²¹ In the context of our study, the Sopher's index (1974) and the Sopher's modified index by Kundu & Rao (1983) may not be applicable. These two measurement techniques are mainly used for identifying the disparity of literacy between males and females or the urban and rural areas. The standard formulae of these two indices are as-

$$\text{Sopher's Disparity Index} = \log\left(\frac{x_2}{x_1}\right) + \log\left(\frac{100 - x_1}{100 - x_2}\right)$$

$$\text{Modified Disparity Index of Kundu \& Rao} = \log\left(\frac{x_2}{x_1}\right) + \log\left(\frac{200 - x_1}{200 - x_2}\right)$$

Suppose, in our study, x_1 indicates male wage rate and x_2 shows female wage rate; where, $x_1 \geq x_2$. After calculating these two indices for the gender wage gap, it is seen that some of the log values of the two indices would be negative as the male wages of some states such as Kerala, Tamil Nadu, and Haryana, etc. are witnessing

period this measured in the following way:

$$GWPI_{it} = \frac{\text{Mean Male Agricultural Wage Rate}_{it} - \text{Mean Female Agricultural Wage Rate}_{it}}{\text{Mean Male Agricultural Wage Rate}_{it}} \times 100$$

The higher value of GWPI indicates more gender-based wage disparity in the agricultural labour market. Now to identify the possible factors which can reduce this disparity over time, we have taken the help of Panel data regression. The chosen explanatory variables in our investigation and the theoretical justifications behind choosing these explanatory variables are given below:

- I. Percentage of the female population (Age group 15-49 years) by the level of primary education in India (priedu): The main aim of the National Policy on Education, 1968 was to promote the women's education at a minimum direct cost which would bring social justice and help to accelerate social transformation. National policy on Education, 1986 has further stressed on reducing the gender disparity by providing the basic education to women as literacy is the instrument of their empowerment and self-awareness and living standard. Recently we observe the expansion of Sarva Shiksha Abhiyan and implementation of the right to education act. It is therefore hypothesized that the higher percentage of primary education for a female would have a positive impact on agricultural wage of the female labour force. Better educational attainment may help the women to get better bargaining power which is expected to reduce gender disparity in terms of wage.
- II. Percentage of women's participation in MGNREGP (wpermgnrp): An important aspect of Mahatma Gandhi National Rural Employment Guarantee Programme (MGNREGP) is equal wage to both male and female participant in any state or region in any particular period. Percentage of women's participation in MGNREGP in a state in a year is calculated by dividing the total number of days of employment participation of women of that state in that financial year by the total number of person-days generated in MGNREGP in that state in that particular financial year. In most of the states, MGNREGP wage rate is determined at least above the market wages for the female agricultural worker (Jose, 2013). Figure stated in Table-5.5 in Appendix shows that the states such as Assam (2010-11), Chhattisgarh (2010-16), Jharkhand (2010-12

more than Rs. 400 during the year 2013-14 to 2015-16. Therefore, the Sopher's Disparity Index and the Modified Kundu and Rao's Disparity Index may not be appropriate in this study for measuring the state-level gender wage discrimination among the agricultural labourers in India.

and 2014-15), Madhya Pradesh (2010-11), Maharashtra (2010-11) and Orissa (2010-16) are experiencing wage rate in MGNREGP which is in between the female and the male agricultural wage rates. MGNREGP wage rate creates a little impact on the wage rate of the farm labourers in West Bengal (Kundu 2016). But no proper investigation has yet done to investigate whether the expansion of MGNREGP among unskilled female labour can reduce the gender wage gap in the agricultural labour market. The agricultural wage of female farm labourers may be directly affected because through participation in MGNREGP, a female labourer gets alternative employment opportunity and due to a decrease of female labour supply, the wage rate of the female labourer in the agricultural sector may be enhanced. Therefore, it is investigated whether a higher percentage of women's participation in MGNREGP can play an important role to reduce the gender wage gap in agriculture?

- III. **Cropping intensity (cropint):** In agriculture, higher cropping intensity²² is one of the possible demands inducing factors of labour. An increase in cropping intensity through multiple cropping leads to higher demand for both male and female labourers. In a male-dominated village community, the unskilled male labourers always have alternative employment opportunities in the private non-farm sector or MGNREGP or through migrating to other areas. Due to cultural and other family-related factors, female members have little alternative opportunity mainly outside the native village. So, when the farmer has to hire labour for agricultural production, he has to employ female labourers besides male labourer mostly during the time of harvesting or threshing. The higher demand for female labour is expected to push up the wage rate of the female agricultural labourers which may be negatively associated with the gender wage gap in the farm labour market.
- IV. **A total number of Self-help groups in the state (shg):** Microcredit system has already established itself an instrument of income generation among village women. Besides that, it plays a significant role to enhance the empowerment of participating women. Expansion of the microfinance system indicates more participation of village women mainly married in different types of economic activity which help them to enhance their earnings. In India, the microfinance system is operating under the joint liability credit

²² It refers to rising of several crops for the same field during one agricultural year. It is constructed as $\sum(GCA_i)/NSA * 100$, where, GCA=Gross cropped area (ha.) in season i, (i = 1, 2, ..., n) and NSA=Net sown area (ha.) in a year.

contract mainly through the formation of Self-Help Groups. More involvement of rural women in the microfinance system will reduce female labour supply in the agricultural labour market. Besides that, it enhances empowerment among the participating women. Based on labour market function, reduction of female labour supply during the time of agricultural production can enhance the female wage rate. At unchanged male wage rate, this may reduce gender discrimination in the labour market.

- V. Total social expenditure as a percentage of Net State Domestic Product (socialexp). Due to spending on the social sector by the state government through spending on healthcare, shelter, civic amenities, the capability of the poor rural households have increased. Better capability can reduce the multi-dimensional poverty of rural households. This may discourage the female members of the households from joining in the unskilled labour force. Hence, the female labour supply in the agricultural labour market will be decreased which can enhance the wage rate of the female agricultural labourer and can reduce gender wise wage gap.
- VI. Net land irrigated area (netlandirr): Cropping intensity of a state in any particular time depends on 'Net irrigated area'²³ of that state in that period. It is expected that, if major parts of the cultivatable land of a state are irrigated, the farmers of that state may move towards multiple cropping which means better cropping intensity of that state. It is assumed that better irrigation facility may not directly create any impact on the male-female wage gap in the agricultural labour market but can influence through enhancing cropping intensity. Here, this is treated as an instrumental variable of cropping intensity.

There are several other factors like labour force participation rate of rural women in private non-farm sector, the participation of family labour force (mainly the female member of the farmer household) during the time of agricultural production may influence gender-based wage disparity in the agricultural labour market. But due to lack of availability of the state-wise data of those factors in our concerned period, the factors as mentioned earlier cannot be incorporated in our investigation model²⁴.

²³ The Net irrigated area is the actual land area on which irrigation is done for growing crops for as many times as many in one agricultural year.

²⁴ In this investigation, those variables are considered as explanatory variables which can influence the gender-based wage gap in the agricultural labour market.

5.5 Sources of data

In this investigation, we consider 18 major states²⁵ of India and six-time points: from 2010-11 to 2015-16. The variables which will be considered in our study are already explained. Theoretical justifications behind consideration of those variables have also given. Now we mention the details of our data source which are as follows:

- (i). Data related to male and female agricultural wages of the 18 states of India are taken from various rounds of Agricultural Wages of India (AWI), published by Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India.
- (ii). Data on the percentage of the female population (Age group 15-49 years) by the level of primary education in 18 states of India are taken from the Annual reports of Ministry of Home Affairs, Government of India.
- (iii). Percentage of female's participation in MGNREGP in terms of person days is calculated from various Annual Report of 2010-11, 2011-12, 2012-13, 2014-15 and 2015-16, published by the Ministry of Rural Development, Government of India.
- (iv). Data related to Cropping intensity of different states in different periods are taken from the various reports (from 2010-11 to 2015-16) published by the Ministry of Agriculture and farmers welfare, Government of India.
- (v). Information on State-wise total number of Self-Help groups (in lakhs) in India in different time periods are available from Lok Sabha Unstarred Question Number 3749, dated on 27.04.2012, Question Number 322, dated on 23.11.2012, Question Number 947, Dated on 04.12.2015, Question Number 487, dated on 26.02.2016, Question Number 5044, Dated on 31.03.2017, Question Number 2434, Dated on 09.03. 2018²⁶.
- (vi). Information related to state wise expenditure on social sector in the different financial year and Net State Domestic Product of a particular state in a specific financial year is taken from the 'Handbook of Statistics on State Government Finances-2010' and various issues of 'State Finances: A Study of Budgets', Reserve Bank of India.

²⁵ A state-level analysis provides an aggregate scenario of the country's gender wage gap of the agricultural labourers from different perspectives. The macro-level state-specific variables are only considered here as the explanatory variables in the econometric model.

²⁶ Source: Indiatat.com

(vii). Information related to the net irrigated area of different states of India in different periods are compiled from the various reports (during 2010-11 to 2015-16) of Ministry of Agriculture and Farmers welfare, Government of India.

5.6 The Econometric Investigation

Before moving towards our investigation; initially one should look at the summary statistics of the explanatory variables considered here. That is presented in Table-3.

Table 5.3 Summary Statistics of the explanatory variables which can explain the Gender Wage Gap Index in the agricultural labour market in India

Year	2010-11				2011-12			
Variables	Max	Min	Mean	S. D	Max	Min	Mean	S. D
GWPI	48.04	3.84	19.18	11.10	50.19	4.34	20.93	11.28
priedu (%)	17.30	8.00	12.54	2.75	17.30	8.70	12.64	2.65
wpermgnrp (%)	93.23	14.74	44.90	19.62	92.91	17.16	45.84	19.05
shg (number)	2.676	0.013	0.352	0.647	8.445	.058	2.163	2.105
cropint (%)	184.90	115.10	138.91	21.58	184.70	113	139.16	21.90
socialexp (%)	14.975	4.608	8.488	2.75	15.443	5.447	8.85	2.76
Year	2012-13				2013-14			
GWPI	54.36	7.34	20.68	11.28	51.57	9.10	19.47	10.62
priedu (%)	16.70	8.00	12.36	2.62	17.80	7.10	12.96	2.91
wpermgnrp (%)	92.62	18.76	46.01	20.22	92.59	20.75	47.31	18.60
shg (number)	14.214	0.104	3.974	3.628	14.18	.0914	4.05	3.716
cropint (%)	181.70	113.00	138.96	22.47	185.00	115	141.69	21.85
socialexp (%)	15.22	5.91	9.32	2.88	15.78	5.76	9.91	3.145
Year	2014-15				2015-16			
GWPI	57.10	9.10	19.47	10.62	57.60	5.77	19.84	12.80
priedu (%)	17.80	6.10	12.99	2.97	18.00	6.20	13.25	3.00
wpermgnrp (%)	92.16	24.77	48.92	18.29	91.32	29.28	50.53	17.16
shg (number)	9.872	0.0828	3.90.091	3.13	9.62	0.42	4.0	3.21
cropint (%)	185.97	114.67	142.62	22.16	188.13	114.30	143.55	22.59
socialexp (%)	22.81	6.629	11.53	4.12	25.82	7.312	14.24	5.808

Source: Calculated by authors

Table-5.3 shows that the mean value of all regressors has increased from 2010-11 to 2015-16. Among the five variables considered here, Standard Deviation (SD) of ‘priedu’ is the lowest.

We consider the following Panel Econometric model:

$$GWPI_{it} = f(\text{priedu}_{it}, \text{wpermgnrp}_{it}, \text{shg}_{it}, \text{socialexp}_{it}, \text{cropint}_{it}, a_i, u_{it}) \dots \dots (1)$$

$$\text{cropint}_{it} = f(\text{netlandirr}_{it}, v_{it}) \dots \dots \dots (2)$$

Here $i = 1, \dots, 18$, and $t = 1, \dots, 6$.

Here $GWPI_{it}$ indicates gender wise agricultural wage gap Index of the i^{th} state in the t^{th} period. Similarly, priedu_{it} , wpermgnrp_{it} , shg_{it} , socialexp_{it} , and cropint_{it} represents, percentage of female population got primary education, percentage of women’s participation in MGNREGP in terms of man-days, total number of Self-Help groups, percentage of Net state domestic product spent on social sector and Cropping intensity of the i^{th} state in the t^{th} time period. It is assumed that the cropping intensity of the i^{th} state in the t^{th} period is endogenous²⁷ and very much dependent on net cropped area²⁸ of that particular state for that specific period. Here ‘ a_i ’ shows the unobserved effect of the i^{th} state which does not change over time. In Equation (1) priedu_{it} , wpermgnrp_{it} , socialexp_{it} and shg_{it} can be treated as policy variables which are correlated with a_i which can be considered as the state-specific socio-economic condition of the rural people. It is assumed that a_i is time-invariant in our concerned time-period²⁹. Besides that, we consider 18 major states of India which cannot be considered as random in nature. As the cross-sectional unit is here stated (a large geographical unit) we should apply Fixed effect estimation method of our balanced panel data without going for Hausman test³⁰. Initially, we allow explanatory variable here cropint_{it} mentioned in Equation (1) to be correlated with the u_{it} . To allow for correlation between the regressor and the idiosyncratic error, we consider the existence of netlandirr_{it} which is strictly exogenous. Here netlandirr_{it} should be uncorrelated

²⁷ Cropping intensity of the i^{th} state in the t^{th} period may be correlated with the disturbance term of Equation (1) which accommodates agricultural production related factors like availability of family labour force of the farm household and use of modern equipment in the production process. Both these factors reduce hired labour demand during the time of agricultural production and can influence gender wise wage gap of the hired agricultural labourer. But we cannot accommodate those items in our original model because of lack of availability of state-level data. Other explanatory variables are uncorrelated with the disturbance term.

²⁸ It is uncorrelated with the disturbance term mention in Equation (1)

²⁹ Participation of rural women of a state in the local informal labour market or any other income generating activity is very much dependent on the socio-economic condition of the rural households of that state.

³⁰ Incidentally, the Hausman test in our regression supports Fixed Effect model. The value of the $\chi^2 = 21.71$ which is significant at 1% level.

with u_{it} . Since Fixed Effect estimate involves time dimension, we have found both $cropint_{it}$ and $netlandirr_{it}$ are time varying.

Initially, the test for endogeneity is required to detect whether the endogeneity as mentioned above is correct or not. If that is correct, then only we can use Instrumental variable estimation in the above panel regression.

To test the endogeneity, we have taken the help of the following two procedures:

1. We regress the endogenous variable ‘cropint’ on exogenous regressors of Equation (1) and the instrumental variable ‘netlandirr’ of Equation (2): Then the augmented equation becomes

$$\begin{aligned} cropint_{it} = & \alpha_1 (priedu_{it}) + \alpha_2 (wpermgnrp_{it}) + \alpha_3 (shg_{it}) + \alpha_4 (socialexp_{it}) \\ & + \alpha_5 (netlandirr_{it}) + \varepsilon_{it} \dots \dots \dots (3) \end{aligned}$$

We have applied the Fixed effect model³¹.

2. Next, we have estimated the residual form of $cropint_{it}$ using fixed effect model and get the Fixed effect residual $\widehat{\varepsilon}_{it}$.
3. After that, we estimate the following augmented equation after introducing $\widehat{\varepsilon}_{it}$ another explanatory variable in the original equation.

Then the new equation becomes:

$$\begin{aligned} GWPI_{it} = & \beta_0 + \beta_1 (priedu_{it}) + \beta_2 (wpermgnrp_{it}) + \beta_3 (shg_{it}) + \beta_4 (socialexp_{it}) + \theta_1 \widehat{\varepsilon}_{it} \\ & + u_{it} \dots \dots \dots (4) \end{aligned}$$

Here the Null Hypothesis is $\widehat{\theta}_1 = 0$. If we accept the Null Hypothesis, then there is no existence of endogeneity in our model. But if we reject the Null Hypothesis, then we can conclude the presence of endogeneity in our model, and we have applied the Instrumental variable estimation method in our Fixed effect Panel data regression analysis. This proves that without using Instrumental variable estimation procedure, we will get an inconsistent estimator in simple fixed effect model.

Here the parameter estimates of $\widehat{\varepsilon}_{it}$, i.e. $\widehat{\theta}$ is significant. This study rejects the null hypothesis

³¹Fixed effect, and Random effect estimation assumes strict exogeneity of the instrument conditional on the unobserved effect. Random effect estimation adds the assumption that the Instrumental variable is uncorrelated with the unobserved effect. Besides that, Fixed effect instrumental variable works when the instrument varies over time. That is happening here. But in Random effect, the instrumental variable can be constant over time.

and establishes the presence of endogeneity in our model. We, therefore, applied the instrumental variable analysis in fixed effect panel regression after considering the net irrigation area (netlandirr_{it}) as an instrumental variable of cropping intensity (cropint_{it})³².

We also have again examined Instrumental variable regression analysis through Two-stage least square (2SLS) method whether the instrumental variable is weak or strong in our study. The instrumental variable will be weak if the joint significance (effect of the endogenous variable on the instrumental and exogenous variable) of the partial F-statistic test is less than 10. Our study shows that the robustness of the F statistic is 12.36 and that is more than 10. Hence, the result indicates that the net irrigated area (netlandirr) is a strong instrumental variable for the cropping intensity (cropint) data.

Besides the endogeneity test, we have also examined the multi-collinearity test among the variables. Multi-co linearity test is used to check whether the above-mentioned explanatory variables have any correlation or not. We can calculate the Variance Inflation Factor ($\text{VIF}=1/(1-R^2)$) to examine the multi-collinearity or inter-correlations among all explanatory variables. Based on the observed VIF values, the variables can be categorized as collinear (VIF values above 4) or non-collinear (otherwise). From this test, we can conclude that all given explanatory variables are not suffering any multi-collinearity problem as their observed VIF values are less than 4.

Now we move to Fixed effect panel data regression after using Instrumental variable method to investigate the influence of any explanatory factor mentioned in Equation (1) on the gender wage gap in the agricultural labour market. Table-5.4 provides the result of the fixed effect panel data regression analysis.

