AgWater Solutions Project
Case Study

The Mahatma Gandhi National Rural Employment Guarantee Scheme: A Promising Solution for Agricultural Water Management in India: An Assessment Based on a Case Study in Madhya Pradesh

Ravinder P. S.Malik
IWMI-New Delhi, India

Vivek Sharma
CARD- Bhopal, India

September, 2012

Acknowledgment
The authors and project partners wish to thank the Bill & Melinda Gates Foundation for the generous grant that made this project possible.

The AWM Project
The AgWater Solutions project was implemented in five countries in Africa and two states in India between 2008 and 2012. The objective of the project was to identify investment options and opportunities in agricultural water management with the greatest potential to improve incomes and food security for poor farmers, and to develop tools and recommendations for stakeholders in the sector including policymakers, investors, NGOs and small-scale farmers.

The leading implementing institutions were the International Water Management Institute (IWMI), the Stockholm Environment Institute (SEI), the Food and Agriculture Organization of the United Nations (FAO), the International Food Policy Research Institute (IFPRI), International Development Enterprises (iDE) and CH2MHill.

For more information on the project or detailed reports please visit the project website http://awm-solutions.iwmi.org/home-page.aspx.

Disclaimers

This report is based on research funded by the Bill & Melinda Gates Foundation. The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of the project, its partners or the Bill & Melinda Gates Foundation.

Contents

Executive Summary

A majority of the permissible works being undertaken as part of the livelihood security program, Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), India, relate to building of assets aimed at enhancing rural water security. The present study attempts to assess how durable these assets have been and how effective MGNREGS has been in helping improve rural water security. The study draws evidence from four selected districts in the state of Madhya Pradesh.

The results obtained show that with emphasis on creating durable assets in rural areas through provision of guaranteed employment, MGNREGS holds a great potential for improving rural water security and in providing irrigation water services on a sustainable basis. With cost effective, reasonably good quality and durable individual and community water structures being built in the studied areas of rural Madhya Pradesh, water availability scenario is slowly improving. However mere building of good quality assets and water stored therein in itself is not sufficient to provide water security. This in itself is akin to a job half done and an objective partially achieved. What use these good quality structures and water therein is if the water available in the structures cannot be put to productive use by the beneficiaries? In addition to building assets, the program must also ensure that the created assets are actually put to productive use by the beneficiary farmers so that the intended objective of creating a process of employment generation on a sustainable basis could actually materialise. Accomplishing this task would require a careful assessment of the location specific underlying causes for non-use of created assets and devising appropriate remedial measures and complementary intervention strategies to address them. In the study area, for example, a number of otherwise beneficiary farmers of the program have not been able to transform the available water in to utilisable water due to lack of access to a water lifting device. This in part is due to the fact that while MGNREGS does address issues of water availability it does not directly address issues relating to accessibility and utilization of water made available.

While the government has been trying to address this concern through such means as convergence of MGNREGS with other programs being run by different Ministries/ Departments of the government and has issued elaborate convergence guidelines for this purpose, in practice this has not been very effective. In any case, with thousands of structures being currently built and planned to be built over the years attempting to fill this gap through convergence of programs is an expensive proposition and is neither feasible nor is desirable. Altering the scope of MGNREGS to include provision of a pumping equipment to bridge this gap is not possible as this would alter the basic premise of employment creation without use of any machinery. We feel that linking of beneficiaries to financial institutions and making available either interest free or concessional loans for investment in a pumping equipment could to a large extent help bridge this gap without altering the basic objective of the program and at not too heavy a cost to the government.

Much greater involvement of the beneficiary farmers in the choice of type and size of the water structure to be built and greater transparency of the technical details (such as designed and actual capacity) and financial expenditure incurred will encourage greater involvement, interest and instill more confidence in the beneficiaries leading to improved

efficiency of the investment and better and more efficient utilization of the built structure. Routinely building water structures without consideration of the nature of water requirement of the beneficiary farmer would defeat the whole purpose of water security and more efficient use of the available water.

The impact of the water structures in improving farmers' income so far has only been modest. While this in part could be due to the fact that most of the beneficiary farmers have had these structures built in the last two-three years only and it takes time to respond, adjust and make necessary changes in the farm economy, part of it could be due to lack of information and knowledge about cultivating irrigated crops and choice of a suitable crop mix in accordance with the water availability. Extension support to the beneficiary farmers could help bridge this gap and enable them better plan their farm economy.

Though designed and built primarily with a single use purpose, of making irrigation water available, in view the built structures are actually being used for more than one purpose by the beneficiary farmers. Not taking in to consideration this fact in designing the nature, size and capacity of the built structure may lead to divergence of preference between the structures actually built and those desired most by the beneficiaries as also the water that can be used for different purposes. If the multiple use nature of the structures is kept in view at the time of designing the structure it would not only add to the utility of the structure but also help avoid duplication of expenditure on parallel government schemes designed for different single use purposes.

Having made the initial efforts towards providing rural water security through MGNREGS, it is reasonable to expect that through multiplier impact this would encourage complementary private investments from the beneficiary and other farmers as well so that the combined efforts of MGNREGS investments and private complementary investments could push the goal of achieving water security on a more sustainable basis on a much higher pedestal than is envisaged with MGNREGS investments alone. Currently however such private investments are not happening as the additional meagre incomes of the beneficiary farmers is being spent on meeting other pressing family requirements. While this could change in the future on its own, a complementary effort at encouraging farmers to invest, at least a part of their additional income derivable from use of irrigation water, in expanding and strengthening their water infrastructure could add further and ensure more sustainable household water security.

In conclusion, based on assessment of the data collected from the study area of Madhya Pradesh, we are of the view that MGNREGS is a good model for providing rural water security. While the efforts being made under MGNREGS towards this end are beginning to yield positive outcomes, successful mediation in addressing some of the above concerns could help further accelerate and give a fillip to the goal of achieving sustainable water security and at a much higher level. More importantly, this would also help enhance productive utilisation of MGNREGS money invested in asset creation. We however feel that more studies, under varying underlying agro-climatic-socio-economic-governance conditions be undertaken to further corroborate and validate the findings of the present study.

1. INTRODUCTION

1.1 The National Rural Employment Guarantee Act: Purpose and Provisions

To enhance the livelihood security of the households in rural areas of India, the Government of India introduced a massive rural employment guarantee scheme in 2006. The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) is empowered by an Act of Parliament, the National Rural Employment Guarantee Act (NREGA) 2005. The objective of the Act is to enhance the livelihood security of households in rural areas by providing at least 100 days of guaranteed wage employment in every financial year to every household whose adult members volunteer to do unskilled manual work[1].

In addition to providing guaranteed employment, NREGA intends to foster conditions for inclusive growth ranging from basic wage security and 'recharging' the rural economy to a transformative empowerment process of democracy. The Act thus seeks to provide:

- A strong social safety net for vulnerable groups by providing a fall-back employment source when other employment alternatives are scarce or inadequate;
- A growth engine for sustainable development of an agricultural economy through the process of providing employment on works that address causes of chronic poverty such as drought, deforestation and soil erosion. The Act seeks to strengthen the natural resource base of rural livelihood and create durable assets in rural areas. Effectively implemented, NREGA has the potential to transform the geography of poverty;
- Empowerment of rural poor through the processes of rights-based law; and
- New ways of doing business, as a model of governance reform anchored in the principles of transparency and grassroots democracy.

The Act was notified in different parts of the country in three phases. In the first phase, 200 districts were notified on February 2, 2006. In the second phase this was extended to an additional 130 districts in the financial year 2007-2008. The remaining districts were notified under the NREGA with effect from April 1, 2008. NREGA now covers the entire country with the exception of districts that have a hundred percent urban population.

1.2 Permissible works under the Act

While the intention of NREGA is to provide a basic employment guarantee in rural areas, the Act indicates the kinds of works that may be taken up for this purpose. The choice of works suggested in the Act addresses causes of chronic poverty like drought, deforestation and soil erosion, so that the process of employment generation is maintained on a sustainable basis.

[1] The entitlement of 100 days of guaranteed employment in a financial year is in terms of a household. This entitlement of 100 days per year can be shared within the household; more than one person in a household can be employed (simultaneously or at different times).

As per Schedule I of the Act, the focus of the MGNREGS shall be on the following works:

i. water conservation and water harvesting;
ii. drought proofing, including afforestation and tree planting;
iii. irrigation canals, including micro and minor irrigation works;
iv. provision of irrigation facilities, plantations, horticulture, land development of land owned by households belonging to Scheduled Castes and Scheduled Tribes, or to land of the beneficiaries of land reforms, or to land of the beneficiaries under the Indira Awas Yojana/BPL families;
v. renovation of traditional water bodies, including desilting of tanks;
vi. land development;
vii. flood control and protection works, including drainage in waterlogged areas;
viii. rural connectivity to provide all-weather access. The construction of roads may include culverts where necessary, and within the village area may be taken up along with drains. Care should be taken not to take up roads included in the PMGSY[2] network under NREGA. No cement concrete roads should be taken up under NREGA. Priority should be given to roads that give access to Scheduled Castes and Scheduled Tribes habitations;
ix. any other work that may be notified by the central government in consultation with the state government.

The above list of permissible works represents the initial thrust areas. Realizing that in some circumstances, locations or seasons, it may be difficult to guarantee employment within this initial list of permissible works, the Act permits the state governments to make use of Section (ix) above, whereby new categories of work may be added to the list on the basis of consultations between the state and the central governments.

In addition to creation of new works as discussed above, the maintenance of assets created under the scheme (including protection of afforested land) are also considered as permissible work under NREGA. The same applies to the maintenance of assets created under other programs but belonging to the sectors of works approved in Schedule I of the Act. NREGA resources however cannot be used for land acquisition. Land belonging to small and marginal farmers or Scheduled Castes and Scheduled Tribes landowners cannot be acquired or donated for works under the program.

1.3 The wage-material ratio

Keeping in view that NREGA is essentially an employment generating program, the Act stipulates that the ratio of wage costs to material costs should be no less than 60:40. This ratio is generally recommended to be applied preferably at the gram panchayat, block and district levels. However, tools and implements may be procured to enable the workers to execute the work. The cost of tools and implements may be booked under the material component of the project. The Act strictly prohibits use of machinery for construction of works. The Act also prohibits use of services of contractors for execution of works.

