Water Scarcity Induced Migration

Can Watershed Projects Help?

Distress migration has been a regular resort of the poor in less-favoured regions, more so in areas that face chronic water scarcity. This paper looks at the evidence from Gujarat, and examines the impact of watershed development programmes on migration among farm workers from landed as well as landless households.

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I Introduction

Agricultural Growth Holding the Torch

The recent discourse on poverty reduction in India has reinforced the need for 'agriculture – first' approach to economic development. This has been borne out by the experience in the post-1990s where relative sluggishness in the agricultural growth had virtually ceased the trend reduction in rural poverty since 1970s [Datta 1999]. The past trend not only suggests that poverty reduction has responded far more to rural rather than to urban economic growth, the former has benefited both the urban as well as rural poor [Ravallion 2000]. To a large extent, this has been achieved through technology-led growth which had centred round dependable irrigation or water resources during the first phase of Green Revolution [Dhawan 1988; Dantwala 1996; Desai and Namboodiri 1997; Mellor and Desai 1986]. But this ideal combination of irrigation, agricultural growth and poverty reduction is not likely to be available in the next phase where growth in agriculture will have to come increasingly from the relatively less favoured regions where water is the limiting factor. This included the large tract of dryland regions with low as well as less dependable water resources, and the rainfed regions with high intensity of floods and waterlogging [Vaidyanathan 1986]. What is therefore, needed officially is a more careful management of water and its efficient use rather than looking for alternatives, within as well as outside rural economy, especially in absence a sustained growth in agriculture. For, the recent evidence also suggest that options in non-farm sectors (urban and rural) primarily, get influenced by the growth in the basic sector, i e, agriculture. In fact, the empirical evidence suggest synergy rather than substitution between non-farm activities and agriculture as well rural development [Ravallion and Datta 1999]. This observation reinstates the need for water resources management, which however is much more difficult in the dryland and rainfed regions as compared to the high potential regions where Green Revolution had succeeded during the first phase. What is thus implied, is water centred development in these 'less-favoured' regions with a specific focus on efficient use through water conservation and budgeting in the case of dryland region, and drainage and ground water development in the case of flood-prone regions. Of late, it has been recognised that, if properly managed, investment in water resources in these regions may have greater pay offs and at the same time have larger impact on poverty alleviation thus making it a 'win-win' strategy [Fan and Hazell, 2000].

Social and Environmental Cost of Distress Migration

In absence of these investments, the poor in the less-favoured regions, which accounted for 84 per cent of India's rural poor in 1993, resort to distress migration which is yet another form of involuntary dislocation. While seasonal movement of labour force from water scarce regions to irrigated and/or economically developed regions is a fairly common phenomenon, what seems to have emerged in the more recent period, is out-migration of relatively active workforce on a long-term or permanent basis. But, this kind of dislocation of labour force may not be sustainable because of the high cost of social as well as environmental implication. For instance, out-migration of the economically active adult population might create shortage of labour force to work on land for enhancing its productivity. A sustained shortage of effective labour force may therefore lead to further degradation of land and other productive resources thus, may have adverse environmental implications. What is worse is, this kind of migration especially, of the adult male, increases the burden on the family members who stay back, i e, the elderly and the women [Myers 1995]. In case, the adult male members migrate with their immediate families (i e, their spouse and children) to urban centres they often end up living in slums or pavements that can hardly be treated as appropriate living conditions with human dignity.

In reality this kind of distress migration though, not enforced by any statutory power, is fairly close to 'involuntary' migration associated with developmental projects in industry, mining or irrigation sectors. But, the social and environmental costs of water scarcity induced distress migration are often overlooked while setting up priorities and resource allocation to the water scarce regions. The recent thrust on Watershed Development Projects (WDPs) is a significant policy initiative which inter alia, aims at reducing distress migration from the water scarce (or dryland) regions. The extent of achievements however, will depend essentially on the (a) size and the composition of investments made, and (b) the mechanism of benefit sharing accross households. This paper tries to examine experiences of selected WDPs in the backdrop of the migration pattern across regions and districts in Gujarat.

