Employment Generation among Women in NREGS: A Synthesis on the basis of Micro Level Field Investigation

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Abstract. Government of India has initiated the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) or N[1]REGS in 2006 where the basic objective is to provide 100 full man-days of employment to each willing rural household. The adjoining act (NREG Act of 2005) that guarantees employment of every rural household for 100 days has different provisions to incentivize participation of women in the programme. The programme indeed has both direct and indirect aspects towards favoring the participation of women in order to fulfill a larger objective of women empowerment. Thus it becomes imperative to focus on the extent to which the programme is inclusive of women. Official data suggest that 47% of all NREGS workers are women. However, in this regard, there is substantial variation not only across states but also across different regions within a state. The present paper based on a primary survey made in Birbhum district of West Bengal, attempts to investigate whether expansion of NREGS has been able to help the female job-card holders to get employment through NREGS where we have considered ratio of female man days to total man days of a household as the outcome variable. It is observed that the heterogeneity in the value of the stated outcome variable is significantly caused by nature of works the female job card holders have to carry out under NREGS and family parameters faced by them which somehow emanate from socio-cultural factor(s) in general and binding in particular. Apart from this, although there is inevitability of the influence of total number of NREGS man- days received in the entire reference period by the household to which the female member(s) belongs, yet, there seems no one to one correspondence between the outcome variable and the same.

Keywords. National Rural Employment Guarantee Scheme (NREGS), Female employment generation in NREGS, Nature of works, Family parameters, Type II Tobit model with endogenous regressor.

JEL. C34, C36, D10, J16.

1. Introduction

T he basic objective of National Rural Employment Guarantee Scheme (NREGS) is to arrange 100 man-days of guaranteed employment for each willing rural household. Like traditional public works programmes this also offers a unique opportunity for women to earn cash incomes in a context where, too often, the ability of women to work outside the home is severely constrained by social norms. Actually the NREGS has different progressive provisions to incentivize participation of women in the programme. The NREG act had an objective to ensure that women have equitable and easy access to work, decent working conditions and equal payment of wages to keep gender equity in informal sector which certainly is expected to have spillover effects on other sectors. But in

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a male dominated society, it is sometimes difficult to believe that within a household, women's decision to avail of employment under the NREGS would get precedence over the decision of the male members.

Khera & Nayak (2009) commented that the NREGS is unique in the context of two key features. First, the Act prescribes that at least a third of all workers be women. Second, since the entitlement to at least 100 days of work is at the household level, the allocation of the work is left to the household members allowing space for the participation of women. MGNREGA Sameeksha, Government of India (2012) views that in addition to the above features, there are provisions for facilities such as childcare at the worksites that aim to reduce the barriers to women's participation. Further, several other aspects of the Act in principle are indicative of creating an ambience favourable to women, for example, the stipulation that the work is within five kilometers of an applicant's residence. Holmes *et al.* (2011) discusses about the measures incorporated by the operational guidelines which are sensitive to gender related issues. The recommendation regarding opening bank accounts for wage payments is that the local government should consider joint accounts to avoid crediting earnings solely to the male member of the household. The operational guidelines also recommend that women be given preference on worksites closest to their dwelling. As far as social audit forums are concerned, the guideline recommends that it must be conveniently scheduled for the workers so that women and marginalized communities can participate without constraints.

During the first eight years since its implementation, administrative data of the NREGS suggests that a large number of women have been involved in the scheme. Pankaj & Tankha (2009) based on field survey support the view that the NREGS has been inclusive and empowering of women. In another survey based study (Pankaj & Tankha, 2010), they also examined the empowerment effects of NREGS on rural women in Bihar, Jharkhand, Rajasthan and Himachal Pradesh and argued that women workers have gained from the scheme primarily because of the paid employment opportunity, and benefits have been realized through income-consumption effects, intra-household effects and the enhancement of choice and capability. Reddy (2013) comments that the introduction of the NREGS, with minimum and equal wages for male and female workers, did bring about not only an increase in the overall agricultural wages but also reduction in the male-female wage differential.

