Impact of MGNREGA on Rural Agricultural Wages in SAT India[1]

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Abstract:

This study attempts to assess the impacts of MGNREGA on labor scarcity, wages, cost of production, the linkages among wage rates in MGNREGA, agriculture and non-agriculture employment and their implications on agriculture sector. The findings are based on field level insights from the selected villages from Telangana and Maharashtra under Village Dynamic Studies in Asia (VDSA) villages of Semi-Arid Tropics (SAT) India. The study shows that the real wages both for farm and nonfarm works exhibited upward trend especially after implementation of MGNREGA in both the states. Apparently, rise in real wage of non-farm sector has outpaced the farm wage resulting shift in labour force from agriculture to non-agriculture. The average daily wage rates of male farm workers has grown sharply after MGNREGA in both the states compared to almost negative growth rate of before MGNREGA. Beside farm wage, non-farm wage of male labor has also increased at a higher rate compared to growth of farm wage. Both the farm and nonfarm wage has increased by almost 3 times during the period of MGNREGA implementation in some area, whereas MGNREGA wage has increased only by half of it. There has been a steady decline in labor use over time in paddy, soybean and pigeon pea. The shortage of male labor for farm work is getting more prominent, whereas the increased participation of female labor in some major crop confirms the feminization of labor. Despite shortage of labour, the productivity of some of the crops exhibited an increasing trend in the study villages. There has been steep drop in the area under cultivation for crops like rabi sorghum, maize and cotton which are highly labour intensive. The proportion of labour cost formed a significant proportion of the total cost and increased phenomenally for the crops like cotton, paddy, sorghum, pigeon pea, maize and wheat. Some of the policy interventions include technological development such as developing short duration – labor saving improved cultivars amenable to mechanization along with custom hiring facility for farm machineries, capacity building programmes for skill augmentation especially female and training in productivity augmentation and cost reducing technologies and accelerating farm profitability.

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Prelude

Mahatma Gandhi National Rural Employment Guarantee Act. (MGNREGA), the flagship programme of GOI implemented by the Ministry of Rural Development (MORD) since 2005 aimed at improving livelihood security of the rural poor and inclusive growth with a primary objective of ensuring wage employment, at least 100 days in a financial year per household. This work guarantee can also serve other secondary objectives like; generating productive assets, empowering rural women, reducing rural-urban migration, and protecting the environment through improved natural resource management leading to sustainable agriculture and rural livelihood. Many studies have also indicated that MGNREGA has generated positive impact on agriculture and livelihoods of the small, marginal and landless households in the rural areas. However, one of the severe criticisms of MGNREGA is that it has generated negative impact on agriculture in terms of labour scarcity especially during peak season. This is because of diversion of rural farm labour to MGNREGA works as wage rates for MGNREGA are much higher than the prevailing farm wages. The lower labour supply to farm work is also due to the labourers preference for works in MGNREGA over other labour, owing to its less toil, less supervision and provision of other facilities (Thadathil 2012). The tight labour supply along with the higher MGNREGA wages caused farm wages to raise significantly leading to increased cost of production and squeezing net returns to the famers. Thus the emerging labour scarcity associated with MGNREGA and other factors along with increased rural wage impacting agricultural production and the profitability of small farms has become the concerning issue for the development practitioners and policy makers. This study attempts to assess the impacts of MGNREGA, a key social protection programme of the Government of India, on labor scarcity, wages, cost of production, the linkages among wage rates in MGNREGA, agriculture and non-agriculture employment and their implications on agriculture sector based on field insights from Village Dynamic Studies in Asia (VDSA) villages of Semi-Arid Tropics (SAT)

India. Further, an attempt has been made in this study to analyse and test the presence of backward bending supply of rural labour due to operation of MGNREGA with reserve wage rate.

Objectives:

The overarching objective of this study is to evaluate the Impact of MGNREGA on agricultural labour market and analyze its impact on wage rate and its implications on agriculture and the linkages among wage rates in MGNREGA, agriculture and non-agriculture.

Data & Methodology:

The data used in this paper were obtained from Village Level Studies (VLS) database generated by ICRISAT on six traditional villages for which forty years longitudinal data is available. However, for comparative analysis the study used the data pertaining to 2003-05 and 2009-2011. The six villages in the Village Level Studies of ICRISAT were selected from two states (Telangana and Maharashtra) which represent the broad agro-climatic sub-regions in the semi-arid tropics of India. The selected villages were; Aurepalle, Dokur, from Telangana and Kalman, Kanzara, Kinkhed, Shirapur from Maharashtra. The data were collected by the residence Field Investigators through personal interview with the every person in the household located in each village by using standard questionnaire K- Employment Schedule and Y-Cultivation Schedule of VLS in South Asia, the questionnaire and data collection methods and the data is available at *http://vdsa.icrisat.ac.in*.The sample households were selected based on the stratified random sampling method to represent landless, small, medium and large farmers in proportion to their population in each village.

Data has been analyzed and computed using descriptive statistics. In addition, growth rates have been computed using standard procedures. Nominal values have been converted into real terms by adjusting for inflation using wholesale consumer price index of agricultural labors with 2009-10 as base year. Real

values were calculated by dividing the nominal wages with consumer price index of agricultural workers at 2009-10 base years. Triennium Averages (TE) of wage of 2001 and 2006 were taken as base year and terminal year for before MGNREGA estimation whereas for after MGNREGA calculation the years are 2007 & 2012 respectively.

Results

Trends in Real wages:

It has been argued that MGNREGA has been one of the factors that have contributed to increase in wages (CACP, 2012). In this regard, the trend in real wages has been analyzed before and after MGNREGA implementation in Telangana and Maharashtra in order to assess the changes in relative wages. The trends in real wages for farm and non farm work irrespective of gender increased at a slower pace from 2000 to 2004 and thereafter the real wages increased significantly which coincides the phase of MGNREGA implementation.

