

When it was launched in 2004, the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) was expected to materially alter the working of rural labor markets. Besides offering a modicum of employment security, it was expected to absorb some of the labor supply slack, lift equilibrium wage rate in the open market, put more purchasing power into the hands of the labor class, and reduce ‘distress migration’. It was also expected that medium and large farmers would view MGNREGA as a rival, creating peak-season labor shortages, pushing up farm wage rates and making farming even more unviable.

Have all these happened? In 2009-10, and then again in 2010-11, IWMI deployed more than 50 masters students of rural management to survey the landscape of these interactions. This highlight offers a quick synthesis of what the students found.

Water Policy Research

HIGHLIGHT

Labor Market Dynamics in Post-MGNREGA Rural India

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LABOR MARKET DYNAMICS IN POST-MGNREGA RURAL INDIA¹

Research highlight based on Gaur and Chandel (2010); Kumar and Chandra (2010); Nair and Sanju (2010); Singh and Modi (2010); Shah et al. (2011)²

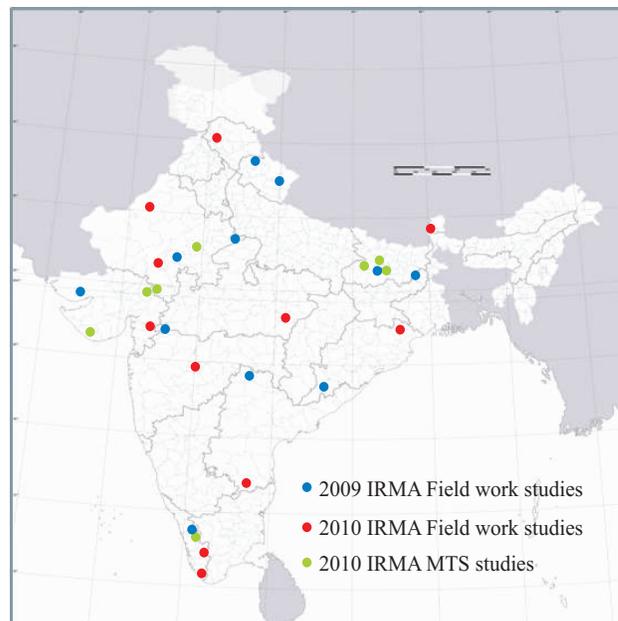
MGNREGA deeply influences and is, in turn, influenced by the rural labor markets. Over the last couple of years, IWMI worked with more than 50 masters students from the Institute of Rural Management, Anand (IRMA) to understand how MGNREGA and village labor markets interact. The students covered 26 villages in 11 districts of 9 states in 2009 and an additional 13 villages in 11 districts of 9 states in 2010. In 2009, the students were asked to provide a qualitative overview of MGNREGA implementation in their village while collecting specific data on MGNREGA works. In 2010, the students undertook fieldwork with the specific brief to explore the interactions between MGNREGA and rural labor markets. Further, also in 2010, 8 IRMA students spent 10 weeks and surveyed more than 950 village leaders, laborers and farmers from across 75 villages in Gujarat, Rajasthan, Bihar and Kerala (Figure 1). This Highlight synthesizes and summarizes the results from all these field studies.

HOW DO LOCAL LABOR MARKETS INFLUENCE MGNREGA IMPLEMENTATION?

The design of MGNREGA assumes that every village has poor people who demand more work than is locally available at the government-determined minimum wage rate. While this might be broadly true for India as a whole, it is not true everywhere. In all, we found 4 distinct situations of MGNREGA's interaction with local, especially agricultural labor markets (Table 1):

1. Type I - Misfit: In this case, a booming local labor market, with work going aplenty at much higher than official minimum wages, makes MGNREGA a 'misfit' and difficult to implement for lack of demand. There was neither interest in the scheme's wage benefit nor in its non-wage benefit. Shah et al. (2011) provide a glimpse into this from the field studies in Mudra, Kutch where people have hit jackpots by selling their land at very high prices and are able to access limitless

Figure 1 Districts covered as part of field studies undertaken by IRMA students



work opportunities at twice the MGNREGA wage rate or more. Here there were no work-seekers; yet the block and district administration was relentlessly pressurizing *Panchayat* leaders to find people to implement the program. Somewhat similar was the situation in Uttarakhand and Himachal villages where prevailing agricultural wages were equal to or far above the minimum wages resulting in a general indifference towards the program; and it required an unusually enthusiastic *Panchayat* leadership to goad people into coming to MGNREGA works.

