Trends in Agricultural Wage Rate after the Mahatma Gandhi National Rural Employment Guarantee Scheme: A District-wise Analysis of Tamil Nadu

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It is increasingly argued that the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) introduced during 2006 has escalated the wage rate of agricultural labourers in different states. But, not many studies are available as to what happened to the wage rate of male and female agricultural labourers after its introduction covering the districts of Tamil Nadu. An attempt is made in this study to answer this by using data during 2001-02 to 2012-13. The growth analysis reveals that the pace of increase in real wage rate for male and female labourers is substantially higher during post-MGNREGS period as compared to pre-MGNREGS period across the districts. The results of simple regression suggests that the irrigation development and employment days per household provided by MGNREGS appeared to have positively fuelled the growth rate of wage for male labourers, while foodgrains productivity, cropped area per farm labourer, rainfall and employment days provided by MGNREGS appeared to have fuelled the growth of female wage rate.

Key words: Wage rate, Irrigation, MGNREGS, Rural employment, Tamil Nadu

Rural poverty has been a major problem in India, mainly because of un-assured employment opportunities and poor wage rate. Keeping this in view, Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) was introduced during 2006, which was renamed as MGNREGS in 2009. With an unprecedented scale of budgeted outlay millions of days of employment have been provided to rural people mostly, living around the corridor of the poverty since inception (MoRD, 2012). By providing the opportunity of right to work and assured employment, NREGS is also aiming to reduce the migration of rural poor among the vulnerable sections by improving their standard of living. Studies carried out on the impact of this scheme shows that it helps getting the assured wage rate and employment in most of the states where, it is implemented effectively (Dutta, et al., 2012; MoRD, 2012). With major objectives of the scheme towards the increase of women participation, with facilities to their convenience at worksite, women found work attractive (Verma, 2010).

This rural employment scheme was introduced specifically to improve the standard of living of the poor people, but it is increasingly argued that this employment scheme has been seriously affecting the growth of agricultural sector (see, Harish *et al.* 2011; Narayanamoorthy and Alli, 2013; Gulati, *et al.,* 2013). Since this scheme is operated throughout the year including the busy seasons of agriculture, it has created unusual labour scarcity in the rural areas, which resulted in steep increase in the wage rate of agricultural labourers (Dutta, *et al.,* 2012; Gulati, *et al.,* 2013). It is also reported that this scheme has deteriorated the quality of labour considerably by reducing the effective working hours of labour, which is ultimately increasing the labour requirement for the given operation (Verma and Shah, 2012). Both the increased wage rate and requirement of labour have reportedly increased the cost of cultivation of different crops substantially, since the introduction of MGNREGS (Chandrasekar and Ghosh, 2011).

Is it correct to say that MGNREGS is increasing wage rate and deteriorating quality of labour supply uniformly across different regions in India given the wide variation in irrigation coverage and other factors governing the rural wage rate? Even if one accepts the argument that MGNREGS increases the wage rate in agriculture, will the impact of it on wage rate be the same across high and low irrigated districts? Quite a few studies have analysed the implementation, equity and governance aspects of MGNREGS after its implementation (Bhatia and Dreze, 2006; Khera and Nayak, 2009 and 2011; Imbert and Papp, 2011). But, not many detailed studies are available as to what happened to the wage rate of agricultural labourers for both male and female after the introduction of MGNREGS across districts. If one agrees to the argument that the agricultural wages are increased due to MGNREGS, what are the factors responsible for the increased wage rate? In view of the absence

of detailed district-level data based studies, one cannot come to a conclusion that MGNREGS has uniformly increased the wage rate. The surplus labour available is less in the irrigated regions as compared to un-irrigated regions and therefore, the impact of MGNREGS on wage rate might be different between the two regions. Similarly, as the irrigation coverage to cropped area, cropping pattern, intensity of crop cultivation, availability of labour and rural infrastructure facilities are widely varied from one district to another, the impact of MGNREGS on wage rate may not be the same across the districts. Keeping this in view, an attempt is made in this study to find out the impact of MGNREGS on the wage rate of agricultural labourers utilizing the district-wise data of Tamil Nadu. The specific objectives include the study of farm wage rate by gender before and after the introduction of MGNREGS across different districts in Tamil Nadu. To find out the growth rate of real agricultural wages before and after the introduction of MGNREGS across the districts of Tamil Nadu and to identify the key factors contributing to the growth rate of real agricultural wages of male and female labourers after the introduction of MGNREGS.