[2] PMGSY stands for Prime Minister Gramin Sadak Yojana. This is another rural roads program initiated by the Government of India for providing improved road connectivity in rural areas of the country.

1.4 Convergence of NREGA with other government schemes

Convergence of the NREGA funds with funds from other sources (government schemes) for the creation of durable assets is permissible. However, care has to be taken to ensure that NREGA funds do not substitute for resources from other sectors or schemes. Guidelines on convergence between different programs have been issued recently and different states are at different stages in following and implementing these convergence guidelines.

1.5 Pattern of financing

As per the provisions of the Act, the financial burden of the scheme is shared between central and respective state governments. The central government bears the following costs:

- The entire cost of wages for unskilled manual workers;
- 75% of the cost of material and wages for skilled and semi-skilled workers;
- Administrative expenses as may be determined by the central government; These include, *inter alia*, the salary and allowances of program officers and their support staff and work site facilities;
- Administrative expenses of the central employment guarantee council;

The state governments are responsible for meeting the following costs;

- 25% of the cost of material and wages for skilled and semi-skilled workers;
- Unemployment allowance payable in case the state government cannot provide wage employment within 15 days of application; and
- Administrative expenses of the State Employment Guarantee Council; and

1.5.1 Progress in implementing MGNREGS.

Ever since the beginning of the program in 2006, both the Government of India and different state governments have taken up the program in earnest. The central government has been making substantial budgetary allocations to the program. Table 1 (a, b and c) provides some details on the number of works that have been undertaken for different activities permissible under the scheme, the coverage in relevant units and the financial expenditures incurred.

During 2008-09, at the all India level, the central and different state governments made a combined expenditure of INR 206 billion on the completed projects while another INR 211 billion was spent on the projects which were still undergoing at the close of the financial year. In 2009-10 the corresponding figures were INR 178 and INR 190 billion respectively. In Madhya Pradesh, the respective figures for 2008-09 were INR 16 and INR 22 billion, which increased during 2009-10 to INR 20 and INR 25 billion respectively.

A majority of the permissible works being carried out under MGNREGA relate to building infrastructure aimed primarily at enhancing water security in rural areas. Apart from works relating to improved rural connectivity (essentially focusing on rural roads) and land development, all other works under the scheme relate to one or the other water related activities (including drought proofing). A perusal of the allocation of expenditure amongst broad groups of permissible works confirms this (Table 2). At the all India level during both 2008-09 and 2009-10, rural connectivity recorded the highest share of expenditure both in

terms of completed and ongoing projects. This was followed by works relating to water conservation and water harvesting (such as digging of new tanks/ ponds, percolation tanks, small check dams etc.) followed by works relating to renovation of traditional water bodies (such as desilting of tanks/ponds, desilting of old canals, desilting of traditional open well etc.) and works relating to provision of irrigation facilities on the land of farmers belonging to certain defined categories (such as farmers belonging to Scheduled Castes and Scheduled Tribes, beneficiaries of land reform and Indira Awas Yojan, small and marginal farmers).

In the case of Madhya Pradesh, the priorities as reflected by expenditure allocations, differed somewhat. The highest attention has been given to works relating to provision of irrigation facilities on farms belonging to defined categories followed by rural connectivity and works relating to water conservation and water harvesting.

Table 1 (part a). MGNREGS works completed and ongoing during 2008-09 and 2009-10: All India and Madhya Pradesh

Year	Region	Units	Rural Connectivity		Flood Control and Protection	
			Rural connectivity, others to be indicated separately		Drainage in wager logged areas, construction & repair of embankment, others to be indicated separately	
			Completed	Ongoing	Completed	Ongoing
2008-09	All India	Numbers	225,069.00	278,217.00	62,554.00	32,754.00
		km/cum/ha	17,237,043.75	7,828,085.60	2,016,059.50	502,831.74
		Expenditure Lakh INR	605,581.67	546,418.93	72,007.92	64,408.00
2009-10	All India	Numbers	355,022.00	409,444.00	95,954.00	89,757.00
		km/cum/ha	11,371,052.96	2,0998,195.00	18,645,862.00	236,383.60
		Expenditure Lakh INR	594,214.42	643,837.04	101,891.97	89,438.39
2008-09	Madhya Pradesh	Numbers	16,664.00	38,296.00	1,499.00	1,543.00
		km/cum/ha	14,119.02	33,487.48	1,600.82	11,837.93
		Expenditure Lakh INR	43,640.08	66,536.47	2,625.83	2,019.43
2009-10	Madhya Pradesh	Numbers	21,145.00	39,984.00	1,605.00	2,395.00
		km/cum/ha	254,984.03	479,641.23	1,969.05	2,288.29
		Expenditure Lakh INR	53,832.07	85,690.63	3,769.89	1,822.79

Table 1 (part b). MGNREGS works completed and ongoing during 2008-09 and 2009-10: All India and Madhya Pradesh.

Year	Region	Units	Water Conservation and Water Harvesting		Drought Proofing		Micro Irrigation Works	
			Digging new tanks/ponds, percolation tanks, small check dams, others to be indicated separately		Afforestation and tree plantation, others to be indicated separately		Minor irrigation canals, others to be indicated separately	
			Completed	Ongoing	Completed	Ongoing	Completed	Ongoing
2008-09	All India	Numbers	248,167.00	339,806.00	7,5443.00	121,439.00	66,173.00	79,128.00
		km/cum/ha	21,0093,887.40	272,751,790.90	123,6352.10	626,407.17	3,767,357.70	2,862,222.30
		Expenditure Lakh INR	279,247.10	556,387.03	60,3896.08	400,254.42	78,605.14	85,268.32
2009-10	All India	Numbers	629,833.00	468,157.00	115885	248,344.00	151,655.00	147,642.00
		km/cum/ha	28,4246,619.30	194,337,140.90	484,130.97	794,943.19	4,745,331.80	4,232,808.30
		Expenditure Lakh INR	307,749.82	333,410.76	97,831.29	112,075.25	98,934.04	104,293.85
2008-09	Madhya Pradesh	Numbers	48,233.00	31,284.00	13,276.00	46,217.00	1,976.00	4,422.00
		km/cum/ha	1,0594,445.55	20,920,271.63	12,134.61	133,030.44	37,838.55	1,144,810.80
		Expenditure Lakh INR	26,656.75	44,309.08	10,389.04	20,273.64	3,385.20	4,830.31
2009-10	Madhya Pradesh	Numbers	18,797.00	35,511.00	18,504.00	69,478.00	2,980.00	5,388.00
		km/cum/ha	1,4292,907.42	29,296,141.98	22,043.52	259,467.96	275,297.52	748,851.67
		Expenditure Lakh INR	34,503.77	55,649.41	8,273.48	22,825.39	3,711.41	6,022.82

Table 1 (part c). MGNREGS works completed and ongoing during 2008-09 and 2009-10: All India and Madhya Pradesh.

			Provision of irrigation facility to land owned by		renovation of traditional water bodies		Land development		Any other activity approved by MRD		Total	
			Scheduled Castes and Tribes, beneficiaries of land reform, IAY's, small & marginal farmer, others to be indicated separately		Desilting of tanks/ponds, desilting of old canals, desilting of traditional open well, others to be indicated separately		Plantation, land leveling, others to be indicated separately		Any other activity approved by MRD, others to be indicated separately			
			Completed	Ongoing	Completed	Ongoing	Completed	Ongoing	Completed	Ongoing	Completed	Ongoing
2008-09	All India	Expenditure Lakh INR	5.76	6.67	8.89	10.91	5.12	3.83	0.48	0.27	100.00	100.00
2009-10	All India	Expenditure Lakh INR	10.71	10.20	13.91	14.15	6.83	6.29	1.21	1.67	100.00	100.00
2008-09	Madhya Pradesh	Expenditure Lakh INR	37.34	26.14	3.29	3.44	5.85	6.34	0.00	0.00	100.00	100.00
2009-10	Madhya Pradesh	Expenditure Lakh INR	37.53	22.40	3.99	3.06	5.22	6.71	0.00	0.00	100.00	100.00

Table 2. Percent allocation of total expenditure on different components of the program.

Year	Region	Units	Rural connectivity		Flood control and protection		Water conservation and water harvesting		Drought proofing		Micro irrigation works	
			Rural connectivity, others to be indicated separately		Drainage in wager logged areas, construction & repair of embankment, others, to be indicated separately		Digging of new tanks/ponds , percolation tanks, small check dams, others to be indicated separately		Afforestation and tree plantation, others to be indicated separately		Minor irrigation canals, others o be indicated separately	
			Completed	Ongoing	Completed	Ongoing	Completed	Ongoing	Completed	Ongoing	Completed	Ongoing
08-09	India	Expenditure Lakh INR	29.46	25.89	3.50	3.05	13.58	26.37	29.37	18.97	3.82	4.04
09-10	India	Expenditure Lakh INR	33.33	33.96	5.71	4.72	17.26	17.59	5.49	5.91	5.55	5.50
08-09	Madhya Pradesh	Expenditure Lakh INR	26.94	30.90	1.62	0.94	16.45	20.58	6.41	9.42	2.09	2.24
09-10	Madhya Pradesh	Expenditure Lakh INR	27.54	33.79	1.93	0.72	17.65	21.94	4.23	9.00	2.37	

2. THE STUDY: SCOPE AND OBJECTIVES

A large number of the works permissible and being executed under MGNREGS focus on water related activities such as water augmentation and improvement in reliability, rainwater harvesting, water application and water use. It is envisaged that execution of these works over time would help provide water security to large parts of rural areas, especially to the marginalized sections of society. Much however would depend upon the nature and quality of works that are undertaken and durability of the assets being created under the program.

While various aspects of MGNREGS, such as its impact on employment generation, payment of wages, the implementation process, leakages in implementation, have been studied and analyzed in a number of useful studies undertaken by academics, NGOs, social activists, government agencies (IAMR: 2008; NCAER: 2009; Ambasta et al: 2008; CBGA: 2006; CRRID: 2010, IITM:2010), only a few attempts have been made to study different aspects related to the quality and efficacy of the works undertaken and executed under MGNREGS, the extent of the utilization of the work undertaken, and the benefits accruing to the intended beneficiaries from the assets so created (Bassi and Kumar: 2010;CSE: 2008, IWMI:2010) . Thus, not much is known about issues such as location specific appropriateness about choice of works, quality of works undertaken, their likely sustainability, impact on water resources, utilization of the created resource and benefits emanating to the intended beneficiaries from use of such assets and resources.