2. Type II - Insignificant: This is the situation of no or insignificant interaction between MGNREGA and the local labor markets. In Godda (Jharkhand), Koraput (Orissa) and Nalanda (Bihar) villages, the volume of MGNREGA work on offer was too small compared to

¹This IWMI-Tata Highlight is based on research carried out under the IWMI-Tata Program (ITP) with additional support from the International Water Management Institute (IWMI), Colombo. It is not externally peer-reviewed and the views expressed are of the authors alone and not of ITP or its funding partners – IWMI, Colombo and Sir Ratan Tata Trust (SRTT), Mumbai.

²These reports are available on request from p.reghu@cgiar.org

the demand and the total size of the labor market. Here, MGNREGA had no perceptible impact on the working of the local labor markets, nor was the scheme able to substantially animate the village community.

- 3. Type III - Potentially Significant:** This is the situation where MGNREGA wages are significantly higher than local wages and the volume of potential MGNREGA work also significant and yet, MGNREGA invokes a lukewarm response from the community owing to administrative bottlenecks, distrust, systemic corruption, lackluster implementation or lack of awareness. In Narmada (Gujarat), the prevailing local agricultural wages were roughly a third of the MGNREGA wages on offer. The local Panchayat rallied to initiate MGNREGA works in the village but was discouraged by a passive block administration. When they finally managed to initiate some work, there were long delays in the payment of wages prompting villagers to give up on MGNREGA and return to the residual labor market which paid out cash wages instantaneously (Verma 2010). Likewise, in Mandla, people initially took to MGNREGA enthusiastically but shifted back to lower-paying works as MGNREGA wage payments took as long as 6 months.
- 4. Type IV - Significant:** This is the situation in which MGNREGA presence is large enough to catalyze widespread interest in the community and to significantly alter the structure, conduct and performance of agricultural labor markets. We found this, to some extent, in Dholpur (Rajasthan) and to a much greater extent, in Palakkad (Kerala), Chittoor (Andhra Pradesh) and Jalna (Maharashtra) villages.

Thus the prevailing labor market conditions define how village communities react and respond to MGNREGA. In labor-scarce village economies, MGNREGA is unlikely to find many enthusiastic takers as the prevailing market wage rate would be higher than the MGNREGA wages. However, in labor-surplus conditions with depressed market wage-rates, a well-implemented MGNREGA is likely to bring huge relief to the laborers.

HOW DOES MGNREGA INFLUENCE LOCAL LABOR MARKETS?

In 2004, Bhalla (2004) argued that the unemployment rate among the poorest - the agricultural workers - was only 1 percent and therefore, MGNREGA was unlikely to benefit them much, especially since it offers work at low (minimum) wages. According to the official statistics, however, in 2011-12 MGNREGA offered more than 2 billion person days of employment to nearly 50 million households across the country (MGNREGA 2012; Figure 2). The same author further argued that the figures of employment generation are grossly over-estimated and that the actual figures are likely to be closer to half these numbers (Bhalla 2010). Even if that were true, the response to MGNREGA and the scale of its implementation has been overwhelming, with significant and possibly irreversible impacts.

A. Tighter and segmented labor markets

Where the interaction between MGNREGA and labor markets has been significant, it has altered the local labor markets in several ways. It has increased work participation rates by offering attractive, accessible and convenient work opportunities, thereby shifting the labor supply curve outward. It has partitioned the pre-MGNREGA labor market into two: the MGNREGA

Table 1 Four distinct types of MGNREGA-labor market interactions

	Type I - Misfit	Type II - Insignificant	Type III - Potentially Significant	Type IV - Significant
Wage Rates	$W_{LOCAL} > W_{MGNREGA}$	$W_{MGNREGA} > W_{LOCAL}$	$W_{MGNREGA} > W_{LOCAL}$	$W_{MGNREGA} > W_{LOCAL}$
Conditions	Booming local labor market offering much greater opportunities	MGNREGA work insignificant vis-à-vis local demand	MGNREGA potentially significant but poorly implemented	MGNREGA significant vis-à-vis local demand
Examples	Kutch (Gujarat), Uttarkashi (Uttarakhand), Kangra (Himachal Pradesh)	Godda (Jharkhand), Koraput (Orissa), Nalanda (Bihar), Narmada (Gujarat)	Narmada (Gujarat), Mandla (Madhya Pradesh)	Dholpur (Rajasthan), Palakkad (Kerala), Chittoor (Andhra Pradesh), Jalna (Maharashtra)

