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

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I. 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 of at least 100 days per household annually. Many studies have indicated that MGNREGA has positive impact on agriculture and livelihoods of small, marginal and landless households in rural areas. However, one of the severe criticisms is that it has negative impact on agriculture in terms of creating labor scarcity during peak season. This is because of diversion of rural farm labor to MGNREGA works as wage rates for MGNREGA are higher than the prevailing farm wages. The limited labor supply to farm work is also due to the labor preference for works in MGNREGA over other works, owing to its less toil, less supervision and provision of other facilities (Thadathil and Mohandas, 2012). The tight labor 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 labor scarcity associated with MGNREGA and other factors along with increased rural wage impacting agricultural production and the profitability of small farms is an issue for development practitioners and policy makers. This study attempts to assess the impacts of MGNREGA, on labor scarcity, wages, cost of production, linkages among wage rates in MGNREGA, agriculture and non-agriculture employment and

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their implications on agriculture sector based on field insights from Village Dynamic Studies in South Asia (VDSA) villages of Semi-Arid Tropics (SAT) of India. The overarching objective of this study is to evaluate the impact of MGNREGA on agricultural labor market and its implications on, wages, cost of production, farm productivity and profitability.

II. Data & Methodology:

The data used in this paper were obtained from Village Level Studies (VLS) database generated by ICRISAT on six villages for which forty years longitudinal data is available. However, for comparative analysis, the study used the data pertaining to two periods of 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 Mahbubnagar District of Telangana and Kalman and Shirapur (Solapur District), Kanzara and Kinkhed, (Akola District) from Maharashtra. The data were collected by the resident Field Investigators through personal interview with the households located in each village by using standard questionnaire of Employment Schedule (labor, draft animal and major machinery utilization schedule) and Cultivation Schedule (Plot cultivation schedule) of VLS in South Asia commonly called as Village Dynamics in South Asia. The questionnaire, data collection methods and the data are 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. 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 and 2012 respectively.

III. Results:

3.1. 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, to assess the changes in relative wages, the trend in real wages has been analyzed before and after MGNREGA implementation in Telangana and Maharashtra. 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.

The real wage rates of all categories of farm and non-farm work have exhibited an increasing trend throughout the period under study as evident from the figure 1, 2, 3 & 4.

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

	Telangana						Maharashtra					
	Farm Work			Non-Farm Work			Farm Work			Non-Farm Work		
	Men	Women	wage differential	Men	Women	wage differential	Men	Women	absolute wage gap	Men	Women	e wage differential
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
(CGR in %)	**4.8**	**9.8**	**-15**	**5.8**	**8.4**	**3.3**	**5.6**	**6**	**5.1**	**8.1**	**10.8**	**5.3**

Source: calculations from VDSA data

In the study villages of Telangana, the farm wage rate for men labor increased from Rs.83 per day to Rs. 140 per day an increase of 4.8 % per annum during 2001- 2012. Similarly for female, the farm wage has increased from Rs 35 to Rs. 95 per day during the same period a sharp increase of 9.8 % per annum (Table 1). This has led to reduction in the gender wage gap by 15 percent during the period in Telangana villages, while in all other places this has widened. The non-farm real wage rate for men experienced a steep increase from Rs. 84 to Rs.157 per day, recording a growth rate of 5.8 % per annum as against Rs.37 to Rs.90 per day a phenomenal increase of 8.4% per annum for women working in non-farm activities (Table-1). Similar trend is evident in Maharashtra as well (figure 3 and 4). However, the non-farm wage rate for women in Maharashtra increased faster as compared to female farm wage rate. Though the % change in wage for the period is higher for women than men, but the perpetual phenomenon of gender wage gap. in rural labor market is continuing over the period (2001-2012). It has increased after 2006 onwards with higher gender wage gap in nonfarm work as compared to farm work.

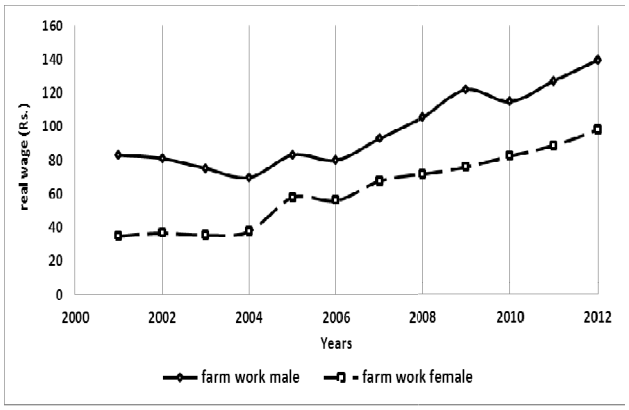

Figure 1: Trends in Real wage per person day across gender in Telangana for Farm work (2001-2012)
Source: Computed from VDSA data