2.1 MGNREGS in the context of AWM Solutions Project of IWMI

As part of the Bill Melinda Gates Foundation BMGF sponsored study on Agricultural Water Management solutions, a state level stakeholder consultation meeting for Madhya Pradesh was organized in Bhopal on 8 January 2010. This meeting, attended by about 50 participants, included the Principal Secretary for Rural Development of the Government of Madhya Pradesh and several senior officials including those responsible for implementation of MGNREGS in the state. Based on the feedback from the participants in this meeting, subsequent discussions with various other stakeholders and other knowledgeable persons, and a literature review, IWMI decided to initiate a diagnostic study in a few selected areas to learn how MGNREGS is contributing to improved water security on the ground and make an assessment of MGNREGS as a possible model for supporting agricultural water management in Madhya Pradesh.

2.2 The study objectives

Given the importance of water related works in NREGA, as reflected by the magnitude of works and the pattern of investments undertaken, the study examines some of the following issues:

- What has been the logic as well as the dynamic underlying the selection of different works at different locations? Does the implementer's choice of works match with the preferences of the beneficiaries?
- With emphasis on manual work, can MGNREGS deliver structures of reasonably good quality which are durable and could ensure sustainable water security? Are beneficiary farmers satisfied with the quality of structures built under the program?

- Has the construction of these structures led to increased or more reliable availability of water to farmers? Are the works being undertaken under the program sufficient enough on their own to ensure flow of intended benefits to the envisioned beneficiaries? Have the farmers been able to use the water made available from these works? If not, what constrains the farmers from using this water? What supplementary investments are required or have been made by beneficiaries to enhance private and common benefits from the constructed structures?
- What changes have been made by the beneficiaries, for example, shifts in cropping patterns, to optimize the benefits derivable from the availability of water? What has been the impact on livelihoods of the beneficiaries? Have the MGNREGS investments in water infrastructure encouraged corresponding private investments to take water security to a higher level of sustainability?

2.2.1 Scope

A scrutiny of the state level aggregate data on expenditure incurred on various water related activities during 2008-09 and 2009-10 in the state of Madhya Pradesh suggest that the two relatively more important water related infrastructure interventions have been: i) provisioning of irrigation water facilities to land owned by certain marginalized sections of society and generally amongst the poorest of the poor with a small piece of land such as Scheduled Castes and Scheduled Tribe farmers, beneficiaries of land reform and Indira Awas Yojana, small and marginal farmers; and ii) works relating to water conservation and water harvesting such as works relating to digging new tanks/ponds, percolation tanks, and small check dams. While the works under i) above are intended to improve water security at individual household level, the works under ii) relate to water provisioning at the community level. Analysis of some of the above issues under the two contrasting models of making water available (individual households versus community works) would provide additional insights into relative efficacy of the two approaches in addressing some of the above concerns. In this study we focus on these two types of water related interventions only.

A scrutiny of the data on the number of completed works under MGNREGA under the two categories of works in different districts of Madhya Pradesh suggest that Mandla and Jhabua are amongst the highest performing districts for individual household works, while Balaghat and East Nimar are amongst the highest performing districts for community works. Keeping in view the time, logistics and financial constraints, it was decided to limit the study to these four districts; two for individual household works and two for community works.

For data collection the study employed a mix of methods interacting with both planning and implementing agencies at the micro district and gram panchayat level as well as at the state level. PRA/FGD combined with a limited household sample survey from some of the selected beneficiaries were also used to collect the relevant data.

For analysis of individual household level water works, a sample of 155 households was selected randomly following a statistical sampling design from the two identified districts of Madhya Pradesh. The details of sample size from each district and block are given in Table 3. Individual household questionnaires were conducted during July-August 2010. The information collected from these surveys was supplemented by information obtained from

discussions the field survey team had with local officials of the program implementing agencies, local NGOs, village officials and other knowledgeable persons.

Table 3. Distribution of sampled households

District	Block	Total Sample
Mandla	Bejadandi	40
	Ghuggri	40
Jhabua	Petalwad	35
	Thandla	40
Total		155

For community water structures, a sample of 30 community structures was selected from the two identified districts of Madhya Pradesh. Table 4 gives details of distribution of community water harvesting structures selected for the present study:

Table 1. Number and Type of Community Structures Studied

District	Block	Type of Structure	Number of Structures Studied
Balaghat	Behar	Check Dam	7
		Stop Dam	1
	Paraswada	Check Dam	2
		Stop Dam	6
Khandwa (East Nimar)	Chhegaon Makhan	Check Dam	5
		Stop Dam	3
		Community Pond	1
	Pandhana	Check Dam	1
		Stop Dam	0
		Community Pond	4
Total			30

3. ASSESSMENT OF MGNREGS: INDIVIDUAL HOUSEHOLD STRUCTURES

In the following sections we present some of the results obtained from analysis of the data collected from sampled individual households.

3.1 Some characteristics of the sampled households

Table 5 summarizes some of the characteristics of the sampled households. The total sample comprised 55 households. About 44% of the sampled respondents were illiterate while about 53% had education up to secondary level. The study area is dominated by Scheduled Caste and Scheduled Tribe populations. About 86% of respondent households belonged to Scheduled Tribes while about 5% belonged to Scheduled Castes. Almost all the sampled households were Hindus. About 63 % of the sampled households had been beneficiary of land reforms, and another 14 % had been beneficiary of Indira Awas Yojana (IAY). About 69 % of the sampled households had got their below poverty line (BPL) cards made. Almost all the sampled households had a job card made under MGNREGA.

The average size of an operational holding of the sampled farmers varied between 4.49 to 5.78 acres in three of the four blocks of the surveyed area. In the fourth block, Petalwad, the average size was much larger at 14.78 acres. Some farmers do lease-in and lease-out.

Table 5. Some characteristics of the sampled households

Characteristics	Districts: Mandla,Bejjadandi, Ghuggri		Districts: Jhabua,Petalwad, Thandla		Total
Number of sampled HHs	40	40	35	40	155
Education level					
- Illiterate	8	12	24	24	68
- Up to High school	31	25	10	16	82
- Above high school	1	3	1	0	5
Caste					
- Schedule Caste	0	6	8	0	14
- Schedule Tribe	39	29	26	40	134
- Others	1	5	1	0	7
Religion					
- Hindu	40	38	35	40	153
- Other	0	2	0	0	2
Beneficiaries of land reform	39	34	16	8	97
Beneficiaries of IAY	4	8	9	0	21
Have a BPL card	26	20	26	35	107
Having an MGNREGA card	40	37	35	39	151
Average size of land holding acres)					
- Owned	5.29	5.23	8.62	5.42	
- Leased-in	0.14	0.63	6.53	0.63	
- Leased-out	0.94	0.08	0.37	0.98	
- Operational	4.49	5.78	14.78	5.08	

3.2 Status of irrigation on sampled farms prior to construction of MGNREGS works

Even before the MGNREGS program started, some farmers in the study region did have access to irrigation even though the available irrigation facility may have been sufficient to provide only protective irrigation to only a small part of their cultivated land in either wet or dry season. The construction of water related works under MGNREGS was intended to provide water security to all farmers who were eligible as per the defined criterion. For those farmers who did not have any source of irrigation water the constructed works were intended to provide irrigation water and for those farmers who already have had access to some irrigation water, the constructed works were intended to provide improved water security.

Prior to construction of assets under MGNREGS, about 23% of sampled households had some access to irrigation water either from own sources or through water markets. Of those farmers who reported some access to irrigation water, only 40% had access to water supplies sufficient to meet their irrigation water requirements (Table 6). From the entire

sample of farming households, about 9% farmers had access to adequate water for meeting their irrigation water requirement.

Farmers having access to irrigation water may or may not be using fully or partly the available water for irrigating their crops. Of the 35 farmers who had access to irrigation water before the MGNREGS program, about two-thirds were actually applying some irrigation water to their crops. More than 85% of the sampled farmers were not irrigating their crops before the MGNREGS started.

Table 6. Status of irrigation prior to construction of MGNREGA works

District	Block	Number of HHs	Availability of irrigation before MGNREGA		If Yes, available water sufficient to meet farm water requirement		Before MGNREGA works, were you irrigating crops	
			Yes	No	Yes	No	Yes	No
Mandla	Bejjadandi	40	7	33	4	3	6	34
	Ghuggri	40	4	36	1	3	0	40
Jhabua	Petalwad	35	13	22	3	10	11	24
	Thandla	40	11	29	6	5	6	34
Total		155	35 (23%)	120 (77%)	14 (40%)	21 (60%)	23 (15%)	132 (85%)

3.3 Type of water structures built under MGNREGS

In the study area there are essentially four types of water related structures being built on individual eligible farmers' fields as defined under the MGNREGS program. These are: farm ponds, farm bunding, gully plugging, and open wells. Of these, while farm ponds and open wells have the potential of providing on-farm water storage, the other two add to improved on-farm management and use of available water without adding to storage. Of the total 155 sampled households, farm ponds and open wells were built on 78% of farmers' fields, while work on constructing farm bunds was undertaken on the remaining 22% (Table 7). On none of the sampled households had farm gully plugging been done. The proportion of farmers with different structures varied from block to block. For example, in Petalwad, Jhabua District, none of the farmers had farm bunding while most of the farmers had an open well.

Table 7. Distribution of nature of water structures built on sampled farmers' fields

District	Block	No. of Households	Number of Water Structures			
			Farm Ponds	Bunds	Gully Plugging	Wells
Mandla	Bejjadandi	40	6	14	0	20
	Ghuggri	40	13	12	0	15
Jhabua	Petalwad	35	6	0	0	29
	Thandla	40	0	8	0	32
Total		155	25 (16%)	34 (22%)	0	96 (62%)

3.4 Appropriateness and choice of works

The menu of works that can be undertaken on a farmers' field have largely been drawn with the aim of providing either access to irrigation water or to help improve management of available water to the beneficiary farmers. Given the limited menu of works that can be undertaken and the limited amount of financial resources available for carrying out these works, it is quite possible that the work undertaken does not necessarily represent the best possible option or is the option most preferred by farmers.

