Chapter 1

1.1 Introduction

A distinctive field of policy and practice and research is noticed in rural Development. It is because a great majority of poor people in the developing countries like India (50.1 percent and 41.8 percent in 1993-94 and 2004-05 respectively as against 31.8 percent and 25.7 percent poverty ratio in urban area) live in rural areas. A severe problem of unemployment in India is created by population pressure, an ever declining land-man ratio, small and fragmented agricultural land holdings, highly varieties of land distribution structures with increasing labour saving farm production procedures. The overall rate of unemployment has been increased from 6.1 percent in 1993-94 to 8.3 percent in 2004-05. The unemployment rate of agricultural labour households was to 9.5 percent in 2004-05 while the rate of unemployment of women in rural was to 8.7 percent in 2004-05 (Hirway, 2010).

Another troublesome feature of India is poverty. Although Indian economy has grown steadily over the last two decades, the impact of the overall high growth has not been positive in case of poverty declination from 30 percent in 1993-94 to 27.8 percent in 2004-05, implying a very small rate of decline of 0.74 percent per year during this period. The elasticity of poverty reduction with respect to per capita GDP growth declined from 1.13 percent to 0.69 percent during the phase 1993-94 to 1999-2000 and 1999-2000 to 2004-05. In the case of some marginalized groups like the scheduled tribes, the reduction in poverty has been almost zero. In short the glorious performance of economic growth is not really reflected in poverty reduction (Hirway, 2010). This is because the rapid economic growth experienced by the India during the

recent decades is the highly unbalanced structural transformation of the economy. Agriculture which contributes less than 20 percent to the national GDP, constitutes about 57 percent of the work force implying very low average labour of productivity in this sector in comparison with other sectors. The employment elasticity of primary sector declined from 0.50 in 1983-1993/94 to 0.33 in 1993/94 –2004/05. The low and rapidly declining employment elasticity implies that the Indian economy would have to grow at a very rapid rate if it has to offer satisfactory employment level to the vulnerable working poor. In a studies it has estimated the size of employment that needs to be generated in the economy on the basis of providing employment to unemployed, underemployed and working poor in the economy at 92.3 million in 2007 (Papola, 2008).

It is frequently argued that the right to employment approach or Employment Guarantee Programme approach under which a legal right to employment is given by the state, to all those who are willing and ready to work at a certain (minimum) level of wages is better than the right to income approach (the cash transfer approach) under which the needy are given a right to a minimum income for maintaining a living standard. Under cash transfer the problems faced are in terms of targeting (there are leakages), pilferage (corruption) of funds and delays. But employment providing schemes like Rural Public Works Programmes are more or less free from such problems. The more important is that the poor needs work to lead a life of dignity and not just for cash (even if as a right). This approach has been recognized by the Article 23 of the UN Declaration on Human Rights, where they says "Everyone has a right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment" (universal Declaration of Human Rights, UN, 1948). There has been a growing theoretical and empirical literature about the role of Public Works Programmes (or 'workfare') on poverty

reduction (Sen, 1995; Van Braun, 1995; Besly and Coate, 1992;   Ravallion, 1991; Acharya, 1990; Dreze and Sen, 1989). 'Workfare' has been enabled to the social planner for separating non-poor's from poor's through connecting income transfers to participation in the public works. The public works also fit by the concepts of Nurkse (1957) who had regarded surplus labour in low-income economies a potential saving useful for capital formation. Again, they has been useful to create and maintenance of rural infrastructure which would provide a positive externalities due to the public goods.

India has a long history of public works programme. These programme started as 'relief works' during the pre-British and British period when disasters like drought, floods etc. threatened the survival of people. After independence, however, public employment programmes had been viewed as means of generating employment, to address the structural un/under employment as well as ways to generate productive assets to increase the labour absorbing capability of the mainstream economy.

Keeping an eye over creating employment for the poor and unemployed people in rural areas, a chain of wage-employment programme have been set such as the 'Rural Works Programme' (RWP), 'Crash Scheme for Rural Employment' (CSRE), 'Pilot Rural Employment Project' (PREP) since the first plan period. Two national employment programme had been introduced in 1980s based on the experiences of another pioneer Employment Guarantee Scheme in India- Maharashtra's Employment Guarantee Scheme, which was introduced in the early 1970s and a legal support was provided to it in 1974. These two schemes were "National Rural Employment Programme" (NREP) and "Rural Landless Employment Guarantee Programme" (RLEGP) launched during 6th and 7th five year plan. With an aim to deliver through the

Panchayati Raj Institutions (village level elected institutions), both the schemes were united and restored in 1989 and the scheme renamed as Jawahar Rozgar Yojana (JRY).

A scheme named Employment Assurance Scheme (EAS) had been introduced in 1993 to facilitate employment in non-agricultural season.In 1999 Jawahar Gram Samiriddhi Yojana (JGSY) had been started to develop the rural infrastructure. Having mearged EAS and JGSY, Sampoorna Gramin Rozgar Yojana (SGRY) was introduced in 2001. To create additional supportive wage employment, Food for Work Programme (NFFWP) has been launched in 2004 which also facilitated to generate assets. The above programme basically aimed at reducing poverty at the bottom by providing employment at reasonable wage to the poor on the one hand and generating productive assets of different kinds on the other. In a way, these programmes aimed at using surplus manpower in generating productive assets to expand the labour absorbing capacity.

The working of these programmes has been evaluated by a large number of official and non-official agencies. The studies revealed that these programmes were crippled by ineffective design, poor targeting and low awareness about the programme or its provisions, problems of administration, inefficiencies in distributions, non-transparent procedures, pilferage and widespread corruption. The programmes have recorded a limited impact at the macro level in terms of generation of employment per worker. They also have made a limited impact in terms of production of durable and good quality assets (Hirway, 2003). More over there was no guarantee of employment for longer durations.

Learning from the past experiences of wage employment programmes in the country on the one hand, and the experiences of implementing of employment guarantee programme, i.e.,

Maharashtra Employment Guarantee Scheme, on the other, the Central government in India decided to introduce an employment guarantee scheme in 2006 under the National Rural Employment Guarantee Act, 2005. Under the act every rural household living in the most 200 backward districts of the country was guaranteed at least 100 days of wage employment in a year at the minimum wage rate of the concerned state. This Act has been extended to 100 more districts in the second year and to the entire country (rural areas) from April 2008. On 2nd October 2009, NREGA got the new name after Mahatma Gandhi to introduce the act more beneficial to the mass and thus it has become Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA).

The basic difference between MGNREGA and earlier employment generation programme that the MGNREGA is demand driven where as the earlier employment generation programme is supply driven. All adult members of a rural household willing to do unskilled manual work will get job within 15 days of application demanding for job at the radius of 5 k.m., otherwise he will paid 10 percent extra wage as travel allowance. If government fails to provide job within 15 days, unemployment allowance will be paid to that labourers who have demanded for job in the duration period of job. MGNREGA promotes the works such as conservation of water, proofing of drought, protection of flood, development of land and minor irrigation. Central Government bears 100 percent wage cost; but unemployment allowance and 25 percent material costs are born by State Government. Wage and material cost ratio should be 60:40. 50 percent work. Finally, least one-third of the workers should be women.

