

**“Human Rights Dimension of  
Regional Water Transfer”  
Experience of  
the Sardar Sarovar Project**

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## Human Rights Dimension of Regional Water Transfer: Experience of the Sardar Sarovar Project

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**ABSTRACT** *Regional water transfer—a water management alternative in general and a means of addressing water scarcity in particular—has been subject to various controversies including those relating to human rights. This paper presents the worldwide practice of RWT and describes the Indian experience against the background of water availability, legal provisions and national policies. Referring to various widely ratified international human rights instruments, the paper emphasizes that social desirability is equally as important as technical feasibility and economic viability of such projects. Intra-state regional imbalances and migration as a consequence of water scarcity in the State of Gujarat in India highlight the significance of Sardar Sarovar Project on the river Narmada. While discussing other alternatives such as rainwater harvesting, the paper goes on to establish that the state has no option but to implement RWT.*

### Introduction

Historically, civilizations have flourished along or around the sources of water. However, for geographical, technical, social, cultural and political reasons, boundaries of demographic regions do not coincide with the basin boundaries. This results in spatial variations in the distribution of this prime natural resource and formation of 'water surplus' and 'water deficit' regions.

Regional water transfer (RWT) is an attempt to redistribute water across the regions to ensure that sustainable water resource development is achieved in consonance with broader planning of socioeconomic development. Depending upon social desirability, technical feasibility and economic viability, regional water transfer could be intra-basin, inter-basin or a merger of both. It is true that issues connected with equitable distribution of dwindling fresh water supplies could become a major source of strife at regional, state, national or international level. However, if managed carefully, it may lead to better cooperation amongst competing water users.

### Worldwide Experience of Regional Water Transfer

Regional water transfer has a long history as a means of addressing water scarcity in one region by transporting additional supplies from water-surplus areas. It has been attempted as a viable water management alternative in both developed and developing countries, all over the world. Amongst the existing RWT projects in the USA the California State Water Project completed in 1973

is an outstanding example, transferring 4000 MCM of water from the northern to the southern part of the state (Verghese, 1999). Growing water scarcity in the arid and semi-arid west has fostered a number of RWT proposals to divert northern rivers of largely uninhabited areas of Canada and Alaska, e.g. the proposed North American Water and Power Alliance (NAWAPA) (to transport 135 683 MCM of water annually, equivalent to about eight times the average annual flow of the Colorado river) (Frederick, 1995). Incidentally, it may be mentioned here that Canada has twice as much surface and groundwater as the USA, with one-tenth of the USA's population and industry. Other proposed ambitious RWT projects, consistent with the North American Free Trade Agreement (NAFTA), are the Great Replenishment and Northern Development Canal (GRAND Canal), the Alaska California Subsea Pipeline Project and the Garrison Diversion Project. According to NAFTA, natural resources such as water are also covered among the goods and services for free trade. As a result, local, provincial or even national attempts to prevent or restrict Canadian water exports to the USA or Mexico would be subject to the review of an international panel (Koftinoff, 1997). In Rio de Janeiro State in Brazil, a total of 160 cumecs is transferred from the Rio Pariba do Sul to the Guandu River Basin via the Light-Guandu system for drinking purposes (World Bank, 1996).

By the mid-1970s, it was clear to the South African authorities that the need for water in the arid industrial heartland of the country, mainly in the Vaal River Supply Area (VRSA) and in Gauteng and Mpumalanga, would in future become so great that the possibility of diverting water from Lesotho to South Africa had to be considered. To address the immediate shortage of water in the VRSA, various transfer schemes such as the Tugeal/Vaal Transfer Scheme between KwaZulu-Natal and the Free State, the Usutu-Vaal Government Water Scheme and the Slang River Transfer Scheme between the KwaZulu-Natal and Mpumalanga were commissioned (Frank, 1997). South African Water Resources Management Policy states: "Current planning predictions suggest that this [inter-basin transfer scheme] will have to continue if the economic growth and the social development of the country is not to be stunted" (South Africa, National Policy, 1997). Inter-basin water transfer has been attempted in Kenya also. The area of water supply for the capital city of Nairobi falls in the Athi River Drainage Basin. Similarly, the 60 km long Yatta canal, built during colonial times, transfers 1 cumec of water from the Thika river downstream of the DelMonte to the semi-arid lands of the Machakos district in the Athi river basin (Nyararo, 2000). The erstwhile Soviet Union too had made several inter-basin diversions from the Volga, Amu Darya, Dnieper and Irtysh (Verghese, 1999). There are 37 inter-basin flow diversion systems with a volume of more than 15 000 MCM per year and total extension of 3000 km (Mikheev *et al.*, 1998).

In France, RWT projects have been taken up to cater to the water demand of large cities. A recent example is the proposed water transfer from the River Rhone in the Languedoc-Roussillon region of France to the Catalonia region of Spain—the LRC Aqueduct, a possible structural response to water shortage in Barcelona. The Ebro-Tarragona Projects and Tajo-Segura Project in Spain are other examples of inter-basin water transfer (World Bank, 1996). Sharing of Danube river waters is a unique example of international water sharing, involving 12 out of 15 riparian countries (Dinar, 1997). The UK Government Environment Agency, announced its R&D strategy in September 1998, which also

includes promotion of inter-basin transfer of water where the scientific basis to do so is sound (UK Environment Agency, 1998). Urban centres in Germany too have resorted to RWT for their water needs (World Bank, 1996).

In Venezuela, 85% of demand for water was in the north, while 85% of supply was in the south. Water therefore had to be transferred across the country. HIDROVEN, the national water management body of Venezuela, has adopted a holistic approach to ensure that water is made available equitably to all in society (Commission on Sustainable Development, 1998).

In the Middle East, 'needs based' rather than 'rights based' paradigms are used for negotiating water disputes. The Nile Waters Treaty, involving nine riparian countries, is an example of 'hydro cooperation'. As regards RWT, Israel's National Water Carrier, which pumps Jordan River inflows into the Sea of Galilee southwards into the Negev desert, is another notable example. In an era of peace, development of the shared water resources of the Jordan River Basin and contiguous water systems, in a programme of regional cooperation including economically feasible projects for water transfer, can bring benefits to all of the riparian partners (Shuval, 2000).

The distribution of people and arable land in China does not match the distribution of water resources: 44% of the population and some 58% of the cultivated land are in the northern and north-eastern regions, whereas only 14.4% of the total water resources (surface and groundwater) can be found in those regions (Heilig, 1999). The Chang Ziang (Yangtze) and Zhu Jiany (Pearl) rivers in the south account for just about half the total runoff of all the rivers in China, while many northern cities are faced with acute water shortage. The Yangtze, which is often called the equator of China, taken literally, should 'make things equal' but it appears that the direction is quite the opposite (Ollis *et al.*, 2000). Hence, water transfer from the south to the north is the only realistic solution for the scarcity of water resources in northern China. China has a history of inter-basin projects, among the oldest of these being the Lingua canal linking the Xianjiang and Guijiang rivers for shipment of armaments during war (241 BC) and the Grand Canal, linking the Yangtze and Yellow rivers for navigation and irrigation (AD 605) (Verghese, 1999). Recently, a major project to divert Yangtze waters north to the Yellow river has been under study for some time. The Three Gorges Project, a mega-project, is already under construction on the Yangtze river. West, Middle and East Route Projects of south-to-north water transfer will transfer 10 200 MCM, 14 500 MCM and 8860 MCM of water annually respectively (Liu, 2000).

In Asia, Japan has to its credit a detailed River Law and comprehensive administrative set-up to implement regional water transfer. Small-capacity dams with a copious inflowing water volume in a large river basin are linked with the large-capacity dam with a small inflowing water volume in a small river basin by creating an interconnecting waterway to store water that is used in drought situations by inter-basin transfer of water through specially created water conveyance channels (Gupta, 2000). The South Asia Water Vision has identified the Ganges, Brahmaputra and Meghna basins as a single basin. This vision of a GBM basin is certainly pushing towards the Indian idea of Indo-Bangladesh inter-basin water transfers (Mirza, 2000). Bangladesh has off and on contemplated a Brahmaputra-Ganga transfer within its own territory and Nepal has likewise identified certain deficit zones which might at some stage import water

## *Water Availability*

One-third of India's territory is drought prone and one-eighth is liable to flooding. Only about 80% of the surface water of rivers is harnessed effectively, while the country reels under the flood-drought-flood syndrome. The per capita availability of utilizable water has been reducing progressively owing to increasing population (361 million in 1951 to more than 1 billion presently). During the last 50 years (1951-2000), it has decreased from 3450 m<sup>3</sup> to 1250 m<sup>3</sup> and in next 50 years it is likely to come down to 760 m<sup>3</sup> (for a projected population of 1.6 billion).

