
Impact of MGNREGA on Rural Agricultural Wages, Farm Productivity and Net Returns: An Economic Analysis Across SAT Villages

**N. Nagaraj, Cynthia Bantilan, Lalmani Pandey and
Namrata Singha Roy***

ABSTRACT

This study assessed the impacts of MGNREGA on labour scarcity, wages, cost of production and the linkages among wage rates in agriculture and non-agriculture employment. The study is based on field data of the semi-arid villages from Telangana and Maharashtra states under Village Dynamic Studies in South Asia (VDSA). The results reveal that the real-wages for farm and nonfarm works exhibited upward trend especially after implementation of MGNREGA in both the states. The average daily wage rate of male farm worker 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 labour has also increased resulting shift in labour force from agriculture to non-agriculture. 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. However, the perpetual phenomenon of gender wage inequality in rural labour market is continuing over the period (2001-2012). There has been a steady decline in labour use for some of the crops: The shortage of male labour for farm work has been more prominent, whereas the increased participation of female labour in some major crop confirms the feminization of agriculture. The share of labour cost formed a significant proportion of the total cost impacting on net returns. In order to address labour scarcity, technological developments that are amenable for mechanisation along with custom hiring facility is crucial. Further, capacity building programmes for skill augmentation especially for female labour is required.

Keywords: MGNREGA, Labour scarcity, Agricultural labour, Wage rates, Rural non-farm employment.

JEL: J21, J31, Q12

I

PRELUDE

Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), the flagship programme of Government of India 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

*Former Principal Economist, Research Program Director (Economics), Visiting Scientist and Scientific Officer (Economics), respectively, Markets, Institutions and Policies, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru-502 324 (Andhra Pradesh).

has negative impact on agriculture in terms of creating labour scarcity during peak season. This is because of diversion of rural farm labour to MGNREGA works as wage rates for MGNREGA are higher than the prevailing farm wages. The limited labour supply to farm work is also due to the labour 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 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 farmers. 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 posed an issue for development practitioners and policy makers. This study attempts to assess the impacts of MGNREGA, on labour scarcity, wages, cost of production, linkages among wage rates in MGNREGA, agriculture and non-agriculture employment and their implications on the agricultural 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 labour market and its implications on wages, cost of production, farm productivity and profitability.

II

DATA AND 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 (labour, draft animal and major machinery utilisation 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 analysed 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 labour with 2009-10 as the base year. Triennium averages (TE) of wage of 2001 and 2006 are 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 analysed 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 with 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.

In the study villages of Telangana, the farm wage rate for men labour increased from Rs.83 per day to Rs. 140 per day an increase of 4.8 per cent per annum during 2001- 2012. Similarly for women, the farm wage has increased from Rs. 35 to Rs. 95 per day during the same period a sharp increase of 9.8 per cent per annum (Table 1). This has led to reduction in the gender wage gap by 15 per cent during the period in Telangana villages, while in all other places the gender wage gap 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 cent per annum as against Rs.37 to Rs.90 per day a phenomenal increase of 8.4 per cent per annum for women working in non-farm activities (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 female farm wage rate. Though the percentage change in wage for the period is higher for women than men, but the perpetual phenomenon of gender wage gap in rural labour market is continuing over the period (2001-2012). It has increased after 2006 onwards with higher gender wage gap in non-farm work as compared to farm work.

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 implications on the agricultural sector in terms of rising labour cost, as well as cost of production leading to shrinkage in net margins realised by the farmers.

TABLE 1. TRENDS IN REAL WAGE (RS. PER DAY, 2009-10 EQUIVALENTS) OF FARM AND NON-FARM WORK IN TELANGANA AND MAHARASHTRA (2001-2012)

(1)	Telangana						Maharashtra					
	Farm Work			Non-Farm Work			Farm Work			Non-Farm Work		
	Wage differential			Wage differential			Absolute wage gap			e-wage differential		
	Men	Women	(4)	Men	Women	(7)	Men	Women	(10)	Men	Women	(13)
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	
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 per cent)	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.

3.2. Wage Gap for Male and Female Farm Labour

In order to examine the extent of wage gap for men and women between farm and non-farm 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 (1)	Telangana				Maharashtra			
	Male		Female		Male		Female	
	Farm (2)	Non-farm (3)	Farm (4)	Non-farm (5)	Farm (6)	Non-farm (7)	Farm (8)	Non-farm (9)
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 per cent)	-0.5	3.6	6.8	4.7	-0.5	4.7	-0.4	9.1
After MGNREGA (CGR per cent)	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 per cent in Telangana and 7.6 per cent in Maharashtra compared to almost negative growth rate before MGNREGA. This indicates the possible effect of MGNREGA on rising wages of male farm labour, thereby creating shortage of male labour 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 males has been drifted from farm work to MGNREGA works causing shortage of labour for farm works. But MGNREGA cannot be the sole responsible of this observed wage increase. Beside farm wage, non-farm wage of male labour has also increased by 2.7 per cent in Telangana and at 1.5 per cent in Maharashtra. So non-farm work is has started becoming 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 (Srikanthamurthy 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 Shariff, 2007). There is growing evidence of rural labour commuting daily 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' (Government of Andhra Pradesh, 2011).

