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Soil and Water Conservation Works through National Rural Employment Guarantee Scheme (NREGS) in Andhra Pradesh — An Analysis of Livelihood Impact

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Abstract

The impact of National Rural Employment Guarantee Scheme (NREGS) has been studied on rural livelihoods and the nature of soil and water conservation (SWC) works. NREGS is under implementation in almost all the rural districts of the country with the major objective of enhancing livelihoods through productive works. Rajasthan, Andhra Pradesh and Madhya Pradesh are the three states leading in scheme implementation with a large number of works, expenditure and employment. In Andhra Pradesh, soil and water conservation (SWC) works have accounted for over 80 per cent. The share of labour wages under the scheme has been 80 per cent with only 20 per cent for material, which is well within the prescribed norm of 40 per cent for the latter. The field study in the Ananthapur district has indicated that almost two-thirds of the beneficiaries are farmers. The scheme has brought down the migration levels from about 27 per cent to only 7 per cent in the study villages. The linear regression function has brought out that the number of family members participating in the NREGS is significantly influenced by income from other sources, family size and landholding. The NREGS earnings are being used mainly for food, education and health security. Although the scheme provides opportunity for 100 days of wage guarantee, the actual average employment is only for 25 days per household. Ideally, this gap needs to be bridged at least in the distress districts. The study has observed that SWC works in agricultural lands, especially in the rainfed areas need to be continued. However, some works require structural modifications for a better impact.

Introduction

Unemployment and Poverty are inseparable. The less favourable areas like rainfed regions are the hot spots for these twin problems experienced by the people. Various programmes and schemes have been implemented by the successive governments at the Centre and states in India to eliminate poverty, reduce distress on account of unfavourable weather and other calamities and thus promote rural development. Some of the significant programmes implemented by the Government of India include IRDP, JRY, SJSRY, RSVY and BRGF. Coupled with these, natural resource management programmes like IWDP, DPAP, DDP and NWDPRA which are primarily watershed development programmes were also implemented more intensively in the past two decades or so. All these have had systemic as well as localized impacts wherever conducive factors favoured them.

Rainfed agriculture contributes 40 per cent to the country's food grain production with 60 per cent area vulnerable for weather vagaries. These areas largely account for migration towards urban / industrial areas, leading to neglect of the already degraded natural resources (GoI, 2007). The intensity of misery experienced in such areas can be gauged by the extent of poverty levels. It may be noted that states like Chattisgarh, Orissa, Madhya Pradesh, Maharashtra and Jharkhand have higher poverty levels, which also have large areas under rainfed agriculture (Figure 1). There could be many other reasons like lower literacy level,

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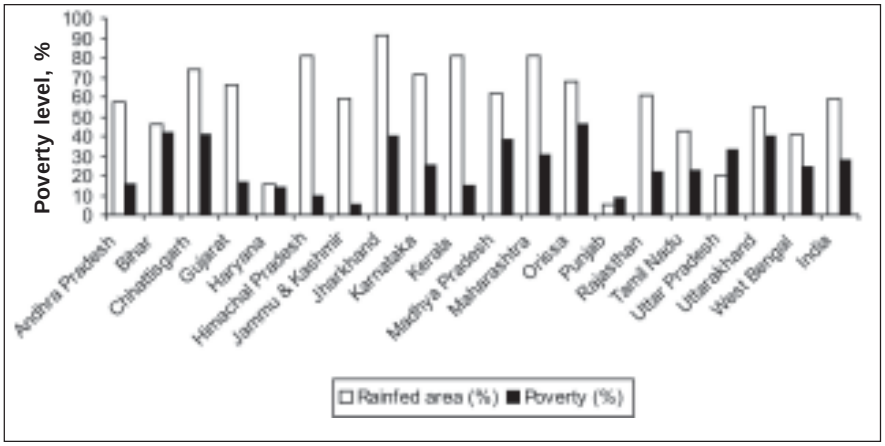

Figure 1. Poverty levels and rainfed areas across major states of India: 2004-05

poor infrastructure and lack of appropriate institutions, which ultimately result in greater poverty incidence. Nevertheless, better natural resources are the base on which a development model can be built upon. In order to assure a certain amount of regular income, providing large-scale work opportunities in the public domain are the best bet.