In the broad fivefold categorization of global water scarcity developed by IWMI, Sri Lanka, the drier region of western and southern India falls into the first category, which includes those countries that are most water scarce and in 2025 will not have enough water to maintain the 1990 levels of per capita food production from irrigated agriculture (Seckler *et al.*, 1998).

Six river basins in India, namely the Cauvery, the Pennar, the Sabarmati, the east-flowing rivers between Mahanadi and Godavari, the east-flowing rivers between Pennar and Kanyakumari, and the rivers of Kutch and Saurashtra fall in the water-scarcity category where per capita water availability is less than 1000 m<sup>3</sup> (FAO, 1993). Water shortage is absolute whereas scarcity is relative. There are degrees of scarcity—absolute, life threatening, temporary, cyclical, etc. However, scarcity is not necessarily inevitable or immutable (Winpenny, 1999).

With a more than 80% share in water use, irrigation remains the dominant sector. Only about 4% of water use is attributed to the domestic sector and more than 25% of villages in India suffer from drinking water problems. Some 90% of the groundwater pumped (using electric or diesel pumps) is used for agriculture. In some parts of the country, indiscriminate use of groundwater has resulted in 'water mining'. It is estimated that even if the utilizable water resources are harnessed to the fullest potential (1122 BCM), water demands will outstrip the availability in next 30 years (Varma, 1999).

## *Legal Provisions*

According to Article 39 of the Indian Constitution, "The State shall ... direct its policy towards securing ... that the ownership and control of material resources of the community are so distributed as best to subserve the common good". The expression is wide enough to include natural resources (1984 S.C. 374). In India, water is a state issue. Under Article 246(3) of the Constitution, every state government has the power to legislate and exercise authority in respect of water within its territory. Article 262 of the Constitution authorizes Parliament by law to provide for the adjudication of any dispute or complaint with respect to the use, distribution or control of the waters of, or in any, inter-state river or river valley. Under the Inter-State Water Disputes Act, 1956, which was enacted under Article 262 of the Constitution, an Inter State Water Dispute Tribunal can be constituted under the Chairmanship of a Supreme Court Judge, and its award is beyond judicial review. The River Boards Act, 1956, also provides for the constitution of River Management Boards.

### *Policies and Projects*

Within this framework of legal provisions, RWTs have long since been made and will continue to take place in view of the compulsion of growing demand, with population growth and development, and the high degree of imbalance in water availability over space and time (Verghese, 1999). The Periyar diversions across the Western Ghats to Tamil Nadu established the principle of inter-basin transfer a century ago, although within the same larger Ganga basin the Ghaghara has been diverted to the Sharda (Sharda Sahayak Project). Through the Bhakra Project, which ushered in a green revolution for India, the Ravi-Beas waters have been diverted to the Yamuna. Inter-basin transfers have also been made from the Krishna, Godavari, Mahanadi, Cauvery, Tapi and Mahi (Gulati, 1972). The relatively recent Indira Gandhi Canal Project, has transformed the once barren land of the Thar desert into an agriculturally productive land by bringing water from the Harike barrage on the Indus river. The Canal has rounded Jaisalmer and is being hewn through dunes and arid, sand-blown wastes along the desert, towards Gadra Road, about 1500 km from the Himalayan storages and upstream diversions that feed it (Verghese, 1994).

During the last quarter of the 20th century several RWT proposals received an impetus. Noteworthy among these were the National Water Grid proposals made by Dr K.L. Rao (Ganga-Cauvery link, 1972) and by Captain D.J. Dastur (Garland Canal Project, 1974). The prohibitive cost of these proposals has relegated them to the realm of science fiction, at least for the foreseeable future.

The National Perspective Plan for Water Development in India (1980) comprised two components, namely the Peninsular Rivers Development and Himalayan Rivers Development. Through such inter-basin water transfer this plan is expected to give additional benefits of 25 million ha of irrigation and 34 000 MW of power, quite apart from the benefits of flood control, navigation water supply, fisheries, salinity and pollution control etc. (National Perspective Plan, India, 1980). The National Water Policy (1987) categorically states that "Water should be made available to water short areas by transfer from other areas including transfers from one river basin to another, based on a national perspective, after taking into account the requirement of areas/basins" (Government of India, 1987). This policy is being updated to cover issues such as inter-sectoral water allocation, environment problems, inter-state water disputes, farmers' participation, private sector participation etc. The updated draft National Water Policy has been approved by the National Water Board by general consensus and is to be placed before the National Water Resources Council for adoption (Latest Parliament News, India, 1999). The Integrated Water Resources Development Plan (1991) also includes inter-basin transfer of water as an integral part of water management (Government of India, 1999). The National Water Development Agency (NWDA) and Ministry of Water Resources have prepared a perspective plan for inter-basin transfer of surplus water to augment availability of water by about 224 MCM. The river links identified for this purpose are the Pamba-Achankovil-Vaippar link involving Kerala and Tamilnadu, the Par-Tapi-Narmada link involving Gujarat and Maharashtra and the Ken-Betwa link involving Madhya Pradesh and Uttar Pradesh.

## Controversies

Despite being an alternative to address imbalances in water supply and demand, RWT has generated a great many controversies nationally and internationally.<sup>1</sup> Environmental (rehabilitation of the ecosystem), social (rehabilitation of the displaced people), legal (sharing of water) and ethical (value, belief and culture bound) and spiritual issues have been raised and debated in RWT projects. Water is so important for human life that it makes definition of surplus water difficult and precludes simple agreement as to when water transfer is desirable. The water-use efficiency in the recipient regions is also an important consideration. RWTs have been attempted in the developed countries mainly for catering to the urban needs of water including those for recreational activities, whereas such attempts in the developing countries aim at supplying water to the poor rural areas for their sustenance. These issues have been discussed and debated in recent times at various international fora.<sup>2</sup> While the debate may be justified either way, the will to cooperate remains the deciding factor. To have water when it is deficient is a basic human right (Bill of Rights, South Africa, 1998) and it has been proposed for universal acknowledgement that a basic supply of water to allow a healthy lifestyle is a fundamental human right (World Commission on Water, 2000). Recently, the Hague Declaration (March 2000) also recognized that access to safe and sufficient water and sanitation are basic human needs and are essential to health and well-being, and to empower people, especially women, through a participatory process of water management.

## Human Rights

This leads us to examination of the larger context of human rights and its linkage to sustainable water development. It is widely acknowledged that sustainable human development aims at alleviating poverty, promoting human dignity and providing equitable opportunities for all through good governance, thereby promoting the realization of all human rights—economic, social, cultural, civil and political (UNDP, 1998). Therefore, human rights and sustainable development are inter-dependent and mutually reinforcing. Development is unsustainable where large number of people live in abject and degrading poverty. Poverty is a human rights violation and freedom from poverty is an integral and inalienable human right (UN, 2000).

## Right to Development

Right to development has been implicit in the Universal Declaration of Human Rights and in the Covenant on Economic, Social and Cultural Rights. The UN Declaration on Right to Development (1986) reaffirmed its existence and it was reiterated as a 'universal and inalienable right' and an integral part of fundamental human rights.<sup>3</sup> The recently concluded Millennium Forum of the UN has also urged all governments, the UN and civil society to cooperate in appropriate actions to realize effectively the right to development as a matter of utmost urgency.

Thus, there is no doubt that right to development is not a mere pipe dream or ideological slogan but it is guaranteed by international law. It includes the

rights of people, such as the right of exercise of full and complete sovereignty over their natural wealth and resources; the right to be the central subject of development; the right to self-determination; the right of participation (in the process of development) etc. In this process, the state also has certain obligations (as per the UN Declaration on Right to Development); e.g. (1) to ensure full exercise and progressive enhancement of the right to development (Article 10); (2) to formulate appropriate national development policies (Article 2(3)); (3) to undertake, at the national level, all necessary measures for the realization of the right to development (Article 8(1)); (4) to create national conditions favourable to the realization of the right to development, i.e. to create enabling environments (Article 3(1)).

### Rights of Women

That women's rights are human rights has been recognized in the Convention on Elimination of all forms of Discrimination against Women (CEDAW), 1979; UN World Conference of Human Rights (Vienna), 1993; the Beijing Platform of Action of the UN Conference on Women and Development, 1995; and Women 2000: Gender Equality, Development and Peace for the 21st Century, UN, New York, 2000.

### Rights of Children

The UN Convention on the Rights of the Child, the most widely ratified human rights instrument, recognizes several crucial rights of children including the right of survival, the right to protection, the right to development and the right to participation.

