

Unit 27

Dam and Displacement

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Learning Objectives

This unit will enable you to learn and critically evaluate more on:

- The history of water management and the role of State and community in water management in general and in Indian context as well;
- Issues of dam and displacement including human, ecological, economic, political and cultural aspects;
- Indian experience with dams;
- Arguments for and against the construction of large dams; and
- Alternatives to the construction of large dams as a form of water management.

27.1 Introduction

One of the most discussed and debated issues in the last century has been the human and ecological cost of constructing large dams in the country. Large dams have singularly displaced millions of people from their habitats and submerged large tracts of forests. The question that has been regularly raised in the context of dams is whether the benefits of dams outdo the losses. Is the construction of dams worth millions of people losing their homes? Can we afford to lose large tracts of rich natural vegetation, which is not only a sanctuary for a variety of life forms, but also the lifeline of the people dependent on it? Although the debate has concentrated around certain movements that have campaigned against the construction of large dams such as the Narmada Movement in India, it has caught the attention of not only the Indian people but also the international environmental circles. These movements have brought to light the politics of development, that is, the reasons as to why such development is undertaken despite resistance and its obvious catastrophic consequences. They have served as sites for raising larger critical issues of economic growth, social justice and ecological restoration.

This unit will try to address some of these key issues on dam and displacement, enumerating the various interrelated dimensions of the issues of human, ecological, economic, political as well as cultural. The first section of the unit would explore and present a short history of dams and the reasoning that accompanied its popularity in the 19th and the 20th century, both in India and the world. The second section specifically focuses on the Indian experience with dams, and would present the debate in India in favour and against dams. The third section would elaborate upon the term 'displacement', of both persons and values, and thereby develop on some of the larger substantive

issues relating to modern development and progress, and ecological restoration. The last section would present examples of some of the alternatives to large dams as a form of water management. The conclusion would recapitulate the key issues that have emerged in the course of the discussion on dams and displacement.

27.2 Dams and Development: Background

Water, as the saying goes, is life itself. Human civilisation has grown on the banks of rivers. Dams are as old as human civilisation and have been considered as one of the oldest techniques of storing and channelling water. Patrick McCully (1998) presents a succinct history of dams. According to him, the earliest dam in the world was built in Jawa town, presently in Jordan, around 3000 BC. It was a system of ten reservoirs made of rock and earth that collected the water from a fall, which was channelled through a canal. The largest dam was more than 4 metres high. Egypt's 'Dam of the Pagan' across a seasonal stream near Cairo was known to be 14 metres high and 113 metres long, but was washed away after a decade of its construction. Spain is home to a surviving Roman dam, built in the late first millennium B.C. A number of dams were built during this period all over the world, in the Middle East, China, and Central America and around the Mediterranean. The King of Sri Lanka, Parakrama Babu, also known for his despotic rule, built a 14 kilometres long dam. No other dam in the region could equal its volume. The king was supposed to have restored and built more than 4000 dams. McCully (1998) quotes the famous anthropologist, Edward Leach, on the large dams in Sri Lanka, stating that these dams 'are monuments and not utilitarian structures' (Ibid: 15). The Sri Lankan villagers depended more on artificial ponds called 'tanks' than on dams for irrigation.

In fact, this is true for most of south Asia. Irrigation in India was largely dependent on traditional hydraulic infrastructure built and maintained locally, which included wells, ditches and tanks. Given the local caste-based social set up, it was difficult for the state to intervene in local customs. Nonetheless, the state did provide tax subsidies to promote water conservation. For example, in Gujarat, local officials had the authority to revise taxes and grant tax concessions. There were instances when tax on crops grown through irrigation from a recently constructed well was reduced till the cost of constructing the well was recovered (Hardiman 1998: 1537). Both the Mughals and the Marathas assessed tax on the basis of the ecological conditions of the region and climatic fluctuations. Local traditional elites were obliged by custom to regularly invest in public resources such as water. They were expected to build tanks, repair wells, etc. from time to time. China unlike India relied on an integrated hydraulic system for irrigation. Village level farming in north China depended on the local level drainage, which in turn was connected to the regional networks of dikes, levees and master canals. This system was closely interlinked to the massive central public works project. Flood control, canal management and local irrigation formed an integrated whole and the collapse of one could lead to the collapse of the entire system. Local irrigation was therefore state sponsored, with many of the wells and ditches built under the supervision of state officials.