About 59% of the sampled farmers reported that under the prevailing conditions, the work that has been undertaken on their farm represents the best option for providing irrigation water (Table 8). While the proportion of satisfied farmers was roughly 50% in three of the four blocks of the study area, in Petalwad Block, where most of the farmers had open wells, the proportion of such satisfied farmers was much larger at 86%. If given an option to construct a structure of their own choice, would the sampled farmers have preferred to build a structure other than what was built on their farm? About 39% sampled farmers felt that if they had such an option they would have liked to build a different structure. The most preferred choice of almost 60% was installing a tubewell. About 12% would have preferred to deepen their existing wells while the remaining 28% would have preferred an open well rather than the existing structure (either farm pond or farm bunding).

Table 8. Appropriateness and choice of works

District	Block	No. of HHs	Work undertaken represents the best option for irrigation?	Given a choice, would you have preferred a different structure?	If Yes, what would have been your preferred choice		
			Yes	Yes	Tubewell Deepening	New Well	Existing Well
Mandla	Bejjadandi	40	21	19	16	2	1
	Ghuggri	40	20	20	6	1	13
Jhabua	Petalwad	35	30	3	3		
	Thandla	40	21	18	11	4	3
Total		155	92 (59%)	60 (39%)	36 (60%)	7 (12%)	17 (28%)

3.5 Farmer's consent and transparency

The process for undertaking construction activities stipulates that before the commencement of work the farmer's consent about the design and cost estimate for the proposed structure must be obtained and a copy of both the design of the work and the cost estimate be given to the farmer for his information and records. This is to ensure transparency of the operations and minimize pilferage.

Are the authorities implementing the MGNREGS following the stipulated procedures related to obtaining farmers' consent and transparency? The results from our survey show that the required stipulations are not being followed in practice. About 61% of the sampled

households reported that their consent was not taken for the design and cost of the works undertaken on their farm (Table 9). The number differs from area to area depending on the seriousness of the implementing agency. The relative position in this regard is much better in Jhabua District as compared to Mandla District. In regard to transparency, the position is much worse. More than 96% of the sampled respondents denied having received copies of the design and cost estimates for their records.

Table 9. Farmers consent and transparency of operations

District	Block	Number of Households	Consent for Design and Cost		Copies given for record	
			Yes	No	Yes	No
Mandla	Bejjadandi	40	4	36	0	40
	Ghuggri	40	11	29	0	40
Jhabua	Petalwad	35	31	4	4	31
	Thandla	40	15	25	1	39
Total		155	61 (39%)	94 (61%)	5 (4%)	149 (96%)

3.6 Quality of assets built

One of the important stipulations in the construction of works under MGNREGS requires that the wage component of total financial expenditure incurred should not be less than 60%, while the material component could account for the remaining, i.e. not more than 40%. The use of machinery in the construction of these works is not allowed. Given the emphasis on manual construction, several questions related to asset quality arise. Are good quality works being built under the program? How robust are these structures? What is the likely durability of the assets being built under the program?

While assessing the quality of the structures being built in a remote village, where most structures are located, what should be the basis for quality assessment? Given the stipulations in the Act, in our perception the ideal basis for assessing the built asset quality should be to compare the asset quality in relative rather than in unqualified terms. Strictly speaking the quality of assets being built in a rural area under MGNREGS or any other program may or may not be comparable with a similar structure built in an urban area, with substantial technical inputs, use of construction machinery, better quality of raw material available and with or without limits on financial expenditure. We advocate that for assessing the quality of assets built under MGNREGS, the ideal basis for appraisal should be the quality of similar structures built in the same or in a neighboring village either by some farmers themselves from their own resources, by some contractors, by some NGOs, or built by government under a non-MGNREGS program.

Based on above proposition, rather than using engineering norms to make a quantitative assessment of the quality of the built structures, we undertook to make an assessment of the asset quality on the basis of four discrete criteria based on the perceived acuities of the beneficiary farmers. The four benchmark measures adopted were:

- Satisfaction criterion: Farmers' own satisfaction with the quality of asset construction;

- Contrasting criterion: Asset quality in comparison with quality of similar assets being built/have been built by some farmers themselves or being built/have been built under some non-MGNREGS programs in the neighborhood;
- Existence criterion: Expected asset life in comparison with the perceived life of similar assets built under non-MGNREGS programs;
- Robustness criterion: Probable or likely durability of the constructed structures.

The results in Table 10 suggest that a majority of the farmers are satisfied with the overall quality of assets built on their farms on all four assessment criterion. Almost 92% of the sampled households expressed their agreement on satisfaction criterion. Assessed in terms of contrasting criterion, almost 80% of the sampled households felt that the quality of structures built on their farms under MGNREGS is either better or at least of similar quality to other similar structures built in their neighborhood under non-MGNREGS programs or by farmers themselves. In terms of existence criterion, 92% of the sampled households expect the life of the assets built under MGNREGS to be at least as or even higher than the non-MGNREGS structures. In fact, 44% of the sampled households expect assets built under MGNREGS to last longer than non-MGNREGS structures. On the basis of the fourth criterion of robustness, also MGNREGS structures score higher than similar non-MGNREGS structures.

Table 10. Farmers' perceptions of quality of structures.

District	Block	Satisfied with quality of construction		NREGA quality compared with non-NREGA structures				Expected life of NREGA structures in comparison with non-NREGA			
		Yes	No	Poor	Average	Similar	Better	Lower	Similar	Better	V du
Mandla	Bejjadandi	38	2	2	7	15	16	1	21	18	
Mandla	Ghuggri	31	9	6	8	10	16	4	22	14	
Jhabua	Petalwad	34	1	4	4	9	18	5	5	25	
Jhabua	Thandla	40	0	1	1	25	13	2	27	11	
Total	155	143 (92%)	12 (8%)	13 (8%)	20 (13%)	59 (38%)	63 (41%)	12 (8%)	75 (48%)	68 (44%)	1 (9

3.7 Asset creation and impact on water availability and use

Building good quality water related assets however does not necessarily ensure availability, accessibility or intended and productive use of the water. For example, a good quality well built on a farmers' field may or may not yield water, may or may not yield water in the required quantity, may or may not yield water on a sustainable basis, and may or may not yield water of good quality. Even if the structure yields sufficient water of good quality on a sustainable basis, the farmer may or may not be able to access or use that water for the intended purpose. The water available in the well becomes accessible to the farmer only if he can arrange to withdraw it. Even after accessing the available water, putting it to the intended productive use requires using the water for cultivating irrigated crops. The farmer would be able to put the extracted water to such a productive use if, amongst other factors, the markets for the irrigated crops exists in the neighborhood and crop output marketing does not pose a problem, assuming that he has either access to know how or can be provided with the requisite know how for cultivating irrigated crops and availability of other crop inputs does not pose a problem.

Farm ponds and wells have the potential of adding to on-farm water storage availability, the other two, farm bunding and gully plugging, contribute to improved on-farm management and usage of available water without adding to storage. Of the 121 households on whose farms potential water augmenting storage structures were built, 116 households (96%) reported increases in actual availability of water on their farms due to construction of these structures (Table 11). Out of these 116 households, 65 farmers (56%) reported that they have actually been able to access and make use of the available water for productive purposes. Thus, 51 of the 121 structures (42%) constructed to augment water availability storage and use on farmers fields either did not add to water availability or even if added to water availability could not transform available water into water useable for productive purposes. In contrast, on those farmers' fields where farm bunding was undertaken, almost all farmers reported making full use of the available water.

Table 11. Water structures, water availability and water use

District	Block	Number of HHs	Water augmenting (storage) structures (wells and ponds)				Water augmenting (non-storage) structures (farm bunding and gully plugging)		
			Number	Led to increase in water availability	Able to fully use the available water for productive purpose	Not able to fully use the available water for productive purpose	Number	Led to increase in water availability (Number)	Able to use the available water for productive purpose
Mandla	Bejjadandi	40	26	25	11	14	14	0	14
	Ghuggri	40	28	27	11	16	12	0	12
Jhabua	Petalwad	35	35	33	25	8	0	0	0
	Thandla	40	32	31	18	13	8	0	8
Total		155	121	116	65	51	34	0	34

3.8 Complementary investments made to utilize water from available structure

As discussed above, 65 farmers reported having been able to use the available water for productive purposes. Water made available in the water structures such as wells and farm ponds becomes usable only if it can be withdrawn. While water from structures such as wells can be drawn using a rope and bucket, the amount of water drawn is small and generally insufficient to meet crop water requirements of irrigated crops. For making productive use of water such as for irrigation, complementary equipment such as a diesel engine or an electric motor is often required. Complementary investments can also include such equipment as drip and sprinkler aimed at improving efficiency of application of available water.

From amongst the sampled households who have been able to make productive use of the available water, 55 farmers had invested in their own water extraction and use of equipment, while another seven farmers got equipment free under some other government scheme (Table 12). Of the 55 farmers who had invested in their own equipment, 34 had invested in a diesel pumping set, 18 in electric motors and six farmers had invested in drip/sprinkler systems.

Meeting the upfront cost of investing in pumping equipment is one of the important constraints facing a small farmer. Of the farmers who have invested in pumping equipment of their own, 43 had self financed this investment from out of their own savings. Six of the these households had borrowed money from money lenders, 5 had taken loans from banks/financial institutions, while four had borrowed from friends and relatives to meet the cost of investment.

3.9 Reasons for non-accessibility/use of available water

What could be some of the reasons for such a large proportion of potential water augmenting structures not adding to on-farm availability or use of water for productive purposes? Converting available water into useable water generally requires access to power for withdrawing water. Quite often, electricity is not available. Sometimes lack of access to markets for inputs/outputs could constrain full use of available water. In our study region, more than 88% of the farmers who could not make full use of the available water for productive purposes cited non-availability of power as the most important constraint (Table 12). Non-availability of electricity to run electric motors was reported by almost 31% of the farmers as a reason for under use of the available water. Lack of access to markets for irrigated crops was not much of an issue in the study area.