At the same time, Dreze & Oldiges (2007) and Dutta *et al.* (2012) find that there are large interstate variations in the extent of women's participation which indicate that the NREGS has not been uniformly inclusive of women. It can be reiterated that Dutta *et al.* (2012) also found that although the scheme is reaching the rural poor and backward classes and is attracting poor women into the workforce, yet there is considerable unmet demand for work on the scheme in all states, and more so in the poorest ones, where the scheme is needed most. Liu & Barrett (2013) using NSSO data examined differences across men and women along a number of aspects; possessing a job card, seeking work under the NREGS and participation and rationing rate, defined as the proportion of job seekers who were not allocated work. Narayanan & Das (2014) studied the extent to which the scheme is inclusive of women, with a particular focus on sub-populations of women such as widows and mothers of young children who typically face serious constraints in the context of labour market participation. They found that while the scheme has indeed been inclusive of women, the substantial variations both across states and the exclusion of vulnerable groups of women need attention. In fact provision of child care facilities is one of the entitlements provided under the NREG Act to encourage women to work. But surveys and anecdotal evidence suggest that this provision is not always available (Dasgupta & Sudarshan, 2011).

According to MGNREGA Sameeksha (2012), in the financial year 2011-12 female participation in NREGS was 47% on an average at the national level and in certain number of states we observe such participation lies below national level.

West Bengal is one of the states having lower than average performance, where, women participation percentage in the financial year 2011-12 was only 32. Thus inter alia it is evident that the objective of inclusiveness of women in NREGS is vitiated so far as its uniformity is concerned.

As a matter of fact, several factors may be active either jointly or single handedly across different regions and communities behind generation of female employment among rural households through NREGS especially for married female members and these are (i) inter-household factor(s) (ii) woman specific factor(s) and (iii) intra-household factor(s). Considering all the factors simultaneously still no investigation has been done to identify the specific one(s) which is (are) much more responsible to influence employment generation among rural women (mainly married) through NREGS. Against this backdrop we want to investigate the effectiveness of NREGS in the agriculturally backward areas to generate female employment in the scheme and to this end, it makes an empirical exercise with intent of objectivity. Here we have considered ratio of female man days to total man days of a household in an entire reference year as the outcome variable. This quasi experiment study is totally based on primary data collected from four gram panchayats of two randomly selected blocks of Birbhum district of West Bengal considering 2012-13 as the reference period.

2. Sample design and methodology

In West Bengal, out of 19 districts, we have chosen Birbhum district as sample district for our impact evaluation. While the choice of the district was primarily driven by pragmatic concerns, yet the selection can be justified on several grounds. In 2006, the Ministry of Panchayati Raj named Birbhum as one of the country's 250 most backward districts. It is also one of the first phase districts in West Bengal as regards implementation of NREGS and it is one of the three most backward and vulnerable districts in West Bengal also. The soil type is older alluvial in the east and laterite in the west. The district is climatically varied and is prone to both drought and flood situation. It is primarily an agricultural district with around 75% of the population being dependent on agriculture.

Birbhum district has 19 blocks out of which we have randomly chosen two blocks, Rajnagar and Suri-1. Again from Rajnagar, we have randomly chosen Tantipara and Gangmuri-Joypur gram panchayats whereas from Suri-1 we have randomly chosen Mallickpur and Nogori gram panchayats. For proper effectiveness of study of this public policy we have to consider household as a unit.

In any impact evaluation study, we have to investigate how have outcomes changed with the intervention relative to what would have occurred without intervention. But it is difficult to judge the outcome of the same individual with and without intervention because people can only be in one circumstance at a time. Often treatments that influence outcomes do not just happen naturally; they are implemented precisely to influence outcomes. Different public policies implemented by the government is an example of it. Sometimes treatments are made on the basis of some non-economic factors like political considerations. In this situation an investigator cannot randomly assign people or two separate units like treatment group and control group. So to do proper impact evaluation; instead of 'control group' we can consider a 'comparison group' and the experiment becomes not natural experiment but quasi-experiment. In any quasi-experimental study, two sets of households are required. We have a 'treatment group', a set of households who are affected by policy change and a 'comparison group', a set of households who are not or partially affected by policy change. Actually finding a proper counterfactual to treatment is always a challenge. After eight years of the implementation of the scheme as far as the tenure of this study is concerned, it was hardly possible to find out non-participant of this scheme at least in our study area among the poor households. So participant-non-participant approach will not be applicable; instead, two kinds of households are selected in our experiment

according to the number of days they got employment in NREGS in the reference period 2012-13.

Initially from the official website of NREGS we have identified the beneficiary households of the sample gram panchayats who got 60 man-days or more through NREGS in the entire reference period and the households who received 15 or less man-days job in those same sample gram panchayats in the entire reference period. All such households were surveyed on the basis of our well designed questionnaire.

The survey work was done between June and August 2013. So this quasi experiment is based on cross-sectional primary data. Different socio-economic information was collected from the sample households. The Focus Group Discussions (FGDs) were also conducted in all the selected villages with the village community including workers to substantiate the data collected from the individual worker.