Origin of NREGS

Maharashtra had introduced an employment guarantee scheme during 1970s, which was a novel idea in rural development. Based on the analysis of previous studies and original fieldwork in rural Maharashtra, it seems that the objective and subjective interests of the rural poor were met by the scheme (Herring and Edwards, 1983; Mahendradev, 2002). This scheme, however, was not in the news subsequently and was not emulated by other states. As rural unemployment, exodus from rural to urban areas and recurrent suicides of farmers took the headlines in the media during the first five years in the new millennium, the new dispensation at the Centre took the bold step to introduce an employment guarantee scheme in the rural areas through productive works meant for natural resource management and rural connectivity.

The National Rural Employment Guarantee Scheme (NREGS) as a sequel to the NREG Act was originally launched in February, 2006 in 200 districts of the country and subsequently it was extended to another 130 districts in 2007-08. Currently, the scheme is in implementation in all the rural districts of the country, numbering 593. The scheme guarantees providing 100 days' employment to the desired households. During the past three years ending March 2009, about 4.5 crore rural labour have obtained employment under the scheme with about 14 per cent of them getting 100 days of employment during 2008-09. Some studies on the benefits of NREGS and its implementation modalities have been undertaken by Shah (2007), Ambasta *et al.* (2008) and Dreze (2009). However, specific information on the impact of the scheme on livelihoods, use of the earnings and the nature and utility of the assets created through the works under NREGS is hardly available, but would be important to further strengthen the scheme. Hence, in view of paramount importance of the scheme for improvement of the rural livelihoods through public investment in the rainfed agriculture, this paper has assessed the impact of the scheme on rural livelihoods and the nature of soil and water conservation (SWC) works.

Methodology

The study adopted a two-stage approach. The first stage involved collection, compilation and analysis of secondary data available in the public domain (www.nrega.nic.in and www.nrega.ap.gov.in) for various parameters that explained the progress of the scheme across the implementing states. The state of Andhra Pradesh was purposively selected as it was one of the leading implementers of the scheme, besides being a typical rainfed state. In the second stage, a field level study was conducted in one of the districts of Andhra Pradesh, where the number of works under the scheme was the highest. While selecting such district, besides the number of works, the rainfed area was also considered as the criterion. Hence, Anantapur

district was chosen in place of Chittoor district, although the former lagged behind the latter in terms of number of works, besides being largely rainfed (89 per cent of net sown area) compared to 62 per cent in Chittoor district.

At the district level, adopting multi-stage random sampling, two mandals from Anantapur district, six villages (@ 2 per mandal), 60 employment beneficiaries (5 men and 5 women from each village), 36 farmer beneficiaries of SWC works (65/sample village), 36 non-beneficiary farmers (@ 6/village) and 54 SWC work sites (@ 6 farmer sites and 3 CPR sites in each village) were selected and studied. Structured and pre-tested interview schedules were used for data collection from the respondents and the work sites. Besides descriptive statistics, a linear regression function was developed to explain the participation of the persons in NREGS works. Thus, the number of persons participating in the NREGS works was related on four explanatory variables, viz. family size (No.), wage earnings from other sources (Rs/year), whether the family was migrating before the launch of the NREGS (dummy variable) and the size of landholding (ha).

NREGS across Major States

Andhra Pradesh is one of the leading states in the implementation of the scheme with 236021 (11.2 per cent) works completed in the country by March, 2009, with the cumulative expenditure of Rs 2964 crore (Table 1). The investment made under NREGS across the states was worked out for the net sown area, as the works have a greater bearing on agriculture. Among the major NREGS implementing states, Jharkhand was on top with Rs 7586/ha of net sown area, closely followed by Himachal Pradesh with Rs 6137/ha. Rajasthan and Andhra Pradesh, which were otherwise leading in terms of number of works and employment generation, had respectively spent about Rs 3677/ha and Rs 2734/ha of net sown area during the past three years of the scheme's implementation (Table 2).