Table 12. Investment in complementary equipment

District	Block	Able to fully use the available water for productive purposes	Number of farmers who made complementary investment in equipment	Type of Equipment Invested in Number)			Source of Finance Number)				Number of farmers who got complementary equipment under some other government program
				Diesel engine	Electric motor	Sprinkler or drip	Self	Money lender	Bank/FIs	Relatives or friends	
Mandla	Bejjadandi	11	11	7	3	1	6	0	2	3	5
	Ghuggri	11	10	10	0	0	9	0	1	0	1
Jhabua	Petalwad	25	21	7	12	4	18	6	0	0	0
	Thandla	18	13	10	2	1	10	0	2	1	1
Total		65	55	34	17	6	43	6	5	4	7

Note : Totals may not tally due to multiplicity of responses in certain cases.

Table 13. Reasons for not being able to fully utilize the available water for productive purposes

District	Block	Number of households with water augmenting (storage) structures who have NOT been able to make full use of available water for productive purposes	Reasons for non-utilization				
			No. of pumping sets	No. with electricity	Size of land holding	Others	Lack of access to markets
Mandla	Bejjadandi	14	11	3	2	1	3
	Ghuggri	16	15	3	1	0	1
Jhabua	Petalwad	8	4	4	0	0	3
	Thandla	13	11	4	1	2	2
Total		51	45	16	4	4	9

Note : The totals may not tally as there could be more than one reason in certain cases.

Access to pumping equipment would not only have given farmers access to productively use the available water, it would have also enhanced more productive use of MGNREGS money invested in asset creation. The farmers who could not invest in such equipment either did not have resources of their own, or had no access to credit or did not want to borrow because they were already in debt. These farmers also did not get any pumping equipment under any other government scheme. The proportion of pumping sets that some of the sampled farmers reportedly got for free from government agencies is exceptionally high in our sample and should not be construed to be a general phenomenon. In any case, with several thousand similar structures being built every year under MGNREGS, providing free complementary equipment to enable farmers to harness the benefits from these structures is a huge task. While the government has been trying to forge a convergence[3] between MGNREGS and several non-MGNREGS programs being run by different departments of the government, in practice, such a convergence is slow to emerge. Even if such a convergence comes, about it would be difficult to meet the huge equipment demand from government programs. Soft loans to farmers with extended repayment terms could encourage these farmers to invest in such equipment and make use of the water from water augmenting assets created under MGNREGS.

3.10 Water harvesting structures and multiple uses of water

Water made available from structures such as farm bunds and gully plugging can generally be used for improving on-farm water management and offers no scope for uses other than irrigation. Water made available in the farm ponds can essentially be used for irrigation, livestock and to some extent sanitation. Wells offer potential use for irrigation, drinking, livestock and for sanitation. The extent to which available water can be used for different purposes depends on the availability of water, the power available to convert available water in to usable water, the quality of available water which determines the possible uses to which the available water can be put, and the preference of the owner in regard to priority for allocation of available water to different uses.

The sampled farmers had different types of water structures yielding water in different quantities and of different quality, had differential access to pumping equipment and electricity. The use pattern of available water also shows a wide combination of uses. For example, quite often a well-owning farmer with adequate water, with access to power and with no constraints on availability of energy can use the available water for irrigation,

[3] MGNREGS is of course not the first or the only program in India trying to improve rural water security. Various ministries and departments of both the central and state governments have been running several schemes, each designed to improve water availability or promote more sustainable and efficient use of water. As more than 50% of MGNREGS works relate to water related activities, the possibilities of convergence between MGNREGS and water conservation and watershed development programmes of different ministries (such as the Ministry of Water Resources and the Ministry of Land Resources) are substantial and offer considerable scope for sustainable use of available financial resources and of assets created under the programme. Convergence of initiatives of partner ministries will also help further expand the coverage area. Convergence is also expected to bring synergy between different government programs in terms of their planning, processes and implementation. With this in mind, the government set up a Task Force to explore possibilities and to review strategies of convergence, latent in MGNREGS. The convergence guidelines formulated are being piloted in a number of districts. However, given the size of MGNREGS and some non-MGNREGS programs and the magnitude of the efforts involved in bringing about the convergence, it will take some time to achieve better and more effective synchronisation between the two sets of programs.

drinking, livestock and sanitation, even though the available water may not be sufficient to meet his full water requirement for any or all of the uses. In contrast, a farmer who has built farm bunding structures can use the additional water made available for irrigation purposes only.

The results on the uses of available water for different purposes by our sampled farmers are presented in Table 14. The results show that while about 43% of the sampled farmers have used water for a single purpose only, 17% have used water for two purposes, 14% have used it for three purposes, while the remaining 26% have used it for all four uses. This use pattern however does not imply sufficiency or otherwise of the available water for a given use.

Table 14. Multiple uses of water structures

Nature of Water Use	District Mandla		District Jhabua		Total
	Bijadandi	Ghuggri	Petalwad	Thandla	
Irrigation alone	18	15	2	12	47 (30.3%)
Drinking alone	0	1	1	2	4 (2.6%)
Livestock alone	5	5	3	2	15 (9.7%)
Sanitation alone	0	0	0	0	0
Irrigation+drinking	1	0	1	2	4 (2.6%)
Irrigation+livestock	3	4	2	4	13 (8.4%)
Drinking+livestock	2	1	0	4	7 (4.5%)
Drinking+sanitation	0	0	0	1	1 (0.6%)
Livestock+sanitation	0	2	0	0	2 (1.3%)
Irrigation+drinking+livestock	1	0	3	0	4 (2.6%)
Drinking+livestock+sanitation	0	5	0	1	6 (3.9%)
Irrigation+livestock+sanitation	2	1	1	6	10 (6.5%)
Irrigation+drinking+sanitation	2	0	0	0	2 (1.3%)
Irrigation+drinking+livestock +sanitation	6	6	22	6	40 (25.8%)
Total	40	40	35	40	155 (100%)

3.11 Impact of MGNREGS

In the absence of baseline data it is difficult to isolate the impact of water related activities carried out under MGNREGS from other changes that may have taken place either concurrently or in the intervening period before and after the water structures under MGNREGS were built. MGNREGS commenced in 2006. The pace of implementation started picking up from 2007 onwards. The intervening period between the time most of the structures were built and the time the present data were collected was not long. It may therefore be safe to assume that the observed changes in at least some of the parameters likely to be influenced directly by the availability of water could be attributed to water related activities carried out under MGNREGS. In what follows we provide order of magnitude estimates of impact of water related activities carried out under MGNREGS on some of the identified parameters following a comparison of a 'before' and 'after' approach. We feel that the 'impacts' discussed below may be taken as tentative and these impact

variables would need to be visited again after the constructed structures have been in operation for some years and farmers would have adjusted better to the new realities.

3.11.1 On area irrigated

A majority of the sampled farmers did not have access to any irrigation during either wet or dry season. The water structures built under MGNREGS have enabled farmers to store rainwater in ponds or access groundwater through wells, or more efficiently use the available rainwater for irrigation through formation of farm bunds. These structures in themselves may not yield sufficient water either because of lack of a power or due to small capacity or low yield to enable farmers to undertake any large scale changes in crops cultivated, cultivate irrigated crops of their choice or meet the full irrigation water requirement of whatever irrigated crop they may be cultivating. Most of these structures may also not be able to provide irrigation at a time when farmers may actually require irrigation. Whatever quantitative or qualitative water constraints these structures may impose on availability of water, these structures nevertheless have the potential to provide farmers at least crop-saving irrigation. With generally less than required irrigation water available, while the farmers may not be able to apply other yield enhancing inputs at their optimal level and obtain high crop yields, application of less than required irrigation water nevertheless will add to the current crop yield.

The construction of water related structures under MGNREGS have added in a significant way in bringing larger areas under irrigation as reflected by the proportion of operated area irrigated during the two cultivation seasons (Table 15). This increase in irrigated area however does not convey anything about adequacy or otherwise of the required irrigation water. The addition to irrigated area during kharif season has been much more than during rabi season. Farmers tend to allocate a larger proportion of area to water demanding crops such as paddy and cotton during kharif season and tend to finish most of the available water, leaving little for the ensuing rabi season.

Table 15. Impact on irrigated area: Per cent of operated area irrigated during kharif and rabi seasons current and before

District	Block	Percent of operated area irrigated during			
		Kharif		Rabi	
		Current	Before	Current	Before
Mandla	Bejjadandi	55.99	2.60	25.21	3.90
	Ghuggri	62.69	2.85	4.76	1.03
Jhabua	Petalwad	47.29	23.94	28.31	5.49
	Thandla	47.04	9.12	22.29	4.89
Total		51.78	12.51	21.93	4.07

3.11.2 On cropping intensity

Access to irrigation permits multiple use of the available land for cultivation in a given agricultural year. Part of the land which could not be used for cultivation due to non-availability of irrigation becomes suitable for cultivation once access to irrigation is available. In the present case, availability of irrigation has led to a significant increase in cropping intensity on sampled farms. On average, the cropping intensity increased by about 27

percentage points from 134.20 before irrigation to 161.03 after the availability of irrigation (Table 16).

Table 16. Impact on cropping intensity (%)

District	Block	Cropping Intensity (%)	
		Current	Before
Mandla	Bejjadandi	159.04	136.07
	Ghuggri	153.59	146.67
Jhabua	Petalwad	162.29	120.40
	Thandla	170.99	143.37
Total		161.03	134.20

3.11.3 On cropping pattern

Access to irrigation water helps farmers diversify their cropping pattern in favor of more remunerative crops. If the farmers have already been cultivating crops under rainfed conditions in regions receiving substantial rainfall, access to irrigation water also helps to provide crop-saving irrigation in case of delays in two consecutive rainy days. Irrigation also helps provide timed inputs of water with substantial implications for crop growth and crop yields. Stored water left over from the rainy season also helps provide some irrigation for dry season crops.