1.2 Survey of the Literature on MGNREGA and Its Implementation

Recent literature highlights a number of significant features regarding Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) in India. The existing literature on MGNREGA has been reviewed here under different heads, namely performance and governance related issues, impact on the livelihoods, effect on the agricultural labour market, environment and impact on economic growth, women empowerment, child well being and socio-economic impact of implementation of MGNREGA.

Performance of MGNREGA

Das et al (2007) examined the reality of NREGS. They had shown that there is a difference between cost and fund sanctioned under NREGS. The negligence and corruption of government official make this difference. They have pointed the major discrepancies in several villages in Koraput, Rayagada and Nawrangpur districts in Orissa. The tribal members in the villages refused to work because most of them did not receive payment in the first phase. Complete and correct job card entries were not completed. So most of the people gave up hope about NREGS

Saho (2007), Dreze (2007) evaluated and assessed the performance of the NREGS in 100 Orissa villages. His survey was covered six most backward districts of the state-Bolangir, Nuapada, Kalahandi, Koraput, Nabarangpur and Rayagada. The preliminary findings of his survey were shocking, scandalous and outrageous. The NREGS has been hijacked by officials responsible for implementing this scheme. Job cards remain to Pradhan and he makes a misuse of it. He believed that MGNREGA would enable them to avoid long distance seasonal migration.

Chakraborty (2007) studied the performance of MGNREGA using the parameter of percentage of rural households enrolled, percentage of rural BPL households enrolled and

percentage of application for enrolment. The first two parameters reflected the preference of the households (non-BPL and BPL) for MGNREGA employment. The third indicated supply side performance. MGNREGA enrolment on the basis of application was extremely low in Maharashtra, followed by Bihar, Karnataka and Jharkhand. The higher per-capita income states used the fund more appropriately.

Ambasta et al (2008) examined how far MGNREGA is successful in question of performing prospect in livelihoods of the poorest and heralding a revolution in rural governance in India. According to them, there are lack of professionals and staff. The main project implementer like DM, BDO and panchayat staffs work as additional charge basis. Delays in administration and lack of project planning make this project faulty. Inappropriate wage rate restrain the worker from MGNREGA work. Mockery of social audit drains the resources in the pocket of implementer. But they think that information technology will help the transparency of MGNREGA. Different civil organization will make it more effective in future.

Siddhartha et al (2008) analyzed the CAG Report on MGNREGA to synthesize the employment programme. According to them analyzing the CAG Report MGNREGA, the last word on the MGNREGA it can be said that MGNREGA was the last resort of employment must be avoided. Only 18 persondays per households was available and 3.2 percent family got 100 days job. In Bihar Rs. 8.99 lakh was paid as a wages to fictitious labourers in respect of 7 works in 2007. He mentioned tempering of muster roll by using white fluid and marking absent as present. The study had been shown that there was over writing in persondays worked.

Sharif (2009) assessed the outreach and benefits of MGNREGA. For his study he took survey data from seven states and sixteen districts located in northern India. The study revealed

that Chhattisgarh, Orissa, Madhya Pradesh and Rajasthan were doing well to provide the benefit of MGNREGS to the deprived households. On the other hand Jharkhand, Bihar and Uttar Pradesh were unable to provide the benefits of MGNREGA in the same sections. Again Johnson (2009) evaluated MGNREGA in Andhra Pradesh as an alternate for weather insurance. He took a regression equation with (EARLY), (LATE), (DAYS), (EXCESS) and (DEFICIT) as dummy variable. Only data from districts which were in the first phase of the implementation roll out is included in the analysis. Population engaged in NREGS was by far the most sensitive to changes in agricultural season rainfall. This implies in times of bad weather, more people participate in NREGS but that workers do not on average, work considerably more days or receive considerably more per day.

 Dey et al (2010) examined the implementation of MGNREGA in Birbhum district, West Bengal. Form their study they had shown that the programme had to provide more personday to make the programme a last resort of employment. This study also showed that, in Birbhum, there was a widespread wakefulness about MGNREGA. But there was a long delay in wage payments during the first year of the programme, since then, the payment lag had declined and it was in the range of 20 days.

Raabe et al (2010) investigated the challenges of MGNREGA- the challenge of avoiding elite capture and actually reaching the poor and the deprived, the challenge of managing the effective fund allocation and reduction of leakages and corruption. They used process-Influence Mapping tool to evaluate the functioning, transparency and accountability of MGNREGA. Their study revealed that the actor of MGNREGA did not work properly. The case study evidence also points irregularities in the job card issue procedure. The job cards were issued to those who had voted for the president of Panchayet. The President of Panchayet also issued job cards to them

who were belongs to same cast with him. MGNREGA works would be successful with co-ordination in all implementing agency. But there was a lack of co-ordination between Panchayet and Block. Since all funds were transferred by block officer and all measurement and estimation of project was done by engineer, they could negotiate themselves and reap the benefits of difference between actual cost and estimated cost of the project.

Zanker et al (2011) examined the comparative effectiveness on employment guarantee schemes and cash Transfers on the poor. In order to increase the likelihood of being able to make meaningful comparisons between the studies in line with the systematic review methodology, the number of studies included on the basis of full text (222) was reduced to only those examining money-metric poverty outcome measures (poverty indices, expenditure and income). Finally they included 37 studies for their analysis. The analysis revealed that cash transfers and EGS on money-metric poverty parameters were not absolutely positive. The ratio of positive to negative impacts identified varied by intervention and indicator. It was consistently higher for cash transfers than EGS across all indicators.

Governance Related Issues

Mathur (2007) said about the essential of authoritative information in a continuous and regular basis. There was space for the Government to adopt simultaneous assessment, more effectual monitoring, time-series studies and focused reports on significant perspective like minimum wages, muster rolls. Vanaik et al (2008) showed that the payment of MGNREGA work through bank would reduce corruption in MGNREGA. They considered Mayurbhanj district (Orissa) for field study. The study confirmed that wage payment through bank or post office would vanish the existence of middle man and bribe of government official. But bank

accounts in Mayurbhanj had been opened in the name of male household member. This was against the gender equality as well as transparency.

Afridi (2008) studied about the accountability system of NREGS in Rajasthan and Andhra Pradesh (AP). His study revealed that civil society and NGOs were the main monitor of NREGS where as state resource person, district resource person and villagers social auditor trained by state government in AP were the auditor of NREGS. Political parties and Sarpanch did not give official document of NREGS to NGOs with the logic of outsider. They wanted to give account to the villagers. But villagers were greatly influenced by powerful elite. In Yendabetla Panchayet almost 36 percent expenditure was unaccounted.

Gopal (2009) examined about the social audit of NREGS in Ananthapur district of Andhra Pradesh. His study revealed that in most of the cases social audit system was fraud. He had shown that a huge number of frauds detected in Ananthapur district in public meeting. But the amount recovered was very insignificant. Adhikari et al (2010) examined about the wage payment through Banks and Post office as the last solution of corruption in NREGA wage distribution. They collected data from two blocks each in Allahabad (U.P) and Ranchi (Jharkhand). Their survey revealed that 87 percent of the surveyed worker preferred to Bank than Post office due to a charge levied by Post offices for transfer of NREGS funds. In 77 percent case pass book were not updated. In most of the cases worker did not get wage from bank directly. So there was a provision for corruption with collusion between band and NREGS authority. Because panchayet secretary send muster roll to the bank directly without publishing to the public domain. So there was a possibility of manipulation to master roll. In Kakram Gram Panchayat of Allahabad district, many upper cast men were included in payment though they had never worked on NREGS work.