Table1: Trends in real wage (Rs. Per day, 2009-10 equivalents) of farm and nonfarm work in Telangana & Maharashtra (2001-2012)

	Telangana						Maharashtra					
	Farm Work			Non Farm Work			Farm Work			Non Farm Work		
	Men	Women	absolute wage gap	Men	Women	absolute wage gap	Men	Women	absolute wage gap	Men	Women	absolute wage gap
2001	83	35	48	84	37	47	81	44	37	91	43	47
2002	81	37	44	94	47	47	87	42	45	147	57	90
2003	75	35	40	86	53	33	78	48	30	120	65	55
2004	70	38	32	88	50	38	76	41	35	101	77	24
2005	83	58	25	107	56	51	87	46	41	118	61	57
2006	80	56	24	119	56	63	78	46	32	188	92	96
2007	101	68	33	178	79	99	87	49	38	201	103	98
2008	106	68	38	128	72	56	86	53	33	196	106	90
2009	122	76	46	120	76	44	78	42	36	214	144	70
2010	115	99	16	134	78	56	117	75	42	246	136	110
2011	130	89	41	145	69	76	134	85	49	222	118	104
2012	140	98	41	157	90	68	147	83	64	216	133	83
% of change (2001-2012)	**69**	**180**	**-15**	**87**	**143**	**45**	**81**	**89**	**73**	**137**	**209**	**77**

Source: calculations from author's primary data

The real wage rates of all categories of farm and non-farm have exhibited an increasing trend throughout the period under study as evident from the figure 1, 2, 3 & 4. During 2001 to 2012, the farm wage rate for men increased by 69 % as against 180 % for women in Telangana. Similarly, the non farm wage rate for men increased by 87 % as against 143 % for women (Table 1). Similar trend is evident in Maharashtra as well. However, the non-farm wage rate for women in Maharashtra increased faster as compared to farm wage rate. Though percentage change in wage for the period is higher for women than men, but the perpetual phenomenon of gender wage inequality in rural labor market is continuing over the period (2001-2012). It has increased 2006 onwards with higher gender wage gap in nonfarm work as compared to farm work. The gender inequality in farm wages has reduced in Telangana as compared to Maharashtra (table 1). This may be due to effective implementation and better performance of MGNREGA in Telangana. Thus the trends in real wages clearly reflect that the wage rate for farm and non farm is moving upwards especially after implementation of MGNREGA. This has serious implication on agricultural sector in terms of increasing cost of production and reducing net margins to the farmers. Hence farmers may be forced to use more of mechanical power to perform agricultural operations timely or they may substitute other inputs in place of labour to augment productivity and profitability.

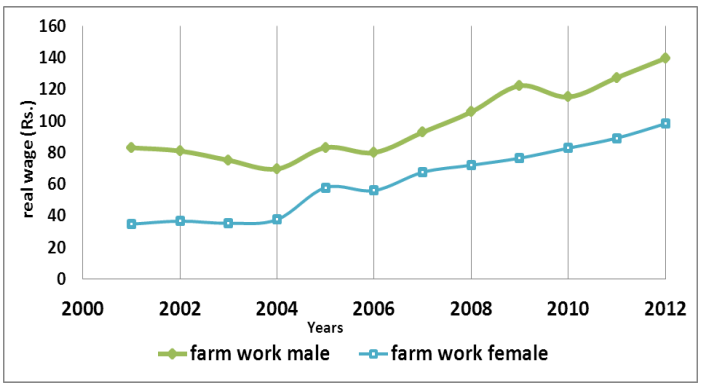

*Figure 1: Trends in Real wage per person day across gender in **Telangana** for **Farm work** (2001-2012)*
Source: calculations from author's primary data

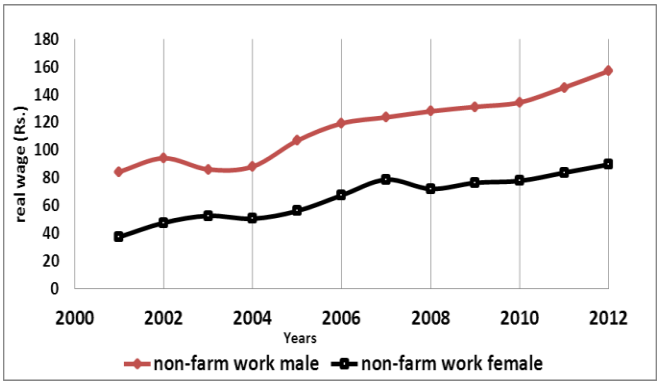

*Figure 2: Trends in Real wage per person day across gender in **Telangana** for **Non-Farm work** (2001-2012)*

Source: Same as for figure 1

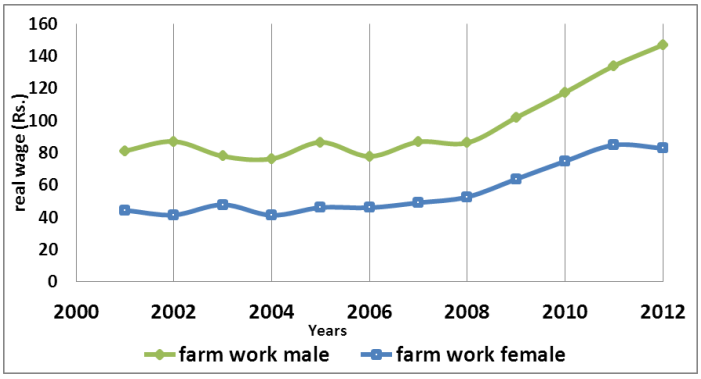

*Figure 3: Trends in Real wage per person day across gender in **Maharashtra** for **Farm work** (2001-2012)*
Source: Same as for figure 1

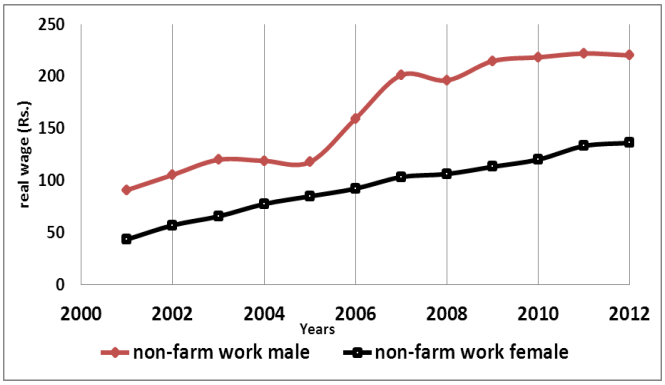

*Figure 4: Trends in Real wage per person day across gender in **Maharashtra** for **Non-Farm work** (2001-2012)*
Source: Same as for figure 1

In order to examine the disparities in the growth rates of wages for men and women between farm and nonfarm in before and after MGNREGA implementation, compound Growth Rate of real wages are computed (table 2).