With whatever little addition to the availability of irrigation water, the sampled farmers did bring in some changes in their cropping pattern in favor of water using crops. To understand the relative contribution of available irrigation water in influencing cropping pattern shifts, we present in Tables 17 and 18 the shifts in cropping pattern separately during Kharif and rabi seasons. At the aggregate level, in kharif season, the proportion of area allocated to the most important water using crop (paddy) has gone up by about nine percentage points while there has been a marginal decline in area allocation to cotton. This increase in proportionate area under paddy has occurred as a result of some decline in proportion of area allocated to mainly rainfed crops such as soybeans and maize. The shift in proportionate allocation of area under different crops differed in different study locations.

The impact of shifts in cropping pattern during rabi season is relatively less marked compared to kharif season. In rabi season, irrigation is generally required for cultivating wheat and gram. Yields improve significantly even if one irrigation can be applied. Gram could be treated as a semi-irrigated crop. During rabi, the proportionate area allocated to wheat increased only marginally by less than 2% while that under gram increased substantially by about 12%. Farmers have been cultivating a variety of small crops, mainly pulses, on some part of their land mainly under dry/rainfed conditions. The proportion of area under these other crops has declined from about 36% earlier to about 22% currently.

Table 17. Changes in cropping patterns (acres); percent of cropped area in kharif season allocated to different crops: current and before

District	Block	Paddy		Cotton		Maize		Soybean		Other Crops		Total	
		Current	Before	Current	Before	Current	Before	Current	Before	Current	Before	Current	Before
Mandla	Bejjadandi	77.56	54.43	0.00	0.00	18.95	40.33	0.00	0.00	3.49	5.25	100.00	100.00
	Ghuggri	84.11	84.41	0.00	0.00	12.05	13.27	0.00	0.00	3.84	2.31	100.00	100.00
Jhabua	Petalwad	0.00	0.00	60.74	59.87	29.48	36.45	44.33	49.83	9.79	3.68	100.00	100.00
	Thandla	59.03	47.39	16.28	17.67	22.65	29.32	0.00	0.00	2.04	5.62	100.00	100.00
Total		49.63	40.96	23.50	25.37	21.45	29.75	14.90	18.81	5.42	3.91	100.00	100.00

Table 18. Changes in cropping patterns: percent of cropped area in rabi season allocated to different crops: current and before

District	Block **changes in cropping pattern: percent of cropped area rabi allocated to different crops: current and before**	Wheat		Gram		Other crops		Total	
		Current	Before	Current	Before	Current	Before	Current	Before
Mandla	Bejjadandi	80.07	74.55	0.00	0.00	19.93	25.45	100.00	100.00
	Ghuggri	18.62	14.87	17.55	14.87	63.83	70.27	100.00	100.00
Jhabua	Petalwad	39.74	73.77	58.41	26.23	1.85	0.00	100.00	100.00
	Thandla	88.53	77.78	0.00	0.00	11.47	22.22	100.00	100.00
Total		54.52	52.79	23.91	11.44	21.57	35.77	100.00	100.00

3.11.4 On livestock

With irrigation and the associated shifts in cropping patterns, farmers generally tend to diversify their farming activities. In the diversification plan, livestock often finds an important place. Since investing in livestock is an expensive proposition, diversification in favor of livestock or diversification of different types of animals and breeds generally follows with a time lag. To ascertain if any diversification has taken place, we collected information on the number of milch animals before and after the construction of water harvesting structures. The results (Table 19) obtained suggest that the number of milch animals cows and buffaloes) with the sampled farmers at the aggregate level has increased by about 33%. We feel while a part of this increase could be attributed to diversification that normally follows after availability of irrigation, the major could be attributed to factors other than irrigation that impinge on the profitability of investing in crops versus livestock.

Table 19. Changes in livestock

District	Block	HHs	Cows		Buffalo		Milch Animals	
			Current	Before	Current	Before	Current	Before
Mandla	Bejjadandi	40	18	18	14	10	32	28
	Ghuggri	40	62	53	28	17	90	70
Jhabua	Petalwad	35	30	14	20	5	50	19
	Thandla	40	33	34	23	13	46	47
Total		155	143	119	85	45	218	164

3.11.5 On groundwater

With so much investment going into improving water security in rural areas, it is worth asking if this investment has in any way helped improve the availability of groundwater, which is likely to provide long-term water security in such areas. We asked farmers if they had observed any improvement in groundwater levels in their neighborhood in the recent past. The results (Table 20) suggest that investments, even though not directed primarily towards groundwater, have to some extent contributed towards improving groundwater levels in these areas. Almost 55% of the sampled farmers reported having observed at least some improvement in groundwater levels in the recent past. This perception needs to be corroborated by a more scientific assessment of the impact on groundwater availability.

Table 20. Water related investments in MGNREGS : Impact on groundwater

District	Block	Total number of households	Observed improvement in groundwater levels	
			Yes	No
Mandla	Bejjadandi	40	17	23
	Ghuggri	40	20	20
Jhabua	Petalwad	35	22	13
	Thandla	40	27	13
Total		155 (100%)	86 (55%)	69 (45%)

3.11.6 On incomes

Availability of irrigation has brought about increases in cropping intensity, changes in proportion of area irrigated, shifts in cropping patterns, and some improvements in livestock activity. The changes in most of the impacted parameters have the potential to raise crop and livestock yields and create more employment opportunities apart from employment generation through construction activities in MGNREGS activities in general and larger incomes to the beneficiary farmers.

As we could not collect detailed data on crop and livestock economics from the sampled farmers, it is difficult to provide a real assessment of the increases in incomes of farmers as a result of changes in some of the above underlying parameters. We have however made an order of magnitude estimate of the possible gains that have accrued to the farmers based on farmers' own assessment of increases in their incomes. The results are based on farmers' assessments of net increase in income from crop production alone (Table 21). The results obtained suggest that farmers' incomes from crop production have increased by between 36 and 47%. In absolute terms, the net income from crop production is reported to have risen by about INR 400 to about INR 800 per acre.

Table 21. Impact on income : Estimated annual increase in income from crop production

District	Block	Estimated net income per acre sown from crop production INR per acre		
		Current	Before	% Change
Mandla	Bejjadandi	1.,632.88	1,200.00	36.07
	Ghuggri	1,858.04	1,261.68	47.27
Jhabua	Petalwad	2,735.72	1,897.84	44.15
	Thandla	2,360.12	1,598.21	47.67
Total		2,207.22	1,531.50	44.12

3.11.7 On Utilization of Increased Income and encouraging private investment in water activities

Having observed the contribution made by availability of irrigation water to increasing farm incomes, having experienced that less than adequate water that the built structures can yield constrain their desired application of irrigation water to crops, and fully aware of the additional financial benefits that are derivable from additional irrigation water, one would expect that farmers would have been encouraged to use their increased income for improving further access to irrigation water on their farms. In other words, the initial efforts being made under MGNREGS in providing water security through a multiplier impact would have encouraged complementary private investments from the beneficiary and other farmers and the combined efforts of MGNREGS investments and private complementary investments would have pushed the goal of achieving water security on a more sustainable basis on a much higher level than is envisaged with MGNREGS investments alone.

The results obtained however show that this is not happening (Table 22). The additional money earned by farmers is being spent on several activities, the most important being improving family consumption. The next most important priority seems to be repairing/building a concrete house. Investing in improving further farm water availability

appears to be the least preferred choice of these farmers. Farmers, in the short run may be correct in their own way in deciding on prioritization of expenditures on various items depending on their current status and pressing family needs.

Table 22. Use of increased incomes number of farmers

Items of Utilization	Mandla District		Jhabua District		Total
	Bejjadandi	Ghuggri	Petalwad	Thandla	
Improving family consumption	29	22	33	31	115
Acquiring farm/non-farm assets	12	6	4	14	36
Repairing/ building *pucca* houses	20	18	28	20	86
Education of children	11	17	31	15	74
Improving savings/paying off old debts	9	4	26	10	49
Improving further water availability	4	4	8	5	21

4. ASSESSMENT OF MGNREGS : COMMUNITY STRUCTURES

4.1 Some Characteristics of the Selected Community Structures

As discussed earlier, for the present study we selected a random sample of 30 community structures from two districts of Madhya Pradesh- Balaghat and Khandwa. The selected structures included 15 check dams, 10 stop dams and 5 community ponds. Table 23 gives data on the average coverage per structure in terms of number of families served, the number of persons benefitted and the area operated by beneficiary families.

Table 2. Some Characteristics of the Selected Structures

District	Type of Structure	Number of Structures	Average Per Structure		
			No. of families served	No. of persons benefitted	Area operated by families served by one structure (acres)
Balaghat	Check Dam	9	10	47	53
	Stop Dam	7	6	34	25
Khandwa	Check Dam	6	9	57	23
	Stop Dam	3	10	84	33
	Community Pond	5	6	43	14

4.2 Appropriateness and Choice of Works/Structures

The menu of water works that can be undertaken for communal use include building such structures as community ponds, stop dams, check dams etc. The main aim of building these structures is to help a group (of varying size depending upon the size of the structure being built) of farmers access irrigation water. Given the limited menu of works that can be undertaken on communal basis and often the limited amount of financial resources available for carrying out these works, it is quite possible that the work undertaken, often in consultation with the farmers and the gram panchayat, does not still necessarily represent the best possible option or that preferred most by the groups of farmers.

In our sampled structures, while more than 60 per cent of the groups of beneficiary farmers did have a say in suggesting what type of water structures need to be built, less than 50 per cent of farmers' groups concurred that the works actually undertaken represented the best option available for providing irrigation water on a communal basis (Table 24). The disagreement is not over preference for an individual structure over a community structure – a majority of the sampled groups of beneficiary farmers did not express their preference for an individual or a community structure. More than 39 per cent of the sampled group of farmer beneficiaries opined that a better alternative, than the existing structure, could have been thought of to provide irrigation water. The most discontented have been the groups of farmers who are served by community ponds. Only 1 of the 5 groups of farmer beneficiaries served by these structures agreed that the work undertaken represents the best choice of works that could have been undertaken. The remaining 4 of the 5 groups of farmers were of the opinion that a better alternative structure could have been built to achieve the same end objective.