Besides male labour, wage rate of female farm workers has grown sharply after MGNREGA implementation to the tune of 8 per cent in Maharashtra and 4.6 per cent per annum in Telangana, thereby strengthening feminisation of labour in farm work. Thus, the slow growth of farm real wage has changed after MGNREGA by breaking the long stagnation of rural wage rate. Basically, there is a problem of endogeneity in isolating the impact of MGNREGA on farm and rural wages. The impact of MGNREGA on farm and rural wage often coincides with the spill over effects from economic growth, urbanisation, non-farm rural growth, rural non-farm 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 non-farm wage have 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 migration of labour from farm work to non-farm work. It may be the expansion of opportunities to work in non-farm sector or rapid growth of urbanisation that is actually pulling out labourers from farm sector. In Maharashtra labourers seems to be indifferent to work on farm or non-farm or MGNREGA work as indicated by wages.

TABLE 3. COMPARISON OF WAGE OF MGNREGA WITH FARM AND NON-FARM NOMINAL WAGES IN TELANGANA AND MAHARASHTRA, TE 2006 TO TE 2012

(1)	Telangana				MGNREGA (6)
	Male		Female		
	Farm (2)	Non-Farm (3)	Farm (4)	Non-Farm (5)	
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				MGNREGA
	Male		Female		
	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. MGNREGA wage figure: http://nrega.nic.in/nrega_statewise.pdf, 2. Farm and non-farm wage: Computed from VDSA data.

3.3. Linkage of NREGA Wage with Sectoral Wage

Broadly three types of wages, viz., farm wage, non-farm 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.

One of the intriguing issues is that even though the MGNREGA wage rate is lower than farm wage, still the male labourer is participating in MGNREGA work. This could be due to several factors like the nature of work or ease of MGNREGA work, as the supervision and monitoring of work is relatively low. On the contrary, the farm wage received by female labourers is not only lower than male labourers but also substantially lower than MGNREGA wages in both the states leading to serious concern for policymakers addressing gender inequity. In the non-farm sector, female wages are lower compared to 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 indicating possibility of more non-farm employment opportunities due to favourable industrial policy and industrial development in Maharashtra compared to Telangana.

3.4. 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 accounting for a significant proportion of total cost of production (<http://www.icrisat.org/labour-scarcity-and-rising-wages-in-indian-agriculture/>). One of the serious criticisms of MGNREGA is that there has been growing 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). In Dokur and Auralpalle villages of Telangana, paddy and cotton are the main food and cash crops grown by the majority of the farmers. Paddy is a highly labour intensive crop compared to cotton hence labour shortage may lead to decrease in area. As evident from Table 4, the labour use per ha of paddy has drastically reduced after MGNREGA to the extent of 20-30 per cent in both the villages reflecting the shortage of farm labour. The machine hours used is almost doubled in case of paddy before and after MGNREGA. These results are in conformity with the results obtained by Reddy *et al.*, (2014a) indicating increased farm mechanisation to compensate the labour shortage. But in the case of cotton, there is no significant change in labour and machine hours used before and after MGNREGA, as some of the operations in cotton like harvesting of kapas is not amenable for mechanisation and it has to be done by manual labour. Due to mechanisation, which lead to reduction in labour use, productivity of paddy increased by 40 to 60 per cent after MGNREGA. This is 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 by efficient use of resources. The farm mechanisation 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 Table 5, there has been a drop in the labour use after MGNREGA for majority of the crops, though productivity of most of the crops has shown an increasing trend except for pigeonpea in Kalman and *rabi* sorghum in Shirapur. On the contrary, barring maize and wheat, farm mechanisation 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 labour intensive but use of mechanical power is not reflected for this crop despite steep drop in labour use (Table 5). Since the rate of mechanisation of irrigation was faster than mechanisation of tillage, the overall effect of mechanisation in terms of displacement of work animals was 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 labour is prominent. In Shirapur village, farm mechanisation is widely adopted with comparatively better endowment than the other villages. As discernible from Tables 4 and 5 labour use for paddy has been declining after MGNREGA, while the use of machine power has been increasing. Though the use of human labour has declined, the productivity has not improved while it improved in majority of the crops.

TABLE 4. TRENDS IN PRODUCTIVITY, LABOUR USAGE PATTERN, CROPPING PATTERN AND MACHINERY USE BEFORE AND AFTER MGNREGA IMPLEMENTATION IN TELANGANA VILLAGES.