TABLE 2: Compound Annual Growth Rate in Real wages in Telangana and Maharashtra Before and After MGNREGA Implementation (Percent)

Period	Telangana				Maharashtra			
	Male		Female		Male		Female	
	farm	non-farm	farm	non-farm	farm	non-farm	farm	non-farm
TE* 2001	80	88	36	46	82	105	45	55
TE 2006	78	105	50	58	80	132	44	85
TE 2007	107	128	72	76	92	204	55	107
TE 2012	127	146	90	93	133	220	81	130
Before MGNREGA (CGR %)	**-0.5**	**3.6**	**6.8**	**4.7**	**-0.5**	**4.7**	**-0.4**	**9.1**
After MGNREGA (CGR %)	**3.5**	**2.7**	**4.6**	**4.1**	**7.6**	**1.5**	**8.0**	**4.0**

** Triennium average (TE)*
Source: calculations from author's primary data

The average daily wage rates of male farm workers has grown sharply after MGNREGA at the rate of 3.5 percent in Telangana and 7.6 percent in Maharashtra compared to almost negative growth rate before MGNREGA. This indicates the possible second round effect of MGNREGA on rising wages of male farm labor, thereby creating shortage of male labor for farm work. MGNREGA provides an alternative source of income for the farm workers. Therefore, since a large section of the rural workforce is serving for MGNREGA works which are assumed less stringent for them, creating shortage of labor for farm work. This creates a secondary effect through increasing the bargaining power of the existing farm labor resulting in increasing farm wage to retain the male workforce. But MGNREGA cannot be the sole responsible of this observed wage increase. Beside farm wage, nonfarm wage of male labor has also increased by 2.7 percent in Telangana and at 1.5 percent inMaharashtra . So nonfarm work is also getting attractive for the farm workers gradually. There is growing evidence of daily commuting rural

labor for work in urban areas with improved road connectivity, especially by male workers for relatively higher wage work.

Besides male labor, wage rates of female farm workers has grown sharply after MGNREGA implementation to the tune of 8 percent in Maharashtra and 4.6 percent in Telangana ,thereby strengthening feminization of labor in farm work. Thus, the slow growth of farm real wage was changed after MGNREGA. Basically there is a problem of endogeniety in isolating the impact of MGNREGA on farm and rural wages. Impact of MGNREGA on farm and rural wage often coincides with the spillover effects from economic growth, urbanization, nonfarm rural growth, rural nonfarm employment, increased literacy, introduction of minimum wage act on agricultural income and agricultural wage.

TABLE 3: Comparison of Ratio of change on wage of MGNREGA with Farm and Nonfarm Nominal Wages in Telangana and Maharashtra, TE 2006 to TE 2012

Telangana					
	Male		Female		MGNREGA
	Farm	Non-Farm	Farm	Non-Farm	
TE 2006	54	74	36	38	80
TE 2012	156	179	109	120	137
Ratio of change	**2.86**	**2.43**	**3.03**	**3.16**	**1.71**
Maharashtra					
	Male		Female		MGNREGA
	Farm	Non-Farm	Farm	Non-Farm	
TE 2006	56	97	31	54	47
TE 2012	164	278	99	158	145
Ratio of change	**2.92**	**2.87**	**3.18**	**2.91**	**3.09**

Source: NGRGA wage figure: http://nrega.nic.in/nerega_statewise.pdf,
Farm& nonfarm wage: calculations from author's primary data

This consequence is again confirmed by table 3. Both the farm and nonfarm wage has increased by almost 3 times during the period of MGNREGA implementation in Telangana, whereas MGNREGA wage has increased only by 1.71 times. Thus, MGNREGA is not the sole reason that can be blamed for migrating labor from farm work. It may be the expansion of opportunity to work in nonfarm sector or

rapid growth of urbanization that actually pulling out laborers from farm sector. In Maharashtra laborer seems to be indifferent to work in farm or nonfarm or MGNREGA work as indicated by wages.

Broadly three types of wages viz farm wage, nonfarm wage and MGNREGA are taken as driving force in rural sector in this present study. It is also interesting to analyze which sector's wage has a stronger effect over time. Figure 5 and 6 as well as 7 and 8 tried to make an understanding of dynamics of farm work.

Linkage of NREGA wage with Sectoral wage:

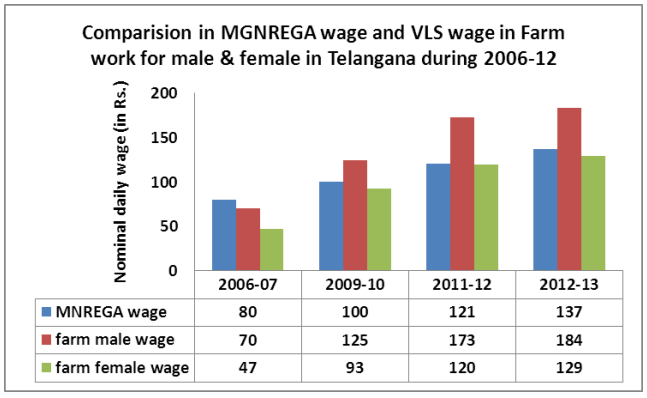

Figure 5: Comparision in MGNREGA wage and nominal daily wage in Farm work for male & female in Telangana during 2006-12.