Materials and Methods

The study has been carried out entirely by using district-wise data of Tamil Nadu covering period from 2001-02 to 2012-13. The reason for selecting Tamil Nadu state for the study is that the results of most of the studies showed that the real wages for male and female labourers in Tamil Nadu have increased much faster than the other states of India (Narayanamoorthy and Bhattarai, 2013; Narayanamoorthy and Alli, 2013; Gulati, *et al.,* 2013). MGNREGS was effectively introduced from February 2006 and therefore, the period of analysis has been divided into two, namely, pre-MGNREGS period (2001-02 to 2005-06) and post- MGNREGS period (2005-06 to 2012-13) to capture the impact of it on wage rate. Out of 32 districts in Tamil Nadu, the study covers 28 districts (excluding the newly formed districts and the capital city of Chennai) for its analysis. The 28 districts together accounted for about 95 per cent of the state's cropped area during 2012-13. District-wise average daily wage data for agricultural labour by gender and operation available in the Season and Crop Reports of Tamil Nadu, published by the Department of Economics and Statistics, Chennai, for various years have been primarily used for the analysis. As one of the objectives of the study is to find out the growth in wage rate for agricultural labourers after the introduction of rural employment scheme, all the money wage related data have been converted into real wage using the consumer price index for agricultural labourers (CPIAL) of Tamil Nadu with the base year of 1986-87.

While studying the growth rate of real wages among male and female labour in agriculture, we aim to find the factors that are responsible for the increased wage rate particularly after the introduction of rural employment scheme. The GWRMLA and

GWRFLA, defined as the growth rate of wage for male labour and female labour after MGNREGS respectively, are the two dependent variables used in the analysis. Many growth and infrastructure variables along with MGNREGS variables which have been identified to influence the growth of real farm wage rate. The physical and financial performance of Tamil Nadu under MGNREGS represented by the variables such as, ADEPH (average person days of employment per household generated by MGNREGS), EXPH (expenditure on MGNREGS per household) and AVDHE (average percentage of demanded households employed from 2006-07 to 2012-13) have been obtained from programme MIS (www.nrega.nic.in).

A total of 14 important variables have been identified to relate with the growth rate of real farm wage. The descriptive statistics of the variables that are used in the analysis are presented in Table 1. The growth related variables used in this study are RAIN (average annual rainfall), GCANSA(cropping intensity), GIANIA (irrigation intensity), TRAHA(gross cropped area per tractor), PTUP (percentage of total urban population), PDGUP (percentage of decadal growth in urban population), PNALTW (percentage of non-agricultural labourers to total workers), GCAAL (gross cropped area per agricultural labourer), PFG (productivity of major food grains), GIAGCA (percentage of irrigated area to cropped area) and GWIAGIA(percentage of groundwater irrigated area to gross irrigated area). Besides, three infrastructure variables such as ROAD (rural road density per $1000km^2$), ELEC (percentage of villages having electricity connection) and LIT (percentage of rural literacy) are also used in this analysis. All these 14 variables in one way or the other are related to the wage rate determination.

There are underlying principles for using these variables in the analysis of rural wage rate. It is expected that any sudden increase in employment availability or additional employment days created by the rural employment scheme would increase the wage rate in any normal rural setting. Hence, the variable ADEPH is included to relate with growth rate of real wages in the analysis. Similarly, AVDHE is expected to influence the growth in the wage rate by altering the supply and demand for labour. The variable EXPH reflects the intensity of the employment scheme in a region which would also influence the wage growth rate. One of the important factors that determine the growth in wage rate is the supply of agricultural labour in a region. Studies have employed the usual demand and supply of labour for analyzing the increase in the wage growth. Many studies have showed the regional variations in the supply and demand for labour and wage rate after the introduction of the rural employment scheme. In order to reflect the variations in supply demand framework in our analysis, the variable GCAAL is included.