Objectives

The analysis will focus on the following specific objectives:

(i) To review the existing evidence on migration in Gujarat.

(ii) To examine the impact of watershed development programmes on migration among farm workers from landed as well as landless households.
(iii) To draw implications for future strategies.

II
Migration in Gujarat: Some Recent Evidence

Given the developed industrial sector, Gujarat offers a relatively dynamic environment for intra as well as interstate migration. This is reflected by the fact that in 1991 Gujarat was second only to Maharashtra in terms of interstate inmigration especially from some of the economically backward states like Bihar, Uttar Pradesh, Rajasthan and Orissa [Srivastava 1998]. To a large extent these migrants tend to seek employment in the industrial sector located in the 'Golden Corridor' between Ahmedabad and Valsad. Of course, these kind of movements are fairly common because of the inherent inequality in industrial development accross space. Since most of these backward states also have relatively higher population growth, migration becomes an inevitable process. What is however, concerning is that, such movements often take place because of the inadequate development of agriculture despite the fact that population density per unit of net sown area is quite low among some of these backward states like Orissa, Rajasthan and Madhya Pradesh[1] in many of the backward regions. To a large extent these movements are associated with absence of water resources development in the water scarce regions. This phenomenon has been clearly borne out by the inter-regional and inter-district migration in Gujarat. For instance, the study by Visaria and Kothari (1984) clearly indicated that in 1971 the direction of net outmigration was mainly from the water scarce less developed districts of Saurashtra and north Gujarat to the more developed and industrialised regions in south Gujarat. To a large extent the inter-regional migrants had moved from rural to urban areas and sought employment in secondary and tertiary sectors.

This phenomenon has been further consolidated by 1991. This has been indicated by the fact that Ahmedabad (+Gandhinagar), Mehsana, Surat and Vadodara were the only districts where incidence of male inmigration had increased over 1981 (Table 1). Incidentally, these happen to be industrially developed districts of the state. Apart from this, there were two other industrially developed districts where incidence of inmigration is relatively higher (Table 2). Conversely, most of the districts in water scarce regions in Saurashtra and north Gujarat have low incidence of inmigration. This includes districts like Amreli, Jamnagar, Bhavnagar, Sabarkantha, Banaskantha and Panchmahals. Apparently, Kutch and Surendranagar are the major exceptions having relatively higher incidence of migration. To a large extent this is due to higher mobility, especially among the pastoral communities, within districts rather than accross districts. For instance, in 1991, Kutch had the lowest share (1.94 per cent) among the total inter-district migrants in the state, followed by Panchmahals (2.25 per cent) and Surendranagar (3.42 per cent) (Table 3).

The phenomenon of net-outmigration is further reflected by the demographic features in Saurashtra-Kutch region. Table 4 indicates that between 1981 and 1991, rate of growth in population had been lower among all the districts (except Bhavnagar) in the region (Table 4). Contrary to this, population growth is found to be higher among the major industrialised districts viz; Ahmedabad (+Gandhinagar), Surat and Valsad (except Vadodara). This suggests a possibility of long term or permanent outmigration of population from Saurashtra-Kutch to the central-south regions. In turn, this seems to have resulted

Table 1: Changes in Proportion of Migration (Male) Across Districts in Gujarat

	1971 Per Cent Share	Changes During 1961-1971	Changes During 1981-1991	1991 Per Cent Share
Amreli	2.59	–	–	2.24
Bhavnagar	4.26	–	–	4.25
Junagadh	6.17	–	–	5.03
Kutch	3.17	0	0	3.25
Jamnagar	4.19	–	–	2.95
Rajkot	6.46	–	–	6.60
Surendranagar	2.85	–	–	2.59
Ahmedabad-Gandhinagar*	19.48	–	+	18.13
Mehsana	5.23	+	+	5.29
Kheda	7.86	+	–	7.31
Vadodara	8.94	0	+	13.38
Bharuch	4.59	+	–	4.56
Surat	9.33	+	+	15.13
Valsad	4.65	NA	–	4.97
Banaskantha	3.06	–	–	2.57
Sabarkantha	3.34	–	–	2.37
Panchmahals	3.21	0	–	2.82
Dangs	0.55	–	–	0.33
	100			100