Source: NGRGA wage figurehttp://nrega.nic.in/nerega_statewise.pdf, farm& nonfarm wage-calculations from author's primary data

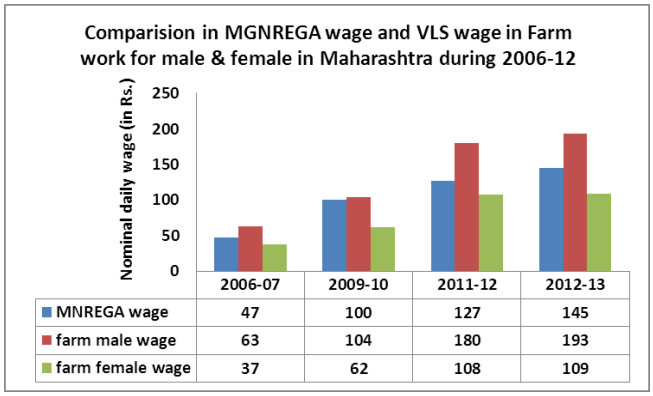

Figure 6: Comparisons in MGNREGA wage and nominal daily wage in Farm work for male & female in Maharashtra during 2006-12.

Source: Same as for figure 5

Since MGNREGA work is based on equal remuneration principle, it remains invariant across gender. In both the states farm wage of male is higher than MGNREGA wage (figure 5 and 6). From this finding it is evident that even if there is a scarcity of labor or in other words, even if male laborers are getting higher wage in farm work but they are going for MGNREGA work. May be it is due to the nature or easiness of MGNREGA work. On the contrary, farm wages received by female laborers are not only lower than their

male counterpart but also substantially lower than MGNREGA wages in both the states. This is matter of serious concern for policy addressing gender equity.

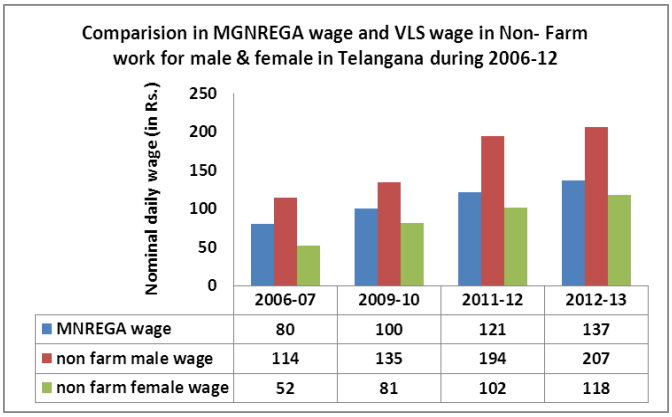

*Figure 7: Comparison of MGNREGA wage and Non- Farm wage for male & female in **Telangana** during 2006-12*

Source:same as for table 5

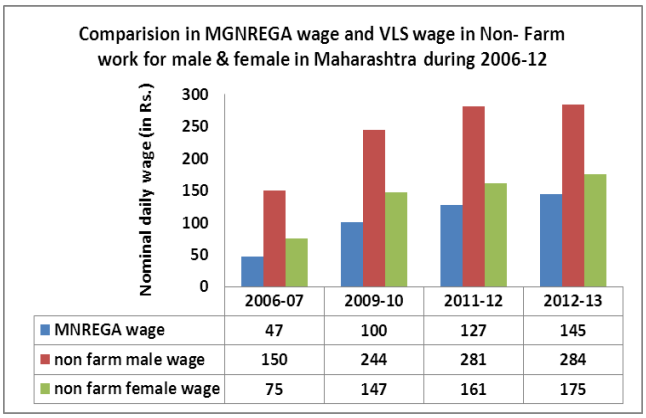

*Figure 8: Comparisons of MGNREGA wage with Non-Farm wage work for male & female in **Maharashtra** during 2006-12*

Source: Same as for table 5

In non-farm sector, female wages are lower compared to male workers in both the states (figures 7 and 8). However, non-farm female wages are lower than MGNREGA wages in Telangana while the same is higher in Maharashtra indicating possibility of stronger industrial policy and industrial development in Maharashtra compared to Telangana.

These figures clearly show that female workers especially aged in Telangana either concentrate in farm work, thereby create feminization in agriculture or going for MGNREGA work. Nonfarm work is not so remunerative for them as compared to male workers in Telangana. This declining labor usage in agriculture and corresponding increase in wage may have a reflection on farm productivity, labour absorption and use of machinery in farm operations.

Impact of MGNREGA on labour and machinery use and its implications on farm productivity

Labour forms a crucial input in the production of crops and livestock products, occupying a significant proportion of total cost of production. One of the serious criticisms of MGNREGA is that there has been increasing labour scarcity leading to higher wage rates and non-availability of hired labour to perform critical farm operations (Gulati et al 2013). In this regard, the labour and machinery power used along with productivity of principal crops before and after MGNREGA in the study villages is examined in both

kharif (rainy) and rabi (winter) seasons (Table 4 and table 5). In Dokur and Aurpalle villages of Telangana, paddy and cotton are the main food and cash crops grown by the majority of the farmers. Paddy is highly labour intensive crop compare to cotton hence labour shortage may lead to decrease in area. As evident from the table 4, the labour use per ha of paddy has drastically reduced after MGNREGA to the extent of 20- 30% in both the villages reflecting the shortage of farm labour. The mechanical power used is almost doubled in case of paddy before and after MGNREGA. These results were in conformity with the results obtained by Reddy, A. (2014) indicating farm mechanisation. But in the case of cotton, there is no significant change in labour and machinery used before and after MGNREGA, as cotton is not that labour intensive compare to paddy. Interestingly, it was observed that in spite of reduction in labour absorption, the productivity of paddy has increased after MGNREGA. This could be due to intensive use of other inputs to substitute the shortage of labour. Also, in order to absorb the wage hike, farmers try to augment productivity. The farm mechanization in Telangana is more prominent in Rabi season which is the peak season in farm work as well as MGNREGA works.