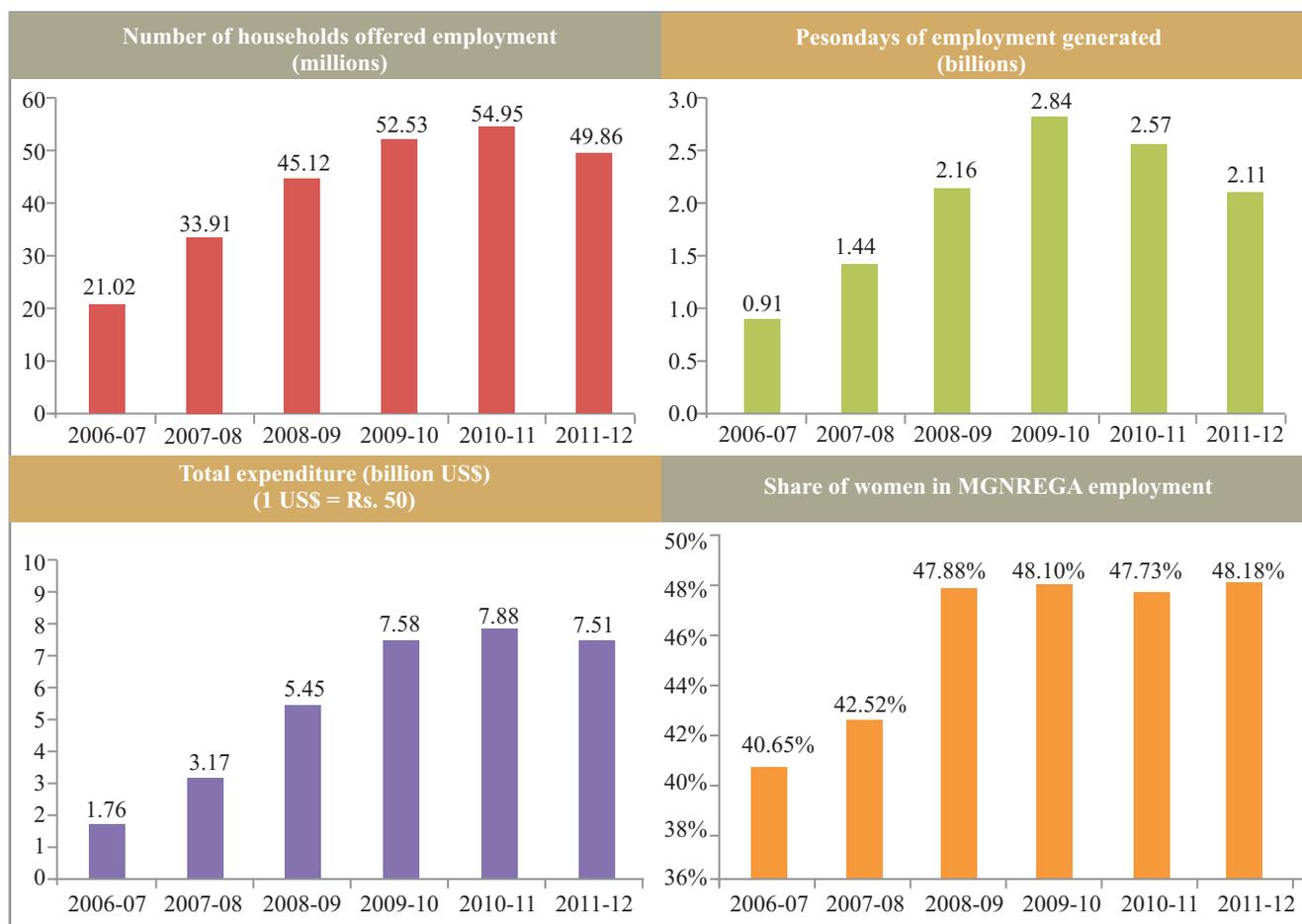
market and the residual labor market. By removing a block of labor supply from the residual labor market, MGNREGA has created labor shortages and pushed up wage rates in the residual market. Further, administrative pressures to implement MGNREGA works can create incentives for site supervisors and managers to be lenient in work measurement. This means that the MGNREGA segment of the rural labor market, over time, becomes less productivity-sensitive vis-à-vis the residual market. This, among other factors, has attracted women and less able men to MGNREGA works which explains the high share of female participation in MGNREGA (Figure 2).