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

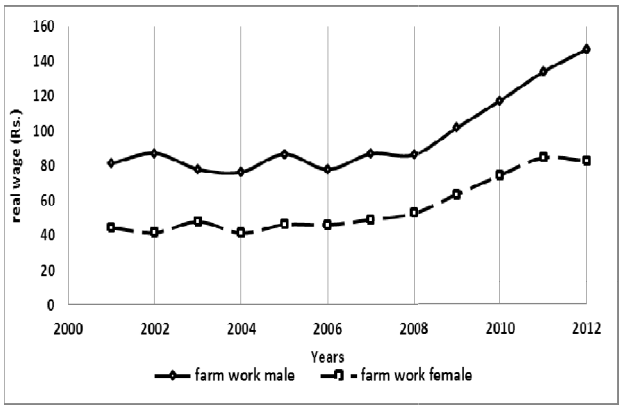

Figure 3: Trends in Real wage per person day across gender in Maharashtra for Farm work (2001-2012)
Source: Same as for figure 1

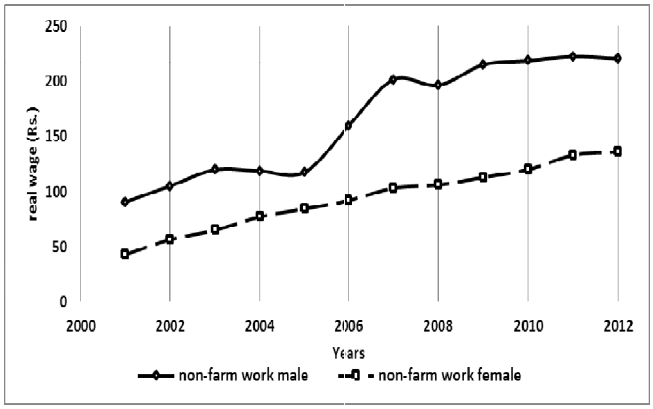

Figure 4: Trends in Real wage per person day across gender in Maharashtra for Non-Farm work (2001-2012)
Source: Same as for figure 1

The gender wage gap in farm wage 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 has moved upwards especially after implementation of MGNREGA. This has serious implication on agricultural sector in terms of rising the labour cost, as well as cost of production leading to shrinkage in net margins realized by the farmers.

3.2. Wage gap for male and female

In order to examine the extent of wage gap for men and women between farm and nonfarm work 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

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: Computed from VDSA data

The average daily wage rate 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 effect of MGNREGA on rising wages of male farm labor, thereby creating shortage of male labor for farm work. In rural areas, MGNREGA is an alternative option in terms of employment guarantee to the rural workers who are willing to work. Since, there is no strict monitoring and supervision on the work sites, a large section of the rural workforce especially male has been drifted from farm work to MGNREGA works causing shortage of labor for farm works. 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 in Maharashtra. So nonfarm work is also getting attractive for the farm workers gradually. Many studies also indicated that the scarcity of labour in agriculture is largely due to the higher hikes in non-farm wages offered especially by the mining and construction sectors. (Murthy and Indumati 2014). Construction activities do not require high skill, yet they are generally preferred over agricultural wage employment. Expansion of construction employment opportunities is likely to syphon labour out of the agricultural labour market, and thereby raise agricultural wage rates (Lanjouw and Sharieff 2007). 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. For instance, in 'Kurnool district of Andhra Pradesh members of some rural households commute to neighboring towns like Allagadda to work in shops and other establishments where the wages are high. Interestingly, they attend some work of MGNREGA at their villages in the forenoon, and commute in the afternoon to nearby towns to work in odd jobs including vegetable and fruit vending' (GoAP, 2011).

Table 3: Comparison of 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	97	137
Ratio	2.89	2.42	3.25	2.35	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	2.92	2.87	3.19	2.92	3.08

Sources: 1. MGNRGA wage figure: http://nrega.nic.in/nerega_statewise.pdf,
2. Farm& nonfarm wage: Computed from VDSA data

Besides male labor, wage rate of female farm workers has grown sharply after MGNREGA implementation to the tune of 8 percent in Maharashtra and 4.6 percent per annum in Telangana, thereby strengthening feminization of labor in farm work. Thus, the slow growth of farm real wage was changed after MGNREGA by breaking the long stagnation of rural wage rate. 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. 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 to nonfarm work. It may be the expansion of opportunities to work in nonfarm sector or rapid growth of urbanization that actually pulling out laborers from farm sector. In Maharashtra laborers seems to be indifferent to work on farm or nonfarm or MGNREGA work as indicated by wages.