Notes: '0' denote 'no-change' or marginal increase
NA = District did not exist
* Gandhinagar was not included in the earlier period between 1961-71
Source: Census of India, Migration Tables.

Table 2: Distribution of Districts According to the Levels of Migration 1991

	Proportion of Migrants (Percentage)					
	Up to 30		30.1 – 35		> 35	
Districts/All migrants	Bhavnagar	(29.88)	Amreli	(31.89)	Bharuch	(35.98)
	Junagadh	(30.35)	Kutch	(32.09)	Surat	(39.55)
	Jamnagar	(27.59)	Rajkot	(34.43)	Ahmedabad-Gandhinagar	(34.90)
	Panchmahals	(26.18)	S Nagar	(33.98)		
	Dangs	(28.74)	Valsad	(31.10)	Vadodara	(37.43)
	Sabarkantha	(29.69)	Mehsana	(32.95)	Kheda	(35.40)
	Banaskantha	(26.52)	Gujarat	(32.8) [33.2]*		
	< 15		15-20		> 20	
Districts/Male Migrants	Amreli	(14.7)	Junagadh	(17.1)	Surat	(35.1)
	Bhavnagar	(15.0)	Kutch	(21.0)	Ahmedabad+ Gandhinagar	(27.4)
	Panchmahals	(7.7)	S Nagar	(17.1)	Vadodara	(34.4)
	Sabarkantha	(11.0)	Valsad	(18.6)	Rajkot	(21.2)
	Banaskantha	(9.5)	Dangs	(18.6)	Bharuch	(23.7)
	Mehsana	(14.6)	Kheda	(16.9)		
	Jamnagar	(15.3)	Gujarat	(19.4) [20.5]*		

Note: * Figures indicate migration rates in 1981

in higher sex ratio among these districts vis-a-vis the industrially developed districts. While it is difficult to gauge the extent of long-term or permanent migration (vis-a-vis seasonal migration) from Saurashtra-Kutch region,[2] the phenomenon could be further substantiated by the fact that livestock population has also followed a more or less pattern as human population as shown in Table 4. It is striking that all the districts in Saurashtra-Kutch region have registered a decline in terms of absolute number of livestock between 1982 and 1992 whereas rest of the districts (including Banaskantha and Panchmahals) have recorded increase in livestock population.

Since the industrially developed central-south regions also happen to be endowed with relatively favourable rainfall as well as more dependable irrigation facilities, such movements of population seem to have created overcrowding and increased pressure in the recipient regions. This can be examined by looking into the correlates of migration accross districts. Table 5 provides results of a co-relation exercise. It is observed that average labour productivity in agriculture is negatively associated with proportion of agricultural to total male workers. Evidently, some of the more drought-prone districts like Amreli, Kutch, Surendranagar and Rajkot have relatively higher agricultural labour productivity than those in Kheda, Mehsana and Junagadh having relatively prosperous agriculture and, thereby attracting more of rural-rural migration as shown in Table 3.

It is plausible that net outmigration of labour force from the water-scarce region of Saurashtra-Kutch may lead to further degradation of land in the region. While there is no systematic data indicating such causal relationship, observations often suggest that neglect of some of the labour-intensive practices like field bunding, land levelling, trenching, etc, that help improving the productivity of land in the long run. Apart from low and/or uncertain returns, shortage of labour is often reported as a crucial constraint in adoption of such practices [Shah 1997].