Vij (2011) explained the structure of social audit from a policy design view point on the basis of field study and recent changes in rules aims, to unravel why despite the merits, it was not yet the magic silver bullet for poverty alleviation. With centre, state government in village level, different local government like Sarpanch, Panchayet conduct the social audit. Different NGOs and organization also helped to the work of social audit. Social audit from ground level would ensure transparency. But studies had noted the problem of elite capture and control of the programme had failed the social audit system. They suggested that if we can change the traditional bureaucracy towards civil society organizations (CSOs), there has been a sustainable development through NREGS

Impact on the livelihood

Very few researches have conducted a thorough scientific analysis of the actual effect of MGNREGA on rural livelihood.

Tiwari et al (2011) studied a multidisciplinary evaluation in Chitradurga district of Karnataka to examine the effect of the MGNREGA in improving livelihood through environmental facility and decreasing vulnerability to climate variability.

UNDP (2010); Verma (2011); Kareemulla et al (2009), point out that the MGNREGA provides different environmental services or facility to support agriculture-based livelihoods. This in turn increases the ability of rural household to respond to the vulnerability of enduring climatic shock.

Nayak (2012) investigated about the factors which motivate to participate in MGNREGA. His study is based on the primary data collected from Mayurbhanj district in Orissa. He took multistage random sampling and considered data as homogeneous in character. To study the determinants of participation in MGNREGA he used Logit regression analysis. The dummy

dependent variable was participation in MGNREGA and sex, caste, education, size of family, per-capita land holding, non-farm employment, political factor, BPL card holding, awareness, age and household income were the explanatory variable in the model. The correlation analysis shows that, the variables, awareness, age, caste ST and OBC, house hold size, political affiliation and BPL card holdings were positively correlated to participation in MGNREGA.

Imai (2003) in an article said that Employment Guarantee Scheme (EGS) had two effects- promotional and protective effect of poverty. The effects which induce the poor to get rid of poverty are called Promotional effects of poverty. On the other hand by protective effect she means the effect of preventing to non- poor from slipping into poverty. To test the effect of EGS she used the COX model. The work participation was function of health, schooling, socio-demographic characteristics, family wealth, village infrastructure, risk faced by households. The wage rate was also important, higher wage rate shows good sign for poor household. But wage rate depended on age, health, gender, wealth. She found that EGS had a promotional effect on poverty reduction in short run and long run.

Jacob et al (2006) examined the impact of MGNREGA in Plakked and Waynad districts of Kerala. Their analysis showed that MGNREGA had little impact on educated population. Since women wage rate in private sector was lower than MGNREGA, there was a direct incentive for women to choose MGNREGA work. The delay payment of wage, seasonal variations, supervisions problem hindered the programme to implement effectively.

Khan et al (2007) studied the indirect and direct effects of MGNREGA on employment creation and poverty mitigation in local area. For this, a detailed survey was done in a poor agricultural village with 400 households and nearly 2500 people. The data on income and

expenditure levels had been collected from large, small and marginal farmers and agricultural labour households. The survey also recorded production activities undertaken by the inhabitants. The village study revealed that most people did not access the scheme. The direct and indirect effects on beneficiary family were not significant. There was enough evidence of mismanagement of records.

Jha et al (2008) examined the effects of MGNREGA from a pilot survey of three villages. They used a set of cross- tabulation to identify the co-relation of participation in MGNREGA. He used Probit analysis for participation and Tobit analysis to capture the duration of participation. The result revealed that the dummy for the Schedule Tribe (ST) were more likely to participate relative to others. The Tobit model showed, the greater the probability of participation, the longer was the duration of participation. Study supported the good performance of MGNREGA. Nearly one third of the households who got job most of them belong to Schedule Caste (SC) and land less labour. One fifth worker worked for about 100 day.

Kareemulla et al (2009) observed the impacts of MGNREGA on rural livelihoods and the progress of soil and water conservations activity. The study adopted a two stage approach. The first stage involved collection, compilation and analysis of secondary data available in the public domain. In the second stage they conducted a field survey in Anantapur district, Andhra Pradesh. They also constructed a liner regression function to explain the participation of the persons in MGNREGA works with four explanatory variables viz family size, wage income other than MGNREGA, migration condition before MGNREGA and land holdings. Their study had shown that the migration level decreased from 27 percent to 7 percent. There was an increase in durable assets like fan, television and bicycle. It was observed that the variables were positively related to dependency on the MGNREGA works.

Palanichamy (2011) examined the hypothesis- increase the socio economic conditions of beneficiaries, employment opportunities and income level in Thiruvannamalai. His study had shown that more backward class, Hindu, agricultural labours were the most respondent of MGNREGA. The persons with annual income as less Rs. 5000 were decreased to 7 percent from 18 percent after the introduction of MGNREGA.

Sankaran (2011) cited that MGNREGA wages ensured a minimum wage rate allowing sufficient flexibility to account for regional or geographical variation. There can be no dispute that ensuring a basic minimum for a decent life is a first charge upon any government. MGNREGA wage rate brought about true need-based minimum wage. So MGNREGA ensured a decent work.

Effect on rural labour market

Jacob (2008) collected data in Villupuram district, Tamil Nadu to observe the effect of MGNREGA on Rural-Urban migration. He chose Kalrayan Hill block, Kallkurichi block as the region for survey. In his survey he collected data from the state government and concern field. The survey result showed contradictory. Some men are like to migrate because the wage was much more than MGNREGA wage. But some of them wanted to stop migrating.

Basu et al (2007) constructed a model to analyse the impact of Employment Guarantee Scheme (EGS). According to them there were costs of job search due to heterogeneity among workers, locational, informational or other skill-related. There was job search cost. Hence Government can introduce EGS and made and expanse for facilitating access to workers. The initiation of and EGS successfully shifts the inverse labour supply curve upwards. Now EGS can either augment or decline private sector employment. If the employment and wage rate were

simultaneously low under EGS, it had no effect on private employment. The opposite can be happened by displacing private employment through EGS. They showed in their model that a rise in EGS wage rate would trigger the reservation wage effect to bend downwards. To their theoretical frame work they have also shown that if the labour market was perfectly competitive to begin, an EGS can of course never raise employment level. So EGS has a multiplier effect which is absent in this paper.

Reddy et al (2010) examined about MGNREGA as social protection collecting data from two sample districts in each state – Rajasthan, Bihar and Andhra Prades, two sample blocks in each district, eight sample panchayats in each block and all total 1,443 worker households. Their study reveals that there were more households with job cards than people actually work. In Rajasthan 91percent, Andhra 71percent and in Bihar 78 percent of the cases of applications were informal to avoid paying unemployment allowance. In 85 percent cases in Bihar attendance is taken in an informal note book. Employment provided to a household in number of days in Rajasthan 76 days, Andhra 74 days and in Bihar 24 days. Though the wage payment is made on the basis of work in Andhra Pradesh and Rajasthan, but in Bihar about half the respondents said they were paid a daily rate. So there is a conflict about wage determination and level of wages.