Clearly, the role of the state, however minimal (as in the case of India), was crucial in establishing and maintaining a hydraulic system. Water was an important resource and its management was not left to chance and a good monsoon alone. Colonialism however played havoc with the local system of water management. Colonialism brought with it a stringent system of revenue assessment, which was unsympathetic to local social and political dynamics and to climatic fluctuations. Likewise, the priorities of the colonial government were markedly different from the previous rulers. In India, expenditure on public works took a backseat with the British trying to consolidate its position after the bloody 1857 mutiny. The post mutiny period was characterised by

greater investiture in military installations and the railways. Of the expenditure that was set aside for irrigation, 90% was spent on major irrigation projects based in Punjab. The British were keen on encouraging commercial crops such as cotton, opium, sugar cane and wheat. This interest in commercial agriculture was at the expense of subsistence-based agriculture and the small farmers managed irrigation systems of wells, tanks, small channels and dams.

Unlike the Mughals, the British did not subsidise construction of wells and tanks. Moreover heavy land tax did not leave any surplus to invest in irrigation systems. The new revenue system of the British granted water rights with land titles, thereby legally legitimising private appropriation of water resources. Those without water resources in their lands faced regular water shortage, especially during poor monsoons. Privatisation of water and land cut into the local system of maintaining irrigation systems. The situation in China was worse with the state withdrawing its role in the maintenance of the centralised hydraulic system. The area under irrigation decreased drastically, to the extent that only 6.8% of cultivated acreage in north China was irrigated in 1932 (The Corner House 2002). Between 1876-79, Asia (India, China, Java, Philippines and Korea), South Africa, Brazil, Algeria and Morocco reported recurrent drought and famine conditions. Never in the history of the world had famine and drought been registered simultaneously in so many nations. Millions died due to malnutrition and hunger. Evidently, "Climate risk...is not given by nature but...by 'negotiated settlement' since each society has institutional, social and technical means for coping with risk...Famines [thus] are social crises that represent the failures of particular economic and political systems" (Watt of The Corner House 2002: 19; emphasis added). The occurrence of famines across Asia, Africa and South America at the same time is not only proof of the effects of colonialism in that it created chronic conditions of poverty, hunger and ill-health, but also announced the break down of local institution systems that usually rescued people from situations of crises.

Dams and in particular large dams gained in popularity in the 19th and the 20th century. Dams perform two important functions that make them supposedly 'indispensable' in the modern world. One, they store river or surface water to overcome the inconsistencies in the demand for water and its availability. Two, the differential height between the water collected in the dam in the upstream and the river downstream create hydropower and generate electricity. The dam thus not only provides electricity to industrial units and households but also supplies water for agriculture, industries and mass consumption. Rivers were the untapped resource for harnessing energy. Around 200 dams were built in Britain in the 19th century to provide water to its expanding cities. The dams built around the 1900s were earthen embankments and were built on a trial and error basis. Many of the dams built during this time in the world collapsed. The collapse of Johnstown Pennsylvania dam in 1889, St. Francis Dam of Los Angeles in the 1900s, and the water supply dam of Yorkshire in 1864 killed thousands of people and destroyed entire townships.

Large dams unlike local irrigation systems are huge structures, and are an outcome of centralised planning. That is why almost all large dams are state ventures, involving large investments and resources, both human and material. They are an integral part of the larger agenda to harness water resources for economic growth and development. The fascination with dams in the United States can be traced to the quest to irrigate the semi-arid regions in the west. In 1902, the famous National Reclamation or 'Newlands' Act was passed to reclaim land in the Western United States. Irrigation projects were seen as a way to turn arid lands into fertile plains, which would attract the landless from the east to migrate and settle in the west. The west however saw the rise of large landlords who benefited from the patronage of the state subsidies. The biggest disaster known in the history of the US is the collapse of the Hoover dam in 1931, though the latter did not dissuade the faith in large dams in solving the problem of water and power.