Given the nature of soil and water conservation works, there is still a large scope for investment under the scheme. Madhya Pradesh and Rajasthan are the other two states where NREGS is in vast coverage in terms of expenditure and number of works. In terms of employment generated under the scheme, Andhra Pradesh stood second with 20.8 per cent of the total employment in the country, next only to Rajasthan (33.9 per cent). The share of households obtaining the guaranteed 100 days of employment was the highest in Andhra Pradesh (23.1 per cent), followed by Rajasthan (Table 3). On an average, 38 days of employment was provided to the employed persons in the NREGS across the country during 2006-09. Among the states, Rajasthan had provided the maximum employment of 58 days to each of the households

Table 1. State-wise completed works and expenditure under NREGS: 2006-09

State	Works		Expenditure		Expenditure on
	No.	Per cent	Amount (in crore Rs)	Per cent	SWC measures, %
Andhra Pradesh	236021	11.2	2964	12.2	97
Bihar	41465	2.0	1316	5.4	33
Chhattisgarh	112798	5.3	1434	5.9	47
Gujarat	19198	0.9	196	0.8	38
Himachal Pradesh	32115	1.5	332	1.4	19
Jharkhand	186291	8.8	1342	5.5	50
Karnataka	97136	4.6	358	1.5	63
Kerala	60500	2.9	225	0.9	53
Madhya Pradesh	424703	20.1	3555	14.6	55
Maharashtra	77204	3.7	362	1.5	71
Orissa	151847	7.2	609	2.5	37
Rajasthan	325245	15.4	6164	25.3	44
Tamil Nadu	11384	0.5	1004	4.1	67
Uttar Pradesh	120811	5.7	3569	14.6	50
West Bengal	108686	5.1	940	3.9	63
India	2114924	100.0	24370	100.0	

Source: Authors' estimate from public domain data on www.nrega.nic.in

Table 2. NREGS investment per unit agriculture area : 2006-09

State	Net sown area ('000 ha)	NREGS expenditure/ha of net sown area (Rs)
Andhra Pradesh	10843	2734
Bihar	5572	2362
Chhattisgarh	4764	3010
Gujarat	9852	199
Himachal Pradesh	541	6137
Jharkhand	1769	7586
Karnataka	10105	354
Kerala	2089	1077
Madhya Pradesh	14971	2375
Maharashtra	17473	207
Orissa	5739	1061
Rajasthan	16764	3677
Tamil Nadu	5062	1983
Uttar Pradesh	16573	2153
West Bengal	5295	1775

Source: Authors' estimate from public domain data on www.nrega.nic.in

involved in the scheme, followed by Maharashtra, Jharkhand and Andhra Pradesh. On a cumulative basis till the end of March 2009, a total of 8,236,289 households have been covered. Most number of household under the scheme obtained employment in the range of 11-20 days in a year (28 per cent), followed by 1-20 days (26 per cent) and 21-30 days (18 per cent) (Table 4). The average wage being paid as of July, 2009 under the scheme worked out to be Rs 84/ day/person across the states with the maximum of Rs 143/day/person in Haryana and the minimum of Rs 70/day/person in Meghalaya. This is in tune with the respected states' prevailing minimum wage rates. Almost 87 per cent of the expenditure on works was meant for soil and water conservation works under NREGS in Andhra Pradesh.

The provision for material component for the various works is permitted to the tune of 40 per cent as per the NREGA guidelines (MoRD 2005). However, the share of material has crossed more than 50 per cent in states like Madhya Pradesh and Jharkhand. This needs to be carefully monitored, as the main

Table 3. Employment status in NREGS (cumulative till March 2009)

State	Distribution of households employed (per cent)	Distribution of employment generated (per cent)	Share of employment for Women (%)	Households completing 100 days (%)	Average days of employment provided (No)
Andhra Pradesh	20.0	20.8	58.1	23.1	40
Assam	2.0	1.2	17.9	0.6	22
Bihar	1.9	1.0	26.4	0.6	20
Chattisgarh	6.0	5.2	46.5	4.2	33
Gujarat	0.6	0.4	48.6	1.9	25
Haryana	0.4	0.4	33.6	4.0	33
Himachal Pradesh	1.1	1.2	46.1	3.7	40
Jharkhand	4.3	4.6	28.5	6.4	41
Karnataka	2.3	2.3	45.4	4.8	38
Kerala	2.2	1.4	86.1	1.7	24
Maharashtra	1.9	2.1	48.6	9.3	42
Madhya Pradesh	12.3	10.8	41.1	4.2	33
Orissa	4.2	4.0	37.6	4.4	36
Punjab	0.0	0.0	33.2	1.5	27
Rajasthan	22.2	33.9	60.9	13.6	58
Tamil Nadu	0.4	0.2	81.7	2.9	23
Uttar Pradesh	8.5	5.2	14.1	1.5	23
Uttarakahnd	0.1	0.1	38.6	0.2	18
West Bengal	7.1	2.3	27.1	0.2	12
Total (No.)	28565863	1083108010	537981379	2723731	38