In this impact evaluation, households got more than 60 man-days of work through NREGS is considered as 'treatment group' and households worked less than 15 man-days through NREGS is considered as 'comparison group'.[i]

Total number of sample households is 286, out of which 180 households belong to treatment group and 106 households belong to comparison group. We took special care to ensure that the comparison group closely matched the treatment group by economic, physical, and social attributes.

The main objective of 'impact evaluation' is to assess whether a scheme or intervention has achieved its intended outcomes (here inclusiveness of women or simply generation of female employment in NREGS). NREGS is a public policy initiated by the Government of India and at present it has almost been implemented in all the implementable districts of India but the intensity is different. It may be reiterated that we have to investigate whether expansion of NREGS is able to help the female job-card holders to get more employment through NREGS or not. As discussed above, due to practical constraints, randomized experiment is not possible during the time of evaluating the effectiveness of this policy because it is difficult to find sufficient number of poor rural households in a locality who still did not participate in this scheme. So we have to depend on 'quasi-experiment' which can be carried out in a realistic setting more often than randomized experiment because evaluation of the scheme occurs after important funding have been made and researchers cannot randomly assign people to treatment group and control group. Participation in NREGS is mainly through self-selection mechanism. Hence, we have chosen those households in the 'treatment group' category who have got larger benefits of NREGS through securing large number of man-days of employment in the entire reference period. Alongside, during the time of choosing 'comparison group' instead of 'control group', we carefully have to consider those households as sample that not only have comparable socio-economic background with treatment group but also have participated less or 'zero' man-days in NREGS in the entire reference period.

The agro-climatic and farming conditions were almost identical in the sample villages, where predominance of mono-cropping was observed. The sample villages were not particularly prosperous, and the residents in the survey area had limited opportunities for alternative employment in the local private non-farm sector and elsewhere. This is substantiated by the following illustrations.

As regards employment in private nonfarm activities within the sample villages, on the basis of Table 1 it is observed that nearly 54% households from treatment group are not engaged in the same and another 42% households are engaged for less than 40 days in the entire year corresponding to the reference period. Again around 54% of the sample households belonging to comparison group do not have access to private nonfarm activities and another 46% have less than 40 man-days of work in the entire reference period. Moreover in almost all sorts of nonfarm engagement, the wage rate per man-day is Rs 100 which is not at par with NREGS wage rate. Thus it is imperative that problem of joblessness in our study areas be reduced by formulating a comprehensive policy for employment like NREGS.

Table 1. *Distribution of private nonfarm activities among the sample households in terms of man-days*

Number of man-days in private nonfarm activities	Treatment group	Comparison group
Nil	97(53.89%)	57(53.77%)
01-40	75(41.66%)	29(46.23%)
41-100	08(4.45%)	0
Total	180(100%)	106(100%)

Source: Field survey conducted by the researcher

Thus on the basis of Table 1 we can say that in the study area, there are little opportunities for alternative supplementary employment beyond agriculture which urgently necessitates for a comprehensive public works program.

The urgency for a comprehensive public works scheme is further accentuated if we get an idea regarding employment of female in private nonfarm activities within the village. Table 2 shows that nearly 74% households from treatment group had reported that their female members were not engaged in any kind of private nonfarm activities and nearly 24% households have females who are engaged for less than 40 days in the entire year corresponding to the reference period. Again around 73% of the sample households belonging to comparison group possess female members who do not have access to private nonfarm activities and another 18% have less than 40 man-days of work throughout the year. Only 2% of the sample households belonging to treatment group and 9% of the sample households belonging to comparison group managed to get moderate man-days of employment and that is mainly as domestic worker in the locality or near-by locality. We have already mentioned that our study area is not economically solvent. Hence possibility of employment generation among female as domestic worker is also very restricted.

Table 2. *Distribution of private nonfarm activities among the female members of households in terms of man-days*

Number of female man-days in private nonfarm activities	Treatment group(no. and % of HHs)	Comparison group(no. and % of HHs)
Nil	133(73.89%)	77(72.64%)
01-40	43(23.89%)	19(17.93%)
51 and above	4(2.22%)	10(9.43%)
Total	180(100%)	106(100%)

Source: Field survey conducted by the researcher

A significant characteristic of the region we studied is that there is almost no incidence of distress migration. More than 90% households within the treatment group do not migrate in the lean period and above 95% households belonging to comparison group are non migrants. Although the reason behind non migration is not explicitly cited by the sample households, yet we apprehend that for these people, the cost of migration might be very high