Table 5.4 Fixed effect results: Dependent variable- Gender Wage Gap Index in the Agricultural Labour Market of India

Observations	102
Variables	Value of the Coefficient
priedu (Primary education for female)	-1.083** (0.6823)
wpermgnregp (Percentage days of the female of MGNREGA)	0.6632 (0.6865)

³² It is obvious because in our model due to lack of availability of different state-level data which may influence gender-wise wage gap in the agricultural labour market, we have limited scope for taking large number of explanatory variables. Besides that, here both T and N are not too large. For this reason, we have applied the Fixed effect estimation procedure. Hausman test also supports our claim.

shg (total no. of SHG in the state)	-0.0032* (.000275)
cropint (Cropping intensity)	-1.32** (1.034)
socialexp (expenditure on social sector as a percentage of Net State Domestic Product)	-.3241 (0.2395)
Constant	4.3269*
R ² (within)	0.3401
Wald $\chi^2(5)$	2578.45***
F (16,80)	26.93***

Note: *** indicates 1% level of significance, ** indicates 5% level of significance and * indicates 10% level of significance. Standard errors of the coefficients are written in the parenthesis

5.7 Discussion

Based on the results given in Table-4, we can observe the following interpretations:

- The spread of primary education among the female population plays a decisive role in reducing gender discrimination in terms of wage among the female labourers. Expansion of education among female mainly in the rural areas generate awareness about rights among the female labour force which helps their bargaining strength during the time of deciding female farm wage. Besides that, it is also observed that after getting an education, the female members in the rural areas become less interested in working as unskilled labour in the agricultural sector which reduces female labour supply in that sector. Due to those two above reasons, the study shows that the states where the spread of female education at the elementary level is high, the male-female wage gap in the agricultural sector has become less.
- It was expected that the spread of MGNREGP work among the female labour force should play a positive role in gender discrimination in terms of offering wage during the time of agricultural production. But our result shows that expansion of MGNREGP work among the female labour force does not create any impact of the male-female wage gap in the farming sector. This result contradicts the earlier investigation of Azam (2012).
- Now a day, the microfinance system under joint liability credit system through forming Self-Help group becomes very popular in rural India. The group members are mainly the local village woman. Through participating in the microfinance programme, the rural women have got an alternative source of income, and gradually they have become

- an earning member of their family. They are not so much willing to work as an agricultural labourer. Resultantly, the supply of local labour in the agricultural sector has declined³³. Due to less supply of female agricultural labourer, the willing female labourers get comparatively higher wage during agricultural peak season which ultimately can reduce gender discrimination in terms of wage in the agricultural sector.
- d) Cropping intensity is seen to be negatively associated with the gender wage gap. It is observed from our investigation that enhancement of cropping intensity can play a most positive role to reduce gender wise wage gap in the agricultural labour market in India. Except ploughing, the female workers are employed in almost all activities in agriculture, i.e. from land preparation to seed selection, planting, weeding, pest control, harvesting, crop storage, handling, marketing, and processing [Ghosh, Ghosh (2014)]. High cropping intensity in a state indicates multiple cropping in the post-rainy season. Lack of enough supply of male agricultural labourers during that time is a cause behind inclination to employ female agricultural labourers³⁴. An increase in female labour demand can stimulate the wage, which can reduce the gender wise wage disparity.
- e) Expenditure on the social sector by the state government may reduce capability deprivation among the poor agricultural labour households, but that fails to minimize the gender-based wage gap in the agricultural labour market.

5.8 Conclusions and Policy Implications

Agricultural labourers are treated as unskilled labourers, and they have to devote only physical labour during different parts of agricultural production. In our male-dominated rural society, there is a belief that male labourers are much more productive than female labourers. Based on this belief the female agricultural labourers are paid less than their male counterpart. This chapter shows expansion of education among the women particularly in the rural areas and more development and participation of microfinance system through forming self-help group mainly among local women can enhance the empowerment and bargaining strength during the time of deciding wage rate of the female agricultural labourers before agricultural production. This bargaining power for women can reduce the gender wage gap in the agricultural labour market. But more participation of MGNREGP among women and percentage of NSDP spent

³³ In West Bengal, it is observed that, in the post-rainy season, the farmers are dependent on migrant female labourers during the time of agricultural production. But the cost of migrant labourers who mainly belong to the ST community is quite high [Kundu (2006)].

³⁴ Kundu (2017) has observed in his village-level survey that, during post-rainy season, unskilled male labourers in rural areas prefer to work in MGNREGP because working there, they can earn good amount without devoting much effort.

on social sector expenditure fail to reduce gender discrimination among the agricultural labourers. Besides that, another important instrument which can minimize the gender wage gap is the enhancement of cropping intensity through the improvement of irrigation facilities in the rural area. For enhancement of farm income, an increase of cropping intensity is necessary. Due to the gradual decline of the family labour force after the break down of the joint family system, most of the Indian farmers cannot depend on family labour force during the time of agricultural production. They have to hire labourers. But at present, availability of different types of unskilled employment opportunities among the male labourers in post-rainy season, the farmers depend on female labourers. This non-farm employment opportunity enhances the demand of female labourers which help them to bargain for better wage and sometimes similar wage rate of the male agricultural labourers. It can also reduce the gender wage gap in the farm labour market. This study is expected to be helpful for the policymakers to take the necessary steps to remove or reduce the gender wage gap in the agricultural labour market of India.

Appendix

Table 5.5 Average wage paid in MGNREGA and gender-based wage for agricultural labourers (in rupees) in 18 major states of India

States	Year	Average Wage rate per day per person (Rs.) in MGNREGA	Wage rate for male Agricultural labour (Rs)	Wage rate for female Agricultural labour (Rs)
Andhra Pradesh	2010-11	95.61	162.01	123.72
	2011-12	101.26	193.73	140.71
	2012-13	101.76	227.14	159.02
	2013-14	110.99	245.42	178.64
	2014-15	116.33	277	195
	2015-16	129.50	295.35	199.82
Assam	2010-11	119.22	117.48	95.15
	2011-12	129.17	142.34	113.54
	2012-13	132.28	177.38	138.23
	2013-14	151.87	208.99	166.04
	2014-15	166.98	242	190
	2015-16	178.94	244.89	200.06
Bihar	2010-11	101.60	129.48	112.09
	2011-12	114.13	140.41	115.1
	2012-13	122.01	184.36	165.99

	2013-14	152.64	190.67	170.56
	2014-15	165.73	205	195
	2015-16	176.80	215.05	202.65
Chhattisgarh	2010-11	107.42	85.26	66.5
	2011-12	114.98	117.43	87.68
	2012-13	121.64	125.02	88.33
	2013-14	142.98	149.64	103.96
	2014-15	150.18	176	124
	2015-16	152.80	180.8	133.96
Gujarat	2010-11	95.68	118.48	106.63
	2011-12	106.15	137.47	123.22
	2012-13	109.73	147.88	132.16
	2013-14	130.81	161.18	144.28
	2014-15	148.48	185	161
	2015-16	158.49	175.88	155.58
Haryana	2010-11	163.76	224.1	184.21
	2011-12	178.69	266.5	214.92
	2012-13	184.32	301.27	254.64
	2013-14	215.16	339.32	290.1
	2014-15	238.06	372	308
	2015-16	253.32	388.24	321.52
Himachal Pradesh	2010-11	108.64	157.87	127.74
	2011-12	117.41	177.08	148.16
	2012-13	120.17	195.66	170.58
	2013-14	137.46	208.52	188.33
	2014-15	153.42	247	228
	2015-16	161.24	276.3	252.47
Jharkhand	2010-11	111.33	105.79	99.64
	2011-12	119.77	103.73	99.23
	2012-13	121.99	119.25	110.5
	2013-14	137.97	154.71	140.63
	2014-15	157.96	171.01	154.29
	2015-16	161.97	181.56	169.66
Karnataka	2010-11	106.84	130.35	125.34
	2011-12	122.98	170.78	152.2

	2012-13	133.55	180.71	161.12
	2013-14	173.62	223.77	201.57
	2014-15	190.26	279	235
	2015-16	203.70	272.31	244.95
Kerala	2010-11	119.99	305.96	235.92
	2011-12	138.63	363.71	282.57
	2012-13	144.06	433.05	336.19
	2013-14	180.16	486.2	375.2
	2014-15	214.28	535	405
	2015-16	231.82	576.47	427.03
Madhya Pradesh	2010-11	108.24	103.19	91.82
	2011-12	115.17	132.6	117.98
	2012-13	120.55	154.55	136.58
	2013-14	139.03	174.92	152.39
	2014-15	149.12	187	162
	2015-16	149.83	213.09	183.75
Maharashtra	2010-11	117.31	100	80
	2011-12	127.00	121.25	93.13
	2012-13	134.30	175	125
	2013-14	159.77	119.55	94.09
	2014-15	164.64	152	100
	2015-16	175.43	165	105
Orissa	2010-11	108.99	102.39	79.67
	2011-12	122.16	124.32	93.65
	2012-13	121.90	149.41	116.1
	2013-14	141.27	170.81	127.18
	2014-15	161.46	197	150
	2015-16	188.02	224.43	173.23
Rajasthan	2010-11	78.56	148.14	90.03
	2011-12	84.87	183.66	118.41
	2012-13	89.78	207.13	155.24
	2013-14	106.60	230.55	181.64
	2014-15	109.17	275	217
	2015-16	116.41	299.63	246.62
Tamil Nadu	2010-11	83.89	160.3	83.29

	2011-12	92.15	195.69	97.48
	2012-13	91.76	245.4	112
	2013-14	103.56	253.21	122.64
	2014-15	122.95	303	130
	2015-16	133.45	334.5	141.84
Tripura	2010-11	109.55	187.63	140.33
	2011-12	117.82	221.94	159.08
	2012-13	119.04	255.44	182.81
	2013-14	133.28	273.2	202.33
	2014-15	150.54	285	217
	2015-16	159.15	288.02	225.08
Uttar Pradesh	2010-11	110.94	124.46	116.16
	2011-12	119.26	150.66	131.13
	2012-13	123.21	179.72	154.23
	2013-14	141.61	202.56	179.69
	2014-15	155.54	226	191
	2015-16	160.88	238.4	216.1
West Bengal	2010-11	117.65	130.04	110.14
	2011-12	126.36	157.11	131.59
	2012-13	129.43	175.82	146.08
	2013-14	147.09	214.33	181.42
	2014-15	164.06	231	186
	2015-16	169.91	259.4	219.18

Source: Compiled by authors

Chapter 6 - Survey Design and Sample Selection for the Empirical Study

Chapter 6 - Survey Design and Sample selection for the empirical study

Based on the state-level data (such as NSSO, Census, etc.), we have already discussed two research problems of the agricultural labourers, such as declining labour force in agriculture and gender wage gap in the fourth and fifth chapters of the thesis respectively. In these two chapters, all the considered variables were taken as the macro-level state-specific variables. Because, a state-level analysis provides an aggregate scenario of the socio-economic problem of the agricultural labourers from different macro perspectives. But, to check whether a field-level investigation conforms with the state-level data in understanding the economics of these poor labourers, we need to validate that through the field-level investigation. In addition, as these secondary data are not current year data, we have conducted a sample survey in the district of East Medinipur in West Bengal to get a present picture of their socio-economic conditions. This chapter, therefore, tries to analyze the demographic, socio-economic, and financial information of these labour households. By explaining this survey data, the seventh and eighth chapters of the thesis present two acute problems of the agricultural labour households, such as incidence of poverty and indebtedness respectively. The findings of the study are expected to be helpful to obtain suitable policies for reducing poverty and indebtedness among these labourers that can bring some positive changes in their standard of living.

6.1 District Selection

The district of East Medinipur has been chosen for our empirical study. In India, Purba Medinipur is one of the most backward districts of 640 districts [Ministry of Panchayati Raj (2006)]. The district comprises³⁵ 25 development blocks, 5 municipalities, and 223 Gram Panchayats. This district is the part of lower Indo-Gangetic Plains and Eastern coastal plains and separated into the flat plains on the west, east, and north, and the coastal plains on the south. This southern district of West Bengal encompasses a geographical area of 4713 square kilometers, and Population density is 1,076 inhabitants per square kilometer [Census of India (2011)]. Around 295.67 thousand hectares out of the 396.59-thousand-hectare geographical area of the district has been cultivated more than once under the decomposition of alluvial soil

³⁵ Four sub-divisions of the district are-Tamluk, Haldia, Contai, and Egra.

[District Human Development Report (2011)]. Gross cropped area³⁶, Net sown area³⁷, and Area sown more than once³⁸ per thousand hectares of the district area are 522.48, 292.73, and 229.75 respectively. As the district is endowed with rivers and canals, they are important sources of irrigation. It is reported that Gross irrigated area³⁹, Net irrigated area⁴⁰ and Rainfed area⁴¹ per thousand-hectare are 398.74, 169.26, and 123.74 respectively. Among food crops, paddy, especially Aman crop dominates in cropping seasons. Due to constraints of irrigation facilities, cropping intensity is not so high. The cropping intensity of the district in 2007-08 was 178 that was below the mean value of cropping intensity (184.38) [Mondal, M. (2012)].

The principal source of income in the district is from the agriculture sector. Among all rural workers, male and female main agricultural labourers in the district in 2011 are 25.01 percent and 21.29 percent respectively. But, the male and female marginal agricultural labourers are 56.89 percent and 49.24 percent respectively [Labour & Employment Statistics of West Bengal (2014)].

6.2 Survey Design

6.2.1 Selection of the Block, Gram Panchayat and Villages

Bhagawanpur block-1 under the administrative division of Egra subdivision is purposively selected for the study as it is one of the economically backward blocks as well as the largest block of East Medinipur district of West Bengal. It has 166 villages with 36,814 households, and the Population density per square Kilometer is 1142. Around 49 percent of people among the total workforce were agricultural labourers [Census of India (2011)]. Based on the Human Poverty Index⁴², the incidence of Poverty in the block is 27.81 [Census of India (2011)]. Among the ten Gram Panchayats, we have purposively chosen two large Gram Panchayats: Mahammadpur-I and Mahammadpur-II. Out of 22 villages of these two GPs, nine villages such as Mahammadpur-1, Benauda, Sekbar, Tiraipur and Mobarakpur, Madammadpur-II, Uttarbar, Paschimbar, and Nimakbar were chosen randomly. Target households are first identified from gram panchayat's recorded list and then selected randomly. In our field investigation, we

³⁶ The total area is sown once and/or more than once in a particular year, i.e. the area is counted as many times as there are sowings in the year.

³⁷ Total area is sown with crops.

³⁸ The areas on which crops are cultivated more than once during the agricultural year.

Sown area more than once = Gross Cropped Area - Net Area Sown

³⁹ It is the total area under crops, irrigated once and/or more than once in a year. It is counted as many times as the number of times the areas are cropped and irrigated in a year.

⁴⁰ It is the area irrigated through any source once in a year for a particular crop.

⁴¹ Rainfed areas are those where irrigation is less than or equal to 30% of the net sown area, and irrigated areas are those with an extent of irrigation exceeding 30% [National Rainfed Area Authority (2012)].

⁴² It is first introduced by Sen and Anand (1997).

consider the agricultural labour households. Here, agricultural labour household is defined as one (i) whose at least one family member worked as a hired labourer in the farming sector for five years and (ii) at least one family member who can find work at least 30 person-days⁴³ as the hired labourers in agriculture or its allied activities during a year (iii) whose size of operational holdings by own land or leased-in land or both is less than 0.5 hectare⁴⁴ only.

To address our research objectives, a well-structured questionnaire has been designed based on the extensive pilot survey of two villages of Mahammadpur GP-1. It contained a set of structured questions about responders' demographic profiles and banking-related information. The interview was happened face to face and, on average, it lasted 40-45 minutes. We hired two local investigators as they were more aware of their social and economic activities. Information on basic details (demographic profile), family details (education, health, and standard of living), occupational condition, details of family wealth, and credit facilities of the formal and informal sector were collected per agricultural household. The field survey was conducted between April and May 2019. Therefore, our reference period for this field study was from April 2018 to March 2019. The total sample for this investigation is 405 agricultural labour households and they are divided into two categories-(i) 120 landless labourers and (ii) 285 marginal farmers who have possessed only their farming land within 0.01-1.00 Bigha.

6.3 Determining Sample size

To determine the ideal sample size in our micro-level study, we have used Cochran's two-step method (1977) as follows-

Step 1: Formula for calculating a sample for proportions can be written as-

$$n_0 = \frac{Z^2 pq}{e^2}$$

Where, n_0 = Sample size

z = Standard error associated with the chosen level of confidence (e.g., 95%)

e = Desired level of precision

p = Estimated proportion of an attribute that is present in the population

$q = 1-p$

Step-2: If the population size is small then the sample size (n_0) can be adjusted using formula of Finite Population Correction for Proportions as follows-

⁴³ Agricultural labourers are less likely to get 100 person-days job in a year even if two seasons of crop cultivation (such as Rabi and Kharif) and other allied activities. Due to high labour costs, most of the farmers are used family labour force in their operational land (own as well as leased-in land). Hence, the demand for agricultural labourers is not created sufficiently in the farming sector [Kundu, (2006)].

⁴⁴ 1-hectare = 6.17 Bigha and 1 Bigha = 53.33 Decimal.

$$n = \frac{n_0}{1 + \frac{(n_0-1)}{N}}$$

Where, n is the sample size and N is the population size

6.3.1 Determining sample size our study area

As per Census 2011, the population of nine villages such as Mahammadpur-1 & Mahammadpur-2 (9,438), Mobarakpur (1,511), Tiraipur (1,534), Benauda (1,097), Sekbar (653), Uttarbar (2,304), Paschimbar (3,242), Nimakbar (1,853) of the Bhagawanpur Block-1 was 21,632. Total workforce out of the total population of these nine villages was 38.56 percent (= 8220). Again, 48.98 percent of people (=4,027) among the total workforce in our survey area were agricultural labourers.

Step 1: Formula for calculating a sample for proportions can be written as

$$n_0 = \frac{Z^2 pq}{e^2} = \frac{(1.96)^2 (0.5).(0.5)}{(0.05)^2} = 385 \text{ agricultural labourers}$$

Step 2: Formula of Finite Population Correction for Proportions is expressed as

$$n = \frac{n_0}{1 + \frac{(n_0-1)}{N}} = \frac{385}{1 + \frac{385-1}{4027}} = 352 \text{ agricultural labourers}$$

Hence, based on Cochran's Two-step method, 352 agricultural labourers may be the ideal sample size of the population size of agricultural labourers (= 4,027) in our study area. But here we have ultimately considered 405 sample households which are more than sufficient.

6.4 Descriptions of the sample

In our study villages, most of the respondents are male-headed agricultural labour households (97.2 percent). The sample has two religion groups—Hindu and Muslim, and three caste groups- general (65.5 percent), Schedule Cast (30.17 percent), and Other Backward Classes (4.23 percent). Around 39 percent of households are involved in the Kharif crop; whereas, 61.23 percent of households are engaged in both Kharif and Rabi crops. During the survey, 53 percent of the households have leased-in land for agriculture and allied activities (betel leaf, fishing, livestock, and horticulture). Experience of respondents of agriculture less than ten years to up to forty years. Here family details, occupational condition, accessibility of credit and other financial services of formal and informal sector of the agricultural labour households (sample size=405) are expressed in the following tables as-

Table 6.1: Demographic information of the sample households (in percentage)

Information of the households	Households (%)
-------------------------------	----------------

Average age of household heads	48.54
Average no. of family members	4.21
Dependency ratio of the family	0.44
Average years of experience in agriculture	21.07
Average no. of sources of income	4.12
Average no. of earning members	2.51
Average no. of unemployed days of the household heads during reference year	25.38

Data source: Author's calculation from field investigation

Table-6.1 represents demographic information of the agricultural labour households in our study area. The average age of the sample household heads is less than 50 years. On average, more than two earning members in a family are observed in the study area as they are involved in several farm and non-farm activities⁴⁵ for improving their living standard. Table-6.2 shows the educational attainment of the sample households.