In Maharashtra villages the situation is different from that of Telangana villages. The major crops cultivated include pigeon pea, rabi sorghum, wheat, soybean and maize. As evident from the table 5, there has been drop in the labour use after MGNREGA for majority of the crops, though productivity of most of the crops showing an increasing trend except Pigeonpea in Kalman and rabi Sorghum in Shirapur On the contrary, barring maize and wheat, farm mechanization is not widely adopted for most of the crops because of soil conditions. For instance, pigeon pea, a long duration crop is highly labour intensive but use of mechanization is not reflected for this crop despite steep drop in labour use. As a result, the productivity has hampered (table 5). In Kanzara, farmers are adopting relatively higher usage of machinery in Rabi season compared to kharif season. In Kanzara, the major crops are soybean in kharif and wheat in Rabi and in both the scenario scarcity of labor is prominent. In Shirapur village, farm mechanization is widely adopted as this village is comparatively better-off than the others.

TABLE 4: Trends in Productivity, Labor and Machinery use before and after MGNREGA Implementation in Aurepalle and Dokur Villages of Telangana

Villages	Crop/Season		Yield (kg)/ ha	Man days/ ha	Mach. Hr./ha
Aurepalle	Paddy (Kharif)	**Before MGNREGA**	3151	237	3
		After MGNREGA	4463	163	10
		% of change	**42**	**-31**	**233**
	Paddy (Rabi)	**Before MGNREGA**	2992	225	3
		After MGNREGA	4860	178	10
		% of change	**62**	**-21**	**233**
	Cotton (Kharif)	**Before MGNREGA**	754	126	4
		After MGNREGA	1092	124	5
		% of change	**45**	**-2**	**25**
Dokur	Paddy (Kharif)	**Before MGNREGA**	3002	180	8
		After MGNREGA	4112	131	10
		% of change	**37**	**-27**	**24**
	Paddy (Rabi)	**Before MGNREGA**	3193	175	6
		After MGNREGA	4915	121	11
		% of change	**54**	**-31**	**83**
	Cotton (Kharif)	**Before MGNREGA**	440	109	4.2
		After MGNREGA	474	104	3.7
		% of change	**8**	**-5**	**-12**

Source: calculations from author's primary data

TABLE 5: Trends in Productivity, Labor and Machinery use before and after MGNREGA Implementation in Kalman, Kanzra, Kinkhed and Shirapur Villages of Maharashtra

Village	Crop/Season		Yield (kg)/ ha	Man days/ ha	Mach. Hr./ha
Kalman	Pigeon pea (Kharif)	**Before MGNREGA**	425	30	0.7
		After MGNREGA	284	20	1.0
		% of change	**-33**	**-33**	**33**
	Sorghum (Rabi)	**Before MGNREGA**	462	30	1.5
		After MGNREGA	455	27	1.2
		% of change	**-2**	**-8**	**-16**
Kanzara	Soybean(Kharif)	**Before MGNREGA**	618	49	5.9
		After MGNREGA	1421	35	7.4
		% of change	**130**	**-30**	**25**
	Wheat (Rabi)	**Before MGNREGA**	1465	57	6.9
		After MGNREGA	2550	35	11.6
		% of change	**74**	**-39**	**68**
Kinkhed	Soybean (Kharif)	**Before MGNREGA**	531	67	7.7
		After MGNREGA	1171	40	9.6
		% of change	**120**	**-41**	**26**
Shirapur	Maize (Kharif)	**Before MGNREGA**	959	57	2.0
		After MGNREGA	1339	54	6.7
		% of change	**40**	**-4**	**238**
	Sorghum (Rabi)	**Before MGNREGA**	556	27	8.9
		After MGNREGA	393	25	3.0
		% of change	**-29**	**-9**	**-67**

Source: calculations from author's primary data

Season wise labor usage pattern in farm work

Paddy cultivation is highly labor intensive involving both male and female labor for different operations. The human labor employment in paddy cultivation is exhibiting a steady declining trend over the period (table 6). Male labour use per ha in Aurepalle village of Telangana has declined by 30 to 50 percent, while the decline in female labor use is negligible in both the seasons after MGNREGA. The wage rate of male work force for farm work exhibited increasing trend and thereby creating shortage of male labor in farm work. The rapid social and economic transformations in erstwhile Telangana accelerated the process of labor migration from agriculture to other sectors. Whereas increasing growth in female farm wage and reduced growth in nonfarm wage for female workforce (mainly the aged) compelling them to stay on farm activity. This can again be confirmed by the ratio of female to male labor force participation

which has increased after MGNREGA in some major crops in Telangana, thereby confirming the feminization of labor in agriculture. Earlier there were 130 female against 100 male in Kharif paddy cultivation in Aurepalle village. After MGNREGA implementation there are 190 female against 100 male. Therefore concentration of women in farming has increased by 53 percent after MGNREGA. At the same time scarcity of labor is reflected by reduced participation of family and hired labor for farm work. But with the adoption of farm mechanization, demand for hired labor has reduced by higher percentage compared to family labor. There is sharp reduction in demand for hired labor by 30 to 45 percent as compared to 10 to 20 percent decline in family labor in Telangana villages.

TABLE 6: Season wise composition of Male, Female, Family and Hired Labours use per Ha. in Aurepalle & Dokur Villages of Telangana during Year 2003-05 and 2009-11

Village	Crop/Season		Man days /ha	Mandays/Ha.		Female/Male ratio	Mandays/Ha.	
				Male	Female		Family	Hired
Aurepalle	Paddy (Kharif)	**Before MNREGA**	237	104	133	1.3	102	135
		After MNREGA	163	55	108	1.9	75	88
		% of change	**-31**	**-47**	-19	**53**	-26	**-35**
	Paddy (Rabi)	**Before MNREGA**	225	95	131	1.4	97	128
		After MNREGA	178	55	123	2.2	89	89
		% of change	**-21**	**-42**	-6	**61**	-8	**-31**
	Cotton (Kharif)	**Before MNREGA**	124	40	84	2.1	63	61
		After MNREGA	126	50	76	1.5	67	59
		% of change	**2**	27	-10	**-29**	6	-3
Dokur	Paddy (Kharif)	**Before MNREGA**	180	70	110	1.6	61	119
		After MNREGA	131	46	85	1.9	59	72
		% of change	**-27**	**-35**	-22	**19**	-4	**-39**
	Paddy (Rabi)	**Before MNREGA**	175	79	96	1.2	67	109
		After MNREGA	121	52	69	1.3	61	61
		% of change	**-31**	**-34**	-28	**8**	-9	**-44**
	Cotton (Kharif)	**Before MNREGA**	104	31	73	2.3	46	58
		After MNREGA	109	26	83	3.2	45	64
		% of change	**5**	**-16**	14	**36**	-2	10