For MGNREGA to have major impact on farm labor markets, it is critical that the volume of work offered under the scheme is substantial during the peak agricultural season. In Dholpur (Rajasthan), much MGNREGA work was scheduled during summer when farm labor demand was low; therefore, the scheme's impact on labor market was relatively small. Here, therefore, MGNREGA work was additive; it expanded the labor market by attracting new labor to the work force

without drawing away a significant chunk of workers from the residual market. Similar results were reported from Bikaner and Rajsamand (Rajasthan); Idukki and Trivandrum (Kerala); West Sikkim District (Sikkim); and Chittoor (Andhra Pradesh). In Palakkad (Kerala), however, the plantation economy demands farm labor throughout the year; and here, MGNREGA offered nearly 100 days of work to anyone who asked; as a result, the scheme's impact on labor market was broad and deep, raising female wage rates from Rs. 60 to Rs. 90 and male wage rates from Rs. 100 to anywhere between Rs. 150 and 225/day. The impact of MGNREGA in Palakkad, therefore, was substitutive; it withdrew a sizeable, mostly female, work force from agriculture. To make up, farm wage rates had to go up 50-70 percent.

Several parallel effects seem to be in operation here. The scheme puts into the hands of poor people significant amount of cash that reduces the need for distress or forced labor. Our survey found that, on an average, annual income of MGNREGA workers increased by roughly 50 percent. Where MGNREGA is implemented on full scale,

Figure 2 Performance of MGNREGA over the years



Source: Verma 2012

farm and non-farm labor markets become tighter, putting pressure on wage rates (Figure 3).

B. Increased women participation and reduced male female wage ratio

MGNREGA work has found particular appeal for poor women who find the wages attractive and the facilities at the work site - such as crèche and shade - particularly convenient. Finding work close to their home also increases the scheme's appeal. In Bambara village of Adilabad, the Panchayat also offered flexi-time on MGNREGA works which enhanced its appeal even further. The convenience and appeal of MGNREGA - besides the general impression of MGNREGA work being light and poorly monitored - also attracts relatively less poor rural women to the scheme, some entering the labor market for the first time. In a Dholpur village (Rajasthan), students found that when SC/ST women first joined the MGNREGA work force, *Thakur* women stayed aloof; but soon, they too joined and got away with shirking work while the SC/ST women did the hard labor. Likewise, in Idukki (Kerala), students reported that almost all economically-inactive middle class women joined the MGNREGA labor force.

Since the residual labor markets pay significantly higher wages to male workers than to their female counterparts, MGNREGA sites were doubly more attractive to women workers. In Palakkad villages, the labor market got vertically segmented: women, old and the infirm choosing MGNREGA but able-bodied men demanding higher wages in farm jobs. Likewise in Rajsamand and

Dungarpur (Rajasthan) where migration to urban centers like Udaipur, Ahmedabad and Surat offers lucrative opportunities for men, much of the MGNREGA workers were found to be women and older men who had discontinued migration. Women found MGNREGA work attractive since it gave them extra cash they could spend on themselves and on household items for which they earlier had to depend on their husbands and had to wait for them to return home during festivals (Verma 2010). Wage data from our surveys in 75 villages shows that not only have the wages in the residual market been rising steadily, the ratio of male wages to female wages has been declining (Figure 3). This is a positive outcome of the pressure MGNREGA exerts on the residual labor markets.

C. Less clear impact on migration

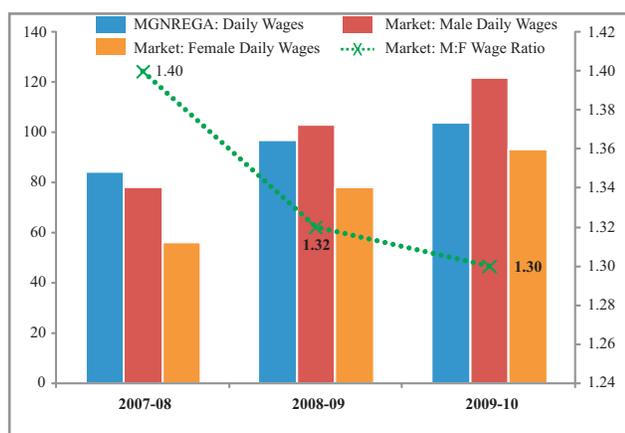
Students reported that farmers in popular migrant destinations repeatedly complained about reduction in the inflow of migrants and the demand for higher wages and better facilities by the migrant workers. At the same time, students in migrant-source locations found no significant reduction in out-migration. Shah and Indu (2010) reported that in many villages of Punjab and Haryana, MGNREGA is reducing inflow of migrant labor; and even those workers who come often prefer to work on MGNREGA works. In Rithal village of Rohtak district in Haryana, farmers depended heavily on migrant labor from Madhya Pradesh. These migrants however started working on MGNREGA works in Rohtak. Farmers felt that poor people and migrants prefer MGNREGA work at Rs. 135 per day rather than farm work at Rs. 200 per day, because the former is lighter and less rigorously supervised. Farmers are now using JCBs to get their earth work done (Shah and Indu 2009).