Basu (2011) developed a theoretical model to examine the effect of rural employment guarantee programme on seasonal labour markets. According to him, landlords employ permanent and casual labours both for agriculture. Permanent labours were employed in the beginning of the season. In the lean season permanent labour produce inputs for peak season output. The remaining labours who fail to get permanent contracts in the lean season were absorbed by a productive EGS programme at the pre-determined wage. The infrastructure created by the EGS programme is used as agricultural inputs because it facilitates agricultural

production. Basu had shown that an increase in the wage paid in EGS programme increases the permanent wage. So permanent labour fall reduces lean season output and had a negative impact on the peak season output. But EGS had a positive impact on casual labour demand and expected agricultural output in peak season. The loss in expected agricultural output is dominated by the increase in the number of labourers seeking EGS employment in the lean season when elasticity of the EGS input with respect to permanent labour was greater than the elasticity of expected agricultural output with respect to permanent labour. The increase in EGS wage would increase in labour demand in peak season and casual wages.

Mukherjee et al (2011) had investigated the adverse effect on labour market as well as agricultural productivity. They framed a theoretical frame work. According to them, if targeted income of poor household reaches with the introduction of NREGS, they would not supply labour to the rich house hold and labour market will not exist. With increase in wage rate due to the introduction of NREGS leads lower supply of labour due to back ward bending supply curve. So, an agricultural productivity falls. On the other hand NREGS create assets which would increase the agricultural productivity. The agricultural output would increase if the favourable affect out ways the adverse effect. The labour supply can be increased if the targeted income level can be increased. They had been suggested the Government to increase the choice option of consumption and good schooling of their child to increase the targeted income level.

Imbert et al (2011) examined the impact government hiring on labour market. Both in theoretical and empirical analysis he hasd showed the impacts. An increase in government hiring would raise wages as long as the income effect is not too large. It would be larger if demand is less elastic or if labour supply was less elastic. The net labour demanding households may actually increase their labour supply due to the income effect of rising labour costs. The change

in wages depends on how exactly the work was distributed throughout the population. Since wage rises, private labour demand falls and output falls. So price level will rise. But if there was imperfect labour market and monopsony power of employer, private employment would not fall. For their empirical analysis they consider NSSO data, ARIS-REDS data set 2001 and employment-unemployment survey of NSSO at five rounds. The empirical results shows that wage will rise by the amount of $1.6/ Ed = 4.5$.

Sharma et al (2011) examined the impact of NREGS on Rubber block plantation scheme (BPS) in Tripura. The higher wage rate of NREGS differ the family wage rate of rubber block plantation by 52.9% during 2007 which leads to labour shortage for BPS. So rubber production would be endangered. Tripura government makes a scheme under NREGS to help BPS.

Channaver et al (2011) examined the impacts of MGNREGA on pattern of input-use, productivity of labour and profits of selected crops. Form five villages 120 sample farmers were selected. Their study showed that chemical inputs, labour and machinery were used in a greater proportion in full-implemented than partially-implemented NREGS villages. The aggregate yield of all kinds of crops were considerably higher in fully-implemented than partially-implemented MGNREGA villages. But marginal productivity of all kinds of inputs was lower in first case than in second case. The wage rate in fully-implemented villages was significantly higher than partially-implemented MGNREGA villages.

Berg et al (2012) analysed the effect of farm wage rate after the initiation of MGNREGA. For their study they considered 249 districts across 19 Indian states from the period 2000-2011. They found that one person day created 1.6 percent increase in agricultural wage rate. One district in average created 3.3 person days with MGNREGA. So the agricultural wage can be

increased by 4.8 percent in a year. But it takes 5 to 6 months after introduction of MGNREGA. The wage of skilled labour that was related to agricultural equipment supply was also increased.

Impact on Economic Growth and Environment

Hirway et al (2008) in their study of Nana Kotda come to the finding that MGNREGA has a multiple impacts on village economy. They had constructed Social Accounting Matrix (SAM) to show the impacts. The study reveals that MGNREGA increases the labour earnings which lead to increase in expenditure. But the expenditure comes from within the village and outside the village. The multiplier depends on the expenditure spent on village goods. If the increase in demand comes from village, multiplier will be more effective. The marginal farmer would be most benefited. Though SAM was most useful to explain the linkage effect through which we can know the multiplier effect of MGNREGA, it had a limitation due to static nature of the model.

Dinesh M et al (2011) said about the environmental impact of MGNREGA. They considered the attribute like enhanced crop harvest, increased in crop area, productivity of agricultural land, increase in tank storage, and improved soil moisture storage as the measurement of environmental services. They had shown that there was a positive impact of MGNREGA.

Tiwari et al (2011) assessed the effect of MGNREGA for environmental service improvement and vulnerability reduction in Chitradurga district in Karnataka. The effects on environmental services were examined by comparing the pre-and post MGNREGA status of natural resources. For their study they adopted a linear aggregation method to aggregate the weighted indicator variables. They collected data from focus group discussion and secondary

data. After implementation of MGNREGA Koverahatti, Khandikere, Talavatti recorded a rise in ground water level 77 percent, 53 percent and 30 percent respectively. The cropland recorded a two to three fold increase in carbon content. Tree plantation through MGNREGA project has a potential growth rate of wood production of 3 tons per hectare. Cumulative carbon sequestration after 30 years was projected to be 93 tons of carbon per hectare. So their findings clearly indicated that MGNREGA had provided multiple environmental services and reduced vulnerability.

MGNREGA and Women empowerment

Khera (2008) studied about the empowerment of rural workers. He considered Badwani and Sidhi districts in Madya Pradesh (M. P.). Along with work site visits, it included interviews with 50 randomly selected MGNREGA labourers in each Block. Pati and Rajpur were selected for his study. According to his study, introduction of MGNREGA has helped the rural workers to be united and fight against uneven circumstances of work. The labourers demand a receipt of submitting application. They demand for minimum wage and unemployment allowance and organized movement of Pati Block in Badwani district in Madhya Pradesh forced the M.P. government to repay the unemployment allowance. The workers participate in the participatory planning and planed for creating durable assets which will help them in the long run.

Nayak et al (2008) examined the socio-economic impacts of the MGNREGA for women workers. For their study they took six states. The data collected from 98 works sits randomly, spread over the 10 sample districts with a random sample of 1,060 MGNREGA workers employed in the selected work site. Their analysis shows the low work force participation rates in case of women in MGNREGA works. Those women who were engaged in MGNREGA works

belong to scheduled castes and scheduled tribes. Most of the workers were illiterate. The earnings from MGNREGA protect them from hunger, migration, illness, hazardous work. Now they can repay the debt and send their child to school. But tenacious social norms deter the women from MGNREGA work. Some time same wage with men and presence of contractors creates problem on women participation in MGNREGA works. But for gender empowerment and social equality, all constraint had to be removed.

Kelkar (2009) examined the causality between gender equality and economic expansion. His study revealed that domestic violence against women can pushed the economically weak family into economic crisis. According to him women were likely to have a greater prestige in the households and community. So they want to direct more of the household income towards improvement of their own economic agency as well as education and nutrition of children. Hence his policy prescription is to facilitate women for MGNREGA work to asset and achieve a position in her family.