Source: Authors' estimate from public domain data on www.nrega.nic.in

Table 4. Duration-wise employment provided under NREGS in the country: 2006-09

Duration of employment (days)	Share of households (%)	Cumulative share of households (%)	Average employment/ household
1-10	26	26	6
11-20	28	54	14
21-30	18	72	25
31-40	10	81	36
41-50	6	88	46
51-60	4	92	55
61-70	2	95	65
71-80	2	97	75
81-90	2	99	90
91-100	1	99	99
>100	1	100	100

Source: Authors estimate from public domain data on www.nrega.nic.in

objective of the scheme, to create wage employment, should not be defeated on this account.

NREGS in Andhra Pradesh

In Andhra Pradesh, the scheme was launched from Anantapur in February, 2006. The total number of works completed under NEREGS in Andhra Pradesh till March, 2009 were 235938, with the highest share in Chittoor district (16.1 per cent), followed by Anantapur (9.3) (Table 5).

Land development (34 per cent), followed by water conservation (harvesting) (30 per cent) were the two major interventions done under the scheme in Andhra Pradesh (Figure 2). Given the needs of terrain and moisture scarcity in the state, these two works take prominence.

The cumulative ratio of material in the overall expenditure in Andhra Pradesh was worked out to be 20 per cent, which is well within the limit of 40 per cent stipulated in the guidelines. Thus, the provision for labour wages is that much more (Table 5). Across districts, the share of material component was highest in the Guntur district (36 per cent) and lowest (1 per cent) in West Godavari district.

NREGS in Anantapur District

Anantapur district has 63 mandals and the scheme is being implemented in all the mandals. During the past three years since implementation, 22375 works have been completed in the district contributing to natural resources development in farmers' and CPR lands. The total expenditure on this account was of Rs 16455 lakh. The scheme provided employment to 5.66 lakh persons of 3.14 lakh households in the district during the period 2006-09.

Table 5. District-wise progress and share of labour and material expenditure in NREGS works in Andhra Pradesh: 2006-09

District	Total No of works	Share , %	Labour	Material
Adilabad	12595	5.3	89	11
Anantapur	22372	9.5	77	23
Chittoor	37872	16.1	79	21
East Godavari	10829	4.6	68	32
Guntur	10664	4.5	64	36
Kadapa	18639	7.9	68	32
Karimnagar	13761	5.8	70	30
Khammam	20960	8.9	84	16
Krishna	5164	2.2	91	9
Kurnool	7105	3.0	97	3
Mahabubnagar	12890	5.5	78	22
Medak	5676	2.4	80	20
Nalgonda	6193	2.6	73	27
Nizamabad	8567	3.6	85	15
Prakasam	6176	2.6	87	13
Ranga Reddy	5658	2.4	93	7
S.P.S Nellore	6074	2.6	68	32
Srikakulam	3972	1.7	98	2
Visakhapatnam	1027	0.4	97	3
Vizianagaram	5644	2.4	83	17
Warangal	11027	4.7	73	27
West Godavari	3073	1.3	99	1
AP Total	235938	100.0	80	20

Source: www.nrega.ap.gov.in

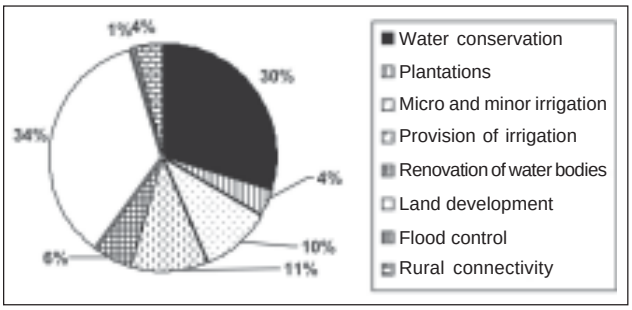

Figure 2. Composition of works under NREGS in Andhra Pradesh: 2006-09

Among different types of works completed under the scheme, water conservation accounted for the highest share (56 per cent), followed by land development (29 per cent), irrigation facilities (4 per cent), renovation of traditional water bodies (3 per cent), drought proofing and plantation (3 per cent), rural connectivity (3 per cent) and micro and minor irrigation words (1 per cent). Most of the NREGS works (96 per cent) have been executed by the Gram Panchayats in Andhra Pradesh, as also in Anantapur.