Together these evidences suggest a clear pattern of (a) shifting of human as well as livestock population from Saurashtra-Kutch to the developed districts in central-south Gujarat; and (b) diversification of labour force from primary to secondary and tertiary sectors. But, this kind of shift in population and occupational structure may not be desirable if it is primarily induced by 'push' factors like water scarcity and, creates over crowding in the places of destination as indicated by the above analysis. Development of land and water resources is therefore, considered as an important strategy for reducing such distress migration from the water scarce regions. How far this strategy has actually worked? This has been discussed in the light of the micro-level evidence especially, from watershed projects in dryland/semi-arid regions.

III
Reducing Migration Through Watershed Development: Select Evidence

While labour absorption in agriculture is significantly higher in the irrigated regions, not much is known about the impact of soil-water conservation programmes on increased labour use hence, reduced migration in the predominantly dryland/semi-arid regions. According to a recent study by Fan et al (2000), investment in soil-water conservation by itself does not seem to have exerted significant impact on poverty reduction except for direct employment generation.

To a large extent, the observed weak linkage between the two is due to inadequate and ineffective implementation of most of the soil-water conservation programmes, which till recently, had been carried out mainly as welfare or relief works programme. It is only since the mid-1980s when these activities got transferred into a comprehensive strategy for Watershed Development Programmes (WDPs), positive impact on labour absorption hence reduced outmigration started emerging. It may however, take more time before the full impact of such interventions is realised on a larger scale. What is therefore attempted here is a somewhat early assessment of the impact of WDPs on increased farm productivity and reduced migration.

There has been a growing body of literature, looking into the various impact of watershed programmes in dryland/semi-arid regions in India [Kerr et al 1998; Farrington et al 1999; Deshpande and Narayanmoorthy 1999; Rao 2000]. While these studies highlight significant achievements, often reflected through a fairly high benefit-cost ratio, there are any few studies that have gone into examining the impact of such projects on migration. One of the striking examples, apart from the few successful stories like Ralegoan Siddhi, is that of Rajiv Gandhi Watershed Mission in Jhabua district of Madhya Pradesh. The watershed project in Jhabua is a testimony of the fact that if, designed and implemented properly, these kind of micro-level initiatives can help checking the incidence of outmigration at least during a normal rainfall period. Similar observations have also come from some of the dryland districts of Gujarat where WDPs have helped reducing outmigration even during a drought period [Anil Shah 2000]. A comprehensive overview of the National Watershed Development Project for Rainfed Regions (NWDPRA) also reports positive

Table 3: Districtwise Patterns of Migration: (1991, Male)

District	R-U > R-R	Per Cent Share in Inter District Migrants		Per Cent Share in Total Migrants	
		R-R	R-U	R-R	R-U
Jamnagar		2.98	1.62	2.97	2.66
Rajkot	_/	7.27	6.28	5.09	7.03
Surendranagar		3.42	1.26	2.92	2.17
Bhavnagar		4.27	2.70	5.10	3.87
Amreli		4.78	1.18	3.49	1.47
Junagadh		4.77	1.96	6.67	3.96
Kutch		1.94	0.88	3.55	2.45
Sabarkantha		4.60	0.84	4.64	1.24
Banaskantha		4.07	0.69	4.27	1.30
Mehsana		8.15	2.09	7.14	4.31
Gandhinagar	_/	3.04	2.47	1.08	1.58
Ahmedabad	_/	7.30	31.62	4.47	22.95
Kheda		10.03	3.72	11.06	5.31
Panchmahals		2.25	0.72	4.80	1.35
Vadodara	_/	8.77	0.98	8.00	11.17
Bharuch		11.08	3.92	8.07	2.11
Surat	_/	10.11	24.93	10.71	21.09
Valsad		3.89	3.38	5.33	3.79
Dangs		0.49	0.19	0.63	0.19
All		100.0	100.0	100.0	100.0