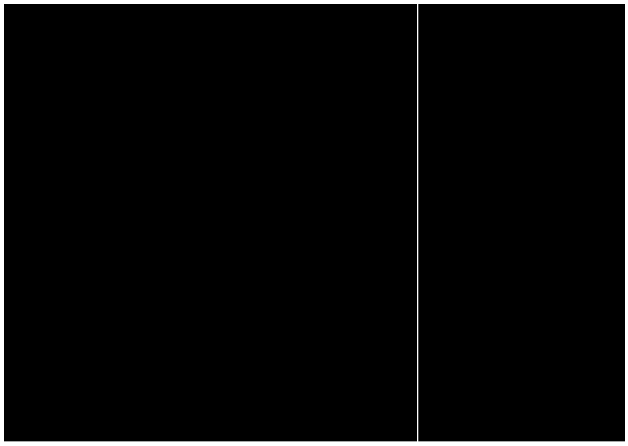

Figure 6: Comparisons of MGNREGA wage with nominal daily wage of farm work for male & female in Telangana during 2006-12
Sources: MGNGRGA wage figure http://nrega.nic.in/nerega_statewise.pdf, farm& nonfarm wage-Computed from VDSA data

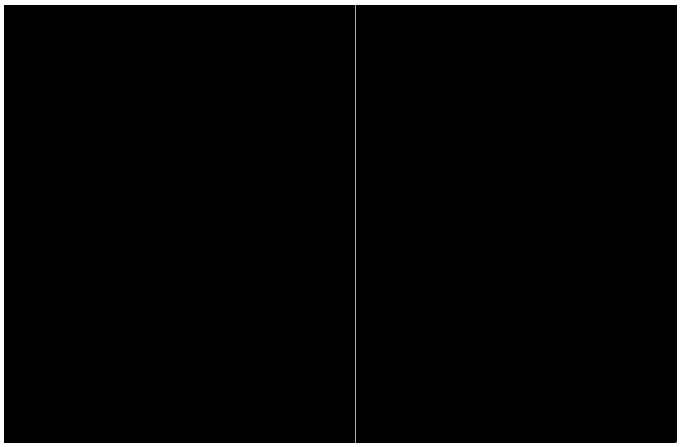

Figure 7: Comparisons of MGNREGA wage with nominal daily wage of farm work for male & female in Maharashtra during 2006-12

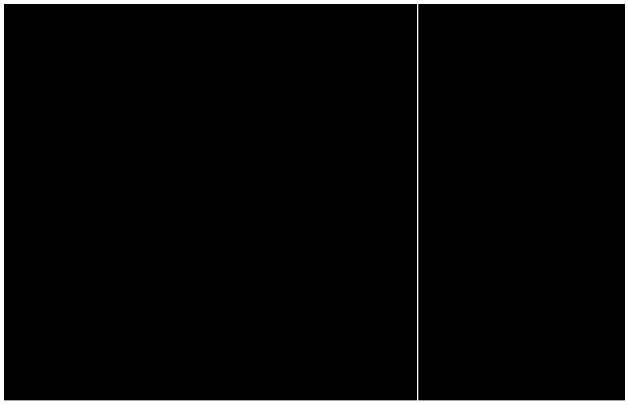

Figure 8: Comparisons of MGNREGA wage and Non- Farm wage for male & female in Telangana during 2006-12

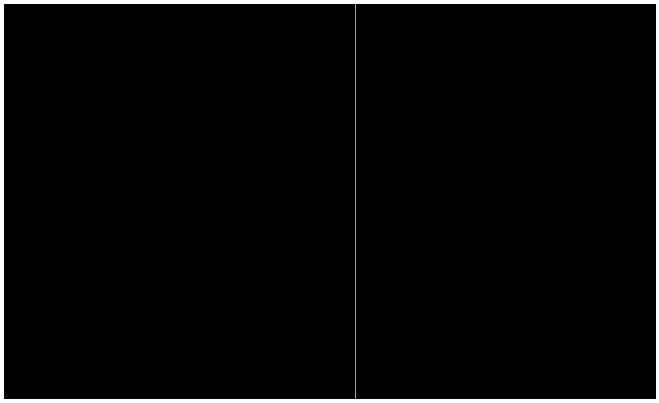

Figure 9: Comparisons of MGNREGA wage with Non- Farm wage work for male & female in Maharashtra during 2006-12

3.3. Linkage of NREGA wage with sectoral wage

Broadly three types of wages viz farm wage, nonfarm wage and MGNREGA and their linkages and effects are discussed in the foregoing section. 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 that of MGNREGA wage (figure 6 and 7).