Villages (1)	Crop (2)	(3)	Yield (qtl./ha) (4)	Man days/ha (5)	Mach. hr./ha (6)	GCA (ha.) (7)	Male labour/ha (8)	Female labour/ha (9)	Family labour/ha (10)	Hired labour/ha (11)	Female/ Male ratio (12)	
Aurepalle	Paddy (<i>bharif</i>)	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	
	Paddy (<i>rabi</i>)	Per cent of change	42	-31	233	-29	-47	-19	-26	-35	-53	
		Before MGNREGA	29.92	225	3	15	95	131	97	128	1.4	
	Cotton (<i>bharif</i>)	After MGNREGA	48.60	178	10	9.1	55	123	89	89	2.2	
		Per cent of change	62	-21	233	-39	-42	-6	-8	-31	-61	
Dokur	Paddy (<i>bharif</i>)	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	
	Paddy (<i>rabi</i>)	Per cent of change	45	-2	25	4	27	-10	6	-3	-29	
		Before MGNREGA	30.02	180	8	11.5	70	110	61	119	1.6	
	Cotton (<i>bharif</i>)	After MGNREGA	41.12	131	10	26.6	46	85	59	72	1.9	
		Per cent of change	37	-27	24	132	-35	-22	-4	-39	-19	
Paddy (<i>rabi</i>)	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		
Cotton (<i>bharif</i>)	Per cent of change	54	-31	83	13	-34	-28	-9	-44	8		
	Before MGNREGA	4.40	109	4.2	2.8	31	73	46	58	2.3		
Per cent of change	After MGNREGA	4.74	104	3.7	3.3	26	83	45	64	3.2		
	Per cent of change	8	-5	-12	18	-1.6	-2	-2	-2	10	36	

Source: Computed from VDSA data.

TABLE 5. TRENDS IN PRODUCTIVITY, LABOUR USAGE, PATTERN, CROPPING PATTERN AND MACHINERY USE BEFORE AND AFTER MGNREGA IMPLEMENTATION IN MAHARASHTRA VILLAGES

Villages (1)	Crops (2)	(3)	Yield (qtl./ha) (4)	Man days/ha (5)	Machi. hr./ha (6)	GCA (ha.) (7)	Male labour/ha (8)	Female labour/ha (9)	Family labour/ha (10)	Hired labour/ha (11)	Female/ Male ratio (12)
Kalthan	Pigeon	Before MGNREGA	4.25	30	0.7	23.6	17	13	15	15	0.8
	pea	After MGNREGA	2.84	20	1	88.2	14	6	12	8	0.4
	(bharif)	Per cent 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
Kanzara	(rabi)	After MGNREGA	4.55	27	1.2	57.5	19	8	17	10	0.4
		Per cent of change	-2	-8	-16	-40	0	-28	-9	-12	-27
	Soybean (bharif)	Before MGNREGA	6.18	49	5.9	4.2	25	25	12	37	1
	(bharif)	After MGNREGA	14.21	35	7.4	21.2	24	11	11	24	0.4
Kinkhed		Per cent 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
		Per cent of change	74	-39	68	88	-21	-72	-38	-40	-65
Shirapur	Soybean (bharif)	Before MGNREGA	5.31	67	7.7	2.1	29	38	27	40	1.3
	(bharif)	After MGNREGA	11.71	40	9.6	14.4	24	16	14	26	0.7
		Per cent of change	120	-41	26	587	-19	-57	-49	-35	-48
	Maize (bharif)	Before MGNREGA	9.59	57	2	9.7	22	35	24	33	1.6
Shirapur		After MGNREGA	13.39	54	6.7	2	25	29	19	35	1.1
		Per cent 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
	Per cent 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

Tables 4 and 5 depicts changes in the 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. The area under paddy cultivation has declined by 30-40 per cent in this village after MGNREGA. This decline in area of paddy cultivation is due to scarcity of farm labour mainly male workers in Aurepalle village. On the contrary, area under cotton declined only by 4 per cent. This is mainly due to commercial importance of the crop as well as cotton which requires relatively less labour as compared to paddy. In Dokur, paddy and cotton 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 per cent under *kharif* and 13 per cent under *rabi* season in Dokur village. This is attributed to assured groundwater irrigation and free electricity to pump groundwater, ease of mechanisation, assured Minimum Support Price and access to markets which ensure remunerative returns to paddy cultivation.

In Maharashtra, labour scarcity induced changes in the 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 labour 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 per cent. This is mainly because of its short duration, less resource intensive nature of the crop and which fetches higher returns as compared to other crops. Moreover, the crop is amenable for mechanical harvesting and there is assured market. It clearly shows that villages in Maharashtra are much progressive in terms of changing cropping pattern.