Table 3. *Incidence of daily distress migration among sample households*

Number of days of daily distress migration	Treatment group	Comparison group
Nil	163(90.56%)	101(95.28%)
01-50	09(5%)	04(3.77%)
Above 50	08(4.44%)	01(0.9%)
Total	180(100%)	106(100%)

Source: Field survey conducted by the researcher

Table 3 depicts the incidence of migration outside the village among the sample households. Besides the fact that a large section within the treatment and comparison group do not migrate, we also observe that 5% households from the treatment group and a little over 3% households from the comparison group migrate for less than 50 days throughout the whole year. Thus, with immediate effect we can anticipate as a corollary that there is no question of female migration outside the village and that is by our observation in the study area. As a

consequence, the possibility of generation of female employment on that front undoubtedly gets negated.

As mentioned earlier that the chosen study area in Birbhum district is predominantly mono-cropping in nature. Further, the sample farming households both in the treatment group and comparison group are mostly marginal farming households. Apart from this, a gigantic portion of the sample households within both groups belongs to agricultural labour class. Moreover, illustration of Table 1, Table 2 and Table 3 brings out that a remarkable size of sample households have little or no access to either private nonfarm activities within the village or migrated job available outside their villages, implying very meager sources of alternative employment opportunities not to mention about the female community. Thus the sample households in the study area are not only poor; their poverty is also accompanied by limited or no employment opportunities in the agriculturally lean period, making them absolutely vulnerable. Moreover, it is not difficult to introspect that the female members of these households need emphasized priority so far as their employability is concerned. It is here where expansive and inclusiveness character of NREGS pertaining to women becomes imperative.

As already mentioned, total number of sample households is 286, out of which 180 households got 60 man-days or more through NREGS in the entire reference period and 106 households received 15 or less man-days job in the same reference period[2]. The first set of households is referred to as the treatment group and the second set of households is called the comparison group in the entire future analysis. The underlying empirical exercise is in its essence an impact evaluation study, where, we try to understand whether NREGS becomes efficient to generate rural public non-farm employment to female members and to identify the ex-factor(s) (if any) which can influence women's participation in NREGS. In other words, the observations are truncated for impact evaluation intending to evaluate whether more number of NREGS man-days received by the household implies proportionately more participation of female in the same or it is further substantiated by other factors.

3. The Model and its Results

We have already mentioned that, the outcome variable is the ratio of female man days to total man days received by the sample household through NREGS in the entire reference period (*rofnregs*) and $rofnregs \in [0,1]$. Intuitively it may be assumed plausible that a female member of a household can seek proportionately more man-days of employment through NREGS if the household she belongs to can manage more man-days of employment resulting in the increase in the value of outcome variable. But, it is observed from our field investigation that seeking more man-days of employment through NREGS from the point of view of a household does not in all cases indicate that female members of those households will participate intensively in this public employment scheme. It came out from our field investigation that there exist considerable number of sample households who managed more than 60 man-days of employment through NREGS, but the participation of the female members of those households in NREGS is very poor and in some situations it was zero. Besides that there are a few sample households who could not manage high man-days of employment through NREGS in the entire reference period but the proportionate participation of the female job-card holders of those households is considerably high.

Out of our 286 sample households, there are 118 households (both belonging to treatment and comparison group) where the female members of the sample households did not do any work in man-day through NREGS in the entire reference period and the outcome variable in terms of positive integer is available in the remaining 168 sample households but the value of it is in any case not more than 1[3]. Actually only among two households, its female members have participated maximum 80 man-days of employment and the value of the outcome variable is

0.8. So it is clear that female employment in man-days through NREGS takes not only strictly positive values but it also takes on zero[4] with positive probability. So we can take the help of Type-II Tobit model in this impact evaluation.[5]

Here truncation in the sample is observed in our investigation and it is due to incidental truncation[6] as well as truncation due to survey design. So the taken sample is non-random in nature.

On the basis of our observations from the field survey, it is hypothesized that participation of female in NREGS depends on several factors: (i) inter household factor(s), (ii) women specific factor(s) and (iii) intra-household factor(s). All those three types of factors are considered simultaneously in the 'Generalized Tobit' regression equation[7] for impact evaluation.

As a matter of fact, to judge the effectiveness of NREGS to generate employment among female job-card holders one has to depend on impact evaluation technique. Besides that, here both intra as well as inter household factors are considered simultaneously to investigate the relative strength of the factors responsible to influence employment generation among female job-card holders through NREGS. This study will help us to derive few policy implications related to this factor which will be narrated in the last part of this paper.