Our overall impression was that while MGNREGA implementation reduced distress migration, opportunistic migration continued as before. MGNREGA wages could not match up to the wages able-bodied men could earn by migrating to urban centers, where the wages are much higher. Moreover, administrative bottlenecks might have tempered any potential impact on out-migration. In Mandla (Madhya Pradesh), MGNREGA implementation initially reduced out-migration but delays in payment of MGNREGA wages led the people back to their migrant ways. Similar delays were also reported elsewhere.

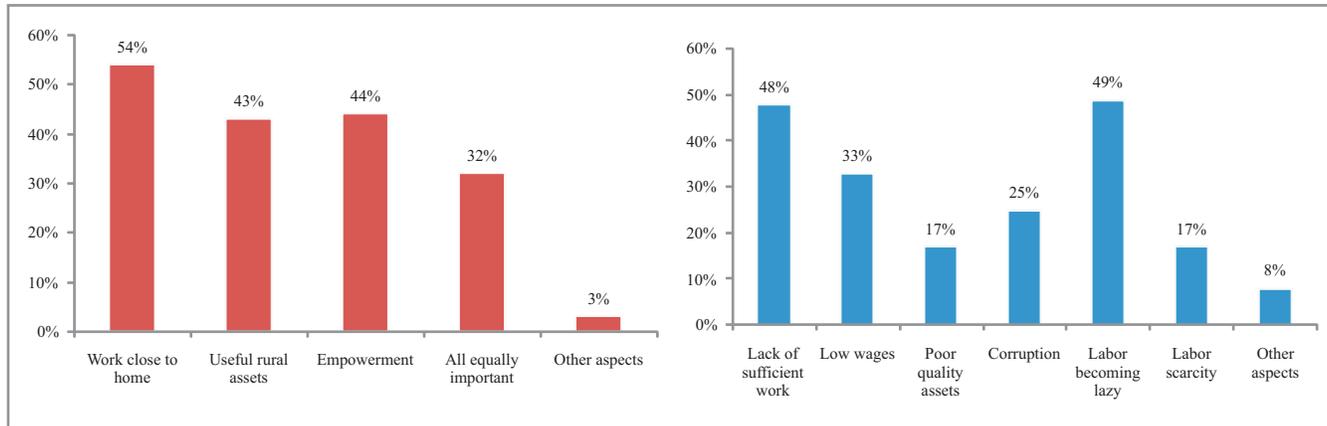
ATTITUDE OF THE RICH AND THE POOR

The principal-agent problem comes to full play in MGNREGA. Moral hazard is openly evident as is adverse selection. A working hypothesis we had was that works on private lands would be better monitored compared to CPR works. In some villages of 24 Paraganas district in West

Figure 3 Impact of MGNREGA implementation on male and female wages in the market



Data Sources: IWMI-IRMA student surveys in 4 states: Bihar (Kumar and Chandra 2010); Gujarat (Gaur and Chandel 2010); Kerala (Nair and Sanju 2010); and Rajasthan (Singh and Modi 2010).

Figure 4 (a) Most beneficial and (b) Worst aspects of MGNREGA implementation

Data Sources: IWMI-IRMA student surveys in 4 states: Bihar (Kumar and Chandra 2010); Gujarat (Gaur and Chandel 2010); Kerala (Nair and Sanju 2010); and Rajasthan (Singh and Modi 2010).

Note: The values on the y-axis represent the percentage of villages that chose the particular variable.

Bengal, Shah and Indu (2009) found MGNREGA work on private fishing ponds was supervised well, all funds available were utilized and wages were paid promptly. Shah and Indu (2009) also reported that people applying and then not reporting for work is emerging as a big issue in Punjab and Haryana villages. In one village near Rohtak town, the *Pardhan* got a MGNREGA project to get irrigation drains de-silted, but most people who applied for work refused to come despite cajoling and coercing; so children, old people and anyone who would work had to be accepted to complete the work.