IIM Lucknow (2009) assessed that the participation of women in MGNREGA work enhanced women to move around in places like Gram Panchayat Office, banks, schools, block office without anybody to accompany them. It was also shown that women involvement in MGNREGA work reduced wage gaps prevalent in the labour market due to gender discrimination. Sudarshan (2011) investigated the effects of women's involvement in MGNREGA in study areas in three states-Kerala, Rajasthan and Himachal Pradesh. 100 people mainly women, were interviewed in each of the three most backward districts, one in each state. The participation of women in Kerala and Gujrat was more than Himachal Pradesh.

MGNREGA and Child Well Being

Bhatty (2006) examined about the child rights in Dungarpur district in Rajasthan due to introduction of MGNREGA. The study shows that mother leaves the child to home alone. They feed their child at the time of leaving of work and return from work. Infant child come to work site with their mother. But there was no crèche facility where most of the workers were women due to migration capability of men.

Narayanan (2008) observed that MGNREGA had generated a difficulty of child care though the act has brought about prime significant changes in the lives of women. The survey covered eleven villages and fifteen MGNREGA work site located in two blocks of Viluppuram district. In most of the work site, there was no child care facility. So, a child comes with their mother and wandered in harsh weather. 85 percent of women say if there are crèches, they would bring their child. But though there had a provision of crèches at MGNREGA work site, it was not applicable in most of the cases.

Dev (2011) examined the role of MGNREGA on child well being in Chaksu block near Jaipur of Rajasthan in India. He collected data from 100 randomly selected worksites and random sample of about 1000 workers employed at these work sites. His analysis showed that child labour had been reduced and nutritional level had been increased. There seemed to be a positive correlation between programme participation of parents development of health and mental of child although did not robust across all the specifications.

Socio-economic Impact due to MGNREGA

Shah (2007) says about the Indian democracy and employment guarantee through civil society. The unemployment and hunger hinder the democracy. Collapse of agriculture and meager income force the rural poor to endure their freedom to rich people. MGNREGA activity

protects them from hunger by direct cash transfer and structural facility which will induce agricultural productivity. The more and more involvement in MGNREGA activity would make them involvement towards politics which ensure the Indian democracy. He thinks panchayat related institution is the main holder of democracy from grass root level. On the other hand panchayat is the chief implementing agency of MGNREGA.

Shah (2008) investigated the structures of power in Indian society. Indians Adivasi pockets have suffered exploitation and discrimination qua region and community. Ruling classes control the adivasi and marginalized people. But after the introduction of MGNREGA and abolition of contractor raj, marginal people are abled to construct democracy, equality and development at the grass roots through empowering local bodies of self-government.

Benerjee et al (2010) investigated about the MGNREGA and Maoists. Maoists have been flourished in backward and less developed area. The main support of Maoists comes from the groups which identify large scale displacement, forest issue, usury, land alienation, insecure tenancy contracts. Maoists counter developmental activity due to rise of anger against government. But their study shows MGNREGA was implemented successfully. For their study they choose several blocks in Chhattisgarh, Jharkhand and Orissa classified into four groups according to working day created – group A, B, C, D. The purchasing power, Wage rate have raised. The Maoist blocked the road construction but not the other permissible work under MGNREGA- land development on SC/ ST land, small irrigation facilities, afforestation.

Khosla (2011) analysed the impact of caste reservation to facilitate the public goods and services in GP in Andhra Pradesh using data from MGNREGA. The study revealed that the impact of reservation varied enormously in different socio-political framework. For his

study he considers Telangana and costal Andhra. The result shows that in Telangana, there was no significant effect of reservation for OBCs. Similarly there was no effect for SC reservation in coastal Andhra. There was large and statistically significant effect for OBC reservation in coastal Andhra because the reallocation occurred solely through the Sarpanch. It does not matter on the other representatives like MP, MLA or Jila Parisad President. In most of the cases Sarpanch distribute the goods and services through MGNREGA in favour of his own caste.

Haque (2011) investigated the socio-economic effect of execution of MGNREGA in India. He collected primary data from 23 selected districts which were in the Maoist-affected areas. A survey of minimum 60 households in each block worked for at least three to four years were selected and overall was 2200. His study revealed that the share of MGNREGA income was higher than that of traditional agricultural and non-agricultural wage incomes in Khammam (A.P), Lalitpur (U.P) and Sonbhadra (U.P). He had seen that the increase in the agricultural wage rates could be observed more prominently. The participation of SC, ST and Women was higher than other category. Out migration had been decreased.

1.3 Gaps in the Existing Literature

From the brief review of the existing literature on MGNREGA it is revealed that the performance of MGNREGA in state level and particularly in districts level in West Bengal has not been analysed in depth. The multiplier effect of MGNREGA and its impact on rural labour market has not been adequately analyzed. Earlier researchers have been discussed the effect of MGNREGA on rural agricultural labour market from theoretical view point. There is hardly any empirical evidence of the impact of MGNREGA on rural labour market. Through the multiplier effect, MGNREGA affects rural farm wage. The core objective of MGNREGA was to develop

rural economy through the productive asset creation and increasing purchasing power. So there is an interaction among economic agent and this leads to multiplier effect in an economy which is not analysed so far in depth. Moreover, in micro level studies the effect of MGNREGA on rural livelihood has not been analysed in details. In a hope to bridge this gap, the present investigation has been designed with mentioned objectives.

1.4   Objectives of The Study

Keeping in view of the importance of MGNREGA, the present study will emphasize on following objectives.

1. To evaluate the performance of MGNREGA in West Bengal vis-à-vis other States of India.

2. To evaluate the performance of MGNREGA across districts in West Bengal.

3. To explore the impact of MGNREGA on rural labour market.

4. To study the contribution of MGNREGA on livelihood of the rural households in the sample villages.

5. To analyse the impact of MGNREGA in the Village Economy.

1.5   Hypotheses

The following are the proposed hypotheses for our present study.

1. Performance of MGNREGA has been improved over years in West Bengal vis-à-vis other States of India.

2. Performance of MGNREGA has been improved over years across districts in West Bengal.

3. MGNREGA has induced to increase the wage rate of the rural unskilled labour.

4. The standard of living of the rural households is significantly improved by MGNREGA.

5. MGNREGA has a multiplier effect on income and employment of a village economy.

1.6   Sources of Data

While the performance of MGNREGA is our objective of the present study, we would try to develop a comparative analysis at both state level and district level. The effect of MGNREGA on wage rate in rural unskilled labour and the effect of the programme on rural livelihood are other objectives and for this purpose we take resort to the secondary data. The multiplier effect of MGNREGA in a village economy is our core objective. However, on account of the limitations of the secondary data and for the sake of an in-depth and detailed study on multiplier effect of MGNREGA and contribution of MGNREGA on rural livelihood, we have collected and used primary data.

1.6.1   Secondary data and their sources

Secondary data relating to MGNREGA have been collected from MGNREGA government portal. Data from Statistical Hand Book of West Bengal have used to rank the districts for our sample design and make a comparative analysis across districts. We have used the data of Census of India for West Bengal and National Sample Survey Organization's Employment and Unemployment Surveys, corresponding to the years 2004/5, 2007/8 and 2011/12. The study on the effect of wage rate is also based on secondary data and covers the period 2005-06 to 2013-14. The districts of West Bengal have been considered and the study relates to the districts wise

wage data of the agricultural labour across districts of West Bengal has been collected from Labour Bureau, Ministry of Labour and Employment, Government of India, across various years.