After the implementation of MGNREGS, the farm mechanization increased especially in paddy and

wheat cultivation in the major foodgrain producing states of India (Narayanamoorthy, *et al.,* 2014). This growing farm mechanization and change in the cropping pattern from labour intensive to labour saving crops can also be related to the rise in wage rate (Reddy, *et al.,* 2013). On the other hand, the rise in wage rate is also one of the compelling factors that increase the farm mechanization. Therefore, the variable TRAHA is used to relate with the growth of wage rate. Cropping intensity, the ratio of gross cropped area to net cropped area (GCANSA) in percentage term implies the intensity of crop cultivation in a year. If cropping pattern changes witnessed a widespread acceleration in male agricultural labour productivity, it may result in higher wages (Bhalla and Singh, 2012). In general, the production of foodgrains is higher in any highly irrigated region, which is an implication for the enhanced wage rate. In order to reflect the agriculture development of a region, the productivity of major foodgrains (PFG) is included in the analysis.

The reason for relating irrigation with the wage growth rate is that quite a few studies carried out in the recent years have proved that the availability of irrigation helps reducing the rural poverty through increased agricultural growth (Hanjra *et al.,* 2009, Narayanamoorthy and Hanjra, 2010). It is a well known fact that irrigation influence on farm wage rate is very significant as the agriculture growth and irrigation development are closely correlated in India (Dhawan, 1988). Therefore, the variable, percentage of irrigated area to cropped area (GIAGCA) is included in the analysis to relate with the growth rate of farm wage. In fact, there is vast difference in productivity of crops across different sources of irrigation. The quality of irrigation can be understood clearly by the effectiveness of the source of irrigation. Sources of variation in the wage rate appeared to be more rooted in irrigation facilities and that it had a positive effect on the wage rate. Since groundwater is treated as superior to other sources because of its dependability and accessibility, the percentage of groundwater irrigated area to the gross irrigated area (GWIAGIA) is considered as factor determining irrigation development reflecting increase in wage rate (Dhawan, 1988 and Vaidyanathan, 1994).

The share of urban population to total population (PTUP) and decadal change in urban population (PDGUP) are the proxy variables for urbanization which is also expected to influence the rural wage rate. Similarly, a substantial shift of rural workforce from agriculture to non-agricultural sectors may affect the growth rate of wage. To capture this percentage of non agricultural labourers to total workers (PNALTW) is used in the analysis. The rural infrastructure is proved to be the important factor not only in determining the agricultural development but also in controlling the farm wage rate and rural poverty (Fan et al., 1999). In view of this, two important rural infrastructure variables namely the rural road density (ROAD) and the percentage of villages having rural

electrification (ELEC) are also used in the analysis so as to relate with the growth in farm wage rate. Rural literacy (LIT) helps improving the knowledge of the rural people and their bargaining power in the labour market and therefore, it is considered as one of the variables along with others in the analysis (Narayanamoorthy, 2000).

In order to find out the impact of rural employment scheme on the growth rate of real wages of agricultural labourers after its introduction, compound growth rate was computed using the district-wise data. As the main aim of the study is to find out the most important factors that influences growth of wage rate after the introduction of rural employment scheme, simple regressions were estimated by treating the growth rate of wage (during post-MGNREGS period) as dependent variable and the related determinant variables (as defined in Table 1) as independent. Regressions were estimated separately for male and female wage rate by using 17 independent variables. The general form of regression equation used to explore the independent relationship between the variables is as follows:

GWRMLA or GWRFLA = a + b1X1 ……............……. (1)

In the above equation (1), GWRMLA or GWRFLA refer to the growth rate of wage for male agricultural labourers or female agricultural labourers during post-MGNREGS period. X1 refers to an independent variable used in the analysis (as specified in Table 1). Since the factors determining the growth in wage rate may not be the same for both male and female labourers, regression equation is estimated separately for GWRMLA and GWRFLA.

Results and Discussion

Amidst intense debates, a large body of literature has categorically proved that MGNREGS has inflated the agricultural wage rate. Equally debatable is the issue of wage differentials between male and female agricultural labourers. The rate of increase in wage rates across different states has been found to be relatively higher in the female agricultural labourers as compared to their male counterparts (Narayanamoorthy and Bhattarai, 2013). In this particular study, an attempt has been made to analyse the wage rate differentials between male and female agricultural labourers across various districts of Tamil Nadu. As mentioned earlier, data from 28 districts of Tamil Nadu covering the period from 2001-02 to 2012-13 have been utilized to assess the growth in farm wage rate after the introduction of rural employment scheme.