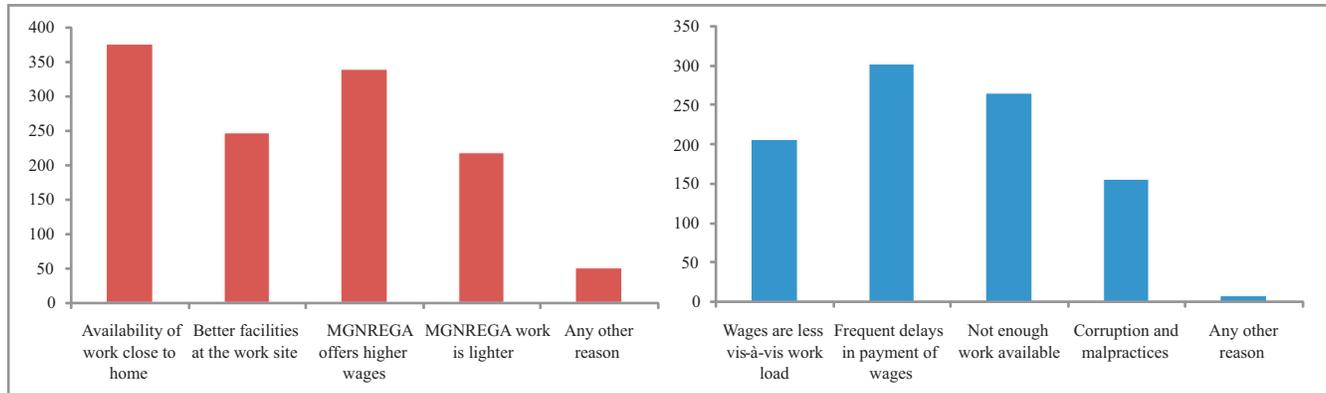
Large land owners are at the receiving end of MGNREGA. Subodh Saha, a large farmer who migrated from Bangladesh on the basis of land exchange, told Shah and Indu (2009) that MGNREGA was government's plan to finish off the farmers. "When people got Rs. 80 for doing 'nothing', why would they do hard farm labor for me?" he asked. Similar sentiments were portrayed in eastern Uttar Pradesh, south Rajasthan and West Bengal. Growing labor scarcity and the consequent rise in wages were the obvious grouses, as were the growing laziness of laborers and a decline in the work ethic. Our survey in 75 villages of Bihar, Gujarat, Kerala and Rajasthan tried to better understand the perceptions of the rich and poor regarding MGNREGA and its various aspects.

In focused group discussions, we asked about the most beneficial and most worrisome aspects of MGNREGA in each village (Figure 4). Not surprisingly, most groups nominated 'availability of work close to home' as the most beneficial aspect of MGNREGA; 'empowerment of village communities, including women' was second; closely followed by 'creation of useful rural assets'. In terms of the worrisome aspects, the most prominent was a

dilution in work ethic expressed as 'labor becoming lazy'. Nearly half the groups complained about the 'lack of sufficient work' and one-third felt that MGNREGA offered 'low wages'. These groups demanded that MGNREGA be implemented more forcefully and at a larger scale. Interestingly, corruption and malpractices in MGNREGA did not figure prominently; and were reported by only one-fourth of the groups as worrisome.

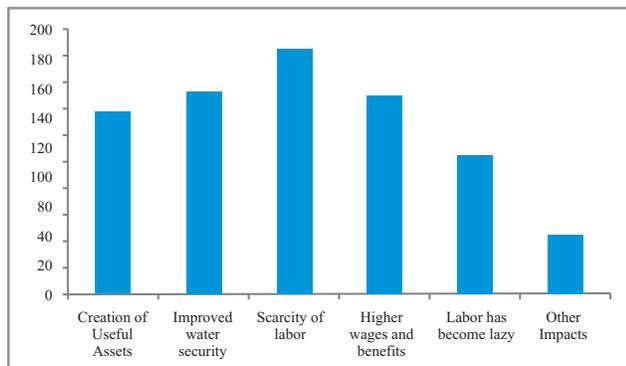
Next, we interviewed more than 600 landless and marginal farmers - the most likely beneficiaries of the wage benefits of MGNREGA - and asked them to list down reasons why they found it attractive; and reasons that made it unattractive to them (Figure 5). As in the group discussions, 'availability of work close to home' was found to be the most attractive aspect of MGNREGA. This was followed by 'MGNREGA offers higher wages' than the prevailing residual market wage rates; somewhat contradicting the results from the group discussion. Laborers acknowledged that MGNREGA wages acted as the new wage-floor and offered negotiating power to the laborers vis-à-vis their employers. The laborers also appreciated the 'improved work-site facilities'; putting pressure on residual labor market to provide the same. Several laborers, especially women, acknowledged that 'MGNREGA work is lighter' compared to the residual farm labor market.

Our respondents found frequent delays in MGNREGA wage payments and the non-availability of sufficient quantum of work as the most unattractive aspects of MGNREGA; several laborers were also unhappy with the unclear/ arbitrary manner in which actual wages were calculated, leading to suspicions of corruption and malpractices. In some villages, laborers suspected that

Figure 5 Reasons why MGNREGA work is (a) attractive and (b) unattractive for laborers

Data Sources: IWMI-IRMA student surveys in 4 states: Bihar (Kumar and Chandra 2010); Gujarat (Gaur and Chandel 2010); Kerala (Nair and Sanju 2010); and Rajasthan (Singh and Modi 2010).