Micro-Level Study

Among the employment beneficiaries (N=60), 62 per cent were farmers and 38 per cent were landless labourers. The average landholding size of such farmers was 1.65 ha. The major impact of NREGS has been on reducing the migration level in the sample villages from about 55 per cent of the households to a mere 13 per cent. Similarly, the annual income earned as a consequent of migration has decreased from Rs 8135 to Rs 1414 per family**.** The earnings from NREGS wages accounted for 32 per cent of the household income for those families who worked in the scheme as labourers (Figure 3).

Purchase of food followed by expenses related to education of the dependents and health care were the major modes of utilization of the earnings from NREGS (Table 6). To capture the use of earnings from NREGS, the asset/amenity status of the employment beneficiaries was obtained for the pre- and during NREGS periods. There seems to be a significant contribution towards household assets like fan, television and bicycle mainly attributable to the savings of NREGS wages. Household amenities like electricity connection, toilet within the premises and drinking water connection also have been created from the savings of NREGS wages (Table 7). Some of these amenities have been created partly with the funds from other schemes like housing.

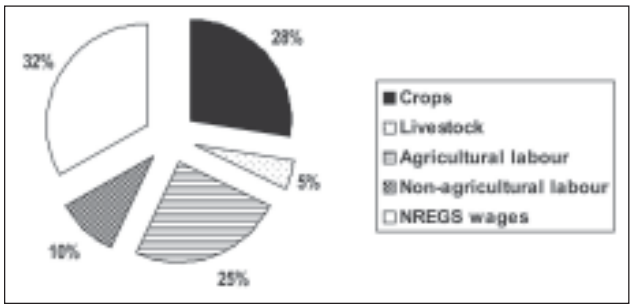

Figure 3. Average annual income from different sources, Rs/household (Total = Rs 42833)

Table 6. Utilization of NREGS earnings

Purpose	Percentage of households
Food	32
Education	18
Health	13
Debt repayment	8
House construction	7
Purchase of household assets	3
Clothing	7
Purchase of land	5
Savings	7

Source: Authors' work

Table 7. Change in household asset / amenity status after NREGS

(per cent of households)

Household asset	Before NREGS	After NREGS
Electricity	17	32
Fan	7	27
Television	3	22
Bicycle	2	10
Toilet within premises	0	13
Drinking water within premises	0	12

Source: Authors' work

Based on the visits to the sites of NRM works in the six study villages spread across three mandals in the district, the observations have been summarized in Table 8. Almost all the works have been executed with due technical care, except for weeding of Hariyali grass in black soils of one mandal of the Anantapur district. On an average 76 per cent of the works were found to be useful and were under use for the purposes meant for. In the case of farm ponds, only 25 per cent are being utilized as there is no provision for lining of the same, which is making the impounded water to percolate and is not available for use in supplemental irrigation, especially in the red soils. At best, such ponds were serving the purpose of groundwater recharge. As regards the weeding operation done in black soils of one of the mandals, it is felt that the quantification of

Table 8. Diversity of NRM interventions and their utility in Anantapur district

Name of the work	Total works (No.)	Technically sound works (No.)	Works requiring minor correction (No.)	Works with no sound technical backup (No.)	Works being put to use (No.)
Farm ponds	16	13 (81)	0	3	4 (25)
Tank desilting	3	3 (100)	0	0	3 (100)
Earthen field bunds	14	14 (100)	0	0	14 (100)
Stone bunding of fields	3	3 (100)	0	0	3 (100)
Bush (jungle) clearance	3	3 (100)	0	0	3 (100)
Plantations* (Horticulture / Biodiesel)	7	6 (86)	1	0	6 (85)
Drainage / culvert	4	4 (100)	0	0	4 (100)
Weeding of fields (infested with Hariyali grass)	4	0 (0)	0	4	4 (100)
Total	54	46	1	7	41 (76)

Note: Figures within the parentheses are percentages to total works; ***** 75-95 per cent survival
Source: Authors' work

work was a major issue, otherwise, the work as such was useful. The horticulture plantations have been done in convergence with other line department schemes like National Horticulture Mission (NHM) and Andhra Pradesh Micro Irrigation Project (APMIP). The NHM provides planting material while APMIP provides drip system to the SC/ST farmers and the plantation pits are made through NREGS. Of course, the farmers are expected to have their irrigation source and pumping systems.