Secondary data is available in aggregate level. But to examine the livelihood of households of the study villages and to find the multiplier effect of MGNREGA on the study villages, the data is necessary in disaggregate level. To form the social Accounting Matrix, it is also necessary the data in sector wise for the study villages.

1.6.2 Primary Data and Sample Design

On account of limitations of the secondary data to serve the present study a detailed primary survey has been made. Primary data has been collected from the households of sample villages of West Bengal. The villages are selected on the basis of stratified random sampling and then a census method has been used i. e. data have been collected from all households of sample villages to form a Social Accounting Matrix (SAM) at the village level.

For its significant contribution in MGNREGA implementation, West Bengal has been purposely selected for the present study. Selection of districts of the state constitute the 1st stage unit while blocks the 2nd stage and villages 3rd stage. In the last stage (in stage four) all households have been selected from each of the sample villages.

The differences in agro-climatic and socio-economic characteristics are noticed in different districts of West Bengal. Eighteen districts of West Bengal are ranked on the basis of a number of socio-economic indicators. Districts are separated into two categories - relatively developed and relatively less developed according to the ranking. Two districts are drawn from each stratum based on the random sampling without replacement.

Development Indicators of Districts of West Bengal

Districts are ranked on the basis of ten indicators namely food grain productivity / hector, percentage of non food grain area over gross crop area, percentage share of urban pop to total pop, rural literacy rate, road density per '000 k.m., percentage of village electrified, percapita electric consumption (kh), percapita district domestic product, annual compounded growth rate of employment in rural area and rural worker participation rate. These indicators are related with agricultural development, urbanization, infrastructure, percapita income and employment. The relevant information in respect of these indicators for 2011-12 is shown in Table A1 given in appendix.

The ranking of the districts has been given in Table A1 given in appendix and it is observed from the table that the development index varies from 0.72 to 0.26. We know that the development index can vary between 1 and 0 as per Fuzzy analysis. So if we assign index value 0.50 as a line between developed and less developed only 5 districts namely 24 PGS (N), Hooghly, Burdwan, Howrah and Medinipur (W) are within the range of developed districts and remaining 13 districts are within the range of less developed districts.

Identification of Districts, Block and Villages

In order to conduct the study, Hooghly and Howrah are selected randomly from the relatively developed districts while 24 PGS (S) and Birbhum have been selected randomly from relatively less developed districts. All the blocks of the districts are not equally important. Therefore, one block is selected randomly from each sample districts with distinct socio-economic characteristics. Goghat-II block in district Hooghly and Amta-I block in district Howrah are

selected as sample blocks. Mandir Bazar and Labpur are two sample blocks of Twenty Four Parganas (South) and Birbhum respectively.

Within a block all villages are not equally important in respect of socio-economic characteristic. In view of this, one village is drawn randomly from each sample block. In this way four villages are drawn from four blocks. The socio-economic and cultural characteristics of these four sample villages are distinct from each other.

Selection of Households

Survey has been conducted in a Census method to collect data from of the households in a village to form SAM. But households have been classified into five sections based on major sources of household income. The five categories were – farmer, agricultural labour (AL), self-employed non-agricultural labour (SENA), regular or salaried employed (RE) and other labour (OL). The term farmer belongs to those people whose prime source of income is farming. On the other hand the casual wage labourers who work within the village or out-side the nearby village are considered as agricultural labour in a broad sense. The households whose main source of income is self-employed non-agricultural activity like trade or act as service provider is termed as self-employed non-agricultural labour. Regular or salaried employed is used against the households whose main source of income is salaried income either from government or private sector. Lastly the casual migrated wage labour is termed as other labour.

From the above survey design 934 households have surveyed in a census method from four sample villages for detailed analysis. Reference period for the study is the financial year 2016-17 (April 2016 to March 2017).

Necessary Information collected for Study

The necessary information has been collected from the sample households on the following socio-economic heads:

a) General information of households: General information of households includes age, sex, income earner, education level of the members of households and the caste of the households.

b) Occupation of the Members of the Households: Classification of worker in cultivators, agricultural labour, non-farm self employed, salaried or regular worker

c) Time Allocation and Earnings: Numbers of days employed as cultivators and agricultural labour and in agri-allied activities and non-farm activities; earning from these activities.

d) Migration: Name of migrated labour, type work in work place, duration of work, wage rate and remittance in a year.

e) Production of Households: Gross cropped area, foodgrain, cash crop, agri-allied production, non-farm production and production process of surveyed households etc.

f) Consumption of Households: All kinds of household expenditure either in food items or in non-food items are taken for our analysis. The durable consumer expenditure is also considered for our analysis.

g)   Data of MGNREGA: Collection of MGNREGA data includes the information related to work, women empowerment involving the job and perception of households about the MGNREGA.

1.7   Methodology of Data Analysis

The data has been processed, scrutinized, and analysed for the aim to developing the research plan. This was essential for ensuring that all relevant data are available for making comparison and analysis.

To meet the different objectives of the study, tabular analysis, percentage, 't' test, multiple regression, growth estimation, Performance Index, Social Accounting Matrix and Probit model were used. Brief descriptions of the different analytical techniques used are presented hare.

A.   Performance Index (PI):

To rank the districts or states according to their performance we will use PI. Indicators are grouped by following methodology:

The variable X_j^i is the values taken by indicators j for the ith respondent. Let us assume μ_j^i provides the degree of effective achievement of the ith respondent relative to the indicator j. μ_j^i is defined as –

$$
\mu_j^{(i)} = \begin{cases} 1 & \text{If, } X_j^{max} \leq X_j^i \\ (X_j^i - X_j^{min}) / (X_j^{max} - X_j^{min}) & \text{If, } X_j^{min} \leq X_j^i \leq X_j^{max} \\ 0 & \text{If, } X_j^i \leq X_j^{min} \end{cases}
$$

Where, X_j^{min} and X_j^{max} are the lower and upper bound of the system. Following Cerioli and Zani (1990), composite index is defined by taking the weighted arithmetic mean of the

membership functions, obtained from the respective indicators. Mathematically, it is represented

as: $\mu_{PI} = \sum_{j=1}^{M} w_j \ \mu_j$

Where $w_j \geq 0$ and $\sum_{j=1}^{M} w_j = 1$ and

$w_j = \log(1/\bar{\mu}_j) / \sum_{j=1}^{M} \log(1/\bar{\mu}_j)$

Where, $\bar{\mu}_j = 1/N \sum_{i=1}^{N} \mu_j(i)$

The value of PI lies between zero and one. Where one indicates high PI, zero indicates low PI. The critical value (or breaking value) $\mu_j$crit associated to indicator j can be defined as:

$F(\mu_j \text{crit}) = 1 - \bar{\mu}_j$

With F the cumulative distribution function and $\bar{\mu}_j$ the average value of indicator j which indicates, dichotomously, the proportion of under-performed states according to j.

B.   Social Accounting Matrix (SAM):

To analyse the multiplier effect we have been use Social Accounting Matrix (SAM). SAM is the extended Input-Output model. The meso and macro-economic accounts of a socio-economic system has been particularly representing in SAM, which capture the transfer and transactions through all economic agents in a system. SAM at a same time consider the data on income and the production as generated by different groups and classes, on the one hand, and data on expenditure of those incomes of the other represented in equal number of row and column i.e. a square matrix. In a SAM, incomings have been considered as receipts for the row accounts in

which they have been placed and outgoings have been treated as expenditure for their column accounts. The totals of rows and columns have to be equal for a given account in a SAM. This indicates incomings for an account have been equal to total outgoings for that account.