Note: The values on the y-axis in (a) and (b) represent a composite index which was calculated based on ranks given by the respondent to the different variables. The number of respondents giving each variable a particular rank (1-4) was divided by the rank itself and the totals were added to form the composite index for each variable.

Figure 6 Key impacts of MGNREGA for medium and large land-owning farmers

Data Sources: IWMI-IRMA student surveys in 4 states: Bihar (Kumar and Chandra 2010); Gujarat (Gaur and Chandel 2010); Kerala (Nair and Sanju 2010); and Rajasthan (Singh and Modi 2010).

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large farmers colluded with the MGNREGA administration to ensure that no works were carried out during the peak agricultural season. This significantly reduced their bargaining power.

Finally, we interviewed roughly 350 large farmers - the people most likely to hire laborers to work on their farms - in order to understand their perceptions about the impact of MGNREGA implementation (Figure 6). These farmers, not surprisingly, thought that the biggest impacts of MGNREGA have been the growing scarcity of labor and

the resultant hike in wages and benefits. Several of them acknowledged improvements in local water security and appreciated the creation of useful rural assets. The erosion of work ethics among laborers and their growing laziness was another key impact they reported.

CONCLUSION

It is clear from our field studies and survey results that in several places, post-MGNREGA rural labor markets come with significantly altered rules-of-the-game. By offering 100 days of convenient and accessible work close to home at competitive wages, MGNREGA has: (a) brought into the labor force a new segment of previously economically inactive people, including a large number of women; (b) tightened the residual labor markets and lifted depressed wage rates; (c) set wage-floors and provided greater bargaining power to the laborers by introducing a high opportunity cost for their time; and (d) affected the labor work ethic and segmented the village labor markets into two. These impacts, however, have not been the same throughout the country and the nature of local labor markets has deeply influenced the attractiveness, effectiveness and impacts of MGNREGA.

We identified four distinct kinds of interactions between MGNREGA and local labor markets. Their respective implications have been summed up in Table 2.

As Table 2 shows, the net impact of MGNREGA can be maximized if it is implemented in the areas where it is most needed, at a substantial scale, and with strict adherence to the MGNREGA protocol, in letter and in spirit. A target-driven, supply-push to MGNREGA in areas where there is little demand would result in adverse

impacts on the local labor markets and the agrarian economy. Finally, in the long run, the success of MGNREGA may be measurable in terms of its reduced demand. Regions and communities that require MGNREGA work today should be able to improve their economic condition and reduce their need for unskilled,

minimum-wage employment over time. This would happen only if the labor markets become more productive and the MGNREGA assets are able to enhance the profitability of agriculture by providing enhanced water security, improving land productivity, connecting villages to markets etc.

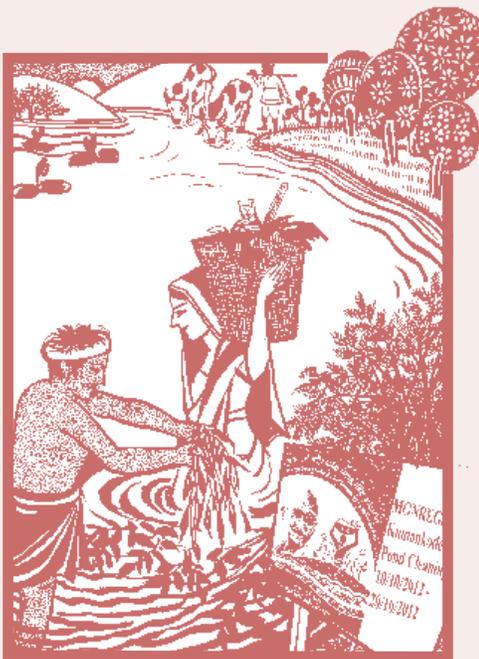
Table 2 Implications of different MGNREGA-Local labor market interactions