Table-6.2: Educational attainment of the agricultural labour household heads or respondents (in percentage)

Educational details	Households (%)
No Education	4.20
Primary education (1-4 years of schooling)	32.10
Upper primary (5-8 years of schooling)	31.11
Secondary Education (9-10 years of schooling)	24.69
Higher Secondary Education (11-12 years of schooling)	6.42
College (More than 12 years of formal education)	1.48
Total	100

Data source: Author's calculation from field investigation

Table-6.2 reveals that around 32 percent of agricultural household heads are completed primary education. But, attaining a college degree among these households is observed very low (1.48 percent) in the study area.

Table-6.3: Socio-economic factors of the agricultural labour households (in percentage)

Socio-economic factors of the agricultural labour households	Households (%)
<i>Sanitation</i>	
Pit Latrine	74.8
Permanent Latrine	25.2
Total	100.0
<i>Cooking fuels</i>	
Wood	69.4
Both wood and Gas	30.6
Total	100.0
<i>Ration cards</i>	

⁴⁵ Several farm and non-farm diversified activities of the agricultural labour households are discussed in chapter-7 of the thesis.

Antyodaya Anna Yojana (AAY)	1.0
State Priority Households (SPHH)	40.0
Rajya Khadya Suraksha Yojana-I (RKSY-I)	41.0
Rajya Khadya Suraksha Yojana-II (RKSY-II)	4.0
Priority Households (PHH)	14.1
Total	100.0
<i>Living Space</i>	
one room with separate kitchen	24.4
Two rooms	58.3
More than two rooms	17.3
Total	100.0
<i>Flooring housing infrastructure</i>	
Kutcha House	42.5
Kutcha-pukka house	50.6
Pukka house	6.9
Total	100.0

Data source: Author's calculation from field investigation

Table-6.3 provides information on the socio-economic status of the agricultural labour households. In the case of sanitation, it is reported that only 25.2 percent of households have built permanent and hygienic latrines. Although 58 percent of households possess two rooms with separate kitchens in their houses, most of these houses (50.6 percent) are semi-pukka houses. Around 41 percent of sample households possess Rajya Khadya Suraksha Yojana-I (RKSY-I) ration cards.

Table-6.4: Distribution of monthly income of the agricultural labour households during reference year

Monthly income	Households (%)
< Rs 5000	48.4
Rs 5000 to Rs 10,000	38.0
> Rs 10,000	12.1
Total	100.0

Data source: Author's calculation from field investigation

Table-6.4 shows that the monthly income of 48.4 percent of agricultural labour households is less than Rs. 5000 in our study area. Only 12 percent of households are reported that their family income is more than Rs. 10,000/month.

Table 6.5: Average person-days of several farm and non-farm activities of the agricultural labour households

Average Person days of employment	Households (%)
Avg no. of person days of Respondents as agricultural labour	37.405
Average no. of person days of Female agricultural labour	17.5
Average person days in MGNREGA	43.8

Average person days in hair processing	222.01
Average person days in Carpenter	107
Average person days in Bidi binding	227.5
Average person days in Construction sector	110.5
Average person days in brick fielder	135.8
Average person days in other work	224.5

Data source: Author's calculation from field investigation

Table-6.5 calculates the average person-days of several farms and non-farm activities of these labour households. It is reported that except the household head, adult family members of a household are engaged in several income-generating activities during the reference period. Average person-days of the respondent of the sample households of hair-processing, carpenter, and brickfield job are 222 days, 107 days, and 136 days respectively.

Table 6.6: Total person-days worked by the agricultural labour households in National Rural Employment Guarantee Programme (MGNREGP) (in percentage)

No. of days engaged in MGNREGP	Households (%)
71-100 days	16.79
51-70 days	4.44
31-50 days	30.37
1-30 days	33.58
0 days	11.85
No possession of MGNREGP job card	2.96
Total	100

Source: Author's calculation from the field survey

Table-6.6 describes that total number of person-days of wage employment of the sample households under MGNREGP during the off-season of agriculture. More than 60 percent of households are engaged in MGNREGA less than or equal to 50 person-days during the reference year and nearly 12 percent of households are not getting any jobs in this livelihood enhancement program instead of their job card.

Now, the chapter has described the banking-related information of the agricultural labour households to capture their financial behavior and financial knowledge in the study. The accessibility of formal and informal banking services among the sample households is presented in the following tables as-

Table 6.7: Banking details of the agricultural labour households (in percentage)

Bank Accounts /membership	Purpose of Bank Accounts	Households (%)
SHG	Loans/Savings	89.4

Co-operative Bank	Loans/Savings	39.012
Commercial banks (e.g., SBI & Allahabad Bank & PNB)	Loans/Savings	2.22
	Jan Dhan Yojana (JDY)	14.81
	Mahatma Gandhi National Rural Employment Guarantee Programme (MGNREGP)	96.79
	Kanyashree	23.95
	Ujwala Gas Yojana	21.48
	Pension/Remittances	9.38

Source: Calculated by author from field investigation

Table-6.7 reveals that 89.4 percent of agricultural labour households have SHG membership. Sample households have also their accounts in commercial banks for MGNREGP wage payment receipts (97 percent), Kanyashree (24 percent), Ujwala Gas Yojana (21.48 percent), and Jan Dhan Yojana account (15 percent).

Table 6.8: Summary of bank accounts of the households (in percentage)

Number of bank accounts	Households (%)
one	1.23
Two	55.56
Three	36.54
Four	5.68
Five	0.99
Total	100

Source: Calculated by author from field investigation

Table-6.8 shows that 98 percent of agricultural labour households have two bank accounts for MGNREGA wage payments /Kanyashree /Ujwala Gas Yojana /savings accounts/ remittances /pension). Opening a bank account for getting remittances or wage payments or membership of SHG is not enough for financial inclusion among the agricultural labour households. Rangarajan Committee (2008) recommended that supply-side solutions of the formal financial sector hardly work to the poorer and weaker section especially, landless labour households (without cultivable land) without creating enough demand for the financial services. Table-6.9 has provided some information on institutional and non-institutional credits of our sample households.

Table 6.9: Percentage distribution of the agricultural labour households who accessed institutional and non-institutional credits

Types of loans	Sources of Loans	Households (%)
Formal loans	Co-operative bank	12.78
	SHG	23.19
	Co-operative bank & SHG	7.07
Informal loans	Money Lender	6.94
	Non-Institutional Credit Society	27.54
	Friend/Relatives	8.8
Formal and Informal Loans	Any financial institutions	9.32
Not accessing any loan		4.45
Total		100

Source: Calculated by author from field investigation

In the Table-6.9, we observe that around 13 percent and 23 percent of the households access their loans from co-operative banks and SHG, respectively. Further, 7 percent of household access loans from these two institutions simultaneously. It is also reported that 9.32 percent of the families access formal and informal loans simultaneously. Although these households are less interested in receiving loans from a moneylender at exorbitant rates, the dominance of other non-institutional sources such as non-institutional credit society is relatively high (around 28 percent) in our study region.

Table 6.10: Percentage distribution of the agricultural labour households who accessed other financial services (except credit) in institutional and non-institutional banks

Financial Institutions	Financial services		Households (%)
Formal Sector Banking	Savings	Co-operative Bank	5.6
		Commercial Bank	7.7
	Pension/Remittances	Commercial Bank	0.078
	Insurance or (and) other financial products		
	Kisan Credit Card (KCC)	Co-operative Bank	8.2
	Krishak Bandhu Yojana	Co-operative /Commercial Bank	2.9
	Frequency of bank visit	Once in a month	8.26
		Twice in a month	5.87

		Once in a 6 month	43.13
		Once in a year	28.95
Informal sector Banking	Informal saving	Credit Society	4.0

Source: Calculated by author from field investigation

Except for credit, Table-6.10 depicts the information on the accessibility of other financial services of these labour households. It shows that only 13 percent of agricultural labour households have savings in any formal financial institution. Around 29 percent of the respondents informed that they visit any institutional banks only once a year.

Chapter 7 - Occupational Diversification as Livelihood Strategy among the Agricultural Labour Households of West Bengal, India

Chapter 7 - Occupational Diversification as Livelihood Strategy among the Agricultural Labour Households of West Bengal, India

7.1 Introduction

An agricultural labourer works for wages (either in cash or kind or a combination of both) in another person's land [Census of India (2001& 2011)]. These types of labourers are usually casual and unskilled in nature. According to the Census of India (2011), 40.9 percent of the total rural workforce in West Bengal is working as agricultural labourers who are either landless or marginal farmers in nature and more than 56 percent of marginal farmers possess less than 0.40-hectare agricultural land [70th round NSSO data (2012-13)]. Due to continuous fragmentation of landholding, the prevalence of marginal farmers in West Bengal has become 82.81 percent [Agricultural Census (2015-16)] among all the agricultural households and the farming sector alone is not enough to provide a decent earning for their survival. Besides that, employment of hired labour during agricultural activity is gradually declining. So, the members of agricultural labour households frequently face a divergence between irregular income and daily consumption, leading to 'income smoothing' and 'consumption smoothing' problems that makes them economically vulnerable and poor⁴⁶ [Statistical Handbook, Govt. of WB (2006)]. Livelihood is a combination of economic activities including self-employment and/or wage employment by utilizing one's endowment to generate adequate earnings to fulfil the requirements of self and the household he/she belongs. To fight economic vulnerability, it is an urgent need to choose livelihood strategy among the agricultural labour households. Occupational diversification as livelihood strategy among the agricultural labour household occurs due to gradual decline of the labour force participation in agricultural sector as hired labourer. In this context, poverty eradication through occupational diversification is a vital component of sustainable livelihood development for this section of people. The contribution of occupational diversification has been increasingly recognized and promoted by the United Nation Development Programme (UNDP) and the Department for International Development (DFID) for achieving the goal towards 'Eliminating World Poverty' since 1997. The occupational diversification allows the rural households to participate in both farm and private non-farm activities and/or in Mahatma Gandhi National Rural Employment Guarantee Programme (MGNREGP) other than purely crop and livestock production to earn additional

⁴⁶It was observed that the Poverty ratio in West Bengal in terms of Head Count Ratio is 28.5 [WB Development Report, Planning Commission (2010)].

income for improving their living standards [Smith et al. (2001)]. According to Ellis. F (1998), occupational diversification can compensate the income deficiency of these agricultural labour households.

The present chapter intends to examine the role of occupational diversification as livelihood strategy among the agricultural labour households of West Bengal to reduce their incidence of poverty.

7.2 Review of Literature

In the rural sector, the agricultural labourers are an important component of the unskilled workforce [Ellis (1998)]. The rural households who are at the lower end of the income distribution, employment diversity has strengthened their economic well-being by reducing cyclical and insecurity threats in the agricultural labour market [Ellis, F. (2000)]. Reardon (1997) has stated that the non-farm employment diversification of the asset-rich households is much greater and significant compared to that of the asset-poor households. The non-farm growth rate has created mainly low-skilled job opportunities at a large scale to the local off-farm sector, but the productivity of diversification is not increased at a satisfactory level. By applying Gini and Pseudo-Gini coefficients of total rural income sources, Escobal, J. (2001) has pointed out that income diversification varies with household wealth. Poorer households have looked for low-paid, unskilled and labour-intensive non-farm activities due to illiteracy and credit constraints. On the other hand, households possessed with skill, education, and asset can pursue high waged non-agricultural activities. This skewed distribution of non-farm income shows that “the rural non-farm labour market fails” for the lower income tercile households. Basant (1994) has also observed that the poor labourers are often compelled to engage in many low productive non-farm activities for their survival and even accept a lower wage rate compared to the market going wage rate. By examining the “Residual sector hypothesis” in the Eastern states of India, Verma & Verma (1995) have shown a strong relationship between unemployment and rural non-farm male employment. Unabsorbed residual surplus labour force involuntarily participates in the unproductive non-farm sector as a self-employed or low-paid worker or unpaid family labourer and consequently turns into open unemployment from disguised unemployment. Vatta, K., & Sidhu, R. S. (2007) have found that non-farm diversification among the non-cultivating poor households is distress driven. Marginal and small landholders are earning their income mainly from three sub-sectors such as manufacturing, construction, and community, social, personal services. It was observed that diversified income has not improved their livelihood significantly, but only able to generate a

safety net against trapping into the high incidence of poverty. Kumar, *et al.* (2011) has investigated the impact of the increasing rate of diversified occupations on the rural poor on the basis of NSSO unit level data during the time period between 1983-84 and 2004-05. The diverse employments including non-farm occupations can provide food and health security among rural households which can reduce their intensity of poverty. Démurger, S. & et al. (2010) discussed about three types of employment participation towards the non-farm sector and those are; local off-farm employment, local self-employment, and migration. Land and availability of family labour boost on-farm diversification, whereas, at the household level, age composition and asset position are seen to be significant in the migratory labour market and off-farm diversification respectively. An empirical study based on field survey was conducted during 2007-08 in two districts of West Bengal: the diversified Burdwan and comparatively less diversified Purulia [Khatun & Roy (2012)]. Their study has prescribed some economic policies such as the development of rural infrastructure and innovations of formal institutions which are the most influencing factors to smooth livelihood diversification among the poor. Saha and Verick (2016) on the basis of NSSO unit level data for the year 1999-2000 and 2011-12 has observed that there is a significant enhancement of rural non-farm employment over the years. Shifting of labour from farm to non-farm sector is an important reason behind it. Bhue and Vijay (2017) again on the basis of NSSO unit level data had identified that a set of surplus labour among the rural households for survival purposes are moving towards urban sector for casual work or working as self-employed either in their own locality or nearby urban areas. Due to which there is a gradual decline of the share of agricultural labour households. Pramanick (2019) has attempted to understand the nature of occupational diversification among the agricultural labour households on the basis of micro level survey in selected six districts of Uttar Dinajpur of West Bengal. According to his observations, acute poverty and unemployment in the farm sector forces the agricultural labourers to search for alternative employment outside agricultural sector. But still no investigation has done to identify the effectiveness of occupational diversification among the adult able-bodied working members among the agricultural labour households to reduce the incidence of poverty of that household. This chapter will try to investigate that.

7.3 Research Objectives

Still now causes of occupational diversification among rural households have been investigated. But no focus has given on agricultural labour households who are one of the poorest sections of rural labour force. Besides that, no investigation has done on the role of

occupational diversification as livelihood strategy among the household member(s) with in agricultural labour households to combat poverty. In rural India, occupational diversification through participating in different types of skilled and unskilled work among the agricultural labour households is observed either only of the household head or among more than one able-bodied adult members of the household. Family members of an agricultural labour household are generally capable to participate in different types of unskilled occupations. In West Bengal, we observe dominance of marginal farmers and those farmers demand a smaller number of hired labour during the time of cultivation and mostly depends on family farming. Hence, sufficient employment cannot be generated among those labour households in agricultural sector. So, for survival purpose they have to involve different types of non-farm employment. A section of marginal farmer household who owns very small size of land also has to work as an agricultural labourer for survival purposes. In this background, we shall investigate the following research questions:

1. Initially we have to identify, the possible situation(s) in which only the head of the family is the sole earning member of the household or apart from household head other able-bodied member(s) also have become earning members to supplement family income.
2. An earning member of a household who are generally unskilled in nature can participate in a single occupation or in diversified occupations. This chapter will try to assess the role of occupational diversification among the earning member(s) of an agricultural labour household as livelihood strategy for tackling the incidence of poverty of those households. Here we consider two types of occupational diversification: (i) the occupational diversification only of the main earning member of the sample household which will be represented after calculating Simpson Diversification Index of the household head and (ii) occupational diversification among all the working household members of the sample agricultural labour household which will be represented through calculating Berry's Diversification Index. To calculate adjusted rural poverty line of West Bengal, Monthly Per Capita Consumption Expenditure in terms of adult equivalent scale will be calculated. Then, it will be investigated which type of occupational diversification among the family members of a household is more effective to improve economic well-being of that household through reducing the acuteness of poverty?

3. Besides occupational diversification, the chapter will also try to identify the other possible determinant(s) which can eradicate or reduce the intensity of poverty among the agricultural labour households of West Bengal.

7.4 Sample design and field investigation

The primary survey was conducted in the district of East Midnapur of West Bengal. In this district, Bhagawanpur block-1 under Egra subdivision was purposively selected as it is one of the economically backward blocks as well as the largest block⁴⁷ of East Medinipur district of West Bengal. The incidence of Poverty of this block is 27.81% (Census, 2011) based on the Human Poverty Index. Among the ten Gram Panchayats, we have randomly chosen two large Gram Panchayats: Mahammadpur-I and Mahammadpur-II. Out of 22 villages of these two GPs, nine villages⁴⁸ were chosen randomly from those two Gram panchayats. In our field investigation, we consider only the agricultural labour households. Here agricultural labour household is defined as one (i) landless household whose main earning member is able to find work at least 30 person-days⁴⁹ as the hired labourers in agriculture or its allied activities in the entire reference period and (ii) and the marginal farmer household whose size of operational holdings by own land or leased-in land or both is less than 0.5 hectare⁵⁰ only and also works as an agricultural labourer in other's land and got employment as hired labour at least 30 person-days in the entire reference period. Information about the number of target households were initially collected from Census report 2011 and got approximate number of such above mentioned agricultural labour households who are living in that locality. Then sample households were selected randomly from those households.

To address our research objective, a well-structured questionnaire has been designed based on the pilot survey of two villages of Mahammadpur GP-1. Total sample for our investigation was initially 460⁵¹ and after screening the questionnaires thoroughly 55 samples have dropped and ultimate sample became 405 agricultural labour households. Out of final 405 sample

⁴⁷It has 166 villages with 36,814 households and Population density per square Kilometer is 1142.

⁴⁸Five villages of Gram Panchayat of Mahammadpur-1 are Mahammadpur-1, Benauda, Sekbar, Tiraipur and Mobarakpur and four villages of Gram Panchayat of Mahammadpur-II are Madammadpur-II, Uttarbar, Paschimbar and Nimakbar.

⁴⁹Even if two seasons of crop cultivation (such as Rabi and Kharif) and other allied activities, agricultural labourers are less likely to get 100 person-days job in a year. Due to high labour costs, most of the farmers used family labour force in their operational (own as well as leased-in) land. Hence, the demand for agricultural labourers is not created sufficiently in the farming sector [Kundu, (2006)].

⁵⁰1-hectare = 6.17 Bigha and 1 Bigha = 53.33 Decimal.

⁵¹ We acknowledge the co-operation of local panchayats and the respondents without whose help the household survey cannot be completed successfully.

agricultural households, 120 are landless labourers and 285 are marginal farmers who have possessed only own farming land within 0.5 hectare (in the Appendix-2, the adequacy of sample size is explained). Table-7.1 shows types of agricultural labourers among our sample respondents.

Table 7.1 Types of agricultural labourers of sample households

Types of agricultural labourers	No. of households	Households (%)
Local labourers ⁵²	311	76.79%
Migrant labourers ⁵³	94	23.21%
Total	405	100

Source: Authors' calculation from field investigation

The field survey was conducted between April and May 2019. Therefore, our reference period for this field study was from April 2018 to March 2019.