SAM can represent by the tabular representation of circular flow of income. So SAM can be used to analyse the production structure, forward and backward linkage of an economy through which we get a clear picture about income distribution among household and expenditure pattern of a class of household. Pradhan et al (2006) cited that the structure of SAM follows the basic law of economics; it can be used as the reliable data base for aggregate macroeconomic models, together with computable general equilibrium (CGE) models. At present these models are extensively used to study the impact on economy of a range of policy issues, such as trade liberalization issues, fiscal policies, various modes of taxation, impact assessment studies, structural adjustment programmes and the environmental policy and negotiation related studies etc.

Sarkar and Subbarao (1981) structured SAM in India for the first time to show the consistent data base for their CGE model. There after different researchers developed a number of SAMs over the years. But according to our best knowledge there was only two SAM in India for village level study. One is structured by Subramanian and Sadoulet (1990) for Kanzara village of Maharashtra state to study the impact of investments on the village economy under Maharashtra employment guarantee act. This SAM covered 40 households and in that sense it did not cover the entire village. On the other hand another is constructed by Indira Hirway, M.R. Saluja and Bhupesh Yadav developed another SAM for Nana Katda village. They considered 55 producing sectors and four components- 1) production activities, 2) factors of production, 3) institutions, 4)

rest of the village to show the output, income and employment multipliers of MGNREGA of Nana Katda village located in Idar block in Sabarkantha district of Gujarat states.

The above SAMs are not appropriate to serve our purpose. Now we will construct a SAM for a village level which will represent any type of transaction and depict a full circular flow of income from production to factor incomes, household income to household consumption and back to production is captured. Before construction the specific SAM we will analyse a prototype SAM.

Prototype Social Accounting Matrix

| | 1 | 2 | 3 | Exogenous | |
	Factor	Institution	Activities	injection	Total
1.Factor	0	0	W_{13}	X_1	Y_1
2.Institution	W_{21}	W_{22}	0	X_2	Y_2
3.Activities	0	W_{32}	W_{33}	X_3	Y_3
Leakages	L_1	L_2	L_3		
Total	Y_1	Y_2	Y_3		

Source: Payatt and Round (1979)

Account 1 consists of row 1 and column 1 of the SAM. In row 1, the first element (matrix W_{13}) represents the flow of payments by the production activities to the factors of production. The second element (vector X_1) represents payments by the exogenous account to

the factors of production. By definition $Y_1 = W_{13} + X_1$ that is, total factor income (Y_1) is equal to the sum of the payments to factors by activities and exogenous injections. Row 1, thus specifies the sources of factor income. The allocation of factor income, in turn is given in column 1. Matrix W_{21} is a mapping scheme, transferring the income earned by factor j to institution i. the leakages vector (L_1) may include the payment of wages to migrant workers from out of the village economy. Since the row and column sums are identical, we can write for account1: $Y_1 = W_{13} + X_1 = W_{21} + X_1$

In account 2, row-wise, the first element (matrix W_{21}) is the matrix allocating factor incomes into incomes of institutions. The second element (matrix W_{22}) describes intra-account transactions and transfers between institutions. The third element (X_2) represents exogenous payments to institutions. Total institutional income (Y_2) is thus: $Y_2 = W_{21} + W_{22} + X_2$. Column wise account 2 describes the use or allocation of institutional income. The first purpose for which Y_2 can be used is inter-institutional transactions and transfers (W_{22}). The second use that is made of Y_2 is to purchase final goods, matrix W_{32} represents the payments by institutions to activities in return for the supply of goods and services by the activities. The final use of institutional income is given by the leakages vector (L_2), the most important element of which is institutional savings. Finally by definitions we have $Y_2 = W_{21} + W_{22} + X_2 = W_{22} + W_{32} + L_2$.

Account 3, the third and final account, is that of activities. The next item (matrix W_{33}) records the intra-account transactions between activities and is therefore, the exact equivalent of the I-O transactions matrix. In other words, a representative element of W_{33} represents the payments by receiving sector j to sector i , in return for the supply of intermediate goods produced by sector i. in row 3, the third item (X_3) records all exogenous injections into the activities account. It follows that, row-wise, we have $Y_3 = W_{32} + W_{33} + X_3$ where Y_3 = total

demand for the goods and services produced by the activities. Column-wise account 3 presents –
as in the familiar I-O table – a decomposition of the total value of output into its components:
factor payments (W_{13}), intermediate input use (W_{33}) and so-called leakages (L_3). From the SAM,
it follows that $Y_3 = W_{32+} W_{33} + X_3 = W_{13} + W_{33} + L_3$.

Therefore we define flow matrix W as

$$W = \begin{bmatrix} 0 & 0 & W_{13} \\ W_{21} & W_{22} & 0 \\ 0 & W_{32} & W_{33} \end{bmatrix}$$

We can express the first three rows of the table in matrix algebra, as $Y = W + X$ -----(1)

Now, we assume – as in the case of the I-O model – that the inter-account and intra-account
transactions are a linear proportional function of the column totals. That is $A_{ij} = (W_{ij} / Y_j)$

Then, equation (1) can be rewritten as $Y = AY + X = [I - A]^{-1} X = MX$

Where M stands for the SAM multiplier matrix with a representative element m_{ij} as the total
(direct + indirect) impact on account i of a change in exogenous injections in account j.

Any input multiplier can be derived as employment multiplier. The employment multiplier
indicates the additional employment generated in the regional employment due to an initial
employment increase in a particular sector. The employment multiplier are derived from a
combination of output multiplier and direct employment coefficients i.e. employment per sector
output (Mayfield et al; 2005). Fixed employment coefficient of each sector, which may be
formally stated as, $E_i = (L_i / Y_i)$

Therefore $L = \hat{E} [I - A]^{-1} X$

Where $\hat{E}$ is the diagonalised matrix formed with elements E_i.

C.   Correlation and Regression:

To examine the factor relationship both correlation and regression analysis have been used wherever it is necessary. On the basis of Pearsonian correlation coefficient a correlation matrix is constructed which is used to understand the interrelation among the variables.

The exact relationship between dependent variable and independent variable is estimated in regression analysis.

OLS method will be used in the present study. The parameters are estimated by OLS in the Classical Linear Regression Model). The model is specified by the regression equation as-

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_n X_{ni} + U_i$$

Where, Y is dependent variable, X_i are the explanatory (regresses) variables, U_i stands for the stochastic disturbance term, and i is i^{th} observation. The multicolinearity has been essentially a simple phenomenon rising out of the largely non-experimental data which collected in most social sciences. The measures of the strength of multicollinearity are made by High pair-wise correlation among regressors, Eigen values and conditional and Tolerance and variable influence factor.

D.   Probit Model:

The probit model calculates maximum likelihood estimates of regression parameter with qualitative (dichotomous or polytomous) dependent variables within the regression frame-work. Many response variables may be binary by nature (yes/no), while the others are measured ordinally rather than continuously (degree of severity).