Note: _/ = Districts where number of rural-urban (R-U) migrants was higher than rural-rural (R-R) migrants.

impact on employment. However, this kind of employment gains, as reflected through beneficiaries' perceptions, are somewhat difficult to reconcile with the quantitative estimates presented in the evaluation study. For instance, the estimates indicate that average employment among beneficiaries is found to be lower vis-a-vis non-beneficiaries despite the relatively higher irrigation intensity among the former [Deshpande and Narayanmoorthy 1999:386]. While there are a number of success stories, the studies by and large bring out certain shortcomings in terms of impact on migration. For instance (a) employment in the one-time project activities is often confused with a sustained increase in farm employment; (b) increased crop productivity due to improved soil-moisture alone, is often found to be small and uncertain; and (c) significant decline in migration is achieved only when there has been a substantial increase in irrigation. Unfortunately, the studies do not clearly indicate the conditions under which impact on migration is achieved

Given the difficulties in capturing long-term employment gains, many of the existing findings appear to be impressionistic rather than borne out of carefully examined empirical realities. One such attempt was made in the case of Indo-British Western India Rainfed Farming Project which indicated that watershed projects may help reducing the severity, but not the incidence of distress migration [Mosse et al 1997]. To a large extent this is due to the weather (or rainfall) induced uncertainties that are difficult to overcome by these moderate interventions under the WDPs. While foodgrain security at the household level does help reducing the intensity of migration, such security is difficult to attain by a large number of households operating small/marginal holdings under unirrigated conditions.

What is therefore, central to the impact of micro-level developmental interventions is access to irrigation as suggested by a number of watershed project reviewed by Kerr et al (1998). The importance of irrigation is further evidenced by a detailed study of the project affected persons of the Sardar Sarovar Project [Sah 1999]. The study suggests that households with average holding of five acres and access to irrigation had helped containing migration among 83 per cent of the sample households. Similar findings have also come from Andhra Pradesh indicating that 2000 micro watersheds have brought nearly 1.7 lakh hectares of additional area under irrigation; and as a result; migration of labour declined from 10 to 40 per cent in different watersheds [Rao 2000].

While these results are quite encouraging what is often missed out is the fact, the benefits especially, through irrigation, has been fairly selective and covering a small subset of the watershed community. This fact has been borne out by a recent review of watershed projects in Gujarat [Shah and Memon 1999], which almost for the first time, tried to gauge the distributive aspects of such benefits. This is essential if the concern is to know the impact of such interventions on migration or quality of life, and poverty. The study covering four micro watersheds – three in Saurashtra and one in hilly tribal region Bharuch indicated that there is a significant positive impact on shift in cropping pattern (from groundnut to cotton) hence increase, in cropping intensity, there is no significant increase in on-farm employment on a sustained basis. Hence, migration remains more or less unaltered. What is more concerning is that the positive impact on crop-shift and productivity as well as income remain confined mainly to those who received direct benefits from water harvesting structures like checkdams. Since number of such structures in a village generally do not exceed two-three the actual number of households receiving these benefits may range between 40-60. This leaves a large number of the village communities outside the net of the direct benefits either in terms of employment or crop productivity and income on a sustained basis [Shah forthcoming].