Type	Community Response	Implications
Type I: Misfit	Lukewarm	<ul style="list-style-type: none"> (-) MGNREGA unlikely to excite local village community; (-) Negligible impact on (already tight) local labor markets; (+) Might bring new entrants to the labor force, including women who were economically inactive, elderly and disabled; (-) If MGNREGA is artificially pushed by administration, it will likely lead to poor implementation and will encourage corruption and malpractices; (-) It will also distort work ethic among laborers and reduce productivity of agriculture
Type II: Insignificant	Demand more forceful implementation	<ul style="list-style-type: none"> (±) MGNREGA unlikely to have significant impact on local labor market because its scale is negligible vis-à-vis local surplus labor availability; (±) Substitutive impact is likely but at a low level; (±) Wages in the residual market unlikely to be affected and will continue to remain depressed; (+) Clamor for more forceful implementation
Type III: Potentially significant	Disappointment and disillusionment; expectation of better implementation	<ul style="list-style-type: none"> (±) MGNREGA has potential to have significant and positive impact for laborers; (-) But this does not happen because of administrative bottlenecks and/ or systemic corruption; (-) Village community will initially get excited by MGNREGA but feel disillusioned; (-) Laborers will return to residual labor market and/ or migration due to poor implementation
Type IV: Significant	Non-wage benefits of MGNREGA will attract entire village community; boon for laborers; bitter-sweet for large land owners	<ul style="list-style-type: none"> (+) MGNREGA catalyzes widespread interest; (+) Higher wages and better work conditions for laborers; (+) Fixing of wage-floor at MGNREGA level and greater bargaining power for laborers; (+) Reduction in distress migration; (+) Reduction in ratio of male-female wage rates; (±) Creation of rural assets can potentially benefit entire community if implemented well; (±) Segmentation of the labor market into: (a) less productivity-sensitive MGNREGA market comprising largely of women, elderly and less-abled; and (b) highly productivity-sensitive residual market comprising of able-bodied youth; (-) Possible decline in work ethic if MGNREGA works not supervised well; (-) Higher input costs in agriculture, higher prices of agricultural produce



REFERENCES

- Bhalla, S.S. 2004. Corruption with a human face. *Business Standard*, 11th December.
- Bhalla, S.S. 2010. Does NREGA really work? *Business Standard*, 27th March.
- Gaur, P. and Chandel, P. 2010. Effectiveness and ownership of irrigation assets created under NREGS & effect on labor market in Gujarat. Anand: IWMI-Tata Program, unpublished Internship report.
- Kumar, A. and Chandra, G. 2010. Effectiveness and ownership of irrigation assets created under MNREGA and labour market dynamics in Bihar. Anand: IWMI-Tata Program, unpublished Internship report.
- Nair, N. and Sanju, S. 2010. Water conservation and irrigation asset creation under NREGS in Kerala: Understanding the ownership and effectiveness of the assets created and its influence on labor dynamics. Anand: IWMI-Tata Program, unpublished Internship report.
- MGNREGA. 2012. Website of the Mahatma Gandhi National Rural Employment Guarantee Act 2005. Ministry of Rural Development, Government of India. <http://nrega.nic.in/netnrega/home.aspx>
- Shah, T. and Indu, R. 2009. MGNREGA in Indo-Gangetic Basin: Field notes from here and there. Anand: International Water Management Institute.
- Shah, T., Verma, S., Indu, R., and Pullabothla, H. 2011. Asset creation through employment guarantee? Synthesis of student case studies in 12 states of India. Anand: International Water Management Institute.
- Singh, A. and Modi, R. 2010. Effectiveness and ownership of irrigation assets created under NREGS & effect on labor market in Rajasthan. Anand: IWMI-Tata Program, unpublished Internship report.
- Verma, S. 2010. Labor market dynamics in post-NREGS rural India: Field notes from tribal South Gujarat and Southern Rajasthan. Anand: International Water Management Institute.
- Verma, S. 2012. Water asset creation in MGNREGS, India. Pretoria: Invited presentation at seminar organized by the Water Research Commission of South Africa (WRC), International Water Management Institute (IWMI) and Trade and Industrial Policy Strategies (TIPS) International. 14th August.



About the IWMI-Tata Program and Water Policy Highlights

The IWMI-Tata Water Policy Program (ITP) was launched in 2000 as a co-equal partnership between the International Water Management Institute (IWMI), Colombo and Sir Ratan Tata Trust (SRTT), Mumbai. The program presents new perspectives and practical solutions derived from the wealth of research done in India on water resource management. Its objective is to help policy makers at the central, state and local levels address their water challenges – in areas such as sustainable groundwater management, water scarcity, and rural poverty – by translating research findings into practical policy recommendations. Through this program, IWMI collaborates with a range of partners across India to identify, analyze and document relevant water-management approaches and current practices. These practices are assessed and synthesized for maximum policy impact in the series on Water Policy Highlights and IWMI-Tata Comments.

Water Policy Highlights are pre-publication discussion papers developed primarily as the basis for discussion during ITP's Annual Partners' Meet. The research underlying these Highlights was funded with support from IWMI, Colombo and SRTT, Mumbai. However, the Highlights are not externally peer-reviewed and the views expressed are of the author/s alone and not of ITP or either of its funding partners.

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