Participation in NREGS Works

To examine the dependency of household on NREGS works, the number of participants in NREGS works was related to a set of independent variables, as mentioned earlier. It was observed that the variable family size, landholding, and wages from other sources were positively related to dependency on the NREGS works. It was interesting to note the positively significant coefficient of landholding size, which shows that even large farmers face livelihhod and income insecurity in this drought-prone district (Table 9). It also indicates that the employment beneficiaries with relatively larger landholding size bank more on NREGS as a source of wages. The status of the family in terms of migration before the launch of the programme had a positive thought and does not influence significantly on the number of persons participating in the NREGS works. The variables included in the model explained about 64 per cent of the variation in the dependent variable.

Labour Supply and Wage Rates for Farming Operations

The implementation of NREGS had affected labour supply and wage rates for agricultural operations. In the Anantapur district, the increase in wages was to the tune of 38 per cent per annum in peak season, while it was 34 per cent during slack season (Table 10). This may indicate rationalization of rural wage rates, but it pinches the farmers as it cuts down their profit margin and does not commensurate with the hike in the price of their produce. The specific impact on labour supply due to NREGS works needs to be studied in depth.

Table 9. Estimated co-efficients of linear regression for factors influencing the dependency of households on NREGS works

Variable	Coefficient	Standard error
Constant	0.805	0.236
Family size (No.)	0.084*	0.038
Wages from other sources (Rs/household/year)	0.00004**	0.00001
Whether migrated during 2005-06 (pre-NREGS period)	0.132	0.146
Landholding (ha)	0.304**	0.050
R^2	0.64	

Note: ** and * indicate significance at 1 per cent and 5 per cent levels, respectively.

Table 10. Trend in wage rates for agricultural labour (at current prices)

(Rs/day)

Period	Year	Peak season		Slack season	
		Male	Female	Male	Female
Before NREGS	2005-06	48	36	36	27
After NREGS	2006-07	67	53	50	38
	2007-08	84	64	61	45

Conclusions

NREGS is under implementation in almost all the rural districts of the country with the major objective of enhancing livelihoods through productive works. Rajasthan, Andhra Pradesh and Madhya Pradesh are the three states leading in scheme implementation with a large number of works, expenditure and employment. In Andhra Pradesh, soil and water conservation (SWC) works have accounted for over 80 per cent. The share of labour wages under the scheme has been 80 per cent with only 20 per cent for material, which is well within the prescribed norm of 40 per cent for the latter. The field study in the Ananthapur district has indicated that almost two-thirds of the beneficiaries are farmers. The scheme has brought down the migration levels from about 27 per cent to only 7 per cent in the study villages. The linear regression function has brought out that the number of family members participating in the NREGS is significantly influenced by income from other sources, family size and landholding. The NREGS earnings are being used mainly for food, education and health security. Although the scheme provides opportunity for 100 days of wage guarantee, the actual average employment is only for 25 days per household. Ideally, this gap needs to be bridged at least in the distress districts.

Over three-fourths of the SWC works done under the scheme are being used or serving the intended purpose. Some works require structural modifications, which may be inbuilt into the scheme. Finishing touches for the SWC works may be made as a mandatory contribution from the beneficiary farmer. For instance, the lining of farm ponds in red soils with locally available silt/clay to increase the water-retaining period, to be made as the farmers' contribution. Similarly, a provision to extend some incentive like giving diesel pump cum sprinkler/drip system through convergence with other line department schemes for farmers who demonstrate their resilience in retaining/sustaining the SWC works like farm ponds.

Thus, the SWC works in agricultural lands, especially in the rainfed areas under the public-funded schemes need to be continued as they ensure livelihoods through wage incomes and creation of productive assets. In the years to come, NREGS has the potential to usher in massive rural development in broad convergence with a variety of government schemes provided the communities are given a greater leverage in all aspects of the scheme's implementation. This study has provided empirical evidences on the impact of NREGS. However, for comprehensive understanding of the implications of NREGS, there is a need to conduct an extended study covering some more rainfed states. The issue of impact on labour availability for farming operations and possible options for ensuring labour availability needs to be further analysed.

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