3.1. Possible factors which may influence female employment generation in NREGS

treatdummy$_i$→ The variable takes the value 1 if the ith household as a unit got 60 or more man-days of NREGS work in the entire reference period (i.e. if the sample households belong to treatment group) and it is 0 if the ith household receives 15 or less number of man days of work under NREGS (i.e. if the sample households belong to comparison group)[8]. This variable here represents the inter-household factor which will influence '*rofnregs*'. Intuitively we can say that a female job card holder will get increasingly more man-days of employment if and only if the household she belongs to, can manage good number of man-days of employment in the entire reference period. But in actual practice for a considerable number of sample households belonging to 'treatment group' female members did '0' man- days of employment or very few man-days of employment in the entire reference period. Hence, '*treatdummy*' although may influence '*rofnregs*', yet the relationship may neither be monotonic nor be having one to one correspondence.

We know that NREGS is operated through self-selection mechanism. Besides that, this policy is implemented through local panchayat. So following Kundu (2015), this variable can be endogenous in nature which may generate sample selectivity problem.

tfmember$_i$ → Total number of female members in the ith household. This variable may have a bearing on the total number of days of NREGS work obtained by female members in the household. Actually in our survey area all the adult female members of the sample households are job-card holders. So it is expected that more employment through NREGS among the adult female members can be managed if the household has more female job-card holders.

natureowrk$_i$ → It is considered as a female specific factor and here expressed in dummy. In our study area, the main task done under NREGS was digging of soil and that is 60 cubic feet to complete one man-day work. It came out from our field investigation that such type of work is considered physically constraining for female job card holders both of treatment as well as comparison group. During the time of field survey, the respondent of each sample household was asked: "do they consider the nature of work assigned to them under the program physically challenging for women?" We asked them to answer in affirmative or negative (i.e, yes or no). Thus, in the cases, where the answer is affirmative we took 1 and otherwise 0[9]. Interestingly women are not excluded from job-card holding, but the nature of job are sometimes possibly active against women of some sample households for working under NREGS[10].

familyprmtr$_i$ → This is an intra-household factor and is narrated as a 'dummy' regressor. An important factor which can influence participation of female members in NREGS is whether there are facilities in the workplace pertaining to women like child care facilities and/or availability of work not far from home. In our study area, the first kind of facility was not at all observed and this feature is rampant across the country as mentioned earlier (Dasgupta & Sudarshan, 2011). So we interrogated about the second facility which is sometimes highly related with the first one. Actually due-to lack of availability of child care facilities, most women who have children mainly below 6 years cannot bring them to the worksite as it is not considered as safe place for them. They are also restricted by the other members of their households to participate in NREGS. Besides that among a considerable number of sample households, it is observed that the women married members have to look after the elder members of the household. So if they are not offered job nearer to their native village, they cannot participate in NREGS in spite of their willingness mainly due to their household work pressure reflecting family parameters. It came out from our field investigation that 27 sample households belonging to treatment group and 37 sample households belonging to comparison group reported that the female members cannot participate in NREGS work because to do that they had to travel far distance from their native village which is not possible for them due to family parameters. Here the variable as we have already mentioned previously is dummy in nature taking value 1 for 'yes' and '0' for 'no' to the following question; "do you find it difficult for the female member to go and work under NREGS after sustaining the household work pressure"? Thus out and out family parameter plays a vital role in determining the participation of women itself in the scheme and if yes, the intensity of it. The underlying factor functioning implicitly with the prevailing one is the socio-cultural norm. A very notable feature observed in the study area was that the female participation in the program is guided by socio-cultural factors nourished either consciously or subconsciously by the male members of the household. So this variable stands for the socio cultural norms in general and bindings in particular attached with the ith household. So if the work is not available closer to a household's dwelling, generation of female employment is constrained either due to pragmatic reason like household work pressure or exclusively due to socio-cultural binding on married women members or both. The variable '*familyprmtr*' captures the whole flavor here.

Only 12 sample households belonging to treatment group and 15 sample households belonging to comparison group replied during the time of field investigation that they would not send the female members of their households in NREGS work due to '*natureowrk*' and '*familyprmtr*' both. It is tested that no correlation exists between, '*natureowrk*' and '*familyprmtr*'. Hence we can rule out the possibility of multi-co linearity during the time of estimating Eq.(1).

bpl$_i$ → this variable symbolizes whether i[th] household belongs to BPL or APL category. It is 1 for BPL and 0 for APL. The intention is to investigate whether BPL category households are more prone to send their female members in NREGS job market or not.