Table 3. Appropriateness and Choice of Works

District	Type of Structure	Villagers had a Choice of Structure that could be built? Yes	Work represents the best possible option? Yes	Any better alternative that could have been used to provide irrigation? Yes	Would you have preferred an individual over a community structure? Yes
Balaghat	Check dams	7	7	1	3
	Stop Dams	4	4	1	2
Khandwa	Check dams	4	2	2	0
	Stop Dams	3	0	3	0
	Community Ponds	0	1	4	1
Total	All 30 Structures	18	14	11	6

4.3 Farmer's Consent and Transparency

The choice and the implementation of the works under MGNREGS are undertaken following a detailed process prescribed under the scheme. The prescribed process is intended to ensure that the works undertaken are not only relevant and acceptable to the community but also ensure complete transparency in the execution of these works. The process for undertaking construction activities stipulate that before the commencement of the work both the design and cost estimates are discussed in a transparent manner and a copy of the design and cost estimates are made available to the beneficiaries.

Are the authorities implementing the MGNREGS following the stipulated procedures related to farmers' consent and transparency? The results from our survey show that the required stipulations are not being followed in practice. About 43% of the sampled beneficiary groups reported that the design and cost estimates were not discussed (Table 25). More than 86 per cent of the sampled groups of respondents denied having received copies of the design and cost estimates for their record.

Table 4. Transparency of Operations

District	Type of Structure	Design and Cost Estimates Discussed?		Copy of Design etc shared?	
		Yes	No	Yes	No
Balaghat	Check dams	8	1	3	6
	Stop Dams	3	4	1	6
Khandwa	Check dams	3	3	0	6
	Stop Dams	2	1	0	3
	Community Ponds	1	4	0	5
Total	All 30 Structures	17	13	4	26

4.4 Quality of Assets Built

Following the reasoning and methodology employed for judging the quality of water structures built on the lands of individual farmers, as discussed in Section 3.6, we have attempted to evaluate the quality of some of the communal water assets that have been built under MGNREGS in the study region using a similar methodology. Based on the four criterion employed for judging the quality of the structures, the results obtained suggest that the quality of different types of community structures- check dams, stop dams and community ponds- that have been built in the study area are of reasonably good quality (Table 26). Almost all the groups of farmers who have benefited from construction of these community structures expressed their satisfaction with the quality of construction. The quality of structures compare favourably with similar structures that have been built under non MGNREGS programs. A small percentage 7% of these groups of beneficiary farmers feel that the quality of construction of the structures built under MGNREGS is better than that built under non MGNREGS programs. More than 83 per cent of the farmer groups feel that the expected life of the structures built under the program is likely to be either similar or better than the structures built under non MGNREGS program. The same is true about durability of the structures – about 86 per cent of farmer beneficiary groups feel that the structures that have been built are very durable. However in the case of community ponds

the perception differs- out of 5 community ponds, 3 groups of farmers feel that the structures are not very durable.

Table 5. Quality of Assets Built

District	Type of Structure	Satisfied with quality of construction		NREGA Quality Compared with Non NREGA Structures				Expected Life of NREGA structures in comparison with Non NREGA				Durability of Structure	
		Yes	No	Poor	Similar	Good	Better	Lower	Similar	Better	Can't say	Very Durable	Not Durable
Balaghat	Check dams	8	1	0	6	3	0	0	8	1	0	9	0
	Stop Dams	7	0	0	4	1	2	0	7	0		7	0
Khandwa	Check dams	6	0	0	3	3	0	0	1	2	3	6	0
	Stop Dams	3	0	0	2	1	0	0	3	0	0	2	1
	Community Ponds	4	1	1	2	2	0	1	1	1	2	2	3
Total	All 30 Structures	28	2	1	17	10	2	1	20	4	5	26	4

4.5 Asset Creation and Impact on Water Availability and Use

As in the case of individual structures, mere building of good quality water related community assets also however does not necessarily ensure availability, accessibility or intended and productive use of the water. For example, a good quality check dam may or may not yield water at all, may or may not yield water as per designed capacity/ in sufficient or required quantity, may or may not yield water on a sustainable basis, and, may or may not yield water of good quality. Even if the structure yields sufficient water of good quality on a sustainable basis the group of beneficiary farmers may or may not be able to access and/or use that water for intended usage. The water available in the structure becomes accessible to the farmer only if he can arrange to withdraw it out using either gravity flow (if the location so permits) or a motive power (such as a diesel engine or an electric motor). So long as the farmers do not have access to a motive power or even if the farmers have access to a motive power (such as electric motor) but do not have access to energy (electricity supply) to run it, they cannot access the available water. Even after accessing the available water putting it to productive use requires using the available water for cultivating irrigated crops. The farmer would be able to put the extracted water to such a productive use if, amongst other factors, the markets for such irrigated crops exists in the neighbourhood and crop output marketing does not pose a problem.

Of the 30 community structures studied, farmers reported that in only 16 of the structures (about 53 %) the water availability matched the designed capacity of water storage in the structure (Table 27). In the remaining 14 structures water availability was less than the designed capacity. Of the available water in these structures farmers were able to fully utilise the water from only 67% of these structures.

For drawing water from these structures one generally needs a motive power. Of the 30 farmer groups, 9 reported having invested in such a complementary equipment to draw water, another 5 got this equipment under some scheme of the government while 3 other groups got some subsidy for investing in a complementary equipment. The remaining 13 groups of farmers had neither invested in any pumping equipment nor had got it under any scheme of the government. While 3 of these groups of farmers could still use the available water, the remaining 10 groups who had not invested in the pumping equipment could not fully utilise the available water.

Table 6. Availability and Use of Water in the Water Structures

District	Type of Structure	Water availability in the structure matches the design capacity?	Able to fully utilise the available water for productive purposes?	Complementary private investments made to utilise available water?	Complementary equipment received from some official agency?	Any Subsidy received for investing in complementary equipment
Balaghat	Check dams	7	8	2	0	0
	Stop Dams	2	4	2	0	0
Khandwa	Check dams	4	6	2	2	1
	Stop Dams	2	2	2	1	1
	Community Ponds	2	1	1	2	1
Total	All 30 Structures	16	20	9	5	3

4.6 Conflicts and their resolution

Community water structures built to benefit a small group of farmers within a village could lead to conflicts amongst members within the beneficiary group of farmers on allocation of available water as also between beneficiary group of farmers and non- beneficiary farmers. Did the farmers in our sampled villages face any such conflicts and if so is there an institutional arrangement available within the village to resolve such conflicts if they arise.

Fortunately none of the beneficiary groups of farmers reported any conflicts amongst the members of the group on allocation of the available water in the structure as also with non-beneficiary farmers (Table 28). Except for one group who reported existence of an institutional arrangement to resolve such conflicts, if such conflicts were to arise, none of the other farmer group reported existence of any such institutional mechanism for conflict resolution.

Table 7. Conflicts and Their Resolution

District	Type of Structure	Conflicts between beneficiaries of structure over water allocation?	Conflicts between beneficiaries and non-beneficiaries?	Any institutional arrangement available for conflict resolution?
Balaghat	Check dams	0	0	0
	Stop Dams	0	0	0
Khandwa	Check dams	0	0	0
	Stop Dams	0	0	0
	Community Ponds	0	0	1
Total	All 30 Structures	0	0	1

4.7 Water Harvesting Structures and Multiple Uses of Water

Water made available in the studied community structures is not fit for drinking but offers some potential for use in sanitation and livestock besides its primary use for crop irrigation. Depending on the location of the structure, quantum of water available in the structure, the availability of pumping equipment to draw water from the structure, the extent of its use could differ from structure to structure as also over different time periods.

The results on the uses of available water for different purposes by our sampled groups of farmers from different types of structures are presented in Table 29. The results show that a majority of the structures are in fact being used as multiple use structures. In fact 70 per cent of the available structures are being used for all the three purposes- irrigation, livestock and sanitation while another about 23 per cent of the structures are being used for two purposes – irrigation and sanitation, or irrigation and livestock. Not a single structure is being used for irrigation alone. This usage pattern however does not imply sufficiency or otherwise of the available water for a given use purpose.

Table 8. Multiple Uses of Water Structure

District	Type of Structure	Nature of Use of the Water Structure					
		Irrigation Only	Livestock only	Sanitation only	Irrigation+ Livestock	Livestock+ Sanitation	Irrigation+ Livestock+ Sanitation
Balaghat	Check dams				1		8
	Stop Dams			1	2		4
Khandwa	Check dams						6
	Stop Dams				1		2
	Community Ponds		1		1	2	1
Total	All 30 Structures	0	1	1	5	2	21

4.8 Farm Level Impacts

We could not collect detailed farm level data on the nature and magnitude of changes the groups of beneficiary farmers have been able to bring about on their farms subsequent to the availability of irrigation water from the constructed community water structures. As a result we have not been able to estimate the financial/economic gains that would have accrued to these farmers from availability of water. Based on focussed group discussions with beneficiary group of farmers of different structures we did collect some qualitative data on the broad changes they have brought about in the farm economy after water from the structures was made available to them for irrigation.

Availability of irrigation water in general has brought about increases in proportion of cultivated area irrigated, has enabled increases in cropping intensity, has encouraged larger use of yield increasing technological inputs such as fertilisers, and has led to increases in crop yields on beneficiaries of almost all the water structures. Due primarily to variations in quantum of irrigation water available in different structures the shifts in cropping pattern

have been reported by farmers in only about 55 per cent of the structures (Table 30). Due to upward shifts in almost all the underlying variables the farm employment opportunities (apart from employment generation through construction activities in MGNREGS activities in general) of the beneficiary farmers have also increased. Diversification of farming activities such as towards livestock etc has been reported by only about 40 per cent of farmer groups. Such diversification normally comes with a lag and this activity may undergo some positive shifts in due course of time. As already discussed the indicated changes in various parameters are indicative of the nature of shifts and provide no clue about the extent of shift in these parameters.

As a result of increases in crop yields and larger employment opportunities, the farmers reported increases in their incomes by varying amount. As discussed above, in the absence of any detailed data on crop and livestock economics from the sampled farmers, it is difficult to provide a real assessment of the extent of increase in incomes of farmers as a result of changes in some of the above underlying parameters. We have however attempted to ascertain from the sampled farmers an order of magnitude estimate of the possible gains based on farmers' own perception. As per these estimates farmers reported an increase in incomes ranging from almost nil to nearly 50 per cent of their pre water availability income.