Table 4: Socio-Economic Features Across Regions in Gujarat: 1991

Regions	Pop Growth (Per Cent) 1981-1991	Sex Ratio	Per Cent of Agri to Total Main Workers	Change in Livestock (Per Cent) 1982-92	Normal Rainfall (mm)
Saurashtra-Kutch					
Amreli	1.61	98	67.2	–2.5	545
Bhavnagar	2.20	95	55.9	–9.5	596
Junagadh	1.40	96	67.4	–0.3	88
Kutch	2.02	96	57.7	–15.0	351
Jamnagar	1.22	95	57.6	–4.2	497
Rajkot	2.01	94	51.1	–8.0	621
Surendranagar	1.69	92	64.3	–2.3	507
Central South					
Ahmedabad	2.39	89	26.6	37.1	789
Gandhinagar	4.15	92	42.5	71.9	
Kheda	1.41	92	70.4	13.1	832
Vadodara	1.93	91	55.9	30.8	1006
Bharuch	2.08	93	68.7	26.9	884
Surat	3.63	90	44.9	15.4	1100
Valsad	2.25	96	62.2	34.9	1892
Other (Tribal)					
Dangs	2.68	98	87.9	51.3	1808
Banaskantha	2.97	93	77.6	1.9	758
Sabarkantha	1.72	96	76.4	17.8	796
Mehsana	1.53	95	65.2	1.4	613
Panchmahals	2.73	95	82.0	25.0	989
All districts	2.12	92	59.3	NA	NA

Source: Socio-Economic Survey, Bureau of Economic and Statistics, Government of Gujarat, Gandhinagar.

Table 5: Correlates of Migration 1991

Variables	Correlation Coefficient								
	1	2	3	4	5	6	7	8	9
R-R rate as per cent to total male migrants		0.88**			-0.94**	0.89**			0.66*
R-U male as per cent to total male migrants					0.94**	-0.84**			0.78**
Productivity of agri (main) workers				-0.67**		0.53*			
Marginal as per cent to all holdings							0.57*	0.57*	
Level of urbanisation						-0.90**			0.70**
Per cent share of agri workers to total main workers									0.67**
GIA as per cent to GCA									
Land productivity									
Male migrants as per cent to total population									

Notes: * Significant at 10 per cent level.
** Significant at 1 per cent level.

Developing Common Property Resources (CPRs) is another important avenue through which large number of poor households could be benefited [Jodha 1997; Chopra and Gulati 2001]. But, such activities are difficult to undertake mainly because of the problem of encroachment and effective management. For instance, examining the activity profile among 16 Project Implementation Agencies (PIAs) in Gujarat, a recent study by Shah and Memon (1999) suggests that only nine PIAs had carried out some kind of treatment on the community pasture land; and only five had undertaken work on village tanks. These, together, constituted 66 and 10 out of the total 181 villages (or micro watersheds) covered by these 16 PIAs[3].

The above evidence suggest a significant gap between the potential as well as the realised benefits in terms of increased productivity and reduced migration. The study by Chopra and Gulati (2001) highlights this gap through a detailed empirical analysis suggesting that irrigation intensity and regeneration of forests have direct impact on reducing distress migration. However, the study notes that CPR management essentially depends on carefully worked institutional mechanism. For. it is found that creation of common property rights and ownership of cattlestock have a significant and negative impact on distance migration. Finally the study also underlines the importance of complementarity between participation in common property water and land resources.

Together the existing evidence bring out two important aspects that have crucial bearing on impact of watershed projects on income generation and checking distress migration among a large number of households within watershed communities. These are:

(i) Availability of irrigation is central to increased cropping intensity, crop productivity, hence labour absorption and reduced migration. However, irrigation benefits are often limited to a subset of households within the village community. The critical issue therefore, is to expand the coverage of irrigation benefits if, larger number of poor households are to gain from the project.

(ii) Development of CPRs can be an important means to influence a larger number of poor households. But, this needs significant changes in the ownership as well as management structure. Since participation in common land is complementary with that in water, the need is to explore a large part of the available water as common pool resources and thereby expand its net of beneficiaries.

IV
Policy Implications

The foregoing analysis brings out certain important implications for tapping the full potential of watershed development programmes for amelioration of poverty. Prima facie, the need is to focus on widening the net of irrigation in watershed regions. This implies restructuring of the watershed programmes in the following direction.