The former United Soviet Union (USSR) was no exception in this regard. Motivated by the conviction to build a strong socialist nation, dams were viewed as important structures of centralised resource mobilisation. As in the United States, it was a grand state project staffed by numerous engineers, officials, junior staff and workers. Damming of rivers claimed vast stretches of fertile land, marine life as well as the occupation of hundreds of fishermen (McCully 1996). Following the revolution, dam building was an integral part of Mao Zedong's project of 'Great Leap Forward'. Large dams to hold floodwater put the traditional system of containing floodwater through levees and canals redundant. Hydrologists were sceptical of the enthusiasm shown by the economic planners and their cynicism was not ill judged. Thousands of dams burst and created conditions of chaos and led to one of the worst known famines in the world. China has embarked on a new venture of constructing the Three Gorges Dam in 1996. Seismologists have drawn attention to the disastrous seismic consequences of building the dam in the region.

India too has had its share of involvement with dams. Jawaharlal Nehru's words are quoted ever too often in praise of the Bhakra Nangal Dam, claiming big dams to be 'modern day temples'. But Nehru too overcame his fascination for big dams subsequently, as is evident in the following statement, "I have been beginning to think that we are suffering from what we call we may call disease of giganticisms" (Ibid: 23). In newly independent India, big dams, power centres, factories and industrial units came to symbolise the magnanimous presence of the state and its will to build a prosperous and a modern India. Dams were the official solution to generating water resources for industries, irrigation and harnessing energy. The focus was on increasing agricultural production and generating hydropower to fuel industrial production. Interestingly, despite the crores of rupees spent on building large dams, most of India survives by exploiting ground water. Surface water or rivers cater to less than 10% of the water requirements in the country. The next section analyses the impact of dams on development in India, whether large dams facilitate development and, if they do, at what cost (human and ecological), and finally, whether this development was uniform or uneven across classes, castes and regions.

Reflection and Action 27.1

Write a sociological note on the background of dams and their impacts on irrigation and agriculture.

27.3 Arguments Against Large Dams

There are various debates on the impact of dams on economy, society, ecology and environment. These debates have brought forth arguments both in favour and against the construction of large dams. Let us examine some of these arguments.

a) Resistance and Displacement

Large dams have evoked more resistance than approval. The construction of Hirakud was marked by thirty thousand people, comprising of local politicians, bureaucrats and the people who were going to get evicted from the dam site taking to the street, in 1946. Hirakud was in this sense a forerunner of protests against dams in other parts of the country. Even while these protests focused on specific projects, the arguments raised for and especially against dams have been common. In the newly created tribal state of Jharkhand, there have been thirteen large irrigation projects, hundred and eight medium irrigation projects and six thousand eight hundred and twenty small water projects till date. Most of these projects have failed. Some are incomplete and have been

abandoned. Most of these projects have been notorious for high levels of corruption and red tape. Large dam projects, notably the Subarnarekha Project and the Koel-Karo Project, faced tremendous resistance from the local tribal population.

The Koel-Karo Project was commissioned despite the fact that it would have destroyed 200 tribal villages and submerged 45,000 hectares of arable land. The Subarnarekha Project has been the site of police atrocities and the high level of illegal transactions of funds within the project has been common knowledge. JOHAR, a Human Rights Organisation in Jharkhand, has some very appalling findings on the state initiated nine minor irrigation projects within 1960-90 in West Singhbhum district of Jharkhand. The entire capital outlay of these projects was 14 crores. The government had claimed that 47,764 acres of land would gain through the irrigation facility of these projects on their completion. According to JOHAR's research, the nine projects 'do not exist' and there is no accounting for the public money spent on these projects. Till 1997, 22.5 lakh acres of land had been procured from the local tribal population in the name of minor and major irrigation projects. Lakhs have been displaced from their land and have turned towards wage labour in mines and factories in the surrounding areas for employment.