### Sardar Sarovar Project: Realization of Human Rights through Regional Water Transfer?

Harnessing the untapped waters of the Narmada river through the Sardar Sarovar Project and the regional transfer of water from water-surplus to water-scarce regions has been seen as an attempt to fulfil the right to development for millions of people by a strategy of poverty alleviation through water development. These efforts have been questioned by some individuals on the grounds of violation of human rights of the oustees. This school of thought holds that the human rights of those subjected to involuntary displacement cannot be impaired on the grounds of national sovereignty and national economic interest. They hold that such considerations may justify a project, though these may not justify nullification of basic human rights (Morse, 1992). One needs to understand the peculiar climatic, geographical, geological and socioeconomic conditions in the state of Gujarat before arriving at any conclusion.

### *Water Situation in Gujarat: Past, Present and Future*

Gujarat State, one of the most progressive states in India, is situated in the western part of the country. It covers an area of 196 024 km<sup>2</sup> and has a population of about 47 million. It is relatively urbanized and has a large and fast-growing manufacturing sector. Agriculture accounts for more than one-

Region	No. of dams	Storage capacity		Current storage available	
		(MCM)	(%)	(MCM)	(%)
North Gujarat	13	2 018	(13.48%)	96	(4.75%)
Saurashtra	113	2 229	(14.90%)	244	(10.95%)
Kutch	20	265	(1.77%)	63	(23.77%)
South & Central Gujarat	28	10 452	(69.85%)	4660	(44.58%)
Total	174	14 964	(100.0%)	5063	(33.83%)

Source: Narmada, Water Resources & Water Supply Department, Government of Gujarat, September 2000.

third of the state's income. The state, which has 6.39% of the geographical area of the country and 4.88% of the country's population, is blessed with just 2.28% of the country's surface-water resource. Added to this is the fact that out of the 185 rivers, the state has only eight perennial rivers and all of them are located in the southern part. Around 80% of the state's surface-water resources are concentrated in central and southern Gujarat, whereas the remaining three-quarters of the state has only 20% of the resources. Average per capita water availability of 980 m<sup>3</sup> per year puts the state in the 'water scarce' category. Intra-state variation in per capita water availability (1570 m<sup>3</sup> in south and central Gujarat to 414 m<sup>3</sup> in north Gujarat) is also eye-catching (Vyas, 2001).

As regards agriculture, seasonal, two-seasonal and even perennial crops are possible because of the tropical monsoon climate with suitable temperature. An average annual rainfall of 25 cm to 200 cm with high coefficient of variance underlines the state's dependence on dependable irrigation for agricultural production. In most parts of the state, the rainfall is not only scanty but is highly unreliable. The pattern of surface-water availability within different regions of the state divides it into four distinctly different regions, namely Saurashtra, Kutch, North Gujarat and South & Central Gujarat. The Narmada basin alone constitutes about 40% of the surface-water resources and this underscores the state's dependence on regional transfer of water. The vagaries of nature are often experienced by one part of the state or other. Recently, on 11 September 2000, as against a total storage capacity of 4512 MCM in all the dams of Saurashtra, Kutch and North Gujarat, the storage available was hardly 403 MCM (8.93 %). In contrast with this, in the water-surplus regions of South Gujarat, against a total storage capacity of 10 452 MCM, 4660 MCM (44.58%) of storage was available (Table 1). On the other hand, during September 1999, in just four days, about 24 700 MCM of Narmada water flowed down to the sea unutilized. On average, three years in a cycle of 10 years are drought years. Millions of rupees are spent almost every year to mitigate the drinking-water problem in rural and urban areas.

In Saurashtra, due to overexploitation of groundwater resources, the natural balance between the seawater and groundwater level has been disturbed and salinity ingress has become a major problem. In North Gujarat, as a result of groundwater exploitation, the fast depletion of groundwater has led to ground-

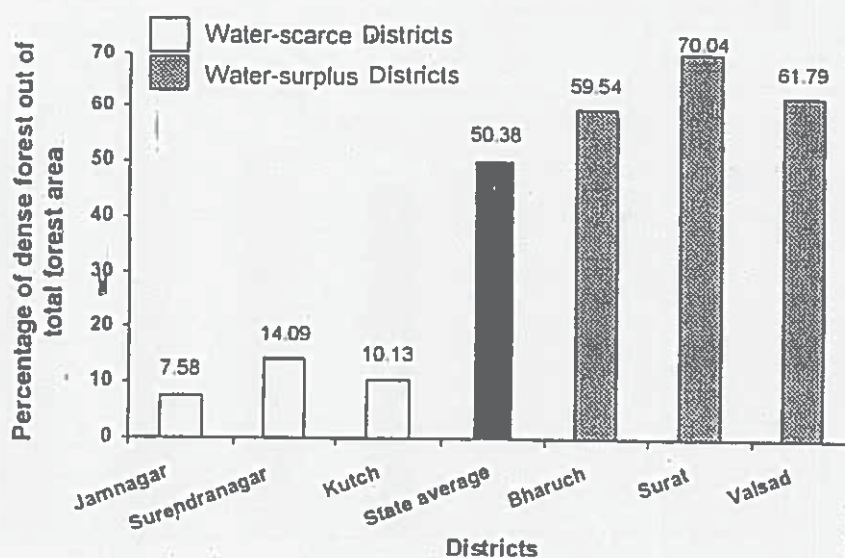


Figure 1. Density of forest in Gujarat. *Source:* Forest Survey of India, Government of India (1997).

water mining. In Kutch, the non-availability of water has caused advancement of desert, environmental degradation and national security issues because of the long Indo-Pak border in this area. The lower percentage of dense forest in water-deficit districts and higher density of forest as compared with the state average in water-surplus districts adequately proves the detrimental effects of water scarcity on the environment (Figure 1).

As a result of over-extraction, groundwater tables are falling steadily in Saurashtra, Kutch and North Gujarat. More than 40% of the state's electricity consumption is used for extracting groundwater which is at a average depth of 700 to 1000 feet in some parts. Non-availability of clean and safe drinking water necessitates transfer of water from the water-surplus regions to water-scarce regions by tankers, special water trains and even by ship via the sea route. In summer, the grim situation of water scarcity leads to social tensions and even to water riots. In more than 25% of the state's villages, the quality of drinking water poses serious threats to the health of the people. In North Gujarat and Saurashtra (south-western Gujarat) the incidence of dental and skeletal fluorosis and kidney diseases is very high, resulting in early ageing, permanent disability and restrained economic activity. Children are the worst sufferers with deformed teeth and bones, which are a common sight in rural areas. Women have to undergo the daily drudgery of fetching water from a distance of up to 8 km. There are reported instances of women risking their lives by lowering themselves down into semi-dried up wells to take out a few buckets of water. Lack of access to safe drinking water, time lost in collecting available water, effects of head loading on women's and girl children's health and the burden of women's household responsibilities all have an adverse impact on their health and general family welfare, including their income-earning ability (SEWA, 2000). The pertinent question is: Do these children and women not have a right to development and other social, economic and cultural rights enshrined in any number of international human rights instruments?

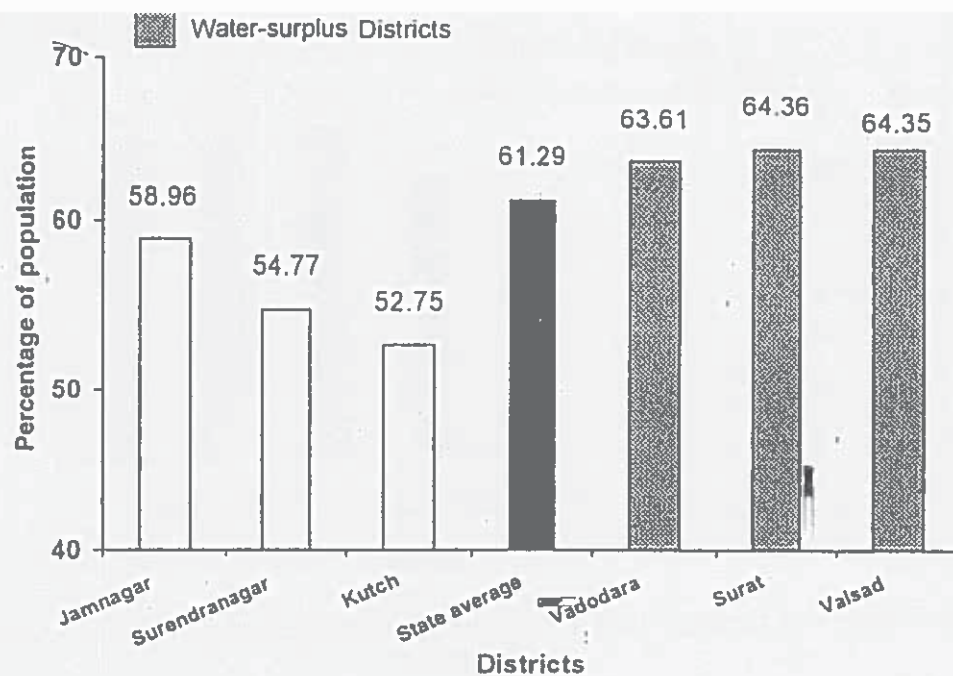


Figure 2. Literacy rate in Gujarat. Source: Census Handbook (1991).