Growth performance of male farm wage rate

As revealed by some of the earlier studies, our study also shows that the farm wage rate for male labourers has increased considerably after the introduction of employment scheme (see, Table 2). At the state level, the average real wage rate for male agricultural labourers has increased from Rs. 23.31/day in 2001-02 to Rs. 23.27/day in 2005-06 and then to Rs. 40.93/day in 2012-13.

This means that the wage rate which grew at a rate of -0.04 per cent per annum for male labourers during pre-MGNREGS period, registered a growth rate of 7.31per cent per annum during post- MGNREGS period at the state level. This trend holds true for almost all the districts as they show increase in wage growth rate during post-MGNREGS period.

Table 1. Variables used in the study for the analysis

Variable	Description of the variable	Avg.	SD	Max.	Min.
PFG	Productivity of major foodgrains for the triennium ending 2010-11(kg/ha)	2669.35	885.31	4530.44	1385.74
GIAGCA	Percentage of gross irrigated area to gross cropped area for the triennium ending 2010-11(%)	56.38	19.07	88.79	0.50
ADEPH	Average of person days per household from 2006-07 to 2012-13 (days)	48.80	7.86	63.72	29.78
EXPH	Expenditure per household from 2006-07 to 2012-13(Rs)	4201.54	544.08	5316.78	3453.92
AVDHE	Average of percentage of demanded household employed from 2006-07 to 2012-13(%)	99.71	0.18	99.89	99.22
RAIN	Average annual rainfall for triennium ending 2010-11 (mm)	1090.99	323.81	2119.22	699.17
GCANSA	Cropping intensity for triennium ending 2010-11(%)	115.12	19.09	175.59	100.00
GIANIA	Irrigation intensity for the triennium ending 2010-11(%)	114.06	10.14	131.17	100.00
TRAHA	Gross cropped area per tractor for the triennium 2008-11(ha)	54.92	44.14	191.01	17.12
PTUP	Percentage of total urban population in 2011(%)	42.41	18.41	82.47	14.72
PDGUP	Percentage of decadal growth in urban population from 2001 to 2011(%)	26.01	14.63	65.33	-4.09
PNALTW	Percentage of non agricultural labourers to total workers in 2011 (%)	53.00	17.74	86.98	21.40
GCAAL	Gross cropped area per agricultural labourer for triennium ending 2010-11(ha)	0.71	0.31	1.61	0.40
GWIAGIA	Percentage of groundwater irrigated area to gross irrigated area for triennium 2008-11(%)	60.00	27.88	98.22	4.22
GWRMLB	Growth rate of wage for male labour before MGNREGS (%)	0.12	2.27	5.42	-6.01
GWRMLA	Growth rate of wage for male labour after MGNREGS (%)	7.18	2.11	13.88	3.15
GWRFLB	Growth rate of wage for female labour before MGNREGS (%)	-0.31	2.33	5.01	-4.58
GWRFLA	Growth rate of wage for female labour after MGNREGS (%)	5.19	2.47	12.90	-2.06
ELEC	Percentage of village electrified in 2010(%)	94.57	4.35	100.00	82.65
ROAD	Road density per 1000 Sq. km for the triennium ending 2009-10(kms)	567.47	256.67	1341.43	160.82
LIT	Rural literacy rate in 2011(%)	74.84	5.62	90.80	65.40

Sources: Computed using data collected from Season and Crop Report of Tamil Nadu (from 2000-01 to 2012-13), Economic Appraisal of Tamil Nadu (from 2000-01 to 2012-13).

Of the 28 districts considered for the analysis, the growth rate is negative in 12 districts during pre-MGNREGS. Even in districts like The Nilgris, Karur, Kanniyakumari, Coimbatore and Cuddalore the real wage rate for male labourers had declined sharply before the introduction of employment scheme. But this trend seems to have undergone a dramatic change during 2005-06 to 2012-13 in all the districts. The real wage growth rate of male labourers in all the districts except Kancheepuram district had increased during the post-MGNREGS. Surprisingly, the growth in real wage rate for male during post-MGNREGS period has been found to be very impressive in districts like Sivagangai, Kanniyakumari, Pudukkottai, Thiruvannamalai, Villupuram, Thiruvarur and Thanjavur. This increased growth rate of real agricultural wages for male labour could be mainly due to the introduction of MGNREGS. The statistical significance of this can be assessed by regression analysis which is attempted in the following section of this paper.