7.5 Single earning member or multiple earning member of an agricultural labour household

During the time of field investigation, two different types of agricultural labour households are identified: (i) the household where there is only one earning member who is involved different types of employment for the livelihood of his/her family (ii) the sample households where more than one adult member are involved diversified occupations to maintain the livelihood of their family. In our sample, out of 405 sample households; 144 households have single earning member and 261 households have multiple earning members. Still no investigation has done to investigate possible reasons behind this type of difference in terms of number of earning members among the agricultural labour households or any other type of rural households. Here the possible reasons will be investigated.

For this investigation we shall apply simple Probit model where the dependent variable is dummy in nature. It will take value 1 if the sample household has one earning members. But for household with more than one earning members, it takes value 0.

7.5.1 The possible decision-making variables influencing more than one earning member of an agricultural labour household

As no such investigation has done previously to address the above-mentioned research objective, the theoretical justification of choosing the explanatory variables are given below-

⁵²These labourers are lived in a village for more than ten years and working in the farm sector and its allied activities in his native village at least for five years [Kundu (2006)].

⁵³ Mostly, they are inter-state or inter district migrant agricultural labourers employed through an intermediary with a daily wage rate lies between Rs 400 to Rs 500 in different occupations.

- i. Age of the i^{th} household heads (age_i): The relationship between aged household head and existence of single one earning member of the family is assumed to be negative. An aged household head may not always be able to earn enough income during a reference period. In such situation, other adult member(s) of the household has (have) to become earning member to maintain the subsistence level of living.
- ii. Children aged less than 6 years of the i^{th} households (children_i): It is measured in numbers. It is expected that if a household has child below 6 years, the female member of that household may not participate in income generating activity or become an earning member of the family due to family obligations.
- iii. Possession of landholdings of the i^{th} households (land_i): It is measured in hectare. It is expected that the adult members of an agricultural labour household who is also a marginal farmer may not have more than one earning member because through cultivation in rainy season they can procure rice for self-consumption which helps him to maintain the subsistence level of living.
- iv. Possession of technical skills of the i^{th} households (technicalskill_i): It is treated as dummy variable and will take the value 1 if at least one member of the sample household except the respondent has some technical skill like carpentry, masonry, or practical knowledge of fishery (especially shrimp cultivation). If that happens then obviously there is a possibility of more than one earning member of the household. Otherwise it will take the value 0.
- v. Total number of unemployed days of the i^{th} household head (unempldays_i): It is measured in person days and it is expected that the relationship between unemployed person-days of the household heads in the entire reference period and the probability of generating more than one earning members of a household is expected to be positive.
- vi. Accessibility of Self-help group loan of the i^{th} households (shgloan_i): Except for the employment of household heads or respondents, accessibility of SHG loan facilities creates an employment opportunity among the female members of the family. It is also treated as dummy variable and will take the value 1 if female member of the household head took credit from her SHG for income generating activity. Otherwise it will take the value 0 and the expected sign is positive.

So, the Probit regression equation can be expressed as-

$$\text{earningmem}_i = \alpha_0 + \alpha_1 \text{age}_i + \alpha_2 \text{children}_i + \alpha_3 \text{land}_i + \alpha_4 \text{technicalskill}_i + \alpha_5 \text{unempldays}_i + \alpha_6 \text{shgloan}_i + u_{1i} \dots\dots\dots (i)$$

Table 7.2 Possible causes behind more than one earning member of an agricultural labour household

Total no. of observation	405	
Variables	Value of Coefficient	Average Marginal effect $\left(\frac{\partial p_i}{\partial x_i}\right)$
age	-0.011507* (0.00776)	-0.00329*
children	0.01823 (0.08718)	0.0056
technicalskill	-0.0953* (0.0517)	-0.01651*
unempldays	-0.00392 (0.00319)	-0.001215
land	0.01086* (0.00637)	0.003333*
shgloan	-0.5385*** (0.1444)	-0.16517***
Constant	0.04344	-
Pseudo R²	0.0865	-
Chi² (6)	41.98	-

Note: *** indicates 1% level of significance, ** indicates 5% level of significance and * indicates 10% level of significance. Standard errors of the coefficients are written in parenthesis.

7.5.2 Discussion

Most of the previous papers have mentioned that lack of employment opportunity in the farm sector forces an agricultural labour household head to move towards multiple occupations. But we observe dominance of marginal farmer households among the agricultural labour households. Based on the results shown in Table-7.2, it can be said that if the sample agricultural labour household has operational holding, then the possibility of single earning member of that household is much higher. This contradicts the observation of Reardon (1997) who observed that non-farm diversification is more among the asset rich households. But if the household head is aged and (or) the female member have taken loan from SHG for income generating activity and (or) if any household member except the main earning member has some technical skill, then we observe multiple earning members among the agricultural labour households. Previous papers did not consider the expansion of micro-finance system on occupational diversification among agricultural labour households. But in this situation, female member of the household can become an earning member and micro credit system under joint liability through Self-Help Group plays an important role here.

7.6 Occupational diversification among the earning member(s) of an agricultural labour household

Our sample households for survival purposes have to engage both in farm and several types of non-farm activities in the entire reference year. Sometimes we observe only one earning member participates in different types of employment throughout the entire reference period or sometimes more than one family members have to participate in different types of employment as livelihood strategy. As they are often sequentially performed two or multiple tasks in a single day, it is hardly possible to compute their actual person-days of work in the given year. Their person-days of non-farm activities solely are also difficult to calculate without undertaking the relationship between farm and non-farm employment. Table-7.3 shows the number of sample agricultural labour households who were engaged in different types of occupations in the entire reference period.

Table 7.3 Some quantitative evidence of diverse set of activities of the agricultural labour households

Farm-based activities	Households (%)	Non-farm-based activities	Households (%)	Remittances	Households (%)
Kharif & Rabi Cultivation in own land	61.23	MGNREGA	97.04	Selling tree/equipment/animal	0.25
Kharif cultivation in leased-in land ⁵⁴	38.77	Artificial hair processing	30.86	Flood compensation of agriculture	8.89
Fisheries in own land	8.40	Carpenter	3.46	Kanyashree/Scholarship	15.56
Fisheries in leased-in land	16.54	Bidi Binding	27.16	Pension	9.89
Vegetable in own land only	2.96	Construction	3.95		
Betel Leaf cultivation in own land	5.68	Brick fielder	7.90		
Betel Leaf cultivation in leased-in land	2.47	As a Migrated labour	19.75		
<i>Livestock</i>		Masonry	3.21		
Cattle/ Cow rearing	86.42	Small business	5.93		
Hen	11.36	Zori work	3.70		
Poultry birds	5.19	Other self-employed job	12.10		
Goat rearing	19.26				

Source: Authors' calculation from the field investigation

Sources of income from the farm and the non-farm sector are highly heterogeneous in our study. In the Table-7.3, we disaggregate income sources into three categories: (a) Farm income

⁵⁴During field survey, it is observed that the landless labourers as well as marginal farmers who possessed a tiny land, have taken land in lease for kharif cultivation to ensure their minimum needs of rice consumption over the year. Leasing agreement is established here in a fixed rent system (such as Rs 4000/Bigha for kharif season and Rs 7000/Bigha for Rabi season) and payment has been made only in cash just before the cultivation.

earns from crop and livestock (b) Non-farm income based on daily wage constitutes high labour productive jobs (such as Carpentry, Masonry, Zori work and small business) and low labour productive (such as MGNREGA, bidi binding, artificial hair processing, migrated labour) jobs and (c) Remittances received from pension, or any compensation from Government. Most of the agricultural labour households are engaged here in low income earning unskilled activities during slack season of agriculture. Table-7.3 shows that 30.86 percent of households are involved in artificial hair processing and 27.16 percent in bidi binding jobs. It is here noted that employment opportunities such as artificial hair processing and other self-employed jobs are created through taking micro-credit from Self-Help Groups (SHGs). Besides that, a large section of the sample households (97.04 percent) are engaged in MGNREGA. As the field investigation it is reported that more than 97 percent of households are possessed only one job card, and female household members are not getting enough opportunity to participate in the program.

7.6.1 Occupational diversification of a sample agricultural labourer within household

To investigate how occupational diversification among the agricultural labour households is used as livelihood strategy to enhance their economic condition, we consider two indices: (i) Simpson Diversification index when only one member of an agricultural labour household is involved in multiple occupations throughout the year and (ii) Berry Diversification Index when more than one member of an agricultural labour household including the main earning member is engaged in different types of occupations. The method of calculation of both the indexes are narrated below.

7.6.1.1 Simpson Diversification Index (D_{SI_i})

To investigate whether an individual member of a household engages in multiple activities for earnings in the entire reference period, we have to take the help of Simpson Diversification index which is expressed as- $D_{SI_i} = 1 - \sum_{j=1}^n h_j^2$. Here, $h_j = \frac{x_j}{\sum_{j=1}^n x_j}$ implies proportion of income earned by the i^{th} member from j^{th} possible sources among all diversified income earning activities and $\sum x_j$ implies net income earned from all livelihood farm and non-farm diversified activities; where $j = 1, 2, \dots, n$ (where n implies Total number of livelihood diversified activities). Here, D_{SI} is a continuous variable that takes any value between 0 and 1. The value of the index is zero demonstrating that there is a complete specialization of work i.e. total absence of occupational diversification but if it approaches towards one then it indicates engagement in diversified occupational involvement in the entire reference period.

7.6.1.2 Berry Diversification Index (D_{BI_i})

If the members of a household including the main earning member, are involved in diversified earning activities, then we have to take the help of Berry Index (Berry, 1971) which is expressed as $D_{BI_i} = 1 - \sum_{j=1}^k w_j^2$. Here, $w_j = \frac{y_j}{\sum_{j=1}^k y_j}$ represents income share of each member in the j^{th} earning members of the household and k is the total number of earning members in the family. Its value also lies between 0 and 1. If the value of Berry Index is zero then it indicates single earning member in the household and when it tends to one, it represents more participation in earning activities among the household members.

Major cause of occupational diversification of an agricultural labour household is to improve its economic condition because only working as hired labourer in agriculture cannot help to get sufficient person-days of employment in the entire reference period. As our sample households are agricultural labour households who themselves are generally poor, to identify their livelihood we can investigate whether this occupational diversification helps them to cross the poverty line. To do that it is required to compute the poverty line in rural Bengal during the time of our survey period. The method is described below-

7.6.2 Measuring Poverty

Unlike conventionally measured poverty line, such as money metric or nutrition-based subsistence norm [Dandekar & Rath (1971), Patnaik (2007)], we try to estimate the poverty level among the households through calculating adult equivalent monthly per capita consumption expenditure. Although large evidence of literature has been showing disagreement on the concept of adult equivalent scale to estimating poverty [Nelson (1993)], without such a construction, inter-personal comparison of well-being is impossible [Pollak & Wales (1979)]. As the characteristics of each member in each household is unique, “consideration of the weight attached to child vs adult welfare may help to resolve the non-robustness of demographic profiles of poverty” [Lanjouw, P., and Ravallion. M., (1995)].

To identify the poor agricultural labour households in our study region, we have adopted a state specific rural poverty line computed by the Tendulkar committee methodology based on the Mixed Reference Period⁵⁵ [Planning Commission (2013)]. In 2011-12, the poverty line of rural

⁵⁵During the 1999-00 and onwards, NSSO used the concept of the Mixed Reference Period (MRP) method for estimating the poverty line. In this method, consumption of five low-frequency items such as clothing, footwear, durables, education, and institutional health expenditures are taken over the reference year and other items such as food expenditure including fuel and entertainment, etc. are considered during 30 days before the date of the survey.

West Bengal in terms of Monthly Per Capita Consumption Expenditure (MPCE) was Rs 783. As product prices vary across states, between rural and urban areas and even for the sub-regions within rural and urban areas of the state, poverty lines are also varied and needed to be inflation-adjusted in each specified area [Panagariya, A., & Mukim, M. (2014)]. According to the Press Information Bureau (May 2019), the General CPI for Rural labourers in West Bengal was 143.9 based on 2012=100 prices and accordingly inflation adjusted poverty line of rural West Bengal on May 2019 becomes Rs.1127.52.

Now, in our study region, calculation of monthly per capita consumption expenditure ⁵⁶ of an agricultural labour household is narrated below.

Step 1: We have taken five major items such as Food items, pan, supari & bidi & tobacco and intoxicant, Clothing & bedding & footwear, Fuel & Electricity and Miscellaneous⁵⁷ and calculated Annual Consumption Expenditure (ACE) in monetary terms of each sample household.

Step 2: Then, we compute the Monthly Consumption Expenditure (MCE) in the household by dividing ACE by 12. We also have to estimate the Adult Equivalent Scale (AES)⁵⁸ of the family. Dividing this MCE by Adult Equivalent Scale (AES) of the family, we get the Monthly Per Capita Consumption Expenditure (MPCE) of each sample household. This value of MPCE can be compared with an exogenous state specified adjusted poverty line Rs 1127.52 and then determine how many numbers of sample households will be below the poverty line. Now we must investigate which type of occupational diversification is effective enough to reduce the

⁵⁶Per capita consumption expenditure adjusted for age and gender composition is considered as an efficient indicator for welfare measurement in poverty research rather than household income as poor households are consumed relatively fewer numbers of commodity bundles [Lipton (1996) & Lanjouw (2001)]. Since household income varies with seasonal crop production as well as crop sales corresponding to their market price, the income method cannot capture the actual per capita income of the family in a specific year. Besides, when households are engaged in both farm and non-farm activities simultaneously, the computation of monthly per capita income requires data on costs, output and prices indicating a more complex method than the expenditure method [Ellis (1998) & Lipton & Ravallion (1995)].

⁵⁷Medicare, Education, Amusement & recreation (such as mobile recharge, cable recharge, cinema, diesel/petrol prices, and others), Transport and communication and Personal care are included in miscellaneous item.

⁵⁸For simplicity, we have considered different weights for different age groups belonging to each family member of a household irrespective of their gender, physical stature and functionality. In the chapter, we have constructed AES by assuming the following weights as- (i) Adult male and female members who aged above 18 years and below 60 years is used weight 1 (ii) Adults lying between 60-70 years is assigned weight 0.75 (iii) Adults whose aged in above 70 years is treated weight 0.5 (iii) Adolescents whose age in between 14 to 18 years is given weight 0.75 (iv) School-aged children who are in age group 6-14 years is used weight 0.5, and (v) Children whose age is below 6 years are given weight 0.25. For detail calculation of per capita adult equivalent expenditure, see [Townsend (1994) & Lanjouw and Ravallion (1995)].

incidence of poverty among the agricultural labour households. Besides that, we also want to identify possible determinants which can help the farm labour households to reduce the acuteness of poverty.

We have already mentioned that out of 405 sample agricultural households; 144 sample agricultural labour households have single earning member and out of this 144 households, 41 are lying above the poverty line and remaining 103 households are lying below the poverty line. Initially the effectiveness of D_{SI} and other possible factors will be considered to reduce the incidence of poverty of a single earning member agricultural labour household.

7.6.3 The possible factors are considered for the investigation of the reduction of incidence of poverty

- i. Educational attainment of the i^{th} household heads(edu_i): Education⁵⁹ is widely recognized as one of the principal components of the Basic needs approach [ILO (1977)] which helps to meet other basic needs (such as shelter, health facility, sanitation, and water) and improves the quality of life. The relationship between education and poverty is hypothesized to be negative as education empowers people by enhancing knowledge and skill that are associated with higher wages and income [Tilak (2002)]. In the chapter, schooling years is used to capture the educational attainment of the household head.
- ii. Number of unemployed days of the i^{th} household head ($unempdays_i$): Number of unemployed person-days of a household head during the reference year may affect the income of the household. This irregular income may not sufficient enough for the survival of the family [Basant (1994)]. The association between unemployed person-days of the household head and probability of being non-poor of that households is expected to be negative.
- iii. Total operational land of the i^{th} households ($operland_i$): The operational area including owned and leased-in land (in Bigha) possessed by households is assumed to meet food consumption of the family in the entire reference period as well as earn some additional farm income. It is considered as an important asset among rural households [Reardon (1997)]. The relationship between operational landholdings and the possibility of being

⁵⁹In the chapter, education may behave as an endogenous variable as it generally assumes that educational attainment (edu) and employment diversification (D_{SI}) are positively related to each other. But in our study area, most of the non-farm jobs are observed to be highly unskilled and low level of productivity and not require any formal education. Besides, our VIF test shows the insignificant relationship between ' D_{SI} ' and ' edu '.

non-poor agricultural labour households is therefore expected to be positive.

- iv. Number of dependent persons of the i^{th} household head (or dependency ratio)⁶⁰ in the family (depratio_i): It indicates that the head's ability to meet the subsistence needs of other family members. The hypothesis is that the probability of being above poverty line households would be inversely related to the dependency ratio, as a higher 'depratio' lowers the ability level to attain the basic needs of the households.
- v. Informal loan accessed by the i^{th} households (informalloan_i): Access to informal loan is usually restricted by collateral constraints especially among the landless households. The informal lending institutions (or informal credit society) offer loans at a high interest rate to finance their requirement. In our study region, it is observed that most of the informal loans are used for non-income generating activities (such as housing construction, medical purpose, marriage ceremony or daily consumption). This dependency of informal sector loans is expected to be a crucial factor in determining the poverty level of the sample households.
- vi. Age of the i^{th} household heads (age_i): It is assumed that younger age of household heads⁶¹ is more potential, skilled and desire to look forward a diverse set of farm and non-farm activities. So, it used as an instrumental variable of Simpson Diversification Index (D_{SI_i}). Here, 'age' may not directly impact on poverty but can influence through household head's diversified activities.

7.7 Econometric Investigation

To identify the actual factors among the above-mentioned possible factors which play important role for poverty eradication of the agricultural labour households, the Probit model is here used which can be expressed as-

$$P_i^* = P(Y = 1/X) = P(I_i^* \leq I_i) = P(Z_i \leq \beta_1 + \beta_2 X_i) = F(\beta_0 + \beta_1 X_i) \dots \dots \dots (1)$$

Where, $P(Y = 1/X)$ is the probability of occurring poverty of the i^{th} households given the explanatory variables and Z_i is the standard normal variable, *i.e.*, $Z \sim N(0, \sigma^2)$ where, σ is normalized to value 1 to identify the Probit model which is estimated by using Maximum Likelihood method. In equation (1), I_i^* is a critical or threshold value of Monthly per capita

⁶⁰Dependency ratio (depratio) = $\frac{\text{The number of dependents persons aged 0 to 18 years and over the age of 65 years}}{\text{The total population aged 18 to 64 years}} \times 100$

⁶¹In our study area, more than 60 percent of household heads are in age group between 30-50 years.

consumption expenditure (MPCE), such that if I_i exceeds I_i^* , the household belongs to above poverty line (APL), otherwise below poverty line (BPL).