(i) Given the central role of irrigation in watershed projects, the focus should shift to providing 'limited irrigation for all'. This implies availability of water not only for the private crop land but, also for community land. One of the important reasons for the present neglect of these community lands is non-availability of water for development of fodder as well as plantation. This works counter-productive because natural regeneration under low and/or uncertain rainfall conditions take a long time often, longer than the life of the project. This makes it difficult to mobilise and sustain people's participation in CPR-development, especially when initial pay-offs are low and/or uncertain.

On private land, the focus should be to ensure efficient use of water by bringing in new technologies. Since water is the most scarce resource in dryland/semi-arid regions, it ought to be used most economically. The recent experiences however suggest that availability of additional irrigation leads to relatively more irrigation intensive crops, and that too without any special measure for ensuring water use efficiency. This is a crucial need for development and diffusion of various water saving devices. While there has been a growing body evidence indicating economic viability of drip irrigation in large parts of dryland regions, efforts have been made to explore technological options for ensuring foodgrain self-sufficiency by providing limited water to a large number of the farms and farmers. A recent experiment in the dryland region Madhya Pradesh suggests that average 'minimum irrigation' requirement could be about 15 cms and 10 cms per hectare for irrigated and unirrigated crops. The gross requirements may therefore work out to be about 20 per cent of the run-off or an overall rainfall harvest of about 5 per cent. It is therefore possible to meet requirement of minimum irrigation for most of the cultivating households within a micro watershed [Shah, Mihir et al 1998]. Such experiments need to be promoted on a larger scale.

(ii) Distribution of water accross larger number of farms and farmers however, would imply a strong institutional back up. Prima facie, it would involve using different sources of water in conjunction with each other and as common pool resources, so as to attain its equitable distribution. While this is a fairly complex process, beginning could however be made by replicating the experience of 'Pani Panchayat' in Maharashtra and participatory irrigation management in Andhra Pradesh. The need is to move towards reformulating the legal structure for water use.

(iii) The distributive mechanism however, will have to address the issue of inter-village and/or inter-regional conflicts over water and its use. For, construction of checkdams on the upper stream may reduce the availability of water in the down streams. At present, large number of checkdams are being built without following the proper sequencing of such structures. This needs to be checked. Also, construction of water harvesting structures in a haphazard manner may have adverse impact on the ground water acquafer. This implies that treatments at the micro watershed should be in conformity with some kind of a macro-level planning for conservation and use of water, at least at the level of sub-river basins. This aspect is also important from the view point of inter-regional equity and also for ensuring minimum level of irrigation to a larger number of farms and farmers. For, one must recognise the fact that depending merely on rain water harvesting within a micro watershed may not help raising farm productivity and labour absorption among a large number of farmers. If agriculture in dryland and semi-arid regions is to enhance employment opportunities on a large-scale and sustained basis, a multi-pronge approach for improvement in water saving technology, building up institutional and legal framework for distribution water, and planning for conservation as well as allocation of water at the sub-river basin level is a must. Micro watershed projects may have to work within this larger framework essentially, as an institutional mechanism for effective conservation of water and its use at the local level. It is time now, that watershed projects start focusing on these larger agenda so as to be able to break

the barriers of having limited impact on distress migration and poverty. EPW

Notes

1 According to the recent estimates, population density per hectare of net sown area was 3.35, 5.10 and 2.65 in Madhya Pradesh, Orissa and Rajasthan. This is relatively lower compared to some of the other poor states having better irrigation. For instance the population density is as high as 11.8 in Bihar, 8.0 in Uttar Pradesh and 8.06 in Assam.

2 The census data on migration do not reveal the actual number of years as well as frequency of migration by place of origin. In fact, the data capture two types of migrants: (i) those who migrated from their place of birth; and (ii) those who migrated from the place of enumeration during the last census. This make it difficult to ascertain the permanent nature of migration.

3 The study is based on detailed probing of 16 PIAs having relatively better experience as well as performance in terms of project implementation. Hence, it is unlikely that the remaining PIAs have done more activities on CPRs.

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