Growth performance of female farm wage rate

In almost all the states in India, the wages paid for female farm labourers are generally low as compared to the male counterpart even for the same operation. At the backdrop of this scenario, it becomes imperative to know as to what is the scenario of wage

rate of female labourers across the districts in Tamil Nadu before and after the introduction of MGNREGS.

As expected, the growth scenario of real wage rate for female agricultural labourers is different from that of their male counterparts across the districts of Tamil Nadu. Data reported in Table 3 shows that the wage rate has increased significantly for female labourers during post- MGNREGS period. Real wage rate for female farm labourers was Rs. 11.75/day in 2001-02, but it increased to Rs. 17.27/day in

Table 2. Growth rate of real wages for male agricultural labour in districts of Tamil Nadu

(at 1986-87 prices)

Districts	Real wage rate of male (Rs./day)			Growth rate (per cent/annum)	
	2001-02	2005-06	2012-13	Pre- MGNREGS	Post- MGNREGS
Coimbatore	29.13	25.12	47.26	-2.92	8.22
Cuddalore	21.88	19.63	34.83	-2.15	7.43
Dharmapuri	20.23	23.27	34.35	2.85	4.99
Dindigul	23.80	23.22	37.64	-0.50	6.23
Erode	25.22	25.46	41.35	0.19	6.25
Kancheepuram	16.47	21.45	27.48	5.42	3.15
Kanniyakumari	40.20	34.61	77.34	-2.95	10.57
Karur	24.33	20.84	34.07	-3.05	6.33
Madurai	21.19	22.02	36.05	0.77	6.36
Nagappatinam	22.63	24.47	43.63	1.58	7.50
Namakkal	24.13	28.14	42.28	3.12	5.22
Perambalur	21.57	22.95	38.72	1.25	6.76
Pudukkottai	22.20	20.86	44.84	-1.23	10.04
Ramanathapuram	24.14	25.97	41.72	1.47	6.11
Salem	25.31	25.65	44.47	0.26	7.12
Sivagangai	20.58	21.43	60.61	0.82	13.88
Thanjavur	21.72	22.87	42.95	1.04	8.19
The Nilgiris	33.49	24.56	40.86	-6.01	6.57
Theni	24.59	27.90	44.82	2.55	6.10
Thiruvannamalai	16.02	15.10	31.76	-1.18	9.74
Thiruvarur	22.30	21.66	42.31	-0.58	8.73
Thoothukudi	24.43	25.64	39.13	0.97	5.43
Tiruchirappalli	21.42	23.18	36.03	1.59	5.67
Tirunelveli	27.71	27.46	49.57	-0.19	7.66
Tiruvallur	19.12	18.40	27.57	-0.77	5.19
Vellore	16.92	17.17	27.39	0.30	6.01
Villupuram	18.39	19.51	37.83	1.19	8.63
Virudhunagar	23.63	23.08	39.29	-0.47	6.88
State	23.31	23.27	40.93	-0.04	7.31

Source: Computed using Season and Crop Report of Tamil Nadu (from 2000-01 to 2012-13), Department of Economics and Statistics, Government of Tamil Nadu, Chennai.

2012-13 at the state level. In terms of growth, the wage rate grew merely at a rate of -0.31 percent during pre-NREGS, whereas it registered a growth rate of 5.07 per cent per annum for female labourers during post-MGNREGS period. Since wages are paid for female labourers on par with the male labourers

under MGNREGS scheme, it must have helped to increase the wage rate at a relatively faster pace for female labourers.