One of the intriguing issue is that even though the MGNREGA wage rate is lower than farm wage, still male laborer are participating in MGNREGA work. This could be due to several factors like the nature of work or easiness of MGNREGA work, as the supervision and monitoring of work is relatively low. On the contrary, the farm wage received by female laborers are not only lower than male laborers but also substantially lower than MGNREGA wages in both the state's leading to serious concern for policy addressing gender inequity. In non-farm sector, female wages are lower compared to male workers in both the states (figures 8 and 9). However, non-farm female wages are lower than MGNREGA wages in Telangana while the same is higher in Maharashtra indicating possibility of more non-farm employment opportunities due to favorable industrial policy and industrial development in Maharashtra compared to Telangana.

3.4. Impact of MGNREGA on labor and machinery use and its implications on farm productivity

Labor forms a crucial input in the production of crops and livestock products accounting a significant proportion of total cost of production (http://www.icrisat.org/labor-scarcity-and-rising-wages-in-indian-agriculture/). One of the serious criticisms of MGNREGA is that there has been growing labor scarcity leading to higher wage rates and non-availability of hired labor to perform critical farm operations (Gulati, *et al*., 2013). In this regard, the labor 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). 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 a highly labor intensive crop compare to cotton hence labor shortage may lead to decrease in area. As evident from the table 4, the labor 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 labor. The machine hours used is almost doubled in case of paddy before and after MGNREGA. These results were in conformity with the results obtained by Reddy, *et al.* (2014) indicating increased farm mechanisation to compensate the labour shortage. But in the case of cotton, there is no significant change in labor and machine hours used before and after MGNREGA, as some of the operations in cotton like harvesting of kapas is not amenable for mechanization and it has to be done by manual labor. Due to mechanization, which lead to reduction in labor use, productivity of paddy increased by 40 to 60 percent after MGNREGA. This is due to intensive use of other inputs to substitute the shortage of labor. Also, in order to absorb the wage hike, farmers try to augment productivity by efficient use of resources. 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 a drop in the labor 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. This is due to lack of appropriate machines or binding soil constraints in the area. For instance,

pigeon pea, a long duration crop is highly labor intensive but use of mechanical power is not reflected for this crop despite steep drop in labour use (table 5). Since the rate of mechanization of irrigation was faster than mechanization of tillage, the overall effect of mechanization in terms of displacement of work animals was of low in Maharashtra (Shah, 2014). In Kanzara, farmers are adopting relatively higher usage of machine hours in post rainy (Rabi) season compared to kharif season. The major crops grown include 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 with comparatively better endowment than other villages. As discernible from tables 4 and 5 labor use for paddy has been falling after MGNREGA, while the use of machine power has been increasing. Though the use of human labor has declined, the productivity has not improved while it improved in majority of crops.

Table 4: Trends in Productivity, Labor Usage Pattern, Cropping Pattern and Machinery Use Before and After MGNREGA Implementation in Telangana Villages

Villages	Crop		Yield (Qt)/ ha	Man days/ ha	Mach. Hr./ha	GCA (Ha.)	Male labor/ha	Female labor/ha	Family labor/ha	Hired labor/Ha.	Female/Male ratio
Aurepalle	Paddy (Kharif)	Before MGNREGA	31.51	237	3	11.7	104	133	102	135	1.3
		After MGNREGA	44.63	163	10	8.3	55	108	75	88	1.9
		% of change	42	-31	233	-29	-47	-19	-26	-35	53
	Paddy (Rabi)	Before MGNREGA	29.92	225	3	15	95	131	97	128	1.4
		After MGNREGA	48.60	178	10	9.1	55	123	89	89	2.2
		% of change	62	-21	233	-39	-42	-6	-8	-31	61
	Cotton (Kharif)	Before MGNREGA	7.54	126	4	59.3	40	84	63	61	2.1
		After MGNREGA	10.92	124	5	56.9	50	76	67	59	1.5
		% of change	45	-2	25	-4	27	-10	6	-3	-29
Dokur	Paddy (Kharif)	Before MGNREGA	30.02	180	8	11.5	70	110	61	119	1.6
		After MGNREGA	41.12	131	10	26.6	46	85	59	72	1.9
		% of change	37	-27	24	132	-35	-22	-4	-39	19
	Paddy (Rabi)	Before MGNREGA	31.93	175	6	14.2	79	96	67	109	1.2
		After MGNREGA	49.15	121	11	16	52	69	61	61	1.3
		% of change	54	-31	83	13	-34	-28	-9	-44	8
	Cotton (Kharif)	Before MGNREGA	4.40	109	4.2	2.8	31	73	46	58	2.3
		After MGNREGA	4.74	104	3.7	3.3	26	83	45	64	3.2
		% of change	8	-5	-12	18	-16	14	-2	10	36