The campaign that drew attention of the world to the politics of large dam construction and its harmful impact on the environment is the Narmada *Bachao Andolan* or the movement to save the river Narmada. Narmada runs through the three States of India, i.e., Madhya Pradesh, Maharashtra and Gujarat. Worshipped as a holy river, Narmada is the lifeline of thousands of villages and her importance is illustrated in the folk traditions of the region. In 1985, the World Bank approved \$450 million Sardar Sarover Multi-Purpose Dam Project on the Narmada. According to World Bank estimates, the project was to generate 1300 million cubic-metres per year of water for civic and industrial purposes, an installed capacity of 1450 MW of electricity and provide irrigation to 1.9 million hectares of land. The project was to submerge 13,744 hectares of forestland, 11,318 hectares of fertile agricultural land, and displace over 100,000 people, mostly persons and families belonging to the category of scheduled tribes and the rural poor. The sheer magnitude and size of the project raised concern among concerned citizens and specialists. The planners according to the Narmada *Bachao* Movement had not critically and realistically assessed the ecological, human and financial consequences of undertaking this project. Let us explore the three main areas identified by the movement as arguments against large dams.

b) Ecological Consequences

The most apparent ecological effect of large dams is the permanent destruction of vast expanse of forests, wetlands, and wild life. The dam would submerge vast tracts of rich forest cover. But the lesser-known consequences are equally disturbing. The forests are routes of migration of many animals, the wetland attract various migratory birds, while the river is a channel for migratory fishes. The destruction of the routes of migration of animals, birds and fishes not only affect the ecosystem, but also affect the lives of the local population. Fish forms an integral part of the staple diet of local populations; embankment blocks their movement downstream as well as intercept the cycle of breeding among them. In places like Jharkhand and Chattisgarh, the cutting down of forests has forced the wild animals to wander into villages in search of food, often attacking and killing the locals. Dams convert rivers into reservoirs, which has environmental implications on its entire drainage area - upstream, downstream and the command area of the reservoir. Embankment restricts the river water to flow downstream. The upstream in the process collects the sediment, which increases the water level and can cause floods in the area drowning people and property. The river downstream, denied of its regular quota of water and sediment is, according to McCully (1998), 'hungry' and eats

away the plains along its course. The plains are also denied of the rich alluvial content of the river, which affects the fertility, quality and the productivity of the soil. The river downstream also experiences sudden fluctuations, with water being thrown out periodically from the command area to reduce the pressure of water. Often this may destroy vegetation along its way as well as settlements that take over the land vacated by the river after the construction of the dam. The reservoir by holding large quantity of water encourages high rate of water evaporation. This leads to the increase in the salinity of water, which can have a long-term effect on the quality of water.

c) Human Consequences

One of the most obvious and visible unwarranted outcomes of dam projects is the displacement of people from their habitat. This means that not only are persons living in and around dam sites asked to vacate their homes and settle in other places, but also that they are expected to give up their land, their homes that they have nurtured all their lives and surroundings they have been familiar with so that the dam could be built for the anonymous beneficiaries. It is difficult for the ousted to comprehend the benefits of dams, as to how it can possibly bring prosperity and well-being. Large numbers migrate to the already overcrowded and overburdened towns and cities in search of work and live in dismal urban conditions. Many subsist by working at the dam site. They labour under severe work conditions. The construction site is especially susceptible to infectious diseases such as malaria, tuberculosis, and influenza. Once the work at the dam is over, very often the locals have to be physically forced to leave the site. In the late 1950s, when Mexico's Maztec Indians refused to vacate their homes from the site of the Miguel Aleman Dam, their houses were set on fire and the army was called in to quell the unrest. Similarly, in erstwhile USSR, the displaced population were often forced to take part in bringing down their homes, churches, and orchards and disinter the coffins of their dead relatives (McCully 1998).