So the original equation we need to estimate is:

$$rofnregs_i = \propto_0 + \propto_1 treadummy_i + \propto_2 tfmember_i + \propto_3 natureowrk_i + \propto_4 familyprmtr_i + \propto_5 bpl_i + \varepsilon_i \qquad (1)$$

Here ε_i is assumed to be normally distributed. We know that NREGS is mainly demand driven. Still the intensity of participation among the households in this public works scheme is likely to be based on unobserved factors which are accommodated in ε_i in Equation (1) which means selection is likely to be correlated with ε_i (Kundu, 2015). So here '*treatdummy*' is initially considered as

'endogenous variable in nature in Eq.(1). So during impact evaluation, to tackle the possible problem of selectivity bias we have to depend on Two Steps Treatment effect model developed by Heckman because here the value of the explained variable is observed both for the treatment group and also for the comparison group. In the following selection equation, we will consider two factors i.e. '*psdummy*' and '*tearningsland*' which can influence '*treatdummy*' of Eq. (1) but those two variables do not appear as explanatory variables in Eq.(1). (Kundu & Talukdar, 2015)

Number of days that the ith household got employment in different kinds of jobs i.e. in private non-farm sector in the locality or outside the locality excluding NREGS in the entire reference period may likely to have an influence on the number of man days of the NREGS work participated by the household. But in our observation it is tested that those days have no influence on participation through NREGS because of very low presence of private non-farm employment opportunity in the study area. So this factor is ignored in Eq.(2) below[11].

3.2. Possible factor(s) which may influence the intensity of participation in NREGS i.e. 'treatdummy' of Eq(1)

$psdummy_i \rightarrow psdummy$ indicates 'Panchayat specific' dummy. Field survey has shown that getting jobs (and even number of man days of jobs) under NREGS depends to a large extent on the efficacy of the local panchayat. Along with this, political clientalism and affiliation to the household by the ruling party play a vital role as well. As most of the households are not explicit about their political stand, here we took the '*psdummy*' indicating whether they are satisfied with the overall work of the panchayat or not (1 if yes, 0 if no) to capture the flavor of all the above facts. Here, it must be mentioned that we observed heterogeneity as well as mixed response in this regard, implying no one to one correspondence between like values of *treatdummy* and *psdummy*. Hence there is no reason to believe that the households belonging to treatment group are assigned value 1 in respect of *psdummy* and vice versa. In our field investigation 46 out of 180 sample households of 'treatment group' and 73 out of 106 sample households belonging to comparison group reported that they were not satisfied with the work of the local panchayat.

$tearningsland_i \rightarrow$ Net farm income from owned land of the ith sample household in the entire reference year. In our investigation 65 out of 180 sample households belonging to 'treatment group' and 39 out of 106 sample households belonging to 'comparison group' were land owners though all of them are marginal farmers. It has already been mentioned that the survey area is mainly mono-cropping area. But sometimes they cultivate different horticultural product during post rainy season from which their net-farm income enhances. So, there is a possibility that members of these landholding farm households will seek less employment through NREGS for these farm activities because the farm income is a source of income of the landowners. This variable in accommodated in Eq.(2). We have calculated net total farm income of the marginal farmer households by first computing their value of total output sold (total output sold x market price). Then we add total value of output kept for self consumption (amount x market price) and thus get the value of total output produced (Total Revenue). After that we calculate the total cost of cultivation under different heads (Total Cost).[12] Finally after subtracting total cost from total revenue, we can get net total farm income in monetary terms.

Thus we discover that, although NREGS is operating under self-selection mechanism, there may be some factor(s) due to which a household demands job but cannot always get that when demanded. This factor is tested through '*psdummy*'. Besides that there may be another factor due to which the household itself is not willing to secure more man-days of employment through NREGS. So through 'selection equation' we want to identify the factors due to which we observe heterogeneity among the households during the time of getting jobs

through NREGS in terms of total man days in the entire reference period in our survey region. The selection equation is expressed as:

$$treadummy_i = \beta_0 + \beta_1 psdummy_i + \beta_2 trearningsland_i + \mu_i \qquad (2)$$

We have already mentioned that to do the impact evaluation, we have to depend on Treatment effect model developed by Heckman (because the value of '*rofnregs*' is observed both for the treatment group and for the comparison group). It can also be here called Type-II Tobit model or generalized Tobit model and this is identical to the Heckman model. The difference between the Heckman type model and Tobit-II type model is that in Heckman type model we have to perform Two step estimation but Tobit-II type model prefers maximum likelihood estimation. Here this method is applied after considering possible existence of sample selection bias. If it exists, then to get consistent estimate of the Type II Tobit model we have to consider another explanatory variable '$\hat{\lambda}_i$' (Inverse Mill's ratio, which we can get through applying Probit model in selection equation apart) with the already mentioned explanatory variables mentioned in Eq.(1) . Let us first cite the result of the selection equation in Table 4.