Source: Computed from VDSA data

Table 5: Trends in Productivity, Labor Usage Pattern, Cropping Pattern and Machinery use Before and After MGNREGA Implementation in Maharashtra Villages

Villages	Crops		Yield (Qt)/ ha	Man days/ ha	Mach. Hr./ha	GCA (Ha.)	Male labor/ha	Female labor/ha	Family labor/ha	Hired labor/Ha.	Female/Male ratio
Kalman	Pigeon pea (Kharif)	Before MGNREGA	4.25	30	0.7	23.6	17	13	15	15	0.8
		After MGNREGA	2.84	20	1	88.2	14	6	12	8	0.4
		% of change	-33	-33	33	273	-15	-56	-21	-45	-48
	Sorghum (Rabi)	Before MGNREGA	4.62	30	1.5	96.4	19	11	19	11	0.6
		After MGNREGA	4.55	27	1.2	57.5	19	8	17	10	0.4
		% of change	-2	-8	-16	-40	0	-28	-9	-12	-27
Kanzara	Soybean (Kharif)	Before MGNREGA	6.18	49	5.9	4.2	25	25	12	37	1
		After MGNREGA	14.21	35	7.4	21.2	24	11	11	24	0.4
		% of change	130	-30	25	403	-1	-56	-9	-35	-55
	Wheat (Rabi)	Before MGNREGA	14.65	57	6.9	13	37	20	37	20	0.5
		After MGNREGA	25.50	35	11.6	24.4	29	6	23	12	0.2
		% of change	74	-39	68	88	-21	-72	-38	-40	-65
Kinkhed	Soybean (Kharif)	Before MGNREGA	5.31	67	7.7	2.1	29	38	27	40	1.3
		After MGNREGA	11.71	40	9.6	14.4	24	16	14	26	0.7
		% of change	120	-41	26	587	-19	-57	-49	-35	-48
Shirapur	Maize (Kharif)	Before MGNREGA	9.59	57	2	9.7	22	35	24	33	1.6
		After MGNREGA	13.39	54	6.7	2	25	29	19	35	1.1
		% of change	40	-4	238	-79	17	-19	-19	3	-31
	Sorghum (Rabi)	Before MGNREGA	5.56	27	8.9	70.6	16	11	12	15	0.7
		After MGNREGA	3.93	25	3	35.3	12	13	11	14	1.1
		% of change	-29	-9	-67	-50	-23	15	-10	-7	50

Source: Computed from VDSA data

3.5. Changes in cropping pattern before and after MGNREGA

Table 4 and 5 depicts changes in area of major crops between two periods. Except pigeon pea and rabi sorghum, the productivity has increased in all crops after MGNREGA. In Aurepalle, paddy is dominant in rabi season and cotton in kharif season. Area under paddy cultivation was declined by 30-40 percent in this village after MGNREGA. This decline in area of paddy cultivation is due to scarcity of farm labor mainly male workers in Aurepalle village. On the contrary, area under cotton declined only by 4 percent. This is mainly due to commercial importance of the crop as well as cotton requires relatively less labor compared to paddy. In Dokur, paddy and cotton are dominant food and commercial crops. It is a paradox to note that despite the labor 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 is attributed 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 cultivation.

In Maharashtra, labor scarcity induced changes in cropping pattern are evident (table 5). There has been steep drop in the area under cultivation for crops like post rainy (rabi) sorghum, maize and cotton which are highly labor intensive. This has serious implication on regional food security for the poor especially rabi sorghum, which is a staple food crop of the region. The most striking feature with respect to change in cropping pattern is emergence of soybean in Kanzara by 400 %. This is mainly because of its short duration, less resource intensive and fetches higher returns compare to other crops. Moreover, the crop is amenable for mechanical harvesting and there is assured market. It clearly shows that Maharashtra villages are much progressive in terms of changing cropping pattern.