The status of poverty of participating households in MGNREGA is analysed with the help of probit model. A probit is an econometric model for which the dependent variable y_i can be only one or zero and the continuous independent variable x_i has been estimated. The Probit model represents a sigmoid curve. It corresponds to the Cumulative Distribution Function (CDF) of a standard normal distribution. Here P_i is considered as standard normal CDF, which is evaluated as a linear function of explanatory variable(s). Thus, the Probit model is specified as

$$P_i = P(Y_i = 1)$$

$$= F(\alpha + \beta X_i)$$

Here $F(\alpha + \beta X_i)$ is the CDF of the standard normal distribution so that

$$P_i = F(\alpha + \beta X_i) = \int_{-\infty}^{\alpha + \beta X_i} f(Z)dz$$

Where

Z is the standard normal variable and f (Z) is the density faction of $Z \sim N(0,1)$

As in Probit model, the log-likelihood function is

$$ln\, L = \sum_{i=1}^{n_1} Y_i ln P_i + \sum_{i=n_1+1}^{n} (1 - Y_i) ln(1 - P_i)$$

$$= \sum_{i=1}^{n_1} Y_i ln\, F(\alpha + \beta X_i) + \sum_{i=n_1+1}^{n} (1 - Y_i) ln[1 - F(\alpha + \beta X_i)]$$

Maximizing ln L with respect to α and β and solving, we obtain estimates of unknown parameters.

It has been show that $LR \sim \chi^2$ with degrees of freedom k = number of explanatory variables in the model. Thus, our decision rule is: If $LR^* \sim \chi^2 > \chi^2_{\lambda,k}$, reject the null hypothesis which states that

all the coefficients of the estimated model are simultaneously equal to zero, and conclude that there is overall significance of regression.

By taking only six variables namely household size, households belongs to the caste, percapita income of households, MGNREGA participation, households total education level and percapita landholding in decimal one model with unbiased estimate were generated. The following is the specification of the independent and dependent variable used in the model.

Y = Probability of being a poor household

('1' for poor and '0'for non-poor)

Where

X_1 Household size

X_2 Households belongs to the caste (SC/ST =1, Other = 0)

X_3 Percapita income of households

X_4 MGNREGA participation (yes=1, No=0)

X_5 Households total education level

X_6 Percapita landholding in decimal

Statistical software package STATA has been used to analyze the Secondary data. Again software SPSS has been used to analyzed the Probit Model. Whereas Data Analysis package for MS-Excel, have been used for mean calculation, deviation calculation and other basic statistical application.

E.   **Growth Estimation:**

For estimating the growth of workers compound growth rate per year is used. Census data, Economic Census data and NSS data are available in fixed time interval. Annual compound growth rate is calculated on the basis of the following formula-

$$G = [\ EXP\ \{LN(W_t\ /\ W_0)\ /\ t\} - 1]\ *\ 100$$

Where G = Growth rate, EXP = Exponential (e), LN = Natural Logarithm, t = Time Period, W_t = Number of workers in the year t_1, W_0 = Number of workers in the t_0. In the proposed study we will also use simple growth and trend growth rate.

F.   t- Test for Equality of Mean:

The equality between two means is tested by **Fisher t-test**. Let there be two sets of populations of which the variables are normally distributed with mean μ_1 and μ_2 and unknown standard deviations δ_1 and δ_2 respectively. m_1 and m_2 are the sample mean and s_1 and s_2 are sample standard deviations.

If the two unknown standard deviations are equal ($\delta_1 = \delta_2$) then to test the null hypothesis H_0: μ_1 - $\mu_2 = 0$, the appropriate test statistic is

$$t_{n_{1}+n_{2}-2} = \frac{m_1 + m_2}{s(1/n_1 + 1/n_2)1/2}$$

Where, $S = [(n_1-1)s_1{}^2 + (n_2-1)s_2{}^2] / (n_1 + n_2-2)$

For the alternative H_1: μ_1 - $\mu_2 \neq 0$, H_0 is rejected for the given samples if I t I (observed) > t $_{\alpha/2}$ n_{1+} n_2-2 (table) and is accepted other wise. On the other hand, if the alternative is H_1: μ_1 - $\mu_2 > 0$, H_0 is rejected for the given samples if t (observed)> t $_\alpha$ n_{1+} n_2-2 (table) and is accepted otherwise, and if the alternatives is H_1: μ_1 - $\mu_2 < 0$, H_0 is rejected for the given samples if t (observed) < −t $_\alpha$ n_{1+} n_2-2 (table) and is accepted otherwise.

When the assumption of homoscedasticity is untenable ($\delta_1 \neq \delta_2$), a test for the difference $\mu_1 - \mu_2$ is made by a simple approximation suggested by Cochran and Cox. This is based on the results that the statistic

$$\frac{(m_1 - m_2) - (\mu_1 - \mu_2)}{\sqrt{(s_1^2/n_1) + (s_2^2/n_2)}}$$

has upper α-point approximately the same as $\quad (w_1 t_{\alpha, n_1-1} + w_2 t_{\alpha, n_2-1})/(w_1 + w_2)$

where t_{α, n_i-1} is upper α-point of the t-distribution with n_i-1 d.f. and $w_i = \delta_i^2/n_i$ may be well approximated by $w_i = s_i^2/n_i$ ($i=1,2$), even for moderately large samples. Thus, e.g., if $H_0 : \mu_1 - \mu_2 = 0$ is to be tested against $H_1: \mu_1 - \mu_2 \neq 0$, then the observed value of $(m_1 - m_2)/\sqrt{(w_1 + w_2)}$ will be comparable with $(w_1 t_{\alpha, n_1-1} + w_2 t_{\alpha, n_2-1})/(w_1 + w_2)$ for acceptance or rejection of H_0. Note that if $n_1 = n_2$, then the critical value is just t_{α, n_1-1}.

G.   F – Test for the Equality of Variance:

Given two independent random samples of sizes n_1 and n_2 from two normal populations with unknown means, we may be required to test the hypothesis that the population **variances** are equal ($\delta_1^2 = \delta_2^2$). For testing $H_0 : \delta_1/\delta_2 = 1$, we use $(s_1^2/s_2^2)(\delta_2^2/\delta_1^2)$ is an **F-statistic** with n_1-1 and n_2-1. When the alternatives are $H_1 : \delta_1/\delta_2 > 1$, H_0 is rejected if for given samples $F > F_{\alpha, n_1-1, n_2-1}$. If the alternatives are $H_1 : \delta_1/\delta_2 < 1$, H_0 is rejected if for given samples $(1/F) > F_{\alpha, n_2-1, n_1-1}$. Lastly, when the alternatives are $H_1 : \delta_1/\delta_2 \neq 1$, H_0 is to be rejected if the samples in hand give either $(1/F) > F_{\alpha/2, n_2-1, n_1-1}$, or $F > F_{\alpha/2, n_1-1, n_2-1}$.

1.8   Plan of the Study

The rest of the work is divided in seven chapters. Chapter 2 examines the performance of MGNREGA in West Bengal vis-à-vis other States of India. Chapter 3 would deal with the performance of MGNREGA across districts in West Bengal. Chapter 4 would analyse the impact of MGNREGA on rural labour market. Chapter 5 would examine the contribution of MGNREGA on livelihood of the rural households. Chapter 6 presents a social accounting matrix to analyse the multiplier effect of MGNREGA and articulates the resultant impact on the village economy. Chapter 7 gives summing up of the main findings and makes concluding observations with recommendation about related policy for development of rural economy.