Source: calculations from author's primary data

TABLE 7: Season wise Composition of Male and Female and Family and Hired Labour use per Ha. in Kalman, Kanzra, Kinkhed and Shirapur Villages of Maharshtra during Year 2003-05 and 2009-11

Village	Crop/Season		Man days /ha	Man days /ha		Female/Male ratio	Man days /ha	
				Male	Female		Family	Hired
Kalman	Pigeonpea (Kharif)	**Before MNREGA**	30	17	13	0.8	15	15
		After MNREGA	20	14	6	0.4	12	8
		% of change	**-33**	-15	-56	**-48**	-21	-45
	Sorghum (Rabi)	**Before MNREGA**	30	19	11	0.6	19	11
		After MNREGA	27	19	8	0.4	17	10
		% of change	**-10**	0	-28	**-27**	-9	**-12**
Kanzara	Soybean (Kharif)	**Before MNREGA**	49	25	25	1.0	12	37
		After MNREGA	35	24	11	0.4	11	24
		% of change	**-29**	-1	-56	**-55**	-9	**-35**
	Wheat (Rabi)	**Before MNREGA**	57	37	20	0.5	37	20
		After MNREGA	35	29	6	0.2	23	12
		% of change	**-39**	-21	-72	**-65**	-38	-40
Kinkhed	Soybean (Kharif)	**Before MNREGA**	67	29	38	1.3	27	40
		After MNREGA	40	24	16	0.7	14	26
		% of change	**-40**	-19	**-57**	**-48**	-49	-35
Shirapur	Maize (Kharif)	**Before MNREGA**	57	22	35	1.6	24	33
		After MNREGA	54	25	29	1.1	19	35
		% of change	**-5**	17	-19	**-31**	-19	3
	Sorghum (Rabi)	**Before MNREGA**	27	16	11	0.7	12	15
		After MNREGA	25	12	13	1.1	11	14
		% of change	**-7**	-23	15	**50**	-10	-7

Source: calculations from author's primary data

In Maharashtra villages the situation is different from that of Telangana villages. Here the decline in man-days for most of the crops is mainly due to withdrawal of female work force except Sorghum in Shirapur. The explanation for the decline of rural female participation is partly the increasing enrollment of girls in education, partly the increase in the real wages of rural male workers which result in improved

household income that facilitates withdrawal of women from income-earning activities or it may be the employment opportunities created in rural nonfarm sectors. Earlier figure 6 and 8 confirm that the nonfarm wage (Rs. 179) of female worker in Maharashtra is not only higher than the farm wage (Rs. 109), but considerably higher than the MGNREGA wage (Rs. 145) , indicating possibility of stronger industrial policy and industrial development in Maharashtra. Therefore, MGNREGA cannot be blamed as the sole reason for migrating labor from farm work, it may be the expansion of opportunity to work in nonfarm sector or rapid growth of urbanization that actually pulling out laborers from farm sector.

Changes in cropping pattern before and after MGNREGA:

Table 8 depicts changes in area of major crops between two periods. In Aurepalle, paddy is dominant in Rabi season and cotton in Kharif season. Total area of cultivation under paddy has declined by 30-40 percent in this village after MGNREGA implementation. This decline in area of Paddy cultivation can be attributed to scarcity of farm labor mainly male workers in Aurepalle village. On contrary, area under cotton has declined only by 4 percentage point. This is mainly due to commercial importance of the crop as well as cotton requires less labor comparing to paddy. In Dokur, paddy, cotton and castor are dominant food and commercial crops. It is a paradox to note that despite the labour intensive nature of the crop, area under paddy has increased by 132 percent under kharif and 13 percent under rabi season in Dokur village. This could be due to assured groundwater irrigation and free electricity to pump groundwater, ease of mechanization, assured Minimum Support Price and access to markets ensures remunerative returns to paddy.

Table 8: Changes in Area (in Hectare) of Major Crops in Study Village's before (2003-05) and after (2009-2011) MGNREGA Implementation

Village	Season	Crop	Before MGNREGA (2003-05)	After MGNREGA (2009-11)	% of change
Aurepalle	Kharif	Paddy	11.7	8.3	-29
		Cotton	59.3	56.9	-4
	Rabi	Paddy	15.0	9.1	-39
Dokur	Kharif	Paddy	11.5	26.6	132
		Cotton	2.8	3.3	18
		Castor	21.0	2.5	-88
	Rabi	Paddy	14.2	16.0	13
Kalman	Kharif	Pigeonpea	23.6	88.2	273
		Maize	5.0	7.4	49
		Onion	2.7	26.6	876
	Rabi	Sorghum	96.4	57.5	-40
Kanzara	Kharif	Soybean	4.2	21.2	403
		Cotton	18.1	10.6	-41
		Sorghum	9.9	3.7	-63
	Rabi	Wheat	13.0	24.4	88
		Chickpea	1.8	4.1	127
Kinkhed	Kharif	Soybean	2.1	14.4	587
		Cotton	4.3	2.6	-40
		Sorghum	3.7	2.0	-47
Shirapur	Kharif	Maize	9.7	2.0	-79
	Rabi	Sorghum	70.6	35.3	-50
		Wheat	3.6	5.0	39

Source: ICRISAT, VDSA data;
Note: Figures in parentheses are area share of major common crops out of total cropping area (in percentage)

In Maharashtra, labour scarcity induced changes in cropping pattern are evident (table 8). There has been steep drop in the area under cultivation for crops like rabi sorghum, maize and cotton which are highly labour intensive. This has serious implication on regional food security especially rabi sorghum, which is a staple food crop of the region. At that time area under commercial crops like Soybean is taking place predominantly. It clearly shows that Maharashtra villages are much progressive in terms of changing cropping pattern. Further, in Kalman and Shirapur villages' area under perennial crops increased as evident from the table-9.