Although the growth performance of wage rate for male labourers is much better than their female counterparts, the overall district-wise scenario in terms of growth rate of wage for male labourers differs entirely from that of the female labourers. For instance, 17 out of 28 districts have registered a negative growth rate in female wage rate during pre-MGNREGS period, while it was 12 in the case of growth in male wage rate. A total of 25 districts have registered a positive growth in female wage rate during post-MGNREGS period, but as many as 27

Table 3. Growth rate of real wages for female agricultural labour by districts of Tamil Nadu

(at 1986-87 prices)

Districts	Real wage rate of female (Rs./day)			Growth rate (per cent/annum)	
	2001-02	2005-06	2012-13	Pre- MGNREGS	Post- MGNREGS
Coimbatore	11.76	11.56	17.03	-0.33	4.96
Cuddalore	11.62	11.13	15.38	-0.86	4.13
Dharmapuri	9.36	9.09	14.02	-0.60	5.57
Dindigul	11.17	10.90	16.79	-0.49	5.54
Erode	10.35	13.21	18.11	5.01	4.02
Kancheepuram	10.54	13.06	16.48	4.38	2.95
Kanniyakumari	22.52	24.29	31.57	1.53	3.33
Karur	10.78	11.31	16.85	0.96	5.12
Madurai	10.47	9.14	15.07	-2.68	6.46
Nagappatinam	12.51	11.51	15.53	-1.65	3.81
Namakkal	8.72	10.27	18.13	3.33	7.36
Perambalur	9.56	8.61	22.73	-2.08	12.90
Pudukkottai	12.01	11.32	18.97	-1.17	6.66
Ramanathapuram	13.54	13.85	20.54	0.46	5.05
Salem	11.51	9.11	15.32	-4.58	6.71
Sivagangai	14.42	11.73	17.80	-4.04	5.35
Thanjavur	12.56	12.67	16.74	0.18	3.55
The Nilgiris	15.00	16.82	14.24	2.32	-2.06
Theni	11.73	11.03	19.31	-1.23	7.24
Thiruvannamalai	9.03	8.99	12.41	-0.08	4.10
Thiruvarur	14.43	12.11	16.68	-3.44	4.08
Thoothukudi	12.70	12.17	19.66	-0.85	6.18
Tiruchirappalli	10.33	8.64	16.59	-3.51	8.50
Tirunelveli	12.49	13.55	21.79	1.65	6.12
Tiruvallur	10.68	11.04	13.67	0.67	2.71
Vellore	9.40	9.09	13.87	-0.65	5.42
Villupuram	9.62	9.11	12.83	-1.08	4.37
Virudhunagar	10.31	10.36	15.52	0.11	5.17
State	11.75	11.63	17.27	-0.31	5.07

Source: Computed using Season and Crop Report Tamil Nadu (from 2000-01 to 2012-13), Department of Economics and Statistics, Chennai.

districts have registered positive growth in male wage rate. Not only this, our growth analysis further shows that some of the districts such as Kancheepuram, Nilgris and Erode have registered high growth rate in male wage during post-MGNREGS period but not in female wage rate during the same period.

The growth analysis suggests that the rate of increase of real farm wage for both male and female labourers is substantially higher during post-MGNREGS period as compared to pre-MGNREGS period across the districts. Besides, the pattern of growth rate in farm wage is not the same for both male and female labourers across the districts. More disaggregated studies need to be carried out to find as to why the wage rate has decelerated during post-MGNREGS for the female labourer in districts such as Kancheepuram, Erode and The Nilgris.

Factors responsible for male and female farm wage growth

The impact of the rural employment scheme on

the agricultural wage is likely to vary for each of the growth and infrastructural variables because the role played by each factor is different. Keeping this in view, an attempt is made here to capture the factors that influence the growth rate of wage for farm labour by utilising all the important variables as reported in the methodology section separately. The independent relationship between each growth and infrastructure variable during post-MGNREGS and growth in male real wages in the districts of Tamil Nadu is investigated, using a common simple regression equation as mentioned in the methodology section. The results of simple regression presented in Table 4 clearly show that among the various independent

Table 4. Factors contributing to growth in male wage rate during post-MGNREGS: simple regression results