### Water Scarcity, Regional Imbalances and Migration

The contrast in the availability of water in the different regions of the state has had serious effects on the socioeconomic development of the water-deficit regions. Such intra-state regional imbalances have caused social, cultural and political problems detrimental to the sustainable development of the state as a whole. It is not a coincidence that the literacy rate in the water-deficit districts is much less than the state average as compared with the water-surplus districts, where it stands higher than the state average (Figure 2). This may be attributed, *inter alia*, to the daily struggle for drinking water experienced by millions of families in these areas, whereby the education of children does not remain a priority any more. The low level of economic activities in these water-deficit areas is reflected in the lower percentage of main workers *vis-à-vis* the total population (Figure 3). These areas remain industrially backward whereas the water-surplus districts are highly industrialized, leading to more employment generation and a higher level of economic activity (Figure 4).

Although migration is common to both developed and developing countries, its frequency and extent is more visible in a developing agrarian economy basically due to uncertainties in on-farm employment. It can be looked upon broadly in two theoretical ways (Gill, 1998). While it is considered as a strategy for utility maximization at individual or household level (based on wage differentials and diversification of income sources) by some neo-classical economic theories, it has also been viewed as a strategy of survival or sustenance of subsistence level of migrants (Connell *et al.*, 1976). It is the second view that is relevant in the case of drought-induced migration of a large number of people in Gujarat. While in-depth study and analysis into who migrates, where, for how long and under what kind of coping strategy may require a detailed survey, the

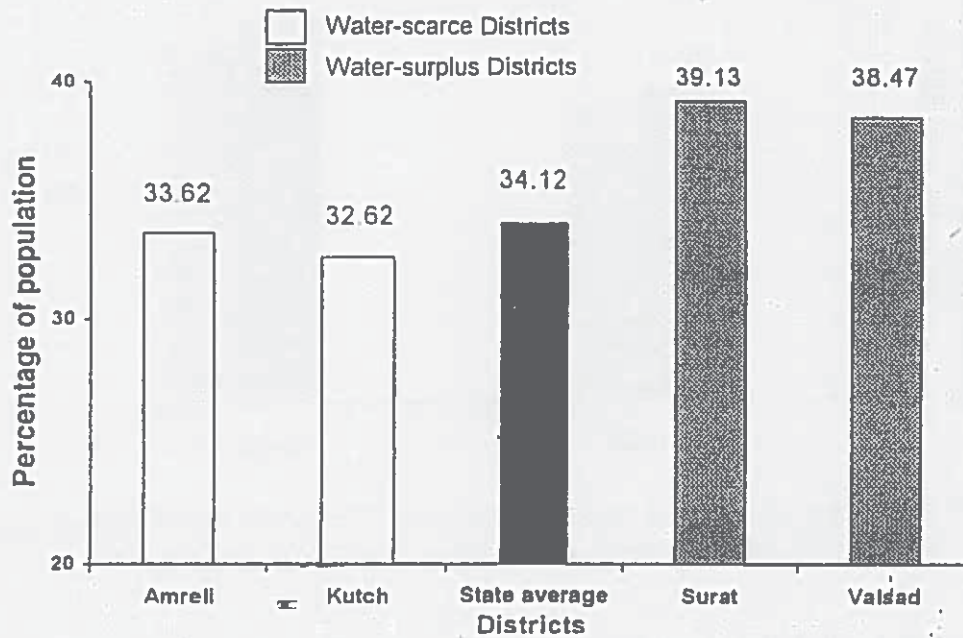


Figure 3. Main workers in Gujarat State (as a percentage of total population). Source: Report of Socio-Economic Survey, Government of Gujarat (2000).

existing evidence on migration based on census data has been analysed with fair accuracy and very significant conclusions have been drawn (Shah, 1996).

While the all India percentage of male in-migrants as a percentage of total male population has declined significantly, for Gujarat it has remained more or less the same and much higher than the all India average (Figure 5). This suggests that Gujarat is an important destination for migratory movement from relatively backward regions both within and outside the state. The inter-district migration increased from 8.9% in 1971 to 11% in 1991 and rural-to-rural male

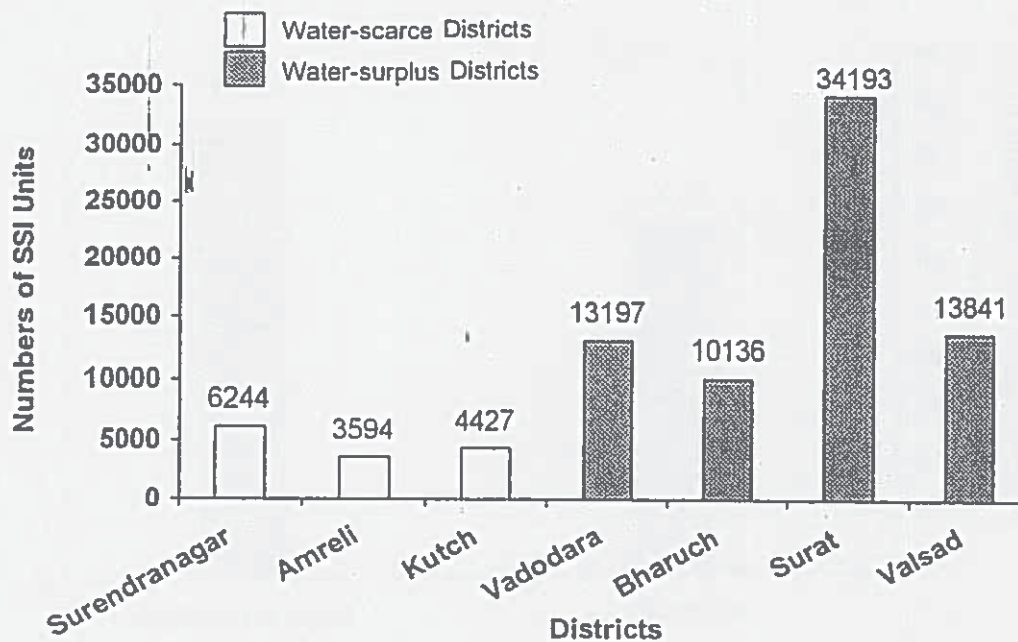


Figure 4. Small-scale industrial units in Gujarat, 1999. Source: Report of Socio-Economic Survey, Government of Gujarat.

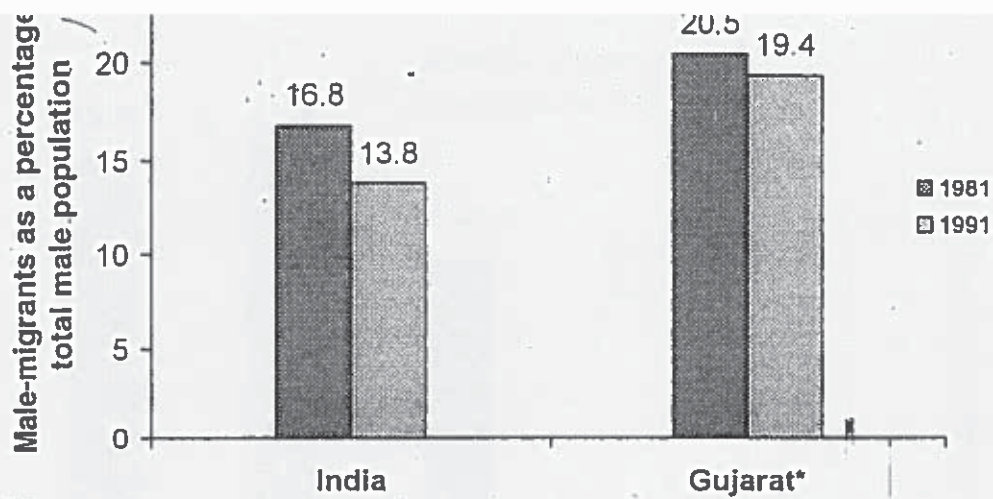


Figure 5. Migration due to water scarcity. Note: \*The state ranks fourth amongst the major states in the country. Source: Census of India, 1991.

migration exceeded the rural-to-urban migration (the ratio between the two on an all India basis is 1.45 as against 2.12 in Gujarat) (Figure 6).