Table 9: Area (in ha) under Perennial cultivation

	Before MGNREGA (2003-05)	After MGNREGA (2009-11)	Sign of change
Aurepalle	0	2.02	↑
Dokur	-	-	-
Kalman	1.62	2.83	↑
Kanzara	-	-	-
Kinkhed	0	0.81	↑
Shirapur	0.81	1.21	↑

Source: calculations from author's primary data

Changes in Production Cost before and after MGNREGA:

In order to examine the impact of wage increase on cost of production, share of labor cost out of total production cost is computed. The proportion of labour cost, out of the total cost gives an indication of increased wage rate due to scarcity of labour. As evident from the table, the proportion of labour cost increased phenomenally for the crops like cotton, paddy, sorghum, pigeon pea, maize and wheat. The labour cost formed the significant proportion (50-60 %) of total cost of production and it is surpassing the material input cost for most of the crops grown in the region. The implication is that the increase in labour cost pushes the total cost of production and thus losing the competitiveness of producing food crops, which is similar to the study by Reddy, D.N. Reddy *et al.,* (2014). This may lead to increase in food prices locally affecting the regional food security.

Table 10: Cost of production per hectare and share of Labor Cost out of total production cost before after MGNREGA implementation

Village	Season	Crop	Cost of production (Rs. /Ha.)			Share of Labor Cost out of total production cost (in %)		
			before MGNREGA	After MGNREGA	% of change	before MGNREGA	after MGNREGA	Increase in Labor Cost (in %)
Aurepalle	Kharif	Paddy	19673	43456	121	53	63	10
		Cotton	13162	38015	189	30	52	22
	Rabi	Paddy	17531	47597	172	52	67	15
Dokur	Kharif	Paddy	17597	33241	89	40	53	13
		Cotton	9992	26133	162	36	66	30
	Rabi	Paddy	17479	31485	80	45	52	7
Kalman	Kharif	Pigeonpea	3743	11418	205	62	80	18
	Rabi	Sorghum	3190	13417	321	55	82	27
Kanzara	Kharif	Soybean	5746	13979	143	29	43	14
	Rabi	Wheat	9422	14601	55	31	35	4
Kinkhed	Kharif	Soybean	5998	14163	136	36	44	8
Shirapur	Kharif	Maize	6142	16913	175	51	78	27
	Rabi	Sorghum	3467	12944	273	52	88	36

Note: Cost of Production Includes Total labor cost (human + bullock labor), Total Material Cost and Other Production Cost
Source: Author's calculation

Trends in Farm and Non Farm Income before and after MGNREGA:

Rural labors are engaged in multiple occupations. Most of the small and marginal farmers participate in both farm and non-farm wage work. The trends in farm and non farm income give an indication that due to labour scarcity whether there has been substantial shift in income from farm to non-farm. The table 11 indicates that there has been increasing trend of income for both non-farm and farm after MGNREGA. However, in some villages like Dokur, Kalman, Kinkhed and Shirapur the farm income

outpaced non-farm income. This is mainly because adoption of improved technologies coupled with assured irrigation.

TABLE 11: Per Capita Farm Income and Non-Farm Income (Net Real Income in Rs.) Before MGNREGA (2003-05) and After MGNREGA (2009-11)

	Telangana				Maharashtra							
	Aurepalle		Dokur		Kalman		Kinkhed		Kanzara		Shirapur	
	Farm	Non farm	Farm	Non farm	Farm	Non farm	Farm	Non farm	Farm	Non farm	Farm	Non farm
Before MGNREGA	8686	7752	4712	6932	5273	8109	9983	4869	8634	4526	7983	7150
After MGNREGA	15393	16628	15273	14724	10182	14328	20176	7001	11342	8289	26812	15781
% change	**77**	**114**	**224**	**112**	**93**	**77**	**102**	**44**	**31**	**83**	**236**	**121**

Note: Farm income includes crop income, farm labor income, and livestock income. Nonfarm income of the household includes Salaried Job, Caste Occupation, Business, Income from common property Resources (CPR), Income from other non-farm sources, Rental Income, Gifts and Remittances.

Landless labor, small & marginal farmers depend on multiple sources of income. Figure 9 shows that the situation of labor class is improving. Their wage income has increased after MGNREGA implementation indicating inclusive growth. In Kalman and Shirapur this increase is more than double. Their dependence on non-farm sources of income is like to be greater than all other farm size- or in other words, - *Smaller the farm size greater is the non-farm sources of income.*

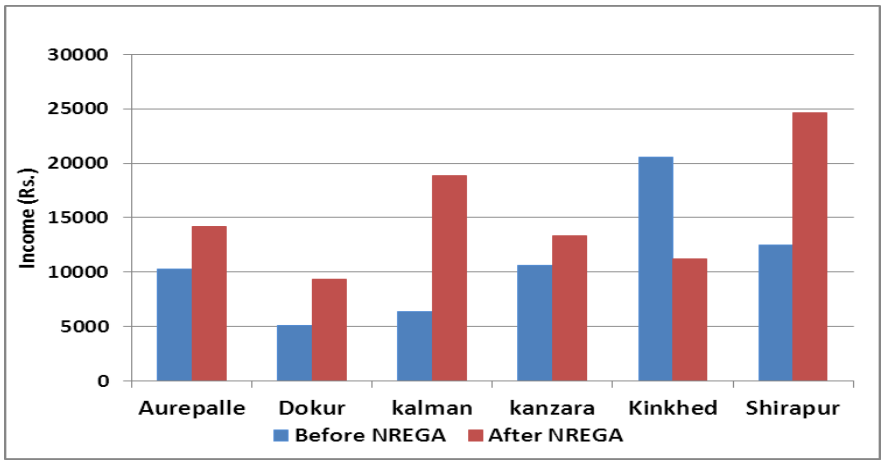

Figure 9: Farm labor income of labor class

Provision of food security through PDS and backward bending labour supply

The provision of food security through PDS reinforces the backward bending supply of labour already manifested due to the hike in non-farm wages. Due to this, many men and women tend to be complacent since their food requirements of the entire month are met with wage income of one or two days. Table 12 showing average amount of benefits received by the beneficiary households from Public Distribution System (rice, wheat, etc.). PDS is well functioning in Telangana. Benefits have increased across all farm sizes. Among them, labor class derived the maximum benefits. In Aurepalle benefit received by labor class has increased by 112 percent compared to 85 percent of large farm and in Dokur it is 90 percent compared to 63 percent of large farm. The situation is opposite in Maharashtra where benefit received from PDS has reduced for all class of farm size. Among them labor class is the most neglected one. Benefit received has reduced by 54 percent in Kalman, 32 percent in Kinkhed and 11 percent in Kanzara except Shirapur.