Before going to the investigation, initially the summary statistics of the concerned variables in the econometric model, are given below-

Table 7.4 Summary Statistics of the explanatory variables including outcome variables

Variables	Max	Min	Mean	Std. Dev.
P_i (Poverty level)	1	0	0.53	0.509
D_{SI_i} (Simpson Diversification Index)	0.795	0.066	0.591	0.143
D_{BI_i} (Berry Diversification Index)	0.511	0.017	0.277	0.085
edu (educational attainment of household head)	5	0	2.01	1.06
unempldays (unemployed person-days of HH head)	180	0	25.57	22.30
nonincomeshg (non-income generating loan from SHG)	1	0	0.454	0.329
operland (operated land)	105	10	43.484	11.29
shg (accessing credit from SHG)	1	0	0.558	0.629
informalloan (informal loan)	1	0	0.587	0.492

Source: Authors' calculation

7.7.1 Role of individual level occupational diversification on poverty

To estimate the impact of Simpson diversification Index (D_{SI}) on poverty level (P_i^*) of the agricultural labour households, the Probit regression equation can be written as-

$$P_i^* = \beta_0 + \beta_1(D_{SI_i}) + \beta_2(edu_i) + \beta_3(unempldays_i) + \beta_4(depratio_i) + \beta_5(operland_i) + \beta_6(informalloan_i) + u_{1i} \quad \dots\dots\dots (2)$$

$$\text{and, } D_{SI_i} = f(\text{age}_i, v_{1i}) \quad \dots\dots\dots (3)$$

Where, the outcome variable is dummy in nature, defined as, $P_i=1$ if households are in APL, and 0 otherwise. D_{SI} represents the value of Simpson diversification index of the i^{th} member (or Occupational Diversification Index at the individual level); unempldays implies unemployed person-days of household head during the reference year; depratio implies dependency ratio in the family; operland implies total operational landholdings and informalloan=1 if any household has accessed loan from any informal institution or money lender, 0 otherwise.

Initially, we assume that Probit regression technique is inconsistent estimator as the decision of the sample households towards diversified activities is suffering from endogeneity problem; because, a diverse set of activities may differ according to skill and ability of the individual in multiple tasks (such as brick making, carpentering, vehicle repairing, and masonry, etc.). This labour allocation among the various activities may be fixed by our society of both within the family as well as a community [Ellis (2000)]. These types of unobserved factors cannot be

controlled in our study that may over or underestimate the true effect of employment diversification. Hence, the error terms, u_{1i} capture unobserved factors which is assumed to be correlated with the exogenous variable $D_{S,I}$ mentioned in equation (2). To allow the correlation between the regressor and the error term, we have taken the variable ‘age’ which is strictly exogenous and uncorrelated with u_{1i} .

Now we need to perform an endogeneity test to investigate whether there exists any endogeneity problem. If there exists any endogeneity problem, we should identify the ideal instrumental variable(s) that affects the outcome variable (poverty) only through its influence on the regressor.

To do endogeneity test, we use two step procedures as follows-

Firstly, we regress endogenous variable-Simpson diversification index ($D_{S,I}$) on exogenous regressors and the instrumental variable ‘age’.

$$D_{SI_i} = \alpha_0 + \alpha_1(\text{edu}_i) + \alpha_2(\text{unempldays}_i) + \alpha_3(\text{depratio}_i) + \alpha_4(\text{operland}_i) + \alpha_5(\text{informalloan}_i) + \alpha_6(\text{age}_i) + \varepsilon_{1i} \dots \dots \dots (4)$$

Secondly, after regressing the endogenous variables ($DI_{S,I}$) on regressors and the instrumental variable in equation (4), we get estimated residual form $\widehat{\varepsilon}_{1i}$ for $(\widehat{DI_{S,I}})$ and introduced it in the original equation (2). The new equation can be written as-

$$P_i^* = \beta'_0 + \beta'_1(\text{edu}_i) + \beta'_2(\text{unempldays}_i) + \beta'_3(\text{depratio}_i) + \beta'_4(\text{operland}_i) + \beta'_5(\text{informalloan}_i) + \theta_1 \widehat{\varepsilon}_{1i} + u_{1i} \dots \dots \dots (5)$$

Here, H_0 : there is no endogeneity problem in our model. If the value of ‘athrho’ is insignificant, then we accept the Null hypothesis, i.e., there is less likely an endogeneity problem in the model. But, in our study, $\text{athrho} < 0.01$ (in Table-4) showing that the regressors are suffering from endogeneity problem. It is therefore proved that the application of the Probit regression with Instrumental Variable analysis is here necessary to minimize the biasedness and inconsistency of the model. To do that we have used the instrumental variable (age_i) for $D_{S,I}$.

We have again examined whether this instrumental variable is weak or strong in our study. The robustness of the F statistic (effect of the endogenous variable on the instrumental and exogenous variable) is 15.39 (more than 10), indicating the appropriate instrumental variable is used in equation (4).

For our econometric analysis, multicollinearity test in equation (2) is also performed. We calculate the Variance Inflation Factor $[VIF = 1/(1 - R^2)]$ values to identify the inter-correlation among the regressors. The test shows that the given explanatory variables are not suffering from any multi-collinearity problem as their VIF values are less than 4. Table-7.5 provides the results of Probit regression with instrumental variable (IV) analysis.

Table 7.5 Probit regression with IV analysis: outcome variable- Poverty level (P_i^*)

Observations	Total number of households with single earning member=144	
Variables	Value of Coefficient	Average Marginal effect ⁶² $\left(\frac{\partial p_i}{\partial x_i}\right)$
D_{SI}	1.392*** (0.2443)	0.01508***
edu	0.0529 (0.08275)	0.00346
unempldays	-0.0027 (0.00276)	-0.00037
depratio	-0.39315* (0.1782)	-0.01335*
operland	0.01225* (0.00788)	0.000152*
informalloan	-0.4137* (0.1319)	-0.02123*
constant	-0.18803*	-
athrho	-1.117***	-
Wald $\chi^2(6)$	58.43***	-

Note: *** indicates 1% level of significance, ** indicates 5% level of significance and * indicates 10% level of significance. Standard errors of the coefficients are written in parenthesis.

7.7.1.1 Discussion

The above result shows that participation of household head in different occupations (as represented by D_{SI}) in the entire reference period apart from working as an agricultural labourer reduces the possibility of poverty of that household. Marginal farmer households who owns or cultivate some plot of land even taking it in lease have higher probability being non-poor. But if an agricultural labour household has taken loan from informal sector with high rate of interest then that creates extra financial burden among that household and possibility of being non-poor of that household will be less.

7.7.2 Role of occupational diversification among the adult members of an agricultural labour household to reduce incidence of poverty

Sometimes the head of the agricultural labour household cannot fully participate different types of occupations for the livelihood benefit of his family. It may be voluntarily or involuntarily. Even if he tries his best to get employment in different non-farm sector, that is not always

⁶² Rate of change of probability of occurring $P_i = 1$ due to one-unit change in the value of independent variables x_i . Here, the average marginal effect is needed to compute since the Probit is non-linear type reflecting the effect may differ from individual to individual.

sufficient enough to maintain subsistence level of living. In such situation it is observed that other adult members of the household have to participate different types of farm and non-farm economic activities. Now we investigate whether this will actually be much more beneficial for the household to improve their livelihood or not? In our sample we have 261 such households out of which 168 are lying above the poverty line and remaining 93 households are lying below the poverty line.

In this investigation, the explanatory variables⁶³ such as ‘edu’, ‘operland’ and ‘informalloan’ have already been explained in the early model. The other new variables are as follows:

- i. Non-Income generating loan from self-help group (SHG) by the i^{th} households (nonincomeshg_i): It is treated as dummy in nature and takes the value 1 if the female member of the household took loan for non-income generating activity in the entire reference period otherwise it takes value 0. If a female member of a sample household has taken loan from the SHG and utilized it as working capital for any income generating activities, that female member is treated as an earning member of the family and her earning is considered during the time of calculation of D_{BI} . But if she takes a loan for using non-income generating activities, then she will not be considered as an earning member while calculating D_{BI} . This may create an extra financial burden which possibly influence the poverty of that household.

Here D_{BI} is assumed to be endogenous in nature and two possible variables which may influence D_{BI} but not the original dependent latent variable is explained below with theoretical justification.

- a) Average age of the working members of the i^{th} households (avgagewrkmem_i): We have considered only adult members (14 to 60 years) who can participate in the labour market as the informal workers. It is expected that households with low average age of the working members may help them to move towards more diverse set of occupations.
- b) Unemployed person-days of i^{th} household heads (unempldays_i): Although in a patriarchal society, the household head is treated as the main earning member of that household but it came out from our field investigation that a large section of male member cannot get sufficient non-farm employment opportunity in his locality and a large section is not interested to migrate outside. In this background, other adult member(s) of that household (mainly the female member) have to participate in the

⁶³Here, we drop the variable ‘shg’ (used in early model) because employment opportunities created among the women of these households through the Self-help group is already taken in the Berry diversification index (D_{BI}).

labour market either as self-employed or as hired labour. So, this ‘unempldays’ of the head of the family does not influence poverty of his family directly⁶⁴ as this may be compensated by other working members of the family.

These two variables are assumed as strictly exogenous and uncorrelated to the error term and do not have any directly impact on the poverty level but can influence poverty through employment diversification at the household level (D_{BI}).

Now the Probit regression analysis can be written as-

$$P_i^* = \chi_0 + \chi_1(D_{BI_i}) + \chi_2(edu_i) + \chi_5(operland_i) + \chi_5(nonincomeshg_i) + \chi_7(informalloan_i) + u_{4i} \dots\dots\dots (6)$$

$$\text{and, } D_{BI_i} = f(\text{avgagewrkgmem}_i, \text{unempldays}_i, v_{2i}) \dots\dots\dots (7)$$

Where D_{BI} is assumed to be an endogenous variable like D_{SI} . To perform endogeneity test, we have followed the same procedure which is used in the early model.

In this case also ‘athrho’ rejects the null hypothesis confirming that the regressors are suffering from endogeneity problem. To minimize the biasedness, we have used two instrumental variables, (avgagewrkgmem_i) and (unempldays_i) for D_{BI} and got the result:

So, the result of the Probit model can be represented in Table-7.6.

Table 7.6 Probit regression with IV analysis: outcome variable-poverty level (P_i^*)

Observations	Total number of households with dual or multiple earning members=261	
Variables	Value of Coefficient	Average Marginal effect $\left(\frac{\partial p_i}{\partial x_i}\right)$
D_{BI}	10.54724*** (1.301)	3.159***
edu	0.0691 (0.05142)	0.0207
operland	0.00747* (0.0061)	0.00039*
nonincomeshg	-0.0855*** (0.0019)	-0.00073***
informalloan	-0.5559* (0.1426)	-0.1301*
constant	-1.326***	-
athrho	-1.421***	-
Wald $\chi^2(5)$	92.17***	-

Note: *** indicates 1% level of significance, ** indicates 5% level of significance and * indicates 10% level of significance. Standard errors of the coefficients are written in parenthesis.

7.7.3 Discussion

Involvement of more than one adult member of an agricultural labour household in economic activity and their participation in different types of occupations including as agricultural labourer as livelihood strategy (D_{BI}) can help the household to keep itself above the poverty line. Comparing the two values of marginal co-efficient of D_{BI} and D_{SI} (as shown in Table-

⁶⁴ This is already proved in the previous model.

7.5 and Table-7.6) it can be claimed that D_{BI} plays a better role than D_{SI} to reduce the incidence of poverty among the agricultural labour households. Like the previous result, the possibility of being poor among the marginal farmer households among the agricultural labour households (on the basis of our definition) are less. But if any member of our sample household has taken loan even from self- help group for non-income generating activity will reduce the possibility of being non-poor.

The importance of occupational diversification among more than one adult members as livelihood strategy among the agricultural labour households is reflected in the following table (Table-7.7) where we observe that out of our total sample of 405 agricultural labour households 209 households are lying above the poverty line and most of them have at least dual earning members who are involved in different types of occupations throughout the reference period to maintain their livelihood.

Table 7.7 Poverty status of the sample households

Poverty level (Based on MPCE)	Single earning member HHs	percent	Dual or Multiple earning member HHs	percent	All	Percent
Very poor (Rs 0-Rs 800)	61	42.36	44	16.86	105	25.92
Moderately poor (Rs 801 to Rs 1127.52)	42	29.16	49	18.77	91	22.46
Total no. of Below Poverty Line HHs	103	71.52	93	35.63	196	48.39
Above poverty line (more than Rs 1127.52)	41	28.47	168	64.37	209	51.60
Total	144	100	261	100	405	100

Source: Calculated by the authors from the field investigation.

7.8 Conclusion

Agricultural workers are one of the poorest sections among rural casual workforce in West Bengal who are unorganized in nature and mostly depends on regular wage earnings for their livelihood. Here, due to dominance of marginal farmers the demand for hired casual workers during the time of agricultural production is declining. So, an agricultural labourer now gets little person days of employment as agricultural labourer throughout the year. Hence, for survival purposes, those labour households have to depend on diversified occupations. This chapter proves that occupational diversification is an essential tool for poverty reduction among the agricultural labour households. Occupational diversification is observed only for the main earning member of the household or apart from the main earning member, other able-bodied adult members of the households. It is also proved that the possibility of being poor of an agricultural labour household will be less if apart from an earning member of the household

other adult members are also involved diversified occupations throughout the year. Our evidence further suggests that the total operational landholding and loan disbursement from SHG for income generating activity can reduce the possibility of incidence of poverty among the agricultural labour households. On the contrary, the dependency ratio of the family, non-income generating loan from SHG and the dependency of the informal loans are likely to enhance the possibility of the households to fall into a high incidence of poverty. Actually, non-farm occupations including self-employment here plays as a complement of an agricultural labourer in the entire reference period to help it to avoid its acuteness of poverty.

Chapter 8 - Accessibility of Institutional Credit among the Agricultural labour households and its Impact on their Livelihood

Chapter 8 - Accessibility of Institutional Credit among the Agricultural labour households and its Impact on their Livelihood

8.1 Introduction

Agricultural labourers are those labourers who are engaged on another person's land for wages paid either in cash or in-kind or both. Around 41 percent of the total rural workforce in West Bengal is working as agricultural labourers who are either landless or marginal farmers in nature and more than 56 percent of marginal farmers possess less than 0.40-hectare agricultural land [70th round NSSO data (2012-13)]. These labourers are casual, unskilled, and belonging to the backward class in the rural economic hierarchy. Limited accessibility of institutional credit with low saving ability is one of the main reasons that make them vulnerable to numerous covariates (e.g., natural calamity) and (or) idiosyncratic shocks (e.g., illness and marriage) [Tang and Guo (2017)]. Mainly, constraints of acceptable collateral restrict their availability of formal credit. During the 1990s, the Govt. of India introduced several economic policies of financial inclusion for empowering the poor. The financial services such as Self-Help Group-Bank linkage programme (1992), Kisan Credit Cards (1998-99), Doubling Agricultural Credit programme (2004), Financial inclusion scheme (2005), Interest Subvention Scheme (2006-07), Swabhiman Scheme (2011), Jan Dhan Yojana (2014), etc. had already been implemented to increase the flow of credit in rural India. Despite the major structural changes in the Indian credit system, agricultural labour households, such as landless labour households, are still deprived of having institutional credits as they do not possess land or any other collateral which has any market value [Kumar, Singh, and Sinha (2010)]. The 70th round survey of the National Sample Survey Organization (NSSO) shows that agricultural loans decreased from 66.3 percent in 1991 to 64 percent in 2013. The RBI further shows that the growth rate of agricultural credit was 3.8 percent in 2017-18, against 12.4 percent in 2016-17 [Reserve Bank of India (2018)]. The non-institutional credit services continue to play a key role in the delivery of credit to rural households, due to the poor institutional credit services, especially, to the marginal farmers and landless labourers [Kumar, Singh and Kumar (2007)]. They disburse loans against some collaterals that may have very high personal value for the poor [Bhattacharyya (2005)]. The dependency of non-institutional credit has been increased from 36 percent in 1990-91 to 44 percent in 2012-13 [NSSO (2013)]. Informal lenders have always better information about the borrowers, and they have applied some contractual mechanisms or interlinkages to confirm that the debtors would not be defaulted [Bardhan and Udry (1999)]. Hence, the asymmetric

information (such as adverse selection and moral hazard problem) is not observed much in the non-institutional credit market [Tang and Guo (2017)]. These informal credit institutions have disbursed around 36 percent of the total outstanding agricultural loan to the farmers [NSSO, All India Debt & Investment Surveys (2013)]. The average rate of interest charged by them has increased from 36 percent per annum in 1991-92 to 42 percent in 2002-03 and further exorbitantly to about 48 percent in 2012-13 [Kumar, et al. (2007), and Debt & Investment Surveys (2013)].

In this context, the chapter analyzes the scenario of credit accessibility of the agricultural labourers of West Bengal. During the 1970s the state had gone through a massive land reform movement such as operation Barga, the imposition of ceiling on landholdings and redistribution of surplus land among the sharecroppers and landless; and the implementation of the minimum legislative wage rate for the landless labourers [Bhattacharyya (2005)]. Operation Barga⁶⁵ has facilitated the rights of land ownership to state bargadars (sharecroppers) who, later, got the status of agricultural households. But, they were not in a state to generate sufficient saving for creating investment and working capital financing for the agricultural productivity [Rajeev & Deb (1998)]. These households do not even access adequate loans from scheduled commercial banks to meet their input requirements. The crop loan to input requirements ratio⁶⁶ in West Bengal is only 0.02 whereas, all-India average was 1.3 [RBI (2019)]. Nearly 52% of agricultural households in West Bengal are suffering from indebtedness in either to institutional or non-institutional sources of credit [70th Round NSS Report (2013)]. A well-developed financial system is, therefore, required to bring the poor labourers into the purview of the formal financial system [Ramji (2009)]. Concisely, accessibility of institutional loans is a prerequisite of these labour households for short-term requirements of working capital and long-term investment in agriculture and other income-generating activities [Ramachandran and Swaminathan (2002)]. In this chapter, we have tried to investigate the possible factor(s) which can help the poor agricultural labour households to avail enough credit from the formal sources. We have further focused on investigating whether the institutional credit using income generating activities can help the beneficiary sample households to enhance their livelihood.

⁶⁵ Operation Barga successfully registered more than 65 percent of an estimated 2.3-2.5 million sharecroppers by 1993 and aimed to educate their rights of cultivation (Banerjee, Gertler & Ghatak, 2002).

⁶⁶ The ratio is calculated by the Reserve Bank of India (RBI) based on the average of three years data 2014, 2015 and 2016 for loans for input requirements, Gross Value of Output (GVO), and Gross Value Added (GVA). Here, Input requirement = Input Cost – (GVA – GVO). Input includes seed, organic manure, fertilizers, maintenance, irrigation changes, electricity, pesticides, and insecticides.

8.2 A brief review of literature

An inadequacy of institutional credit service among the low-income group is one of the challenging issues in India. More than 50 percent of borrowers of the total borrowers of West Bengal depend on non-institutional credit [59th Round of NSSO and All-India Debt & Investment Survey (2003)]. Weaker section categories such as SCs, STs, and OBCs and smallholders are much dependent on non-institutional loans with a high rate of interest that may fall them into chronic poverty [Rajeev and Deb (1998), and Kumar, et al. (2010)]. Although people at the higher level of the income distribution can access a wide range of financial services, those who are at the lower level of the income distribution hardly access the basic financial services. In between, people are only using a banking account for deposits and withdrawals of money [Leeladhar (2006)]. Applying the ordered logit model, Bhattacharjee, et al. (2009) had shown a result that developed districts of West Bengal face low accessibility of institutional credit of the total number of outstanding loans and availability of informal credit facility is higher. Tulasi, et al. (2017) studied the demand-side constraints of the usage of formal financial services in Delhi slums. The indicators such as employment opportunities, education, and financial literacy have increased in the probability of demand for financial services such as ownership of a bank account, formal savings, formal borrowings, formal remittances, and insurance among the poor. Using the Probit regression analysis, Laha, et al. (2011) observed that a higher degree of economic status, level of education, possession of landholdings, non-farm employment, and social security schemes significantly influence the accessibility of financial services among the farm households.