Therefore, in terms of intra-state migration, there has been a clear pattern of significant out-migration from the drought-prone regions like Saurashtra-Kutch (western and south-western Gujarat) and the eastern tribal belt to the central and southern regions of the state that have better water resources endowment as well as a higher level of industrialization. In 1981 (for which estimates of net out-migration can be worked out at district level), the top districts as regards net out-migration were some of the drought-prone areas such as Amreli, Surendranagar, Bhavnagar, Rajkot, Panchmahals and Mehsana. A similar pattern had continued in 1991, which is reflected by the fact that most of the districts in south-western Gujarat, along with the water-scarce districts of North Gujarat, have a significantly lower incidence of male in-migration than the state average.

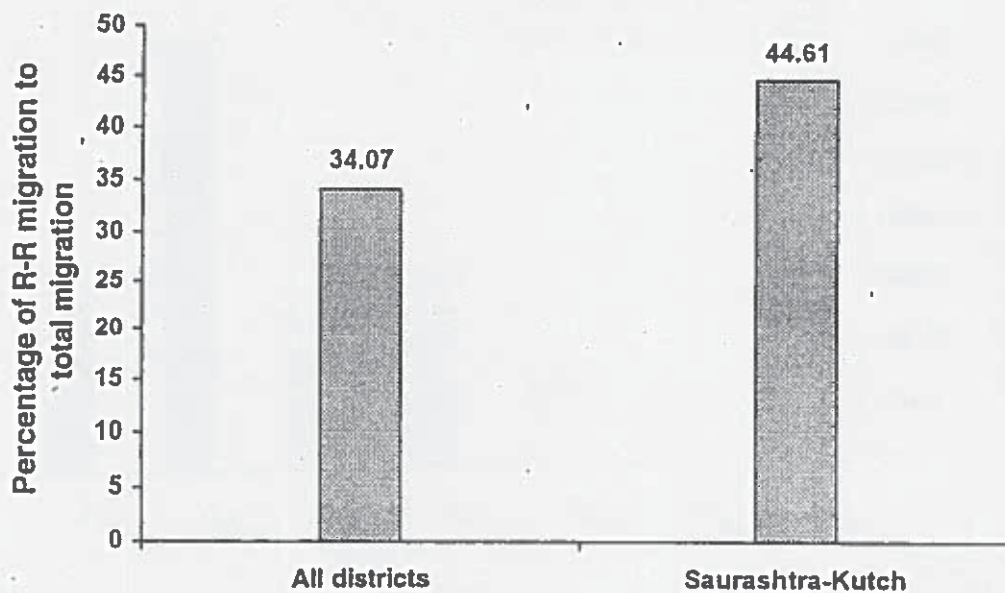


Figure 6. Migration pattern in Gujarat. Source: Census of India, 1991.

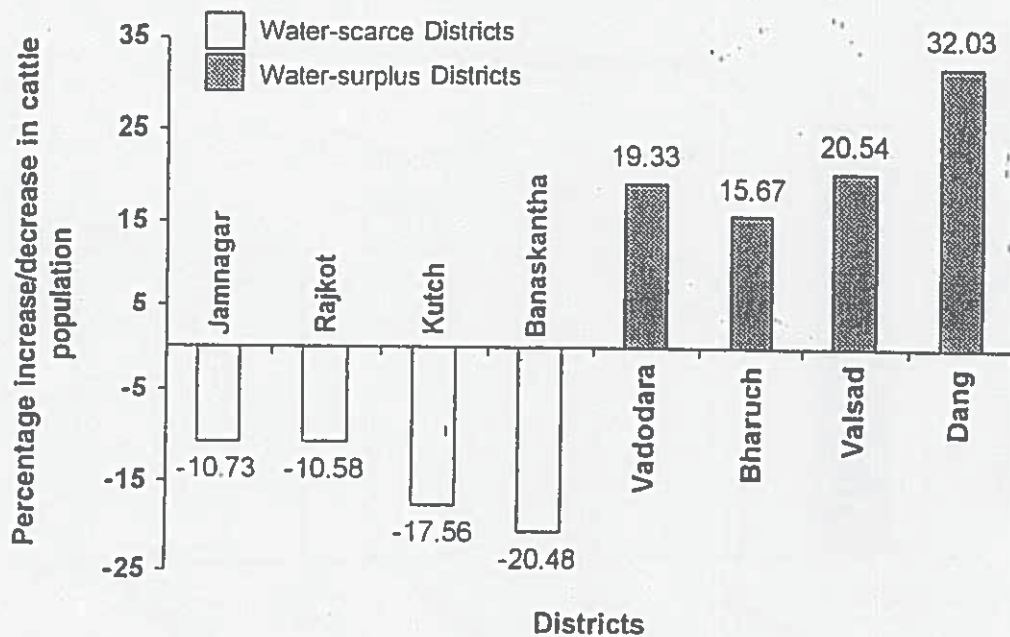


Figure 7. Livestock population growth between 1982 and 1992. *Source:* Agriculture Statistics, Directorate of Economics and Statistics, Government of Gujarat (1996).

Conversely, most of the districts in the central-south regions have a relatively higher incidence of in-migration, suggesting thereby that people from water-scarce regions have generally moved out to water-surplus areas (ibid).

While part of this migration might have been induced by better pursuit of economic opportunities in the industrial sector, a major proportion of this is likely to be of a distress nature and linked with water scarcity. This is reflected by the fact that there has been a shift of livestock from the drought-prone districts in Saurashtra and Kutch to the districts where availability of water is somewhat better. The estimates for a livestock census suggest that between 1981 and 1992, the livestock population had declined even in terms of absolute numbers in Saurashtra and Kutch, whereas the remaining parts of Gujarat (except Banaskantha) had registered an increase in livestock population (Figure 7).

The combined effect of the migration of the human as well as livestock population has resulted in relatively lower population growth in all districts in western and south-western Gujarat *vis-à-vis* the state average of 2.12% per annum between 1981 and 1991 (Figure 8).

Another very important demographic change related to water scarcity is the shifting of the prime workforce from drought-prone districts to water-surplus districts. As per the 1991 census, 57.7% of the state's male population was in the age group 20-59 years. For water-scarce districts this percentage was lower and for water-surplus districts it was higher than the state percentage (Table 2).

These trends clearly establish that perennial water shortages have led to migration of hundreds of thousands of people, dislocating them economically, socially and culturally. Any contentions about human rights have to take into account the fact that these people also possess the right to life, right to development, right to health, right to food, right to education, right to work etc. as contained in the Universal Declaration of Human Rights, International

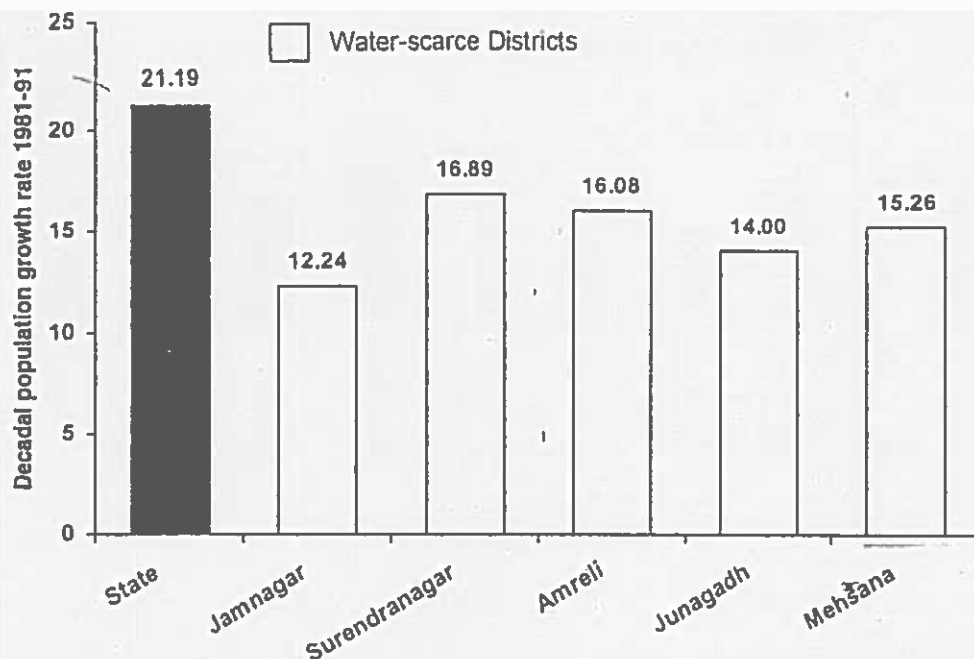


Figure 8. Decadal population growth rate 1981-91. *Source:* Budget Publication No. 30, Government of Gujarat.