Table 4. *Probit model narrated through Eq.(2) Dependent variable: 'treatdummy'*

Name of the variable	Co-efficient	Standard Error
tearningsland	-0.0000751**	0.0000395
psdummy	3.4612*	0.386
constant	-.7969*	.154

Notes: * significant at 1% level   and ** significant at 5% level

In the Type-II Tobit model, we can have the Inverse Mill's ratio $\hat{\lambda}_i$ for each 'i' and then we have to apply simple Tobit model to estimate $\hat{\alpha}_i$ considering $\hat{\lambda}_i$ as additional variable. The result is shown in Table 5.

Table 5. *Two step Treatment Effect Estimation in Tobit-II model:*Dependent variable: '*rofnregs*'

Name of the variable	Value of the Marginal co-efficient	Standard error
treatdummy	0.17894*	0.0301
tfmember	-0.18102	0.31
natureowrk	-0.3549*	0.0297
familyprmtr	-0.1215*	.0272
bpl	0.0311	0.0287
constant	0.3151*	.04785
$\hat{\lambda}_i$	-0.262*	0.0291

Notes: Wald $\chi^2(5) = 340.63*$; * significant at 1% level

As the value of the coefficient of $\hat{\lambda}_i$ is statistically significant we can reject the null hypothesis and say that two step treatment effect model in this Type-II Tobit model is appropriate.

Total number of observations is 286, and out of 286 observations, 110 are left censored at *rofnregs* ≤ 0 and remaining 176 are uncensored observations[13]. The value of Wald $\chi^2(5) = 1039.48$ and is significant at 1% level which establishes goodness of fit of the above model and can conclude that the covariates used in the regression model are appropriate. The parameter estimate of $\hat{\lambda}$ is -0.262 and it is statistically significant. So sample selection bias problem is corrected after considering $\hat{\lambda}_i$ as another explanatory variable in Eq.(1). To justify this statement the result of our Probit regression mentioned in Eq.(2) is given in Table-4 which

shows big influence of 'clientalism' [14] during the time of seeking employment through NREGS. It is also observed that if total earnings from land increases then the household will seek less man days of employment through NREGS.

4. Discussion of the Results mentioned in Table 5 based on Eq.(1)

The results of the Two-step Tobit equation mentioned in Table-5 show that the value of the marginal coefficient is positive for the '*treatdummy*'. This implies that the ratio of man-days the female-member of the household has worked through NREGS and total man-days the household secured job through NREGS may increase if the household as a whole can secure more man-days of employment through this public employment generation scheme and the possibility of it will be much higher if the household is landless and can manage good favor from local panchayat. But the value of the parameter estimate is 0.17 which establishes total absence of one to one relation between the two variables i.e. the female job card holder may not always manage to secure more man-days of employment through NREGS even if the male members can manage that. Thus, this variable does not suffice to explain the heterogeneity in the value of the '*rofnregs*' among the sample households.

The absolute value of the marginal coefficient explained in Table 5 is highest for '*natureowrk*'. The negative significant value of its coefficient establishes the fact that lack of suitable type of work opportunity among the female job card holders from their physical capability standpoint is the main reason behind poor employment generation among female members in our study area through NREGS.

It is also observed that due to family parameters explicitly expressed through household work pressure and/or implicitly reflecting the socio cultural binding, a sizable number of female job card holders failed to participate in NREGS. Here it has to be remembered that this variable accommodates the household duty of the female job card holder or an implicit fact of social binding on the female members of a household or both. If the sample household has aged as well as child members, then female member has to look after them, and it becomes difficult for those female members to work in NREGS if it is offered to her at a distant place. So we can say that due to family obligation and absence of empowerment (intra-household decision making power) among themselves the female job card holders are prevented to participate in this employment generation scheme even if they are offered job in a slightly distant place from their native village.

Total number of female job card holder and BPL Category of the sample household have no significant effect to influence employment generation among female members of the household through NREGS.