3.6. Season Wise Labour Usage Pattern in Farm Work

Though paddy cultivation is highly labour intensive involving both male and female labour for different operations, the human labour employment in paddy cultivation is exhibiting a steady declining trend over the period (Table 4). The male labour use per ha in Aurepalle village of Telangana declined by 35 to 50 per cent, while the decline in female labour 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 labour for farm work. The rapid social and economic transformations in erstwhile Telangana accelerated the process of labour migration from agriculture to other sectors. Whereas increasing growth in female farm wage and reduced growth in non-farm wage for female workforce compelling them to stay on farm activity. This is again confirmed by the ratio of female to male labour force participation which has increased after MGNREGA for some major crops in

Telangana, thereby confirming the feminisation of labour 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 per cent after MGNREGA implementation. At the same time, scarcity of labour is reflected by reduced participation of family and hired labour for farm work as evident from Table 4.

It was also observed that the labour 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. This shows that youth are leaving agriculture and shifting to other non-farm 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 labour force to have likelihood of better employment opportunities and diversified sources of non-farm income.

In Maharashtra villages, the labour use pattern shows that there has been a decline in the labour use/ha for most of the crops except sorghum in Shirapur, especially women labour (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 the rural non-farm sectors.

3.7. Changes in Production Cost Before and After MGNREGA

Out of the total cost, the share of labour cost was computed before and after MGNREGA in order to compare between two periods, if there is any significant increase in the labour cost due to increase in wages. The proportion of labour cost out of the total cost gives an indication of increased wage component due to scarcity of labour. The proportion of labour cost increased phenomenally for the crops like cotton, paddy, sorghum, soybean, pigeon pea, maize and wheat. The labour cost formed the significant proportion (50-60 per cent) of the total cost of production and has surpassed 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 labour 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.*, (2014b). 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 rainfed crops like pigeon pea, wheat and soybean grown in the study villages.

3.8. Trends in Per Capita Real Farm Income and Non-Farm Income Before and After MGNREGA Implementation

There has been 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 the poor performance of agriculture. Rural labourers 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 activities. 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.

IV

CONCLUDING REMARKS AND POLICY INTERVENTIONS

This study assessed the impacts of MGNREGA on labour scarcity, wages, cost of production, the linkages among wage rates in MGNREGA, agriculture and non-agricultural operations. There has been gradual increase in the real wages of both farm and non-farm 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 before MGNREGA. Beside farm wage, non-farm wage of male labour has also increased. Both the farm and non-farm wages have increased by almost three times during the period of MGNREGA implementation in some areas, whereas MGNREGA wage has increased only by half of it. Thus, MGNREGA is not the sole reason for scarcity of male labour for farm work. At the same time, the perpetual phenomenon of gender wage gap in rural labour 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 labour absorption for crops like paddy, soybean and pigeon pea after MGNREGA implementation. The shortage of male labour for farm work became more prominent, whereas the increased participation of female labour in some major crops confirms the feminisation of labour. At the same time, the proportion of hired labour has reduced at much a faster rate than the family labour with the adoption of farm mechanisation. Use of mechanical power has been doubled for some of the major crops like paddy to compensate the labour shortage. There has been substantial drop in the area under cultivation for crops like paddy, rabi sorghum, maize and cotton which are highly labour intensive. The share of labour 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 non-farm 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 non-farm activities, and to earn lower non-farm incomes (Lanjouw and Shariff, 2007).

Some of the policy interventions in response to these emerging issues include technological development such as developing short duration – labour saving improved cultivars amenable to mechanisation 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 the farmers. But, it is the construction boom and the urban employment that lure them and 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 the agricultural sector targets may help in addressing the rural poverty issues more positively and meaningfully.

Received February 2015.

Revision accepted June 2016.

REFERENCES

- Commission for Agricultural Costs and Prices (CACP) (2012), *Price Policy for Kharif Crops: The Marketing Season 2012-13*, 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. 49, No. 10, March 8, pp.47-53.
- Government of Andhra Pradesh (2011), *Impact of MGNREGA on Poverty and Levels of Living of Poor*, (Akshara Livelihood Private Ltd.), Department of Rural Development, Government of Andhra Pradesh, 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 A. Shariff (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 (2014b), "Labour Scarcity and Farm Mechanisation: A Cross State Comparison", *Indian Journal of Agricultural Economics*, Vol. 69, No. 3, July-September, pp. 347-358.
- Reddy, D.N., A.A. Reddy, N. Nagaraj and C. Bantilan (2014a), *Impact of Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) on Rural Labour Markets*, Working paper No. 58, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), 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, July-September, pp. 361.
- Srikanthamurthy, P.S. and S. Indumathi (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.

Village Dynamics in South Asia (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/labour-scarcity-and-rising-wages-in-indian-agriculture/>