Covenant on Economic, Social and Cultural Rights and UN Declaration on Right to Development.

The regional transfer of Narmada waters by the Sardar Sarovar Project to drought-affected regions is an attempt to fulfil the basic human rights of these people.

### Sardar Sarovar Project

The Sardar Sarovar Project on the river Narmada is a multi-state, multipurpose river valley project, born of the deliberations of a constitutional body, following the principles of 'equality of right' and 'equitable utilization' of the whole course of an inter-state river. This unique project is planned to irrigate 1.905 million ha of land; increase the agricultural production by 8.7 million tonnes per annum, worth US\$430 million; generate environmentally friendly hydropower with an installed capacity of 1450 MW; supply drinking water to 8215 villages and 135 urban centres of Gujarat (around 20 million population); generate 1 million jobs, mostly in rural areas; and prevent rapid processes of desertification, salinity

Table 2. Prime workforce in drought-prone and water-surplus districts of Gujarat

More than state average (water-surplus areas) (%)		Less than state average (drought-prone areas) (5%)	
Vadodara	60.9	Banaskantha	52.7
Bharuch	59.8	Amreli	54.7
Surat	61.4	Kutch	54.5
Valsad	60.9	Surendranagar	55.8

*Source:* Socio-Economic Review, Gujarat State, 2000.

ingress and rural-to-urban migration. The command area and drinking-water supply areas of the project are the worst water-scarcity-hit areas of the state.

The vast command area of about 1.9 million ha would be irrigated by the 532 km long concrete-lined main canal, its 42 branches and thousands of kilometre-long network of distributary canals. For judicious, timely and equitable distribution of water, ensuring the rights of the tail-enders in the command area (even 700 km away), consisting of 92% small and marginal farmers, the 'controlled volume concept of operation by computer-aided remote monitoring and control system' is being adopted. To ensure participation of the beneficiary farmers, irrigation water will be supplied on a volumetric basis to the water users' association (WUA) of each village service area (VSA) (200–500 ha), which will also be involved in the preparation of a rotational water supply (RWS) calendar, ensuring just and equitable water distribution.

### Rainwater Harvesting *vis-à-vis* Regional Water Transfer

Harvesting the rainwater through micro-structures such as check dams, percolation tanks, retention basins etc. has often been projected as a viable alternative to eliminate water scarcity in Gujarat. From the standpoint of technical considerations like dependability, carryover storage, flood control, power generation, submergence, evaporation, life span (serviceability) and social considerations like equity in distribution, the regional transfer of water through the Sardar Sarovar Project has practically no alternative. Typically, small tanks of around 40 to 100 ha in size inundate almost as much as they irrigate, around 0.9 of a hectare for every one hectare irrigated (usually irrigating one crop only, whereas large dams irrigate much more than one, apart from also providing power). Thus, even if it were technically possible (which it is not), to find enough small tank sites to hold the same amount of water, the land lost as a result of inundation could well be over 1.0 million ha against 37 000 ha for the Sardar Sarovar Project (World Bank, 1990). Absence of regular, adequate and dependable rainfall, which is common in most of western India, makes it difficult to tackle water scarcity by rainwater harvesting alone. An analysis clearly shows that for the worst scarcity-hit districts of the Saurashtra region, even if an effort is made to harvest the rainwater to its maximum potential, the per capita availability remains much less than 1000 m<sup>3</sup> per year (Table 3). In these calculations, 50% of the area has been conservatively considered to be effective in rainwater harvesting, which otherwise remains at 30% to 40% normally (Frederick, 1995; Seckler *et al.*, 1998). Similarly, the evaporation losses after storage have been assumed to be 50%. But in reality, for the storages with a depth of less than 2 m, it could be around 60% or more (Prabhu, 2000). Further, the calculations are based on the normal rainfall values, but the data for the last 10 years show that its reliability is in the range of 20–40% only (Figures 9–12).

However, this does not mean that this water management alternative is ineffective or impractical. In Gujarat, water-harvesting structures such as check dams, percolation tanks, safe stage works etc. are constructed under a micro-watershed development programme by agriculture, rural development and water resources development schemes of the state Government. So far a total of 22 697 such structures have been constructed to harvest 1047.62 MCM of water and 2250 works are in progress, which will store approximately 100.32 MCM of water (Tables 4 and 5). However, due to failure of the monsoon the

Table 3. Rainwater harvesting

District	Normal rainfall (mm)	Area ('000 km <sup>2</sup> )	50% effective area ('000 km <sup>2</sup> )	Volume (MCM)	50% net considering evaporation loss etc. (MCM)	Projected population (2001) (million)	m <sup>3</sup> per capita per year
Jamnagar	497.2	14.1	7.0	3505.2	1752.6	1.77	987.32
Rajkot	621.2	11.2	5.6	3478.7	1739.3	2.85	609.58
Surendranagar	507.0	10.5	5.2	2661.7	1330.8	1.37	969.24
Amreli	540.0	6.8	3.4	1836.0	918.0	1.42	645.50

existing 1047.62 MCM storage created at a cost of Rs 4008 million has not been effective in solving the drought conditions in the water-scarce regions.

Thus, in Gujarat, both water management alternatives, micro as well as macro, have to be considered as complementary to each other and experience has shown that these are in no way mutually exclusive solutions. However, in the present situation and looking at the scale of the problem, regional water transfer through the Sardar Sarovar Project is inevitable to quench the thirst of millions of 'naturally underprivileged' people.

#### Rehabilitation and Resettlement

The project addresses the worldwide concern for human rights of people involuntarily displaced, not by statistical relativism but by a detailed mechanism of *pari passu* rehabilitation which aims that oustees improve (in the vast majority of cases) or at the very least (in very limited cases) regain the standard of living that they were enjoying prior to their displacement, fully integrate with the

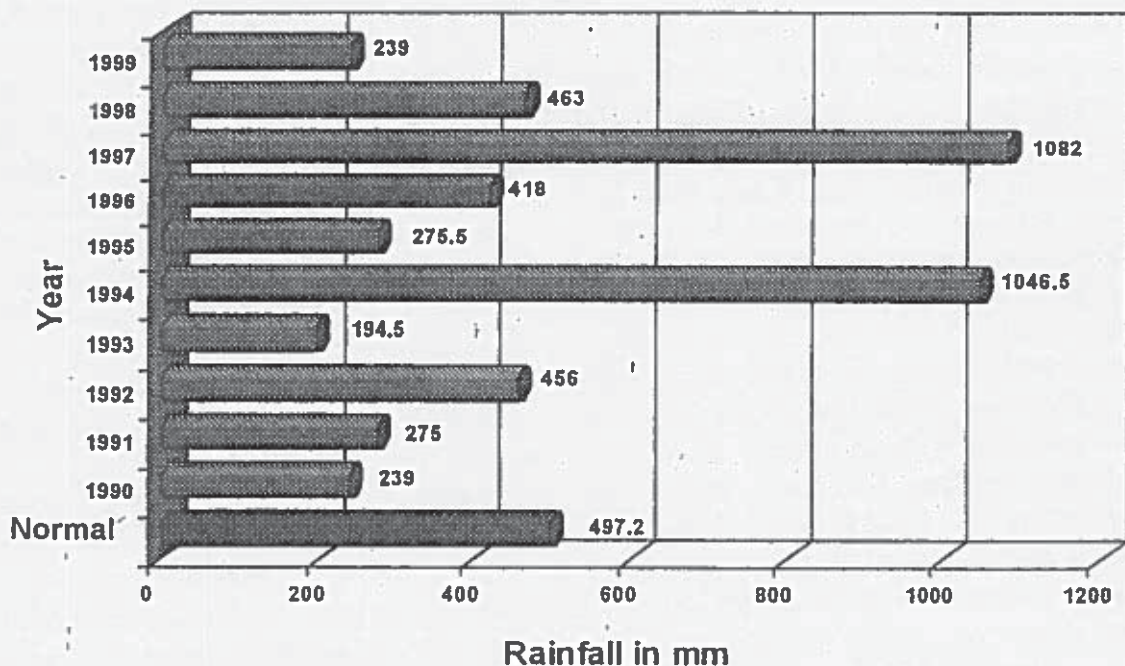


Figure 9. Rainfall pattern in water-deficit regions in Jamnagar District. Source: Directorate of Agriculture, Gujarat State (2000).