5. Observations

The present research work aimed to investigate the effectiveness of NREGS to generate employment among women. In this micro-level quasi-experimental study it is initially noticed that 'clientalism' is very much prominent for a sample household during the time of securing employment through NREGS in our study area. It is proved through selection equation that without loyalty to the political party whose members occupy the prime posts of panchayat, it becomes difficult for the poor rural households to secure more man-days of employment through NREGS. So the female job card holders are also deprived to secure more man-days of employment through this scheme. But that is not the only cause due to which we can say that there is heterogeneity in the employment generation among the women through NREGS in our study area. A large number of female job card holders cannot participate in this scheme due to lack of suitable type of work. Due to lack of physical capacity, a large number of female members do not prefer to work like 'digging of soil'. Sometimes they are prevented by the male members of their households to do this type of work. Besides that local panchayat sometimes have to

arrange job in a distant village which may be more than five kilometers from the native village of the job card holders without arranging for any child care facility in those areas. The female job card holders due to different types of family obligations like looking after their children and elderly persons and lack of empowerment cannot participate in this employment generation scheme. They have to abide by the decision of the elders and mainly their husbands.

6. Policy Implications

We can thus suggest some policy implications which may generate more employment among the female job card holders through NREGS and these are as follows:

a.   Problem of 'clientalism' during the time of arranging employment among the village job seekers through NREGS should be minimized. A proper sensitization of the local administration in this regard is mandatory.

b.   Women can as much as possible be allotted works such as plantation and the likes which are not heavily manual like digging of soil etc. This will to a large extent mitigate the reluctance and reservations of the concerned male members of the households to send their female counterparts to the work.

c.   It must be strictly followed that the works be arranged for women near to their dwelling so that they can avail of the NREGS projects without being anxious about their children and elders in their home. Besides that, the local panchayat must make provisions for child care facilities at the worksites as enshrined in the NREG act. Either or both these measures are expected to mobilize the women to participate more intensively in this employment generation scheme.

Results have shown that enhancement in the earnings from land will reduce the demand for NREGS works. As NREGS is an ongoing scheme, it must be optimally used for creation of proper ambience for turning the mono-cropping areas into bi-cropping and so on. This to large extent may reduce the pressure from demand side for the NREGS jobs.

Notes

[1] These thresholds are chosen bearing a compatibility with the overall trend of the study area.

[2] Minimum number of man-days as a whole a sample household belonging to comparison group had worked through NREGS was 12.

[3] Maximum man-days female members get the work must not be more than the household as a unit can seek in a particular accounting year.

[4] It is the situation of corner solution.

[5] Type II Tobit model is applied in the presence of missing data problem-i.e. when we truly have sample selection issue. Since we have a sample in which information on the regressand is available only for some observations, therefore it is called a censored sample.

[6] It is the decision of a household whether to participate in NREGS or not. In our sample all the households have participated in NREGS in the entire reference period but we observe huge heterogeneity during the time of securing employment through this public works scheme in the entire reference period. So for impact evaluation sample is designed by the surveyor.

[7] It is a censored regression model as well as a truncated regression model where the sample is non-random and we do not observe any information about certain segment of the population i.e. the rural households in our survey region who worked more than 15 but less than 60 man-days in NREGS in the entire reference period. Actually in our investigation we have targeted a particular subset of population, entirely ignoring the other segment of population.

[8] The variable is considered here as latent variable because to get consistent estimator in our Type-II Tobit model, initially we have to take the Probit estimation which can be done through Eq.(2) narrated later.

[9] Out of 180 sample households belonging to 'treatment group' the answer was affirmative among 59 sample households i.e. the female members of those households in spite of being job card holders cannot participate in NREGS or can participate very few man-days exclusively because of the nature of work assigned to them which they are physically incapable of. In case of 'comparison group' households, the number was 46 out of 106. This information indicates that a household as a whole can manage good man-days of employment through NREGS in an entire reference year but that does not mean that female members of those households can seek proportionately more man-days of employment. Actually in some cases there may be barriers from their own home and also from the local NREGS officials citing the reason that women are mostly incapable of doing such heavy manual work. In such cases, in spite of their willingness they cannot participate in NREGS more intensively.

[10] Interestingly among the female-headed households, the female members worked through NREGS. So in those households the value of 'natureowrk' is 0.

[11] It is used to address the issues of self-selection and the estimation of treatment effect model when there is non-random allocation of subjects to treatment and comparison group as is generally the case with observational data.

[12] Here total cost includes cost of seeds, hand tractors/bullocks, different fertilizers at purchase price, pesticides at purchase price, water, hired labour in terms of total wage bill and other costs if any.

[13] This is because no female member of our sample household has got 100 man-days of employment in the entire reference period. Maximum number of man-days the female member of a sample household got job through NREGS is 80 and minimum is 0. So the value of 'rofnregs' never exceeds 1 and always took value in the closed interval between '0' and 1

[14] 'Clientalism' is the favour a household can manage from local administration of receiving government services due to its loyalty for the political party whose members dominate in the local administration.

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