3.6. Season wise labor usage pattern in farm work

Though 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 4). Male labor use per ha in Aurepalle village of Telangana declined by 35 to 50 percent, while the decline in female labor use is negligible in both the seasons after MGNREGA. The wage rate of

male workers exhibited increasing trend and thereby discouraging the use of male labor for 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 compelling them to stay on farm activity. This is again confirmed by the ratio of female to male labor force participation which has increased after MGNREGA for some major crops in Telangana, thereby confirming the feminization of labor in agriculture. Before MGNREGA female to male ratio was 1.3 in kharif paddy cultivation in Aurepalle village. After MGNREGA implementation, the ratio became 1.9. Therefore, the concentration of women in farming increased by 53 percent after MGNREGA implementation. At the same time, scarcity of labor is reflected by reduced participation of family and hired labor for farm work as evident from table 4.

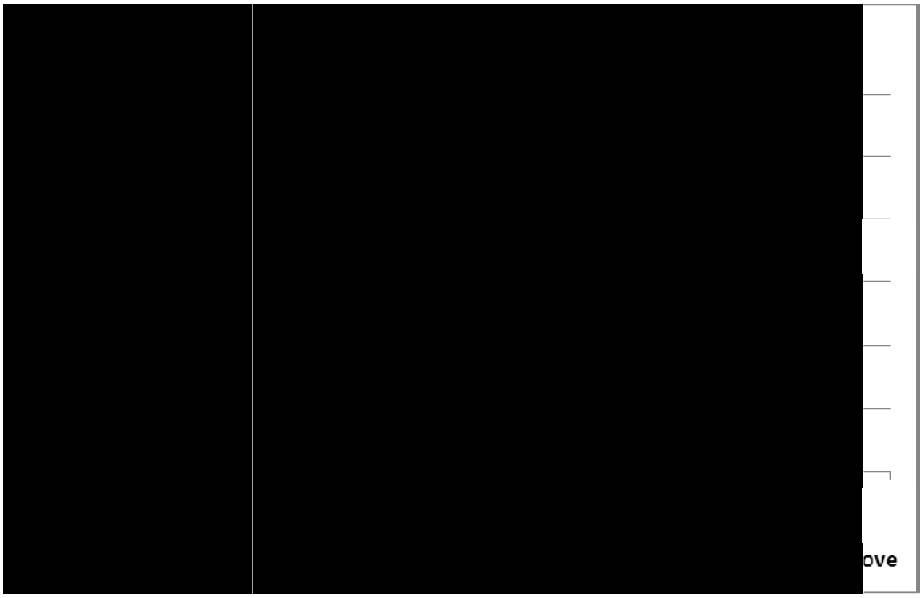

Figure 10: Agewise trends in male farm wokers in Mahabubnagar (Aurepalle and Dokur) District:1977-2011
Source: Computed from VDSA data

It was also observed that the labor scarcity was prominent for the male youth (20 to 34 years), as a sizeable proportion of male youth participation in farm work has been drastically falling (Figure 10). This shows that youth are leaving agriculture and shifting to other nonfarm activities. The participation of middle aged and those above 60 years registered an increasing trend. Therefore the pull factor of

migration is functioning distinctly for the rural male labor force to have likelihood of better employment opportunities and diversified sources of non farm income.

In Maharashtra villages, the labor use pattern shows that there has been a decline in the labor use/ha for most of the crops except sorghum in Shirapur, especially women labor (table 5). The explanation for the decline of rural female participation in agricultural tasks is partly due to the increasing enrollment of girls in education, 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.

3.7. Changes in production cost before and after MGNREGA

Out of the total cost, the share of labor cost was computed before and after MGNREGA in order to compare between two periods, if there is any significant increase in the labor cost due to increase in wages. The proportion of labor cost out of the total cost gives an indication of increased wage component due to scarcity of labor. The proportion of labor cost increased phenomenally for the crops like cotton, paddy, sorghum, soybean, pigeon pea, maize and wheat. The labor cost formed the significant proportion (50-60 %) of the total cost of production and it is surpassing the material input cost for most of the crops grown in the region. The trend in net returns before and after MGNREGA indicates that barring soybean, pigeon pea and wheat other crops are not yielding positive net returns, as these three crops are being grown under protective irrigation. The implication is that the increase in labor cost pushed the total cost of production and thus losing the competitiveness of producing food crops, which is similar to the study by Reddy *et al.* (2014). A recent study by Narayanamoorthy *et al* (2014) revealed that the increasing cost of cultivation dispirited the farmers in reaping appreciable profit and mentioned that only a few rainfed crops are yielding positive returns over costs than irrigated crops in this situation. The results of the study (table 6) also support this finding for rain fed crops like pigeon pea, wheat and soybean grown in study villages.