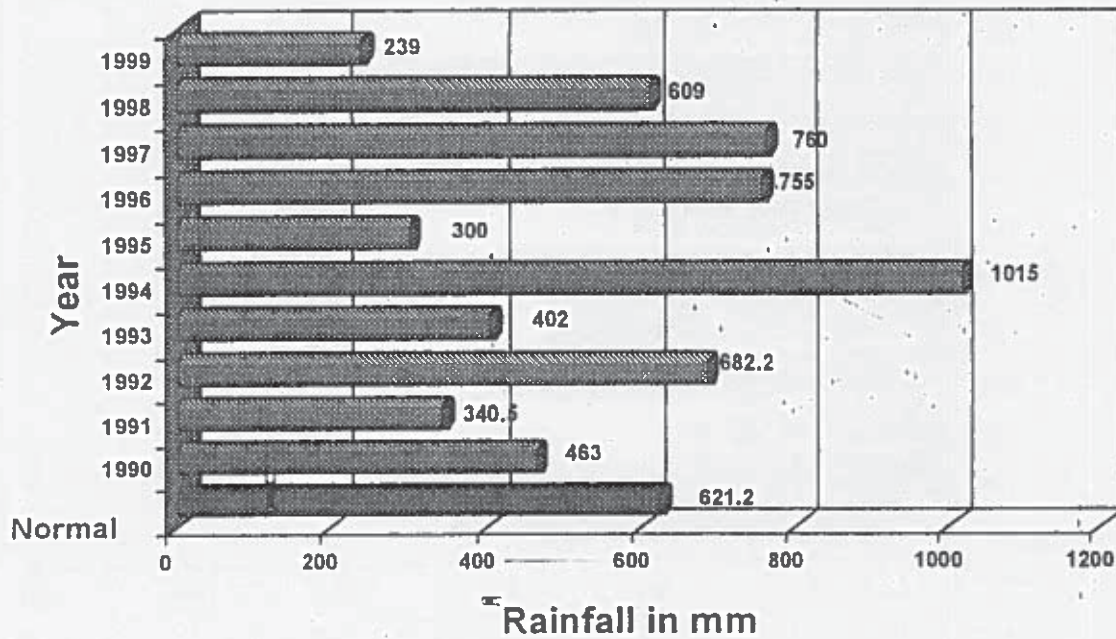


Figure 10. Rainfall pattern in water-deficit regions in Rajkot District. Source: Directorate of Agriculture, Gujarat State (2000).

community in which they are resettled and are provided with appropriate compensation and adequate social and physical rehabilitation infrastructure, including community services and educational and health facilities. In a path-breaking approach in India, a minimum 2 ha of land is given to each project-affected person and even to joint holders, landless labourers, encroachers etc. All rehabilitation sites are provided with minimum infrastructural facilities such as roads, schools, health services etc. By providing the necessary legal safeguards,

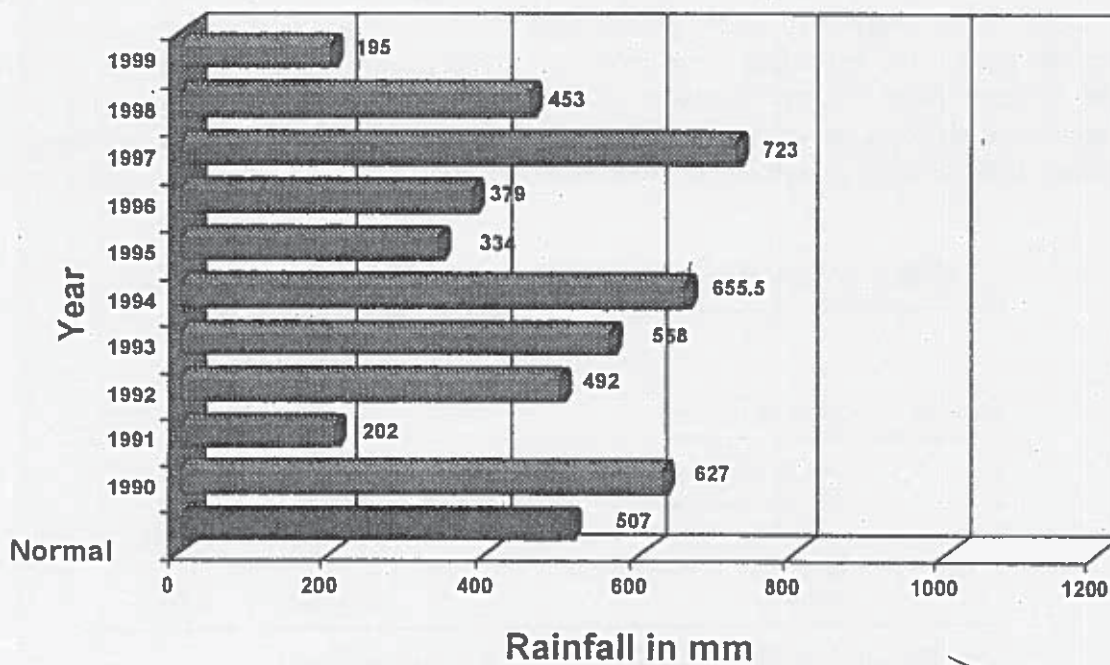


Figure 11. Rainfall pattern in water-deficit regions in Surendranagar District. Source: Directorate of Agriculture, Gujarat State (2000).

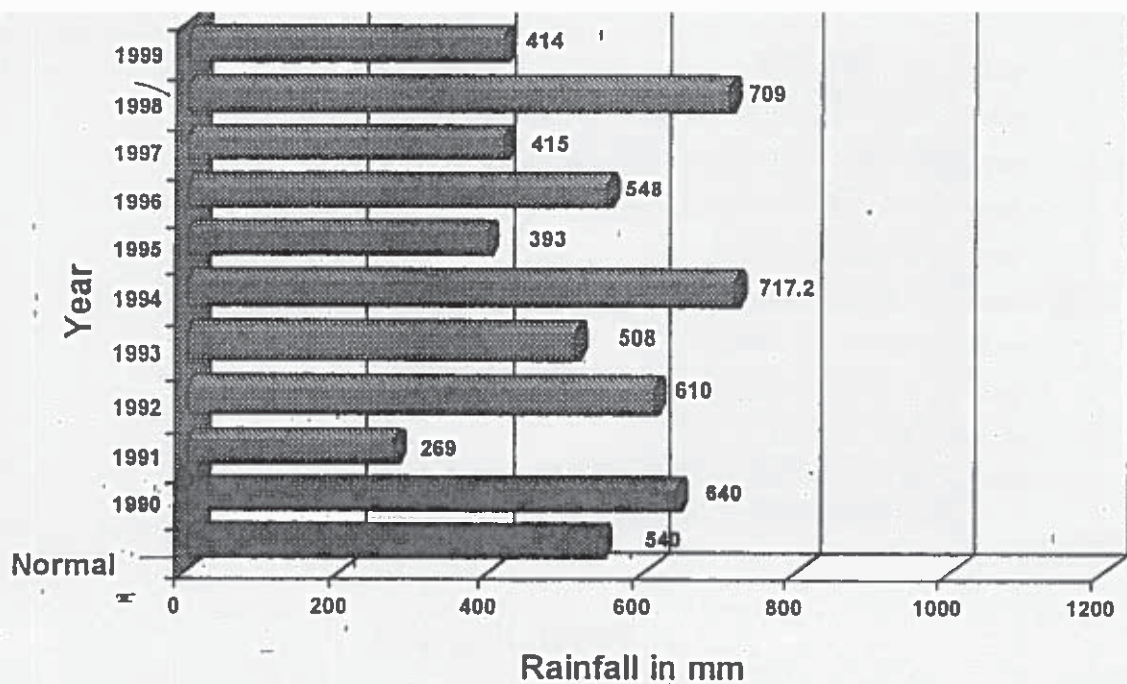


Figure 12. Rainfall pattern in water-deficit regions in Amreli District. Source: Directorate of Agriculture, Gujarat State (2000).

the rights of the indigenous people (tribals) affected by the project are being protected, in consonance with the International Labour Organisation Convention (107) concerning the Protection and Integration of indigenous and other tribal and semi-tribal populations in independent countries.