Table 9. Impact of Water Harvesting Structures on Farm Economy

District	Type of Structure	Increase in Cultivated Area Irrigated	Increased Cropping Intensity	Shifts in Cropping pattern	Increase in level of input use	Increase in Crop Yields	Increase in employment	Diversification of farming activities
Balaghat	Check dams	9	8	3	8	9	7	3
	Stop Dams	6	6	2	3	7	2	2
Khandwa	Check dams	7	7	6	7	7	7	4
	Stop Dams	3	3	3	3	3	3	1
	Community Ponds	4	4	3	4	2	3	2
Total	All 30 Structures	29	28	17	25	28	22	12

4.9 Pattern of Spending the Additional Money

With whatever additional water made available and with whatever farm level changes the beneficiary farmers could bring about with the available water, the net result has been an increase in farmer's income by varying amount depending on the initial conditions, the additional water made available and the changes in farm economy brought about. Having realised the important contribution the availability of additional irrigation water can make in increasing the farm incomes, one would expect that farmers would be encouraged to, as a first choice, utilize this increased income for improving further access to irrigation water on their farms. In other words the initial efforts being made under MGNREGS in providing water security, through multiplier impact would have encouraged complementary private investments from the beneficiary and other farmers and the combined efforts of MGNREGS investments and private complementary investments would have helped push the goal of achieving water security on a more sustainable basis on a much higher pedestal than is

envisaged with MGNREGS investments alone. The results obtained show that this is happening only partially (Table 31). About 57 per cent of the beneficiary groups of farmers reported having spent some of the additional earned money in improving further the availability of irrigation water.

Because most of the beneficiary farmers are small poor farmers, with the modest increase in incomes realised from the availability of water the first choice of majority of such farmers is naturally improving the family consumption. The farmers have however been rational in their pattern of spending of additional earned income on several activities – family consumption, house building/repairing, education of children, paying off old debts etc. Farmers, in the short run, may however be correct in their own way in deciding on prioritisation of expenditure on various items depending upon their current status and pressing family needs.

Table 10. Pattern of Spending of Additional Money by Beneficiary Households of the Water Structures

District	Type of Structure	Improving Family Consumption	Acquiring farm/non farm assets	Repairing/ Building house	Children education	Savings/ paying old debts	Improving further water availability
Balaghat	Check dams	9	3	9	9	6	5
	Stop Dams	7	2	4	5	6	3
Khandwa	Check dams	6	6	6	6	6	5
	Stop Dams	3	3	3	2	3	3
	Community Ponds	4	3	2	2	1	1
Total	All 30 Structures	29	17	24	24	22	17

5. CONCLUSIONS AND STEPPING FORWARD

With its emphasis on creating durable assets in rural areas through provision of guaranteed employment, MGNREGS holds a great potential for improving rural water security and in providing irrigation water services on a sustainable basis. With cost effective, reasonably good quality and durable individual and community water structures being built in the studied areas of rural Madhya Pradesh, water availability scenario is slowly improving. However mere building of good quality assets and water stored therein in itself is not sufficient to provide water security. This in itself is akin to a job half done and an objective partially achieved. What use these good quality structures and water therein is if the water available in the structures cannot be put to productive use by the beneficiaries? In addition to building assets, the program must also ensure that the created assets are actually put to productive use by the beneficiary farmers so that the intended objective of creating a process of employment generation on a sustainable basis could actually materialise. Accomplishing this task would require a careful assessment of the location specific underlying causes for non-use of created assets and devising appropriate remedial measures and complementary intervention strategies to address them. In the study area, for example, a number of otherwise beneficiary farmers of the program have not been able to transform the available water in to utilisable water due to lack of access to a water lifting device. This in part is due to the fact that while MGNREGS does address issues of water

availability it does not directly address issues relating to accessibility and utilization of water made available.

While the government has been trying to address this concern through such means as convergence of MGNREGS with other programs being run by different Ministries/ Departments of the government and has issued elaborate convergence guidelines for this purpose, in practice this has not been very effective. In any case, with thousands of structures being currently built and planned to be built over the years attempting to fill this gap through convergence of programs is an expensive proposition and is neither feasible nor is desirable. Altering the scope of MGNREGS to include provision of a pumping equipment to bridge this gap is not possible as this would alter the basic premise of employment creation without use of any machinery. We feel that linking of beneficiaries to financial institutions and making available either interest free or concessional loans for investment in a pumping equipment could to a large extent help bridge this gap without altering the basic objective of the program and at not too heavy a cost to the government.

Much greater involvement of the beneficiary farmers in the choice of type and size of the water structure to be built and greater transparency of the technical details (such as designed and actual capacity) and financial expenditure incurred will encourage greater involvement, interest and instill more confidence in the beneficiaries leading to improved efficiency of the investment and better and more efficient utilization of the built structure. Routinely building water structures without consideration of the nature of water requirement of the beneficiary farmer would defeat the whole purpose of water security and more efficient use of the available water.
The impact of the water structures in improving farmers' income so far has only been modest. While this in part could be due to the fact that most of the beneficiary farmers have had these structures built in the last two-three years only and it takes time to respond, adjust and make necessary changes in the farm economy, part of it could be due to lack of information and knowledge about cultivating irrigated crops and choice of a suitable crop mix in accordance with the water availability. Extension support to the beneficiary farmers could help bridge this gap and enable them better plan their farm economy.

Though designed and built primarily with a single use purpose, of making irrigation water available, in view the built structures are actually being used for more than one purpose by the beneficiary farmers. Not taking in to consideration this fact in designing the nature, size and capacity of the built structure may lead to divergence of preference between the structures actually built and those desired most by the beneficiaries as also the water that can be used for different purposes. If the multiple use nature of the structures is kept in view at the time of designing the structure it would not only add to the utility of the structure but also help avoid duplication of expenditure on parallel government schemes designed for different single use purposes.

Having made the initial efforts towards providing rural water security through MGNREGS, it is reasonable to expect that through multiplier impact this would encourage complementary private investments from the beneficiary and other farmers as well so that the combined efforts of MGNREGS investments and private complementary investments could push the goal of achieving water security on a more sustainable basis on a much higher pedestal than

is envisaged with MGNREGS investments alone. Currently however such private investments are not happening as the additional meagre incomes of the beneficiary farmers is being spent on meeting other pressing family requirements. While this could change in the future on its own, a complementary effort at encouraging farmers to invest, at least a part of their additional income derivable from use of irrigation water, in expanding and strengthening their water infrastructure could add further and ensure more sustainable household water security.

In conclusion, based on assessment of the data collected from the study area of Madhya Pradesh, we are of the view that MGNREGS is a good model for providing rural water security. While the efforts being made under MGNREGS towards this end are beginning to yield positive outcomes, successful mediation in addressing some of the above concerns could help further accelerate and give a fillip to the goal of achieving sustainable water security and at a much higher level. More importantly, this would also help enhance productive utilisation of MGNREGS money invested in asset creation. We however feel that more studies, under varying underlying agro-climatic-socio-economic-governance conditions be undertaken to further corroborate and validate the findings of the present study.

REFERENCES

Ambasta Pramathesh, P S Vijay Shankar, Mihir Shah. 2008. Two Years of NREGA: The Road Ahead. Economic and Political Weekly, February 23

Annonymous. 2009. NREGA Reforms: Building Rural India - First Annual Report of the National Consortium of Civil Society Organizations on NREGA 2008-09. Madhya Pradesh: Samaj Pragati Sahyog

ADI. n.d. National Rural Employment Guarantee Act (NREGA): Policy and its implementation - An Overview. Alternative Development Institute

AFPRO. n.d. Infrastructure Development and Beyond: Exploring the Scope for Sustainable Livelihood Support under NREGA in Chainpur Block, Gumla District, Jharkhand. New Delhi: Action for Food Production

Bassi, Nitin and M.Dinesh Kumar. 2010.NREGA and Rural Water Management in India: Improving the Welfare Effects. Hyderabad: Institute for Resource Analysis and Policy

CBGA. 2006. Report on Implementation of NREGA in Andhra Pradesh, Chattisgarh, Jharkhand and Madhya Pradesh In May and June 2006. New Delhi: Centre for Budget and Governance Accountability

CRRID. 2010. Appraisal of Impact Assessment of NREGS in Selected Districts of Himachal Pradesh, Punjab, Haryana. Chandigarh: Indian Centre for Research in Rural and Industrial Development.

CSE. 2008a. An Assessment of the Performance of The National Rural Employment Guarantee Programme in Terms of its Potential for Creation of Natural Wealth in India's Villages. New Delhi: Centre for Science and Environment

CSE. 2008b. NREGA : Opportunities and Challenges. New Delhi: Centre for Science and Environment :Natural Resource Management and Livelihood Unit

IAMR. 2008. All-India Report on Evaluation of NREGA: A Survey of Twenty Districts New Delhi: Institute of Applied Manpower Research

IIML. 2009. Quick Appraisal of 5 Districts Under NREGS in Uttar Pradesh. Lucknow: Centre for Food and Agribusiness Management, Indian Institute of Management, August

IITM. 2010. Evaluation of National Rural Employment Guarantee Act in Districts Cuddlore, Dindgal, Kanchipuram, Nagai, Thiruvallur. Chennai: Rural Technology and Business Incubator, Indian Institute of Technology.

IWMI. 2010. Asset Creation Through Employment Guarantee? Synthesis of Student Case Studies in 19 States of India (Draft Report). Anand: International Water Management Institute.

NCAER. 2009. NCAER-PIF Evaluation of National Rural Employment Guarantee Act. New Delhi: National Council of Applied Economic Research.

Shah, Mihir . 2009. Multiplier accelerator synergy in NREGA. The Hindu April 30,2009

Shah, T. 2009. Money for Nothing: Cash transfer is a flawed alternative to NREGS. *The Times of India ,Ahmedabad*. November 5, 2009,

Shah, Tushaar and Rajnarain Indu .2009. 'MGNREGA in Indo-Gangetic Basin: Fieldnotes from Here and There', Anand: International Water Management Institute.

Singh, S.P and Nauriyal, D.K.2009 . System and Process Review and Impact Assessment of NREGS in the State of Uttrakhand. Roorkee: Indian Institute of Technology.