Table 6: Trends in Cost of Production (Rs./Ha, Net Returns (Rs/Ha) and Share of Labor Cost out of Total Production Cost (in %) Before and After MGNREGA Implementation

	Telangana				Maharashtra									
	Paddy (Kharif)		Cotton (Kharif)		Pigeonpea (Kharif)		Wheat (Rabi)		Soyabean (kharif)		Maize (kharif)		Sorghum (rabi)	
	COP	NR	COP	NR	COP	NR	COP	NR	COP	NR	COP	NR	COP	NR
2003	24412	22357	17946	13101	2077	10488	10973	8546	6005	1888	4850	8549	2845	1756
2004	27077	20251	19434	12277	2745	7250	16752	8288	8139	1543	8529	5044	3418	3556
2005	28807	13963	21817	10112	5438	1333	17388	1779	12672	1521	14101	3665	6796	7342
before MGNREGA	26765	18857	19732	11830	3420	6357	15038	6204	8939	1651	9160	6797	4353	4218
2009	34251	20730	21470	28039	10654	8715	12195	10646	10696	2560	11985	-3487	5876	-5999
2010	40903	-1164	27959	-4250	11601	8409	13532	9712	12006	2860	12164	-7233	4579	-5504
2011	43083	-3720	34957	-8098	17667	7098	14392	5430	13295	3454	21298	-8234	5836	-3717
after MGNREGA	39412	5282	28129	5230	13307	8074	13373	8596	11999	2958	15149	-6318	5430	-5073
% of change	47	-72	43	-56	289	27	-11	39	34	79	65	-193	25	-220
	Share of Labor Cost out of total production cost (in %)													
	Paddy (Kharif)		Cotton (Kharif)		Pigeonpea (Kharif)		Wheat (Rabi)		Soyabean (Kharif)		Maize (Kharif)		Sorghum (Rabi)	
before MGNREGA	53		30		62		31		36		51		52	
after MGNREGA	63		52		80		35		44		78		88	
% of change	10		22		18		4		8		27		36	

Source: Computed from VDSA data

Note: 1. COP=Cost of Production/Ha that includes total labor cost (human + bullock labor), total material cost and other production Cost

2. NR=Net Returns = Total gross returns – (Total production cost + (Avg. land rent per ha)

3. Rs. figures are in real 2009-10 equivalents

3.8. Trends in Per Capita Real Farm Income and Non-Farm Income before and after MGNREGA Implementation

There is a growing interest among policy makers and development experts in understanding the dynamics of the non farm sector contribution to economic growth and whether this growth is sustainable in the long run in view of poor performance of agriculture. 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 labor scarcity, whether there has been substantial shift in income from farm to non-farm. The fig 5 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, due to adoption of improved technologies coupled with assured irrigation.

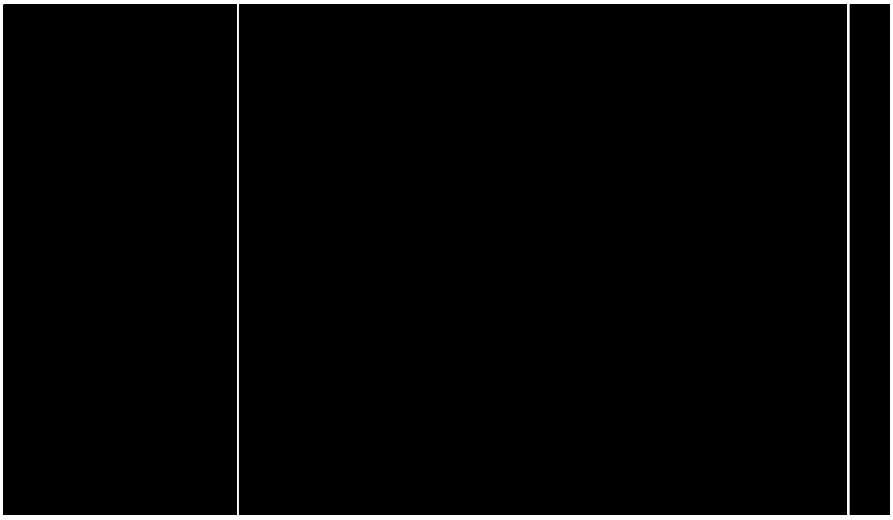

Figure 5: Trends in Per Capita Real Farm Income and Non-Farm Income before and after MGNREGA Implementation
Source: Computed from VDSA data