Independent Variable	Constant	Coefficient	R2
PFG	-1.113 (-0.318)ns	0.003 (0.996)ns	0.037
GIAGCA	-6.200 (-2.348)b	0.146 (3.364)a	0.303
ADEPH	-9.193 (-1.532)ns	0.234 (1.927)c	0.125
EXPH	-7.220 (-0.936)ns	0.002 (1.234)ns	0.055
AVDHE	-245.533 (-0.768)ns	2.480 (0.775)ns	0.023
RAIN	2.007 (0.561)ns	0.000 (0.064)ns	0.000
GCANSA	1.800 (0.289)ns	0.004 (0.070)ns	0.000
GIANIA	-15.025 (-1.365)ns	0.151 (1.573)ns	0.087
ELEC	14.552 (0.660)ns	-0.130 (-0.559)ns	0.012
LIT	9.619 (0.711)ns	-0.099 (-0.547)ns	0.011
PTUP	1.398 (0.549)ns	0.020 (0.354)ns	0.005
PDGUP	2.646 (1.279)ns	-0.016 (-0.231)ns	0.002
PNALTW	3.013 (1.037)ns	-0.017 (-0.288)ns	0.003
GCAAL	4.764 (2.300)b	-3.297 (-1.384)ns	0.069
GWIAGIA	2.865 (1.190)ns	-0.011 (-0.291)ns	0.003
ROAD	3.263 (1.599)ns	-0.002 (-0.581)ns	0.013
TRAHA	4.344 (2.844)a	-0.039 (-1.765)c	0.107

Sources: Computed using data from Season and Crop Report Tamil Nadu (from 2000-01 to 2012-13), Economic Appraisal of Tamil Nadu (from 2000-01 to 2012-13).

Notes: a, b and c are significance level at 1, 5 and 10 per cent respectively; ns- not significant; figures in parentheses are 't' values.

variables, the impact of GIAGCA on growth of male wage rate appears to be stronger than the remaining variables taken for the analysis. The coefficient of GIAGCA is positively and significantly influencing the male wage growth rate. Its R2 estimate suggests that over 30 percent of variation in male wage growth rate is due to variation in the level of irrigation, which is plausible.

Table 5. Factors contributing to growth in female wage rate during post-MGNREGS: simple regression results

Independent Variable	Constant	Coefficient	R2
PFG	-7.236 (-3.220)a	0.001 (5.233)a	0.513
GIAGCA	1.280 (0.457)ns	0.048 (1.043)ns	0.040
APEPH	-1.057 (-0.185)ns	0.105 (0.906)ns	0.031
EXPH	9.053 (1.274)ns	-0.001 (-0.709)ns	0.019
AVDHE	-505.908 (-1.842)c	5.105 (1.856)c	0.117
RAIN	14.555 (6.012)a	-0.010 (-4.520)a	0.440
GCANSA	10.826 (1.980)b	-0.059 (-1.255)ns	0.057
GIANIA	19.516 (1.976)b	-0.137 (-1.574)ns	0.087
ELEC	10.440 (0.521)ns	-0.068 (-0.320)ns	0.004
LIT	41.161 (4.154)a	-0.496 (-3.755)a	0.352
PTUP	7.877 (3.648)a	-0.090 (-1.926)c	0.125
PDGUP	4.065 (2.171)b	0.000 (-0.008)ns	0.000
PNALTW	9.819 (3.715)a	-0.109 (-2.298)b	0.169
GCAAL	10.069 (7.150)a	-7.823 (-4.831)a	0.473
GWIAGIA	0.713 (0.346)ns	0.056 (1.782)c	0.109
ROAD	3.298 (1.784)a	0.001 (0.467)ns	0.008
TRAHA	3.565 (2.449)b	0.009 (0.426)ns	0.007

Sources: Computed using data from Season and Crop Report Tamil Nadu (from 2000-01 to 2012-13), Economic Appraisal of Tamil Nadu (from 2000-01 to 2012-13).

Notes: a, b and c are significance level at 1, 5 and 10 per cent respectively; ns- not significant; figures in parentheses are 't' values.

Another variable which influenced the growth rate of wage is ADEPH (which is the average days of employment per household received from MGNREGS). It suggests that one unit increase in days of employment would increase about 0.234 paise in the real wage rate for male labourers, but its R2 turned out to be very low. While this particular result confirms to the generally held perception that any growth in employment opportunity in a region is expected to increase the wage rate due to inelastic supply of labour in the short run, its explanatory power is disappointing. The regression estimates of other variables (namely, ELEC, ROAD, LIT, PTUP, PDGUP, PNALTW, GWIAGIA, EXPH and AVDHE) estimated separately show a weak relationship in explaining the variation in growth rate of male wages.