Table 12: Average annual Benefits Received per Beneficiary Household from Public Distribution System (Rice, Wheat etc.) (Rs. in real 2009-10 eqiuvalent)

Villages		Large	Medium	Small	Labour	All
Aurepalle	Before NREGA	1096	1164	1349	1056	1153
	After NREGA	2029	2208	2443	2234	2200
	% change	**85**	**90**	**81**	**112**	**91**
Dokur	Before NREGA	1268	1376	1311	1320	1297
	After NREGA	2071	1908	2410	2506	2165
	% change	**63**	**39**	**84**	**90**	**67**
kalman	Before NREGA	2244	2206	2029	2197	2110
	After NREGA	1816	1296	1444	1008	1376
	% change	**-19**	**-41**	**-29**	**-54**	**-35**
Kanzara	Before NREGA	507	1922	2046	1675	1822
	After NREGA	848	1333	1753	1485	1434
	% change	**67**	**-31**	**-14**	**-11**	**-21**
Kinkhed	Before NREGA	1511	1314	1746	1734	1642
	After NREGA	1269	1665	2816	1173	2164
	% change	**-16**	**27**	**61**	**-32**	**32**
Shirapur	Before NREGA	1807	2273	2122	2284	2163
	After NREGA	2086	1216	1679	2721	1792
	% change	**15**	**-46**	**-21**	**19**	**-17**

Source: calculations from author's primary data
Note: This benefit is calculated by taking the differences in values of PDS commodities and the market value of those commodities.

Conclusions and policy suggestions:

At the village level, real wages both for farm and nonfarm works exhibited upward trend especially after implementation of MGNREGA. Apparently, rise in real wage of non-farm sector has outpaced the farm wage resulting shift in labour force from agriculture to non-agriculture in search of income earning opportunities in general and for men in particular. As usual, the wages for female labor are lower than wage for male labor both on farm and off farm in general, but when agriculture and rural wages are considered, the gap is significant even in the presence of the uniform MGNREGA wage for men and women. The perpetual phenomenon of gender wage inequality in rural labor market is continuing over the period (2001-2012). It has increased 2006 onwards with higher gender wage gap in nonfarm work as compared to farm work. Thus, as MGNREGA wage is invariant with men or women labor, women laborers are the takers for MGNREGA wage rate moving towards feminization in agriculture. The average daily wage rates of male farm workers has grown sharply after MGNREGA in both states compared to almost negative growth rate of before MGNREGA. Beside farm wage, there is significant growth of non-farm wage of male labor.. Both the farm and nonfarm wage has increased by almost 3 times during the period of NREGA implementation in some area, whereas MGNREGA wage has increased only by half of it. The shortage male labor for farm work is getting more prominent, whereas relatively higher i participation of female labor in some major crop confirms the feminization of labor.

There is a wider gap in wage rates between rural and urban sectors and employment opportunities in the agricultural and non-agricultural sectors. In non-farm sector, female wages are lower than male workers in both the states. However, non-farm female wages are lower than MGNREGA wages in Telangana while the same is higher in Maharashtra. Shift in cropped area from labor intensive to less

labor intensive crops is not uncommon in rural areas. There has been steep drop in the area under cultivation for crops like rabi paddy, rabi sorghum, maize and cotton which are highly labour intensive. The proportion of labour cost formed a significant proportion of the total cost and increased phenomenally for the crops like cotton, paddy, sorghum, pigeon pea, maize and wheat. However, there has been a steady decline in labor use over time in paddy, soybean and pigeon pea. Despite shortage of labour, the productivity of some of the crops is showing an increasing trend in the study villages. The proportion of hired labor has reduced much faster rate than the family labor. The wage income has increased after MGNREGA, thus MGNREGA programme is complementing the rural wage incomes of the needy leading to inclusive growth. The scarcity of labour is turned out to be more complex issue in agriculture and is largely due to higher non-farm wage. This has also contributed rural-urban temporary migration, especially by male workers to relatively higher wage work with improved road connectivity.

Policy interventions to address labour scarcity inter alia are:

- Address the tightening labour market through technological development such as developing short duration – labor saving improved cultivars amenable to mechanization along with custom hiring facility for farm machineries;
- Encourage innovations in designing appropriate location specific machineries and tools which are female friendly;
- Promotion of farm mechanization in an inclusive manner;
- Creation of employment opportunities for first stage processing of agricultural products for the educated youth and women through skill enhancement;
- Integration of farm and non-farm activities in rural areas through facilitation of producer companies;
- Capacity building programmes for skill augmentation in rural India especially female in order to enhance their skills, suiting to future need in agriculture and non-farm sector in rural area;Modernize existing institutions to create “knowledge centers” which will upgrade the skills of labor class for their productive employment;
- Accelerating farm profitability is the pre-condition for raising wage rate in farm sector;

- Training farmers in productivity augmentation and cost reducing technologies;
- Enhancement of labor productivity through training on knowledge intensive technologies, agricultural machineries and seed production techniques;
- Adoption of ICT driven institutional changes in agriculture;
- Need strong policy support towards infrastructure, transport, storage, credit and market to account non-farm diversification;
- Need to revise the time frame of MGNREGA work. It must create more employment in the lean season.

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