Financial inclusion provides an easy, safe, and affordable credit service to the poor that boosts women's economic empowerment and reduces income inequality [Swamy (2014), and Sharma (2016)]. Using Multidimensional financial index (IFI) across countries, Sarma and Pais (2011) examined the macro-level factors to establish the relationship between financial inclusion and economic development. The result suggested that income, physical infrastructure for connectivity, and information augment the credit accessibility through financial inclusion whereas, banking sector variables, such as Non-performing assets (NPA) and Capital Asset Ratio, are negatively associated with the institutional credit to the poor. Without financial literacy or its training, financial inclusion may create additional costs for the bank. Despite the vast expansion of the financial inclusion programme, NSSO (2004-05) had shown that 20 percent of marginal farmers and 27 percent of total agricultural households in India access institutional credit. Financial inclusion through Mahatma Gandhi Employment Guarantee

Programme (2005) increases the accessibility of banking accounts but that does not imply that banking usage is enough among the rural poor [Ramji (2009)]. Dev (2006) argued that the institutional banks are usually reluctant to provide credit to the poor labourers due to a lack of collateral. Opening a bank account for getting remittances or wage payments is not enough for financial inclusion among the marginal farmers and landless labour households. Supply-side solutions of the formal banking sector hardly work to the poorer section without creating enough demand for financial services [Rangarajan Committee (2008)].

Using a randomized field experiment among unbanked households in Indonesia and India, Cole, et al. (2009) investigated the relationship between financial literacy and demand for financial services. A financially literate person makes a better decision regarding financial services that can improve household well-being and reduce misallocation of capital and economic volatility. Financial knowledge always enhances an individual's financial well-being [Agarwalla, et al. (2015) & Mitchell and Lusardi (2015)]. The banking networking system with the linkage of SHG boosts financial literacy, female empowerment, and social capital of the poor through their credit absorptive capacity [Thorat (2006)]. Dev (2006) stated that low financial literacy and low productivity are the demand-side constraints of essential banking services. Basic level of financial literacy in the country, and the world, is not so high. The uneducated and ill-informed citizens produce simplistic policy solutions, and those solutions are generally suboptimal in any country's economy [Mishkin (2008)].

Khandker & Faruquee, (1999) evaluated the role of formal credit of the Agricultural Development Bank of Pakistan (ADBP) on rural welfare. The two-stage least square (2SLS) method had shown that 10 percent borrowing increases household consumption by 0.04% of total institutional credit. Households' usage of institutional loans significantly impacts farm income as well as their consumption pattern [Chowhan & Pande (2014), Kumar, et al. (2017), and Bharti (2018)]. Yorulmaz (2013) examined the role of financial services on the poor and observed that economic development and human development are positively related. Institutional credit services can improve living standards by generating job opportunities among the poor. Ramachandran and Swaminathan (2002), Chavan & Ramakumar (2002) and Bhatia & Chatterjee (2010) suggested that the high accessibility of institutional credit always helps in economic growth and development by bringing financial stability among the low-income groups. Although many economists have tried to highlight some facts of the rural credit market, they hardly focused on constraints of the accessibility of institutional loans among the agricultural labour households. There is no significant study regarding the role of accessibility

of formal credit utilizing income-generating activities on their livelihood. Based on a village-level field investigation of West Bengal, in this chapter, we shall try to investigate the possible demand-side indicators responsible for institutional credit services and the influence of accessible formal credit utilizing for income-generating activities on the livelihood of the agricultural labour households in West Bengal.

8.3 Research Objectives

Based on the existing literature of the credit market scenario of India, a study is required to investigate the responsible determinants which may help the agricultural labour households to access the institutional credit. The chapter aims to shed some light by examining the following objectives are as-

- (a) To examine the demand side constraints for receiving institutional loans among the agricultural labour households and identify the possible factors which can increase the probability of accessing the formal credit after addressing these constraints.
- (b) To examine the impact of institutional loans using income-generating activities on the livelihood (or monthly per capita income) of the agricultural labour households. For this investigation we have chosen Purba (East) Medinipur district of West Bengal.

8.4 Data

8.4.1 Sample design and field investigation

Our sample is drawn from the East Midnapur district of West Bengal. Out of 25 blocks of the district, we have chosen the largest block, Bhagwanpur-1 as it is one of the economically backward blocks. Based on the Modified Human Development Index (2011) scale, the poverty of this block is 27.81. To provide institutional banking⁶⁷ and financial services, among the 164 villages of the block, thirty-five villages (21.34%) have post offices, 38 villages (23.17%) have agricultural credit societies, and six-villages (3.66%) have banks [Census of India (2011)]. Among the 25 blocks in the district, Bhagwanpur Block-1 has developed the highest number of SHGs (6,567), and 2553 female members have already been involved in these SHGs [District statistical Handbook, Purba Medinipur (2014)]. The chosen surveyed areas are very much suitable to address our research objectives.

A well-structured questionnaire has been designed based on the pilot survey in the two villages of Mahammadpur GP-1. We have purposively chosen two large Gram Panchayats: Mahammadpur-I and Mahammadpur-II of the ten Gram Panchayats. Out of 22 villages of these

⁶⁷Punjab National Bank (PNB), State Bank of India (SBI) of Bhagwanpur Branch, Mugbaria Gramin Bank, Central Bank of India (CBI) of Kajlagarh Branch, Bhagwanpur Gramin Bank, Contai co-operative bank, SBI Bajkul branch, UBI Bajkul branch, sub-post offices at Bhagwanpur-I and Kajlagarh.

two GPs, nine villages⁶⁸ were chosen randomly. The primary objective of our field investigation tries to capture financial behavior, financial literacy, and financial inclusion of the agricultural labour households⁶⁹.

In our empirical study, 55 households dropped out of total 460 sample households after data cleaning. Hence the total sample for our investigation is 405⁷⁰ agricultural labour households, and they are divided into two categories-

- (i) 120 landless labourers and
- (ii) 285 marginal farmers who possessed only their farming land within 0.01-1.00 Bigha.

The field survey was conducted between April and May 2019. Therefore, our reference period for this field study was from April 2018 to March 2019.

8.4.2 Data Analysis

Some characteristics of the financial behavior of the agricultural labour households (sample size-405) towards institutional banking are described as in the following tables-

Table 8.1 Banking details of the agricultural labour households (in percentage)

Bank Accounts /membership	Purpose of Bank Accounts	Marginal farmer HHs (%)	Landless labour HHs (%)	All (%)
SHG	Loans/Savings	92.63	81.66	89.4
Co-operative Bank	Loans/Savings	53.33	5	39.012
Commercial banks (e.g., SBI & Allahabad Bank & PNB)	Loans/Savings	2.45	1.66	2.22
	Jan Dhan Yojana (JDY)	12.98	19.16	14.81
	Mahatma Gandhi National Rural Employment Guarantee Programme (MGNREGP)	97.54	95	96.79

⁶⁸Five villages of Gram Panchayat of Mahammadpur-1 are Mahammadpur-1, Benauda, Sekbar, Tiraipur and Mobarakpur and four villages of Gram Panchayat of Mahammadpur-II are Madammadpur-II, Uttarbar, Paschimbar and Nimakbar.

⁶⁹Agricultural labour households in our sample households are those (i) whose at least one family member works as a hired labourer in the farming sector for last five years and (ii) who able to find work at least 30 person-days as the hired labourers in agriculture or its allied activities during a year (iii) whose size of operational holdings by own land or leased-in land or both is less than 0.5 hectare only. Targeted households were initially identified with the help of Gram Panchayat and ultimately selected them randomly.

⁷⁰Based on the calculation of Cochran's Two-step method, 352 households are the ideal sample size of the population size of 4,027 agricultural labour households in our study area. In the chapter, we have considered 405 sample households which are more than sufficient.

	Kanyashree	29.47	10.83	23.95
	Ujwala Gas Yojana	17.19	31.66	21.48
	Pension/Remittances	10.87	5.83	9.38

Source: Calculated by authors from field investigation

Table-8.1⁷¹ reveals that 89.4 percent of agricultural labour households have SHG membership. Our sample households have also their accounts⁷² in commercial banks for MGNREGP wage payment⁷³ (97.54 percent), Kanyashree (24 percent), Ujwala Gas Yojana (21.48 percent), and Jan Dhan Yojana account (15 percent). Table-2 shows the institutional and non-institutional credit accessibility by our sample households.

Table 8.2 Percentage distribution of the agricultural labour households who accessed institutional and non-institutional credits

Types of loans	Sources of Loans	Marginal farmer HHs (%)	Landless labour HHs (%)	All (%)
Formal loans	Co-operative bank	22.36	3.2	12.78
	SHG	18.41	27.97	23.19
	Co-operative bank & SHG	12.64	1.5	7.07
Informal loans	Money Lender	4.72	9.17	6.94
	Non-Institutional Credit Society	19.51	35.57	27.54
	Friend/Relatives	6.77	10.63	8.8
Formal and Informal Loans	Any financial institutions	11.89	6.76	9.32
Not accessing any loan		3.7	5.2	4.45
Total		100	100	100

⁷¹Table-1 shows the existence of more than 100 percent bank accounts among the agricultural labour households, as they open bank accounts simultaneously in several financial institutions (maybe overlapped) to perform several transactions during the reference year.

⁷² The survey reports that 98 percent of agricultural labour households have two bank accounts for several financial transactions such as MGNREGP wage payments, Kanyashree, Ujwala Gas Yojana, savings accounts, remittances and pension etc.

⁷³Around 51 percent of agricultural labour households have reported that they visit the bank for withdrawing the wage of MGNREGP only. Without this reason, their bank account is useless as they do not have enough money to meet the minimum standard of living.

Source: Calculated by authors from field investigation

In Table-8.2, we observe that around 13 percent and 23 percent of the households access their loans from co-operative banks and SHG, respectively. Further, 7 percent of household access loans from these two institutions simultaneously. It is also reported that 9.32 percent of the families access formal and informal loans simultaneously. Although these households are less interested in receiving loans from a moneylender at exorbitant rates, the dominance of other non-institutional sources such as non-institutional credit society is relatively high (around 28 percent) in our study region.

Table 8.3 Percentage distribution of the agricultural labour households who accessed institutional and non-institutional credit for Income Generating Activities (IGA) or (and) Non-Income Generating Activities (NIGA)

Sources of credit		Marginal Farmer HHs (%)		Landless labour HHs (%)		All (%)	
		IGA	NIGA	IGA	NIGA	IGA	NIGA
Institutional sources	Co-operative	28.3	5.7	3.2	1.5	15.75	3.6
	Bank						
	SHG	23.12	15.33	16.55	18.92	19.83	17.12
Non- institutional sources	Money lender	1.17	3.55	2.05	7.12	1.61	5.33
	Credit Society	14.78	8.12	19.49	13.44	17.13	10.78
	Friends/Relatives	2.52	4.25	4.13	6.5	3.325	5.375

Source: Calculated by authors from field investigation

Table-8.3 is showing that the marginal farmers (28.3 percent) generally access credit from co-operative banks for income-generating activities⁷⁴, whereas most of the landless labour⁷⁵ households (19 percent) utilize loans from SHG for using non-income generating activities⁷⁶. On the contrary, the informal credit sources such as non-institutional credit society plays an important role⁷⁷ in income generating activities especially for the landless labour households (19.49 percent).

⁷⁴Income-generating activities are agriculture and its allied activities such as betel leaves and fisheries, and non-farm activities such as self-employed business and hair processing etc.

⁷⁵ Among the 120 landless labourers, around 40 percent of labourers can access institutional loans where 35.47 percent of the labourers have taken loans from SHG, and 4.7 percent of them access loans from the co-operative bank by using collateral (such as pond or house).

⁷⁶ Non-income generating activities such as consumption, marriage ceremony and illness, housing construction etc.

⁷⁷ In our study area, the agricultural labour households are highly involved in allied activities of agriculture such as betel cultivation and fisheries. Here, the wholesalers act as an intermediate between the informal credit society

Table 8.4 Distribution of size of credit (in Lakh) accessed by the sample households for Income Generating Activities (IGA) or (and) Non-Income Generating Activities (NIGA)

Sources of credit		Marginal Farmers		Landless labourers		All	
		IGA	NIGA	IGA	NIGA	IGA	NIGA
Institutional sources	Commercial Bank	4.90	2.90	0	0.00	2.45	1.45
	Co-operative Bank	58.66	5.89	1.25	0.00	29.96	2.95
	SHG	27.06	1.56	2.83	7.60	14.95	4.58
Non-institutional sources	Money lender	1.05	2.95	0.35	1.90	0.7	2.43
	Credit Society	9.61	18.01	4.45	11.21	7.03	14.61
	Friends/Relatives	2.72	3.80	1.32	1.33	2.02	2.57

Source: Calculated by authors from field investigation

In Table 8.4, it is observed that a higher amount of formal loan is disbursed for income generating activities from co-operative banks (almost Rs 59 lakhs) and SHG (Rs 27 lakhs) respectively for the marginal farmers. On the contrary, except SHG, landless labour households have received loans from non-institutional credit society (Rs 11 lakhs) for income generating activities. Table-8.5 shows that the indicators of financial literacy of the sample households.

Table 8.5 Indicators of Financial Literacy-gender-wise (in percentage)

Indicators	Marginal farmer HHs (%)		Landless labour HHs (%)		All (%)	
	Male	Female	Male	Female	Male	Female
Know KYC	18.25	9.53	5.0	5.5	11.62	7.51
Able to update passbook	62.11	13.33	40.0	10	51.05	11.66
Able to issue cheque book	41.40	6.32	23.3	7.5	32.35	6.91
Able to use ATM	24.91	2.46	14.2	0.83	19.55	1.64
Able to use mobile banking	4.21	0.00	3.3	0	3.75	0.00
Able to calculate arithmetic (+), (-), (*), (÷)	89.12	25.26	77.5	34.16	83.31	29.71
Knowledge of simple interest	62.81	16.14	44.2	15.83	53.50	15.98
Knowledge of compound interest	10.54	1.21	6.1	0.33	8.32	0.77

and the farmers (agricultural labour). There is an agreement that farmers must sell all their produce to the wholesalers in the presence of informal credit societies. After measuring total produce in terms of money at the market prices, wholesalers purchase products from the farmers. Farmers then repay their loans to the informal credit society with the rate of interest and earn some money from these cultivations. Farmers get loans from this credit society when they require credit at zero-transaction cost, and they cultivate and sell products to the wholesalers at zero transportation cost.

Concept of inflation	23.51	7.37	15.0	4.16	19.25	5.76
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Source: Calculated by authors from field investigation

Table-8.5 reveals that almost 90 percent of the respondents are not aware of KYC norms. Around 51 percent of male respondents and 11.66 percent of female respondents can update their passbooks. Most of the male respondents (83.31 percent) report that they can calculate simple arithmetic. Hardly any female member of the sample households knows the usage of mobile banking or can calculate compound interest. Besides, our survey results clearly reflect the prominence of gender inequality on financial literacy among the agricultural labour households.

8.5 Investigating the possible factors which can help the agricultural labour households during the time of receiving institutional credit.

We have already mentioned that agricultural labour households belong to the economically weaker section of rural economy. Still from the previous tables it is observed that accessibility of institutional credit is not impossible for them. But obviously during the time of getting credit they are facing some uncertainties. So, we must investigate the possible factors which can enhance their possibility of getting institutional credit.

8.5.1 The possible factors for accessing institutional credit of the agricultural labour households

- (i) Caste of the household ($caste_i$): In India, the scheduled castes (SC), scheduled tribes (ST), and other backward classes (OBC) are considered socially backward classes. It is observed that they are weak in terms of human capital and less aware of financial terms and conditions. Karthick and Madheswaran (2018) observed that the agricultural labour households who belong to socially marginalized castes (SC and ST) are highly deprived of the accessibility of institutional credit. Therefore, it is required to examine whether caste matters in the accessibility of institutional credit of the agricultural labour households.
- (ii) Age of the household head (age_i): The younger head of the family is expected to be more dynamic and aware of the financial terms and conditions of borrowing that influence their decision to access more formal loans for productive purposes [Kumar, et al. (2010)]. This contradicts the observation of Karthick and Madheswaran (2018) who found that the age of the household head influences the accessibility of institutional credit positively as aged household's head might be

more experienced which may increase more chances of accessibility of formal credit. Hence, it is needed to examine whether the age of the household head plays an important determinant during the time of accessibility of institutional credit.

- (iii) Number of dependent persons of the i^{th} household head (or dependency ratio)⁷⁸ in the family (depratio_i): It is expected that the accessibility of institutional credit of the household would be positively related to the dependency ratio, as a higher 'depratio' increases the extra financial burden of the respondent to meet the subsistence needs of other family members.
- (iv) Education of the household head (edu_i): Education not only influences productivity and income in the labour market but also improves an individual's ability to perform financial activities [Vasilevska (2015)]. A higher level of education of the household head is, therefore, expected to lead to a higher probability of accessibility of the institutional credit as education helps to empower him with better information of various loan schemes implemented by the Govt. The total number of schooling years is used here to measure the educational attainment of the household head in the study.
- (v) Education of the female head or spouse of household's head in the family (femaleedu_i): The education of the female head (or the spouse of household' head) is captured by the total number of schooling years in the study. It is observed that educated women join in various skilled and unskilled employment and strengthen their economic security. Besides, education helps to raise their awareness of financial services, and they can take part within the family as the decision-maker of the choice of institutional borrowing [Kumar, et al. (2007)]. It can be used as a proxy of woman empowerment.
- (vi) Possession of operational landholdings of the i^{th} households (land_i): Here, operational landholding is considered as the ownership of land and (or) leased-in land for cultivation of the agricultural households [59th Round NSS, (2003)]. It is assumed that the households with possession of their own land (in Bigha) are likely to access more institutional credit since the ownership of land is treated as a collateral and can enhance the capacity of repayment of credit. Due to the possibility of less default rate, formal institutions are willing to disburse more credit to the

⁷⁸Dependency ratio (depratio) = $\frac{(\text{The number of dependents persons aged 0 to 18 years and over the age of 65 years})}{(\text{The total population aged 18 to 64 years})} \times 100$

landholders than the landless households. On the other hand, in our study area, it is observed that landless agricultural labourers have taken land on lease for one year and cultivated that. This land is also considered here which means 'land_i' is applicable not only among the marginal farmer households who are also working as agricultural labourer, but also among the landless agricultural labour households.