Having studied the independent linkages between the growth rate of male wages and different variables,

an attempt is made to study the contribution of different independent variables to the growth rate of female wages. Similar to the simple regression estimated for male labourers, separate simple regression has been estimated for female labourers to find out the factors that were influencing the growth rate of wages. The descriptive analysis clearly highlighted the fact that the wage rate for farm labour in the districts of Tamil Nadu grew at a very high rate for male labourers than for female during post-MGNREGS period. How has this happened? Which are the factors responsible for such a fast rise in female farm wage rate? What is the role played by the growth and rural infrastructural factors like rural literacy rate, road density, rural electrification on the growth in female wages? These questions are probed using the simple regression analysis. The results of the simple regression analysis estimated using both growth and other important factors are presented in Table 5.

The regression results estimated using the growth rate of wage for female agricultural labourers as dependent variable show that the role played by each variable is different (see, Table 5). Among the important variables considered for the analysis, the impact of productivity of foodgrains (PFG) on female wage growth rate appears to be stronger than the remaining variables. The coefficient of PFG is found to be positive and statistically significant, which is on the expected line because the wage rate is generally higher in all those agriculturally-developed areas, where the demand for labour is already high. The R^2 estimate of variable PFG suggests that about 51 per cent of variation in female wage rate is explained by productivity of foodgrains. Interestingly, the gross cropped area per agricultural labourers (GCAAL) turned out to be negative and statistically significant with the female wage growth rate. Since a larger proportion of GCA is rainfed in most districts, GCAAL has not positively influenced the growth rate of female wage.

The variables such as rainfall (RAIN) and literacy rate (LIT) are expected to positively influence the wage rate, but they have negatively and significantly influenced the wage growth rate in Tamil Nadu. More disaggregate level studies need to be carried out to pinpoint the reasons for this unexpected relationship. On the whole, the simple regression analysis suggests that irrigation and productivity independently play a greater role in impacting wage growth than the other growth and infrastructure variables for male and female labourers, respectively.

Conclusion

An attempt has been made in this paper to find out (a) whether the introduction of national rural employment scheme has increased the wage rate for agricultural labourers across the districts of Tamil Nadu, and (b) if MGNREGS has increased the wage rate, what are the factors determining the growth rate of wage for farm labour. Both descriptive and regression analyses were used to study the relationship. The results of the descriptive analysis shows that the real wage rate has increased substantially during post-MGNREGS period (2005-06 to 2012-13) as compared to pre-MGNREGS (2001-02 to 2005-06) for both male and female agricultural labourers. The rate of increase of wage rate is found to be relatively larger among the male agricultural labourers as compared to the female counterpart across the districts. The simple regression analysis carried out to investigate the independent relationship between each growth variables and the wage rate shows that except variables such as irrigation and person days of employment provided by MGNREGS, none of the variables appear to be significant in determining the growth rate of wage for male agricultural labourers. Similarly, the growth related variables like productivity of foodgrain crops, rainfall and literacy rate have significantly influenced the growth rate of female wages. The regression analysis suggests that the irrigation development, average days of employment per household provided by MGNREGS, appeared to have positively fuelled the growth rate of wage for male farm labourers, while productivity of foodgrains and rainfall appeared to have fuelled the growth rate of wages for female labourers.

The study clearly suggests that the wage rate after the introduction of MGNREGS has registered a phenomenal growth across the all districts of Tamil Nadu. Growth in male real wage rate during post-MGNREGS period has been found very impressive in districts like Kanniyakumari, Pudukkottai and Sivagangai. While female real wage growth rate in districts like Salem, Thiruvarur, Sivagangai and Tiruchirapalli declined during pre-MGNREGS, it had accelerated after the introduction of employment scheme. Despite having better agricultural performance over the last few years, the wage rate of farm labour has registered a deceleration in districts like Kancheepuram, Erode and The Nilgris for female labourers in post-MGNREGS. Disaggregated district level studies particularly in these districts need to be carried out to find out the reasons for poor growth rate of wage for farm labour. Although the increased growth in wage rate for farm labourer will help improving their standard of living, there is also a need to find out as to what kind of impact this increased wage rate has made on the agricultural front particularly on the cost of cultivation of different crops including the profitability in crops cultivation.

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