IV. Concluding Remarks and Policy Interventions:

This study assessed the impacts of MGNREGA on labor scarcity, wages, cost of production, the linkages among wage rates in MGNREGA, agriculture and non-agriculture. There has been gradual increase in the real wages of both farm and nonfarm works especially after implementation of MGNREGA at the farm level. 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. 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. Thus, MGNREGA is not the sole reason for scarcity of male labor for farm work. At the same time, the perpetual phenomenon of gender wage gap in rural labor market is continuing over the period (2001-2012). It has increased from 2006 onwards with higher gender wage gap in non-farm work as compared to farm work. There has been a steady decline in labor absorption for crops like paddy, soybean and pigeon pea after MGNREGA implementation. The shortage of male labor for farm work became more prominent, whereas the increased participation of female labor in some major crop confirms the feminization of labor. At the same time, the proportion of hired labor has reduced much faster rate than the family labor with the adoption of farm mechanization. Use of mechanical power has been doubled for some of the major crops like paddy to compensate the labor shortage. There has been substantial drop in the area under cultivation for crops like paddy, rabi sorghum, maize and cotton which are highly labor intensive. The share of labor cost formed a significant proportion of the total cost impacting adversely on the size of net returns. Farmers especially women are therefore needed to be trained in productivity augmenting and cost reducing technologies. The nonfarm sector appears to offer relatively few opportunities for women in rural areas. Irrespective of region, women are more likely to be employed in agricultural labour than in nonfarm activities, and to earn lower nonfarm incomes (Lanjouw and Sharieff 2007).

Some of the policy interventions in response to these emerging issues 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. In the rural areas, MGNREGA is blamed for all the hardships faced by farmers. But, it is the construction boom and the urban employment that lure which is weaning away rural labour from agriculture. According priority to execution of MGNREGS works in economically backward and drought prone regions, concentrating more on Natural Resource Management in economically forward regions, linking MGNREGS works with agriculture sector targets may help in addressing the rural poverty issues more positively and meaningfully.

References:

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CACP. (2012), *Price Policy for Kharif Crops: The Marketing Season 2012-13,* Commission for Agricultural Costs and Prices*,* Government of India, New Delhi.

Chand, R. and S.K. Srivatsava (2014), Changes in the Rural Labour Market and Their Implications for Agriculture, *Economic and Political Weekly*, Vol. XLIX, No. 10, March 8, pp.47-53.

GoAP. (2011), *Impact of MGNREGA on Poverty and Levels of Living of Poor*, (Akshara Livelihood Private Ltd.), Department of Rural Development, GoAP, Hyderabad.

Gulati, A.; S. Jain and N. Satija (2013*), Rising Farm Wages in India the 'Pull' and 'Push' Factors",* Commission For Agricultural Costs and Prices, Government of India, New Delhi

Lanjouw, P. and Shariff, A. (2007), Rural Non Farm Employment in India: Access, Incomes and Poverty Impact, Working Paper Series No 1, National Council of Applied Research, Delhi

Reddy, A. A.; Ch. R Rani and G. P. Reddy (2014), Labor Scarcity and Farm Mechanisation: A Cross State Comparison, *Indian Journal of Agricultural Economics*, Vol. 69, No. 3, pp. 347-358.

Reddy, D.N.; A.A. Reddy; N. Nagaraj and C. Bantilan (2014), *Impact of Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) on Rural Labour Markets*, International Crops Research Institute for the Semi-Arid tropics (ICRISAT),Working paper No. 58, Telangana, India.

Shah, D. (2014), Impact of Farm Mechanization on Draught Animal Power Availability in Maharashtra: A Region Wise Analysis, *Indian Journal of Agricultural Economics*, Vol. 69, No.3, pp. 361.

Srikantha murthy, P.S. and Indumathi, S., (2011), Economic Analysis of MGNREGA in the Drought–prone States of Karnataka, Rajasthan and Irrigation–dominated State of Andhra Pradesh. *Agricultural Economics Research Review*, Vol. 24 (Conference Number), pp 531-536

Thadathil, M.S. and V. Mohandas (2012), Impact of MGNREGS on Labour Supply to Agricultural Sector of Wayanad District in Kerala. *Agricultural Economics Research Review,* Vol. 25, No.1, pp. 151-155.

VDSA (2013), Village Dynamics in South Asia (VDSA) database, generated by ICRISAT/IRRI/NCAP in partnership with national institutes in India and Bangladesh, http://vdsa.icrisat.ac.in.

http://www.icrisat.org/labor-scarcity-and-rising-wages-in-indian-agriculture/