The plight of tribals in the Narmada Valley has been portrayed in a lopsided and isolated manner (Roy, 1999). In the past, a few reviews and observations regarding tribal people of the Narmada Valley have been founded on the colonial ethnographers' and the British administrator's perception of the tribal society in the early literature, which was based on the segregation of tribals in certain areas and isolating them from the mainstream of development. Jawahar Lal Nehru, First Prime Minister of India, once remarked "We cannot allow matters to drift in tribal areas or just not take interest in them. In the world of today that is not possible or desirable. At the same time we should avoid

Table 4. Water-harvesting structures constructed in Gujarat

Serial no.	Type of works	Nos	Approx. storage (MCM)	Cost (Rs million)
1.	Check dams	4 315	183.41	911.2
2.	Percolation tanks	3 847	272.53	987.3
3.	Safe stage works	3 827	216.90	988.4
4.	SPPWCS* (Checkdams)	10 708	374.78	1121.6
	Total	22 697	1 047.62	4008.5

Note: \*Sardar Patel Participatory Water Conservation Scheme

Source: Narmada Water Resources & Water Supply Department, Government of Gujarat, 2000.

Table 5. Water-harvesting structures under construction in Gujarat

Serial no.	Type of works	Nos	Approx. storage (MCM)	Cost (Rs million)
1.	Check dams	335	14.23	197.8
2.	Percolation tanks	260	18.42	154.0
3.	Safe stage works	387	21.94	144.4
4.	SPPWCS* (Checkdams)	1268	45.73	152.0
	Total	2250	100.32	648.2

Note: \* Sardar Patel Participatory Water Conservation Scheme

Source: Narmada Water Resources & Water Supply Department, Government of Gujarat, 2000.

over-administering these areas and in particular, sending too many outsiders into tribal territory. It is between these two extreme positions that we have to function. Development has to be ensured in various areas such as communication, medical facilities, education and better agriculture" (Nehru, 1959).

Indians of tribal origin are an integral part of society. Hinduism in India does not exclude them from its ambit as suggested by some individuals. Persons of tribal origin have to be supported so that they may take advantage of development opportunities emerging in the economy, taking into account the levels of development achieved. It is wrong to expect that persons of tribal origin in one state will not move to an adjoining area in another state on account of an imaginary 'long cultural journey'.

A World Bank Report amply clarified this: "A widespread myth is that the tribal people to be resettled from the submergence area are living in pristine forests in a traditional manner as hunter gatherers in harmony with the environment. This is not correct. As satellite imagery shows and field observation confirms, the tribals live in mostly barren farm, stony, steep and increasingly degraded hillsides with a small and decreasing part of their income derived from the forest land" (World Bank, 1990).

The tribal population normally does not have a sustainable income-generating capacity. Therefore, they continue to migrate for almost nine months of the year in search of temporary employment, along with their families. In the process, they stay either in the wilderness in temporary hutments or in ghettos in the cities as a floating population. Their children do not have any access to education and suffer from severe malnutrition. In contrast, the displaced persons in the SSP are being given agricultural land, primary health services, primary education and sustainable employment-generating packages, as well as direct monetary help. So keeping them in their original habitat would only mean continuation of their below-poverty status, and even without dislocation on account of the project, they are dislocated almost throughout the year in their struggle for a livelihood.

Many of them welcome the opportunity to improve their lot in a more fertile and more sustainable command area and, while any move may have considerable social costs for a family, many of them have quite widespread tribal connections in the resettlement areas in Gujarat, which helps their adjustment. A substantial proportion of tribals appear to see little future in the increasingly

degraded submergence area. Indeed, it is within this tribal group that appears to be the least opposition to the project. In this connection, it is important to note an important class division amongst the oustees. Those inhabiting the hills located immediately behind the dam are mostly tribals, who have little political power outside the anti-dam movement. Further upstream are the fertile plains of Nimad, also to be partly submerged, and dominated by relatively prosperous landlords. They have been employing the tribals as farm labourers and in many cases, even though the lands may belong officially to the latter, the former have been enjoying actual possession. It is this class of prosperous landlords (Patidars) that stands to lose if the tribals of this area are rehabilitated elsewhere. These residents of Nimad are economically and politically far more resourceful than the tribals and have played a major role in the Narmada Bachao Andolan (NBA) led anti-dam movement to protect their class interests (Dreze *et al.*, 1997). To insist that people must neither change nor learn non-traditional skills is putting a premium on preciosity. It is no less than asking the tribal people to remain in a museum, to become fossilized. This is a demand that outrages all human values, all democratic rights (Dhagamwar *et al.*, 1997).

Of those already rehabilitated in Gujarat, Madhya Pradesh and Maharashtra, the tribal population is more than 90%. Some of them are today contributing in governance also, as Sarpanches, members of Village Panchayats, Taluka Panchayats etc. as part of the democratic framework of society. This shows that there is least difficulty in resettlement and rehabilitation of the tribal population, who have on the contrary welcomed the opportunity to join the mainstream of socioeconomic development. And rightly so, because they also have the right to development, right to participation, right to work, right to education, right to health, etc.

The resettlement and rehabilitation (R&R) policy provisions were improved as a result of effective interaction between the government and NGOs and the final package now available for the SSP-displaced people carries the promise of development opportunities for the dispossessed for the first time in India and can be translated into a national policy on R&R, which India lacks at present (Parasuraman, 1997). Hence, in addition to the earlier *property compensation focus* for R&R issues, the *people-centred development focus* has now been developed. Carefully assessing the impoverishment risks (Mathur & Marsden, 1998) (e.g. landlessness, joblessness, homelessness, marginalization, food insecurity, loss of access to common property and services, social disarticulation, etc.) the project builds up inter-agency synergies between existing programmes of integrated rural and tribal development with R&R efforts.

## Conclusion

Water scarcity leads to regional imbalances so far as socioeconomic development is concerned and such imbalances are not only detrimental to sustainable development but also adversely affect human rights. The life-sustaining value of water is being increasingly recognized by people all over the world and this is seen as a potent catalyst for regional cooperation. In spite of the inherent complexities and controversies associated with regional water-transfer projects, such an attempt to even out the imbalances in demand and supply of this natural resource continues to be a viable alternative. Water managers cannot afford to rule out regional water transfer on the basis of unwarranted

apprehensions. During the International Coalition Conference (Winnipeg, Canada, 12 January 1999), Warren L. Jamison made it clear in these words: "Another argument I hear is that water should not be transferred from one basin to another because it is an unnatural thing ... This isolationist policy, which would ban all interbasin water transfers, needs close examination. While it may make good rhetoric, it is neither necessary nor practical ... We have to live with the results of any water transfers too. We will, however, never agree to stop development simply because someone has a concern about an unknown thing with unknown consequences. You wouldn't do it if the shoe were on the other foot."

It is very clear that in Gujarat a situation has been reached that puts a question mark over the existence of more than 20 million people in this region without the regional transfer of Narmada waters. The Sardar Sarovar Project has the potential to be the lifeline of these naturally under-privileged people and provide them with their right to development. While the issue of resettlement of people as a result of construction of dams is an important consideration, equally important is the acute deprivation of a far larger number of people. With the given resettlement and rehabilitation provisions, this project becomes a symbol of harmony of the human rights of both the project-affected people and its beneficiaries. What is preferable? Planned displacement of a few thousand people with social security, sustainable income-generating packages and infrastructural facilities or the forced migration of millions of people and cattle due to water scarcity? Equitable distribution of water by regional transfer or possible water riots? The choice should be very clear to any reasonable mind.

## Notes

The views expressed in this article are the author's own and do not reflect those of the organization for which he works.

1. There is a definite school of thought questioning regional water transfer, e.g. PaTrout Policy, Pennsylvania, [www.patroul.org/ptpolicy.htm](http://www.patroul.org/ptpolicy.htm); Tennessee Senate Republican Caucus, [www.legislature.state.tn.us/Senate/Caucuses/Rep/Press/052500.htm](http://www.legislature.state.tn.us/Senate/Caucuses/Rep/Press/052500.htm); Iyer, R.R. (1998) Water resources planning: changing perspectives, *Economic and Political Weekly*, 12 December.
2. IWRA Seminar on Inter Basin Water Transfer, Beijing, China, June 1986; International Workshop on Inter Basin Water Transfer, UNESCO, Paris, April 1999; HYDROTOP Conference, June 1999; Second World Water Forum, The Hague, March 2000; 4th Biennial Congress of IAHR African Division, Namibia, June 2000; International Conference on the Guarantee of Water Resources for the Sustainable Development of Big Cities in the early 21st Century, Tianjin, China; Tenth Stockholm Water Symposium, Stockholm, Sweden, August 2000; International Workshop on Regional Water Transfers in an Integrated Water Resources Management Perspective, Kalmar, Sweden, August 2000.
3. It was further reiterated in Article 1(10) of the Vienna Declaration at the UN World Conference on Human Rights (Vienna); Principle 3 of the Cairo Programme of Action, International Conference on Population and Development (Cairo); Commitment 1 (N) of the Declaration at the World Summit on Social Development (Copenhagen); and Article 213 of the Beijing Platform of Action, Fourth World Conference on Women (Beijing).

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