- (vii) Income from allied activities in agriculture (alliedincomeagri_i)⁷⁹: Apart from Kharif and Rabi paddy production, our sample households are involved in several allied agricultural activities such as horticulture (especially vegetable and Betel leaf), fisheries, and livestock. The agricultural labourers who are productive in allied activities of agriculture are likely to have access to more institutional credit [Baffoe and Matsuda (2015)].
- (viii) Non-farm income of the family (nonfarmincome_i): The households with non-farm income are more likely to access institutional credit as they can diversify risk through the several non-farm income-generating activities [Baffoe and Matsuda (2015)].
- (ix) Membership of SHG (shgmem_i): Self-help group membership of any female member of the sample household is expected to increase its probability of receiving formal credit. Here credit disbursed through Self-Help Group is treated as institutional credit⁸⁰.
- (x) Financial Literacy index (FLI_i): The information of nine sub-indicators has been considered to measure the financial literacy index of the household, described as – (a) knowledge of Know Your Customer (KYC) (b) ability to calculate basic arithmetic (c) knowledge of inflation (d) knowledge of simple interest (e) knowledge of compound interest (f) able to update passbook (g) able to issue cheque book (h) able to use mobile banking (i) able to use ATM. All these indicators are binary in nature (=1 if the respondent has required knowledge, 0 otherwise). According to the methodology prescribed in the OECD working paper on measuring financial literacy [OECD (2012)], we have captured the financial literacy score by counting number of 'yes' responses of these nine sub-indicators of male

⁷⁹ In the study, 'alliedincomeagri' includes only income from allied activities of agriculture. In the equation we have taken another variable 'land' which is used for agriculture purpose as land (own land and/or leased-in land) is the main source of agricultural income. To avoid taking repetition of agricultural income in the model, 'alliedincomeagri' only includes income from allied activities of the sample households.

⁸⁰ As NABARD facilitates sustained accessibility of financial products and financial services to the rural women through the Self-Help Group-Bank Linkage Programme (SHG-BLP) in a cost effective and sustainable ways.

and female respondents of the family separately. Using the simple adding method, we have then calculated a simple average score of both which represents the financial literacy index of a sample agricultural labour household. It is expected that a higher value of a financial literacy index of a household means more information on financial services and more awareness of terms & conditions of banking transactions.

Before explaining the model, it is important to know that our econometric model will exist if and only if the sample households are not suffering any credit rationing problem during the time of receiving institutional credit⁸¹. The survey report informs that most of the marginal farmers receive their loans from co-operative banks against land collateral. Besides, the households are drawing credit through Self-Help Group under a joint liability loans contract among all the members of the groups. Here each group member has the responsibility to repay the loans within the stipulated time to receive the next loans [Zeller (1994)]. Interestingly they were able to get the amount of loan that they demanded. Hence, there is no possibility of a credit rationing among the sample households during the time of accessibility of loans from these formal lending institutions.

To address the research problem, the Probit model is applied in the study, as our dependent variable ‘formalloan_i’ is binary in nature. It takes the value 1 if the sample agricultural labour household has taken loan from formal sources at least once in the entire reference period, otherwise 0.

We have used here the Probit model in our study. Among the three different model fit criterion such as Akaike information criterion (AIC), Bayesian information criterion (BIC), and chi-square, the Probit model shows the marginally better result as compared to the logit model [Tulasi, et al. (2017)]. The Probit regression equation can be expressed as-

$$\begin{aligned} \text{formalloan}_i = & \alpha_0 + \alpha_1(\text{caste}_i) + \alpha_2(\text{age}_i) + \alpha_3(\text{depratio}_i) + \alpha_4(\text{edu}_i) + \alpha_5(\text{femaleedu}_i) \\ & + \alpha_6(\text{land}_i) + \alpha_7(\text{alliedincomeagri}_i) + \alpha_8(\text{nonfarmincome}_i) \\ & + \alpha_9(\text{shgmem}_i) + \alpha_{10}(\text{FLI}_i) + u_i \dots \dots \dots (i) \end{aligned}$$

Now, the descriptive statistics of all quantitative and qualitative variables used in equation (i) are described as in the Table-8.6.

⁸¹Our sample households generally access loans from co-operative banks and SHG.

Table 8.6 Descriptive Statistics of the regressors including outcome variable

Variables	Variable descriptions	Mean	Std. Dev	Max	Min
formalloan	=1 if any household access the formal loan (Co-operative bank and SHG); otherwise=0.	0.629	0.483	1	0
caste	=1 if any households belong to SC/ST/OBC; otherwise = 0	0.581	0.253	1	0
age	Age of the household head (in years)	48.088	8.824	70	26
depratio	dependency ratio in the family	0.454	0.329	0	1.5
edu	Number of schooling years of household head	8.237	3.33	17	0
femaleedu	Number of schooling year of the female head (or spouse of household head) of the family	6.649	3.79	13	0
land	Size of own land and/or leased-in land (in Bigha) for cultivation	0.478	0.3712	1.051	0
alliedincomeagri	Annual income (Rs) from agricultural allied activities of the family	44818	33682	266774	0
nonfarmincome	Annual income (Rs) from non-farm activities of the family	56953	28825	167600	0
shgmem	=1 if any female member of the family has the membership of SHG, otherwise=0	0.465	0.316	1	0
FLI	Financial Literacy Index	1.969	1.115	5.5	0

Source: Authors' calculation

Before going to the result, we have examined the likelihood ratio test for heteroskedasticity to check whether the variance of errors is the function of explanatory variables. It is observed that the variance (or spread) of consumption at low levels of income is much less compared to the

variance of consumption at higher levels of income. The low-income group households are less flexible in spending their income as they spend a large proportion of income on necessities and there is hardly any scope in leisure spending [Frost (2019)]. Our likelihood ratio test for heteroskedasticity also confirms that there is no existence of heteroscedasticity in the model as $\text{Prob} > \chi^2 = 0.2183$ (as the value is greater than 0.05, i.e., we accepted the null hypothesis of homoskedasticity). Besides the heteroskedasticity test, the Variance Inflation Factor $[\text{VIF} = \frac{1}{(1-R^2)}]$ is also examined to detect the inter-correlation among the explanatory variables. The test shows that there is no multicollinearity problem among the given regressors as their VIF values are less than 4. Table-8.7 provides the results of Probit regression analysis.

Table 8.7 Dependent variable: Accessibility of formal loan of the agricultural labour households

Total number of observations= 405		
Variables	Value of coefficients	Average Marginal Effects $(\frac{\partial p_i}{\partial x_i})$
age	0.02083** (0.0102)	0.0056**
caste	-0.4837*** (0.1802)	-0.1291***
depratio	-0.3216 (0.0923)	-0.0858
edu	0.0256 (0.0285)	0.0068
femaleedu	0.0017 (0.0253)	0.0005
land	0.0306*** (0.0044)	0.0082***
alliedincomeagri	0.000017*** (2.81e ⁻⁰⁶)	4.42e ⁻⁰⁶ ***
nonfarmincome	0.000021*** (3.20e ⁻⁰⁶)	5.70e ⁻⁰⁶ ***
shgmem	0.5106** (0.1908)	0.10282**
FLI	0.08838* (0.0386)	0.02359*
Constant	-2.14022***	
Pseudo R ²	0.2802	
Chi-square (10)	149.59	

Note: *** indicates 1% level of significance, ** indicates 5% level of significance and * indicates 10% level of significance. Standard errors of the coefficients are written in parenthesis.

8.5.2 Discussion

The impact of the age of the household head on the probability of accessing institutional credit is positively significant as it is expected that aged people are more aware and experienced of formal financial services. Our study confirms that the agricultural labour households belonging

to backward classes (SC, ST, and OBC) have less possibility of receiving institutional credit than the general caste agricultural labour households. Land ownership enhances the possibility of getting institutional credit among the agricultural labour households. Allied activities in the farming sector such as fisheries and betel leaves cultivation are performed extensively in our study area and occupy a high proportion of income of the total income of these households, and this enhances the accessibility of their institutional borrowing. Diversified non-farm activities among the households encourage them more credit transactions in the formal sector banks. The households with any female membership of SHG show a higher probability of getting institutional loans. The higher value of FLI boosts the cognitive ability of the agricultural labour households that helps them to understand the utility of formal financial services. Educational attainment and dependency ratio of the family have no significant impact on the probability of receiving institutional credit in our study area.

8.6 Examining the role of institutional credit on livelihood of the agricultural labour households

To investigate the impact of credit using for income-generating activities on the livelihood of agricultural labour households, we consider Average Monthly Per Capita Income (MPCI) of the sample household in adult equivalent term as the proxy variable of its livelihood. It is calculated in the following way.

8.6.1 Average Monthly Per capita income of the household (MPCI)

Initially the annual income of the household has been calculated by considering the income of each working member of the family from diverse occupations of the farm sector, non-farm sector, and leased in the land during our reference period (April 2018 to March 2019). We have also recorded the information about the annual savings (in formal and informal banks) and the amount of money required to repay the yearly credit with the rate of interest. We obtain the Net Annual Income (NAI) of the sample households after subtracting the annual savings and borrowings from the household's annual income. Dividing NAI by 12, we get a monthly income in the family that is converted into average Monthly Per Capita Income (MPCI) by dividing the adult equivalent scale⁸² in the family.

⁸² For simplicity, we have considered different weights for different age groups belonging to each family member of a household irrespective of their gender, physical stature and functionality. In the chapter, we have constructed AES by assuming the following weights as- (i) Adult male and female members who aged above 18 years and below 60 years is used weight 1 (ii) Adults lying between 60-70 years is assigned weight 0.75 (iii) Adults whose aged in above 70 years is treated weight 0.5 (iii) Adolescents whose age in between 14 to 18 years is given weight 0.75 (iv) School-aged children who are in age group 6-14 years is used weight 0.5, and (v) Children whose age is

8.6.2 Possible determinants of the livelihood of the agricultural households

Apart from credit taken for income generating activity, we must identify other possible factors which can also play a positive role to enhance the livelihood of the agricultural labour households. Initially possible explanatory factors will be narrated along with theoretical justification.

- i. Size of formal loan for income generating activities ($\text{formalloanincome}_i$): The credit from co-operative banks and Self-Help Group is the key source of working capital of the agricultural labour households in our study area to undertake investment in agriculture or other income-generating activities. It is therefore needed to assess whether these loans disbursement from formal banking sectors for income-bearing activities are adequate to improve their livelihood.
- ii. Size of informal loan for income generating activities of the i^{th} households ($\text{informalloanincome}_i$): Due to short-term credit and the small and medium amount of loans disbursement with a high interest rate, informal credit may not be favourable for using developmental activities compared to institutional credit. Bottomley's Lender's Risk Hypothesis (LRH) (1963, 1975) observed that an imperfection in the credit market exists where due to high probability of default, the interest rate charged by informal credit suppliers is much higher than that of the formal sector. Hence it is also required to examine whether informal loans even taken for income generating activity have any influence on improving their livelihood.
- iii. Average monthly health expenditure of the family during reference year (healthexp_i): Agricultural workers are likely to face chronic health hazards due to the prolonged usage of pesticides. Health impairment not only lowers their productivity but also reduces the number of working days in a year [Antle & Pingali (1994)].
- iv. Size of institutional loan used for non-income generating activities ($\text{formalloannonincome}_i$): It is expected that formal loan use for non-income generating activities like for consumption or medical purposes may create a debt burden of the borrower and can create an impact negatively on MPC_I of that household.
- v. Size of informal loan used for non-income generating activities of the i^{th} households ($\text{informalloannonincome}_i$): Non-institutional credit used for consumption purposes

below 6 years are given weight 0.25. For detail calculation of per capita adult equivalent expenditure, see [Townsend (1994) and Kumar & Mahadevan (2008)].

is observed to be a huge debt burden on these households as they need to repay principal money with a high rate of interest during a short time. But it does not help the borrower to generate a few extra incomes. So, we must investigate whether this credit taken from informal sources creates any impact on the livelihood of the agricultural labour households.

- vi. Total number of family labourers of the i^{th} households (familylabour_i): The family labour force may play an influential role in increasing the income of the households. Most of the time agricultural labour households cultivate their land or (and) leased-in land and perform allied activities in agriculture with the help of the family labour force. In the study area, it is observed that the female members might not work outside as agricultural labourers but they engage as family labourers in agriculture and allied activities. As labour cost is very high (Cash Rs 350/day plus kind), these households are not interested to hire labour during the time of their agricultural activity.
- vii. Financial literacy index (FLI_i): Financial literacy develops an individual's financial knowledge and raises awareness of financial services [Atkinson & Messy (2012)]. The financially literate households are expected to invest institutional credit more on income-bearing activities and less on income non-generating activities which can influence the Monthly Per Capita Income (MPCI) of a household positively.

Here 'FLI' may not directly depend on MPCI but influence MPCI through the accessibility of credit utilizing on income-generating activities or on income non-generating activities. Hence, we have used 'FLI' as an instrumental variable for the formal credit using income bearing activities (formalloanincome) or for using non-income generating activities ($\text{formalloannonincome}$) and for the informal credit using income bearing activities ($\text{informalloanincome}$) or for using non-income generating activities ($\text{informalloannonincome}$) of the agricultural labour households in our study.

Apart from the above variables, we have taken variables such as age and education of the household head and dependency ratio of the family, which have already been discussed in the sub-section of 8.5.1.

For the econometric analysis, we initially examine the Multi-co linearity test of all the above-mentioned explanatory variables. Among all the regressors, four variables⁸³ such as formalloanincome , $\text{formalloannonincome}$, $\text{informalloanincome}$, and $\text{informalloannonincome}$ are

⁸³ Although VIF values of these variables are less than 4.

expected to suffer from multicollinearity problems. Hence, to avoid the problem of multicollinearity among the variables, we must consider four separate regression equations in four models to identify the possible factors responsible for the livelihood of the agricultural labour households. The equations of the model-1 can be written as-

$$\text{MPCI}_i = \beta_0 + \beta_1(\text{formalloanincome}_i) + \beta_2(\text{age}_i) + \beta_3(\text{edu}_i) + \beta_4(\text{familylabour}_i) + \beta_5(\text{healthexp}_i) + \beta_6(\text{depratio}_i) + u_{1i} \dots \dots \dots \text{(ii)}$$

$$\text{and } (\text{formalloanincome}_i) = f(\text{FLI}_i, v_{1i}) \dots \dots \dots \text{(iii)}$$

Equations of the model-2 can be written as-

$$\text{MPCI}_i = \gamma_0 + \gamma_1(\text{formalloannonincome}_i) + \gamma_2(\text{age}_i) + \gamma_3(\text{edu}_i) + \gamma_4(\text{familylabour}_i) + \gamma_5(\text{healthexp}_i) + \gamma_6(\text{depratio}_i) + u_{2i} \dots \dots \dots \text{(iv)}$$

$$\text{and } (\text{formalloannonincome}_i) = f(\text{FLI}_i, v_{2i}) \dots \dots \dots \text{(v)}$$

Equations of the model-3 can be written as-

$$\text{MPCI}_i = \delta_0 + \delta_1(\text{informalloanincome}_i) + \delta_2(\text{age}_i) + \delta_3(\text{edu}_i) + \delta_4(\text{familylabour}_i) + \delta_5(\text{healthexp}_i) + \delta_6(\text{depratio}_i) + u_{3i} \dots \dots \dots \text{(vi)}$$

$$\text{and } (\text{informalloanincome}_i) = f(\text{FLI}_i, v_{3i}) \dots \dots \dots \text{(vii)}$$

Two equations of the model-4 can be written as-

$$\text{MPCI}_i = \mu_0 + \mu_1(\text{informalloannonincome}_i) + \mu_2(\text{age}_i) + \mu_3(\text{edu}_i) + \mu_4(\text{familylabour}_i) + \mu_5(\text{healthexp}_i) + \mu_6(\text{depratio}_i) + u_{4i} \dots \dots \dots \text{(viii)}$$

$$\text{and } (\text{informalloannonincome}_i) = f(\text{FLI}_i, v_{4i}) \dots \dots \dots \text{(ix)}$$

Now, the summary statistics of all the explanatory variables used in equation (iii), (v), (vii) and (ix) are described as in the following table.

Table 8.8 Summary statistics⁸⁴ of the variables used in the models-1,2,3 and 4

Variables	Variable descriptions	Mean	Std. Dev	Min	Max
MPCI	Monthly Per Capita Income of the family	1446.71	935.35	72.99	6846

⁸⁴The summary statistics of the factors such as ‘age’, ‘edu’, and ‘FLI’ are already described in the Table-6.

formalloanincome	accessed formal loans (Rs) using income generating activities	22125.93	15683.01	0	75000
Formalloannonincome	accessed formal loans (Rs) using consumption purposes	6527.41	2829.63	0	35000
informalloanincome	taken informal loans (Rs) using income generating activities	11490.17	4787.65	0	50000
informalloannonincome	taken informal loans (Rs) using consumption purposes	16197.34	11423.27	0	100000
familylabour	total number of family labourers	2.5061	0.7433	1	5
healthexp	average monthly health expenditure	836.902	415.97	350	3733

Source: Authors' calculation

In equation (ii) of model-1, accessibility of formal loans using income-generating activities (formalloanincome) of the family may suffer from endogeneity problem. Some unobserved individual characteristics such as skill, proficiency, or any entrepreneurship ability can influence in making of institutional credit decisions of the households that may lead to biased results in OLS regression analysis.

To avoid the endogeneity problem, we use instrumental variable analysis using the Two-Stage Least Square Method. Here, the error term, u_{1i} captures unobserved factors which is assumed to be correlated with the exogenous variable (formalloanincome) in the equation (ii). To allow the correlation between the regressor and the error term, we have taken the variable 'FLI' which is strictly exogenous and uncorrelated with u_{1i} .

Initially endogeneity test is required to detect whether endogeneity problem is present in our study. If the model suffers from endogeneity problem, then we can apply Instrumental variable analysis applying the Two-Stage Least Square method. To perform endogeneity test, we initially use the two-step procedures in the equation (ii) with the help of instrumental variable analysis are as follows-

Firstly, we regress endogenous variable 'formalloanincome_i' on its exogeneous regressors of equation (ii) and the instrumental variable 'FLI', of equation (iii). Then the augmented equation

can be written as-

$$\text{formalloanincome}_i = \beta'_0 + \beta'_1(\text{age}_i) + \beta'_2(\text{edu}_i) + \beta'_3(\text{familylabour}_i) + \beta'_4(\text{healthexp}_i) \\ + \beta'_5(\text{depratio}_i) + \beta'_6(\text{FLI}_i) + \varepsilon_{1i} \dots \dots \dots (x)$$

Secondly, after regressing the endogenous variable ($\text{formalloanincome}_i$) on regressors and the instrumental variable FLI_i in equation (x), we get estimated residual form $\widehat{\varepsilon}_{1i}$ for ($\widehat{\text{formalloanincome}}_i$) and introduce it in the original equation (ii). Hence, the new equation becomes—

$$\text{MPCI}_i = \beta''_0 + \beta''_1(\text{age}_i) + \beta''_2(\text{edu}_i) + \beta''_3(\text{familylabour}_i) + \beta''_4(\text{healthexp}_i) \\ + \beta''_5(\text{depratio}_i) + \theta \widehat{\varepsilon}_{1i} + u_{1i} \dots \dots \dots (xi)$$

Where, the Null Hypothesis is $\hat{\theta} = 0$. There is no existence of endogeneity problem in the model if we accept the Null Hypothesis. But in the model, the endogeneity problem is present as we reject the Null Hypothesis. We have therefore applied the Instrumental variable estimation method in the above regression equation (ii). It proves that the application of the instrumental variable estimation procedure is required to reduce the biasedness and inconsistency in the model.

The presence of endogeneity problem is established here as the parameter estimates of $\widehat{\varepsilon}_i$, i.e., $\hat{\theta}$ is significant, i.e., the study rejects the null hypothesis in our model. We, therefore, have used the instrumental variable analysis in the regression equation (ii) considering the Financial Literacy Index (FLI_i) as an instrumental variable⁸⁵ of accessibility of formal loan for using income generating activities (formalloanincome).

Since there are also possibilities of endogeneity problem of formal loan using non-income generating activities ($\text{formalloannonincome}$), non-formal loans using income generating activities ($\text{nonformalloanincome}$)⁸⁶ and non-formal loans using non-income generating activities ($\text{nonformalloannonincome}$), we have followed the same two-steps procedure of

⁸⁵ The value of partial F-statistic test is more than 10, indicated as Financial literacy index (FLI) is a strong instrumental variable of the formal loans utilizing income bearing activities (formalloanincome) of the labour households.

⁸⁶ The accessibility of informal loans using income-generating activities ($\text{informalloanincome}$) of the family may suffer from endogeneity problem. Some unobservable household attributes, work environment, productivity of labour and nature of investment on asset endowment may affect household demand for credit and consequently, its estimations become biased.

instrumental variable analysis in the equation (iv), (vi) and (viii) of model-2, 3 and 4 as in the earlier model-1 of equation (ii). Financial Literacy Index (FLI) is used as an instrumental variable of ‘formalloannonincome’, ‘informalloanincome’ and ‘informalloannonincome’.

Now Table-8.9 represents the results of the Instrumental variable regression analysis in four separate models are as follows-

Table 8.9 Instrumental variable analysis: Dependent variable- Monthly Per Capita Income (MPCI)

	Equation (ii) (Model-1)	Equation (iv) (Model-2)	Equation (vi) (Model-3)	Equation (viii) (Model-4)
Observations	405	405	405	405
Variables	Value of the coefficient	Value of the coefficient	Value of the coefficient	Value of the coefficient
formalloanincome	0.1194*** (0.2091)			
formalloannonincome	-	-0.5958 (0.1478)	-	-
informalloanincome	-	-	0.0641*** (0.0249)	-
informalloannonincome	-	-	-	-0.4847** (0.1203)
age	-14.5136*** (6.0818)	-15.4758*** (6.1538)	-21.2437*** (8.7981)	-19.4456*** (7.8571)
edu	52.144 (18.661)	3.7399 (16.058)	157.455 (44.652)	98.658 (31.401)
familylabour	133.3093* (65.1046)	158.808** (81.562)	940.997** (251.834)	173.757*** (83.851)
healthexp	0.3801 (0.1372)	0.4148 (0.1378)	0.1962 (0.1417)	-1.5839 (0.4978)
depratio	-691.371*** (159.463)	-264.739* (103.171)	-322.305** (158.408)	-1605.984*** (313.967)
Constant	1216.615***	401.282*	-2248.377**	-6775.595***
R-squared	0.1388	0.1388	0.1167	0.1167
Adjusted R-squared	0.1083	0.1083	0.0953	0.0953

Note: *** indicates 1% level of significance, ** indicates 5% level of significance and * indicates 10% level of significance. Standard errors of the coefficients are written in parenthesis.

8.6.3 Discussion

Table - 8 shows that size of institutional credit taken by the agricultural labour households for income-bearing activities increases their monthly per capita income. It is also observed that 1% more accessibility of non-institutional loans for using income-generating activities of the sample households results in the enhancement of Monthly Per Capita Income (MPCI) by 0.064 percentage points. A greater numbers of family labourers engaging their agriculture and allied activities can enhance the MPCI. This may happen due to a greater number of family members of the sample households are involved into diversified occupations [Kundu and Das (2021)]. But a non-institutional loan using consumption purposes reduces the MPCI of the family. Our evidence further suggests that the higher dependency ratio of a family and aged household head influence MPCI of the household negatively. The other variables such as accessibility of institutional credit for family consumption, monthly health expenditure of the family, and educational attainment of the household head have no influence on the livelihood of the labour households.

8.7 Conclusion and policy implication

Basic objective of the present study was at identifying the possible factors which can help the agricultural labour households to get institutional credit and tried to estimate the impact of the institutional loans on their livelihood when used in income-generating activities. The Probit Regression analysis shows that the operational holdings is one of the crucial determinants for the availability of institutional credit. We have also recognized that the female members involved in SHG are economically empowered through employment opportunities and enhancement of credit absorptive capacity. Moreover, diversified allied agricultural income and non-farm income have a positive and significant impact on the accessibility of their institutional loans. The higher financial literacy index of the households boosts them to do more financial transactions in the formal banking sector. Using Instrumental Variable analysis, it is further observed that the institutional borrowing using income-generating activities impacts the MPCI of the households positively. Non-institutional sources of loans (such as, informal credit society) for income-generating activities in our study have a vital role in creating job opportunities, especially, for the landless labourers, enabling them to be free from at least a chronic level of poverty. We have also shown that the possibility of monthly per capita income

will be increased if the households are less dependent on informal credits for consumption purposes throughout the year. Besides that, the lower age of the household head and less dependency ratio in the family is better for the livelihood of the agricultural labour households. In the study, we have recommended some important policies that might enhance the accessibility of institutional credit as well as improve the livelihood of the agricultural labour households. Most important issue requires to make institutional credit available among the agricultural labour households is to enhance financial literacy among the members and that can be done if in each bank, there is a help desk which can help these poor customers to accustom in different banking related activities. Accessibility of formal credit becomes much easier if a female member of the sample household is a SHG member. Arranging better group corpus among the self-help groups can help the agricultural labour households to get larger amount of institutional credit from the group which can be used for income generating activities and ultimately can create positive impact on average monthly per capita income of those poor households. Special arrangement is also required among the agricultural labour households belonging to backward class so that they can get more institutional credit to improve their livelihood.

Chapter-9

Thesis Summary and Conclusions

Chapter 9 - Thesis Summary and Conclusions

Agricultural wage earners are one of the poorest sections among the rural workers. They are unorganized in nature and mostly dependent on wage for their livelihood. Four key challenges are faced by an agricultural labour household such as low employment opportunities in agriculture, gender wage disparity, the incidence of poverty, and indebtedness all of which have been discussed in the chapter-4, chapter-5, chapter-7 and chapter-8 of the thesis respectively.

In the fourth chapter, with the development of an economy, a gradual decline in the labour force participation rate in agriculture is observed across all states in India. In this context, the thesis has examined the influencing determinants of the declining proportion of agricultural labour force to the total labour force and its impact on the Indian economy. Six quinquennial rounds (1993-94 to 2011-12) of National Sample Survey data are used for the study. Increasing marginalization of landholdings is one of the crucial reasons for declining the demand for hired agricultural labourers in agricultural activities that ultimately reduces the labour force participation rate in the farming sector. The evidence of the chapter is consistent with other researchers in recognizing the construction industry as the highest non-farm employment generator for the rural unskilled labourers. The higher educated (secondary and above) rural households are unlikely to engage in the farming sector. An increase in the agricultural wage rate reduces the employment opportunity in the farming sector that can 'push' poor labourers towards the non-farming sector. On the other hand, informal activities with new employment opportunities can 'pull' the unskilled, uneducated, or poor labourers towards the non-farm sector for an additional income in the slack season of agriculture to cope with the risk and uncertainty in agricultural production in rural India.

In the fifth chapter, we observed that gender wage discrimination in Indian agriculture is increased substantially over the year. In this context, the chapter tries to examine the socio-economic factors which could minimize the variations of the gender wage gap in agriculture. The finding of the study shows that female primary education of rural households is one the most effective ways to reduce GWG by strengthening their bargaining power in decision making in the determination of farming wage rate. The enhancement of cropping intensity through improving irrigation facilities can also minimize the gender wage gap. Another policy variable such as the number of self-help groups with the non-farm sector provides employment opportunities to unskilled, less educated, or uneducated female labourers to generate an additional income to cope with the risk and uncertainty in agricultural production. But more

participation of MGNREGP among women and percentage of Net State Domestic Product (NSDP) spent on social sector expenditure fail to reduce gender discrimination among the agricultural labourers.

In the seventh chapter, we observed that livelihood diversification is one of the key approaches to poverty reduction of agricultural labour households. Although the quality of these jobs is highly unskilled, low waged and low productive, without these informal employment opportunities, this weaker section category would be fallen into destitution [Nazier, & Ramadan (2015)]. The econometric evidence of the study confirms that a household diversifying its activities by increasing the number of working members of the family (D_{BI}) or an individual participating in multiple occupations (D_{SI}) is an important policy variable to lift the agricultural labour households economically. The possibility of being poor in an agricultural labour household would be less if most of the adult members of a household are involved in different types of unskilled occupations apart from working only as a farm labourer in our entire reference period. The total operational landholding and loan disbursement from SHG for income-generating activity can reduce the possibility of incidence of poverty among agricultural labour households. On the contrary, the dependency ratio of the family, non-income generating loan from SHG, and the dependency of the informal loans are likely to enhance the possibility of the households falling into a high incidence of poverty.

In the eighth chapter, the existence of demand-side constraints remains the main problem to access institutional credit among agricultural labour households. The chapter initially tries to identify the possible factors which could help the agricultural labour households to get institutional credit and tried to estimate the impact of the institutional loans on their livelihood when used in income-generating activities. Probit Regression Analysis shows that the possession of landholdings is one of the crucial determinants for the availability of credit from institutional sources. Allied Income from agriculture and non-farm income has a positive and significant impact on the accessibility of their institutional loans. The study emphasizes the need for financial literacy to keep the households well-informed by an understanding of various terms and conditions of banking services. Using Instrumental Variable analysis, the chapter is also observed that the institutional borrowing using income-generating activities impacts the Monthly Per Capita Income (MPCI) of the households positively. The role of the non-institutional credit society cannot be ignored in the study for its fast disbursement of cash or (and) working capital at low or zero transaction cost during the time of negative income shocks and uncertainty. Some characteristics such as flexibility, quick disbursement of cash, and door-step services of informal credit institutions make it a better choice to poor than formal

institutions when the household suffers a negative shock [Campero & Kaiser (2013)]. The study has also found that the non-institutional sources of loans (such as informal credit society) for income-generating activities have a vital role in creating job opportunities, especially, for the landless labourers, enabling them to be free from at least a chronic level of poverty. The possibility of monthly per capita income would be increased if the households are less dependent on informal credits for consumption purposes throughout the year. The lower is the age of the household head and the dependency ratio in the family the better is the livelihood of the agricultural labour households.

Chapter-10

Policy Recommendations

Chapter 10 - Policy Recommendations

In the study, we have observed that the agricultural labourers have witnessed four key challenges such as low employment opportunity in the farming sector, gender wage disparity, poverty, and indebtedness. To overcome these problems, the thesis has suggested some important policy measures for developing their socio-economic conditions in the long-term basis.

In the fourth chapter, we observe that the labour force participation rate in agricultural activities has declined gradually over time. Decrease in labour demand due to marginalization of landholdings, increase in agricultural wages and expansion of education are the key factors behind it. Besides, dependency on rainfall, high input price, inadequate procurement price for food grains, and increased indebtedness are responsible for agriculture being non-profitable and financially unstable [Gupta (2016)]. Due to inadequate earnings, these labourers are less interested in working as agricultural wage earners. They are switching over to construction work and other private non-farm activities for alternative sources of employment. In this context, we have suggested some policies to encourage farmers to participate more in farming activities. To regain interest and enhance earnings from agricultural activities, it must strengthen co-operative farming, especially among the marginal farmers. This farming operation has been performed co-operatively which lowers the risk of agriculture among the farmers. The marginal farmers can enjoy economies of scale from this farming sector by reducing input costs and other services, such as food grain storage and transport. The profit could be shared among the farmers based on their size of possession of landholdings after the entire production process in agriculture and selling food grains to the market. If co-operative farming is successfully implemented in the economy, marginal farmers can enjoy profit from the farming sector as well as raise labour demand in agriculture where landless labourers might be benefited. Thus, agricultural cooperatives are expected to be helpful to create employment opportunities in rural areas, empower their working members economically and socially, contribute to poverty eradication, and secure the livelihood of the poor [FAO, IFAD, & WFP (2011)]. Besides, the regulation of working hours must be fixed and not more than 8 hours. Agriculture-related training, agricultural education, and vocational course are required to provide to the agricultural labourers to enhance their skill and knowledge of cultivation. It is also needed to invest in infrastructure to generate more employment in and around agriculture. In this context, ILO (1996) also recommended that basic social security benefits, occupational

safety, and healthcare facility must be provided to improve the working condition of the agricultural wage workers.

In the fifth chapter, based on the empirical study, we have suggested some of the policy measures which may reduce the gender wage gap in agriculture. Expansion of education among the women, particularly in the rural areas, and participation of microfinance system through forming self-help group mainly among local women can enhance the empowerment and bargaining strength during the time of deciding wage rate of the female agricultural labourers. An enhancement of cropping intensity through improving irrigation facilities helps to minimize the gender wage gap in agriculture. Besides, non-farm employment opportunities increase the demand for female labourers which helps to bargain them for better wages and sometimes similar wage rates of the male agricultural labourers.

In the seventh chapter, the policy prescriptions based on our empirical findings are expected to be helpful to tackle the high prevalence of poverty among agricultural labour households. The employment diversification towards the farm and non-farm sectors at the household level is the most effective policy variable to bring welfare of the society through absorbing the growing unskilled labour force. The non-agricultural activities provide economic security to some sub-groups of the population, especially, landless households or women who are not participated in the agricultural labour market [Lanjouw, P. (2001)]. There is a need to take some initiatives under MGNREGA to provide job cards and ensure 100 person-days guaranteed wage employment to at least one female member of each agricultural labour household. The possession of this job card legally empowers the female members to participate in MGNREGA irrespective of caste, creed, and custom, which can mitigate the livelihood risk of the households. Educational attainment and skill acquisition are needed to be emphasized for getting high-paid diversified jobs in the non-farm sector. The loans disbursement from SHG for income-generating activity can reduce the possibility of incidence of poverty among agricultural labour households.

In the eighth chapter, we have recommended some important policies that might enhance the accessibility of institutional credit as well as improve the livelihood of the agricultural labour households. The most important issue requires to make institutional credit available among the agricultural labour households is to enhance financial literacy among the members and that can be done if, in each bank, there is a help desk that can help these poor customers to accustom to different banking-related activities. Besides, vocational education, and other skill development programs, especially among the rural females are needed to organize to empower them and to enhance their awareness of financial products and other regulations of formal financial

services. The female members should involve in SHG which facilitates employment opportunities and enhances their credit absorptive capacity that can be used for income-generating activities and ultimately can create a positive impact on the average monthly per capita income of those poor households. The requirement of collateral for the landless agricultural labourers has to be low for receiving their formal loans. The supply of funds of the formal financial institution must increase for disbursing more loans at a low-interest rate that could reduce the liquidity constraints of the households. Special arrangement is required among the agricultural labour households belonging to the backward class that helps them to receive more institutional credit to improve their livelihood.

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List of Publications

1. Kundu, A., & Das, S. (2019). Push and (or) Pull? Drivers of Labour Force Participation in Indian Agriculture. *The Indian Journal of Labour Economics*, 62(3), 413-430.
2. Kundu, A., & Das, S. (2019). Gender wage gap in the agricultural labour market of India: An empirical analysis. *Journal of Economics and Political Economy*, 6(2), 122-142.
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Push and (or) Pull? Drivers of Labour Force Participation in Indian Agriculture

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Abstract

Labour force participation rate in the Indian agricultural sector is gradually declining. This paper wants to investigate the possible causes behind it. Here both possible push and pool factors behind this decline are considered simultaneously. Initially, on the basis of 70th round NSSO data on agricultural households, it is tested whether or not marginal farmers are enjoying comparative advantage during the time of getting employment in the agricultural sector as agricultural labourer. But as 'decline' is a flow concept, to investigate possible reasons behind this decline, we have considered six rounds state-level NSSO data on Employment Unemployment Survey of India and its 20 major states. Applying fixed effect panel data regression technique after considering state-specific possible factors, it is found that gradual decline of per capita land holdings is the major push factor responsible for gradual decline of labour force participation rate in Indian agriculture. Apart from that, other push factors like hike of real agricultural wage rate, improvement in education level of the agricultural households and pull factor like hike of non-farm real wage, employment opportunities in construction and other non-farm activities are found significant for gradual decline of labour force participation rate in Indian agriculture.

Keywords Agricultural labourers · Pull factors · Push factors · Panel data analysis

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By Amit KUNDU ^a
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Abstract. The gender wage gap in the agricultural labor market is observed in all the states of India. This paper will try to identify possible policies which can reduce this gender wise wage discrimination in agricultural labor market. We consider the period between 2010-11 to 2015-16 and 18 major states of India. The possible factors which can create an impact on gender wage gap are the expansion of MGNREGP, Self Help Group, primary education among rural women, expenditure on the social sector as a percentage of Net state domestic products and the cropping intensity. It initially assumes that Cropping Intensity of a state in a specific time is very much dependent on the net irrigated area of that state in that time. Our endogeneity test supports our claim. So, Instrumental variable method is applied in our Fixed Effect panel regression. The result shows that expansion of primary education among women, the number of self-help groups in the state and enhancement of cropping intensity through improving irrigation facility can play a significant role to reduce the male and female wage discrimination in the agricultural labor market in India. But participation of women in MGNREGP and social sector expenditure as a percentage of NSDP fails to create any impact on the gender wage gap.

Keywords. Agricultural labor market, Gender wage gap, Panel data, Instrumental variable.

JEL. C23, C26, J16, J43.

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3. Occupational Diversification as Livelihood Strategy Among the Agricultural Labour Households of West Bengal, India

Research Article

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Abstract

It is now difficult for an agricultural-labour household to get employment as agricultural labourers throughout the year. So, this type of household for survival purposes has to depend on diversified occupations when sometimes only the household head participates and sometimes more than one able-bodied household member participates. Based on a village-level field investigation in West Bengal, the article explores that possibility to keep an agricultural labour household above the poverty line will be more effective if more than one adult member participates in different types of occupations throughout the year. Except this, other possible determinants which can play an effective role to keep an agricultural-labour household above the poverty line are higher operational land among the marginal farmer household who are also working as hired agricultural labour in others' land and accessibility of microcredit for income-generating activity for the female member(s) of a household from self-help groups (SHGs).

Keywords

Demographics and politics, economics, geography, sociology, urban

Introduction

An agricultural labourer works for wages (either in cash or kind or a combination of both) in another person's land (Census of India, 2001, 2011). These types of labourers are usually casual and unskilled in nature. According to the Census of India (2011), 40.9% of the total rural workforce in West Bengal is working as agricultural labourers, who are either landless or marginal farmers in nature, and more than 56% of marginal farmers possess less than 0.40 ha agricultural land (70th round NSSO data,

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