Besides the number of people that dam projects displace, it is noteworthy that majority of the persons who are displaced belong to the category of tribes or constitute the rural poor, with marginal or no land. A document brought out by the Ministry of Rural Development of India Government, in 1996, suggests that over one crore sixty lakh persons have been displaced due to mining, dams and canals, industries, sanctuaries and national parks. Of these, about thirty-nine lakh have been rehabilitated. According to Scheduled Tribe and Scheduled Caste Commission report (1990), almost forty percent of the displaced population belongs to the scheduled tribe category. The Sardar Sarovar Dam project in Gujarat, Koel-Karo Dam project, Subernarekha and the Kaju Dam project in Jharkhand, Balimela project and the Machkunda Dam in Orissa are some of the better-known instances where tribal rights to land and forests have been disregarded to fulfil the larger interests of the State and the general population.

d) Financial Consequences

Dams have entailed huge financial investments, which to its critics are most uneconomical investments by far. The Sardar Sarovar Dam's total final cost as per official estimates (1987-88) is Rs. 11,154/- crores and this estimate does not include other expenses and recurring costs to be incurred on account of treatment of catchment area, delays caused in completing the project, compensatory afforestation among many others over the eight years within which the project has to be completed. Even this 'modest' estimate was more than the centre and state's Plan expenditure in the entire seventh five-year plan period. As per the Government of India, Department of Environment and Forest note to the Prime Minister, the total environmental loss due to the project was a colossal 40,000 crores (Alvares and Billorey 1988: 46-7). Almost all large dam projects the world over has been financed by the World Bank at a heavy interest rate of 10.75% per annum. The Bank agreed to extend a maximum

loan of Rs. 700 crores. The rest of the finances were being sought from Japan; ONGC agreed to extend a loan of Rs 200 crores at the interest rate of 14.5% per annum. The Gujarat government even issued tax-free bonds to raise the required money and managed to raise about a paltry sum from the public (Amte, Baba 1990). The key question is as to how will the Gujarat Government raise this money and how does it propose to pay up the interests on the loans. What about its other development commitments as well as social welfare responsibilities of providing health care, education and employment?

Reflection and Action 27.2

You must have read a lot on the issues of dams and their impacts in the newspaper and other sources. Based on your reading write a note on the impacts of large dams on the economic, social and ecological aspects of the society?

27.4 Arguments For Large Dams

The exposition so far has presented only the arguments against large dams. There has been however a strong support for large dams in India. There are specialists such as economists, engineers, development planners and agronomists who have defended the construction of large dams. The defenders of large dams have tried to answer the doubts about the efficacy of large dams and have been unconvinced by the hue and cry raised by environmentalists and social activists about the destructive potential of large dams. Large dams have been supported on the grounds that they are the best among the existing options in dealing with the crisis in irrigation, drinking water and power. With nuclear energy being questioned for its safety with regard to radiation and thermal energy for using non-renewable resources, the only viable source of renewable energy is water resources. Hydel power is the cheapest, cleanest and a renewable resource. The lack of appropriate technology in the field of solar energy has left no other option but to tap hydel power. If this option is also opposed, the proponents argue, there is no other viable choice left for meeting the energy requirements of the country.

The 1960s in India was characterised by a critical food shortage and the government singularly focused on increasing food production. That is when a concerted effort was made to introduce methods of increasing production. It is argued that the self-sufficiency achieved by the Indian government in the production of food grain is primarily due to its focus on improving irrigation facilities, increasing the area under cultivation and its output by the use of improved fertilisers and seeds. Without the introduction of modern techniques, which have been criticised by environmentalists for its debilitating and poisonous effect on the soil and on the health of the general population, this feat would not have been possible. Thus the first criticism presented by the defenders of large dams is that the latter is necessitated by the sheer scale and requirement of irrigation and power in the country. The Agricultural Division of World Bank, listed a number of arguments in support of large dams. The arguments summarise the views of a number of development planners and engineers in support of large dams. An excerpt of their defence is presented below. The context was their defence on the Sardar Sarovar Dam.

While small dams have a role and are, indeed, a significant part of the overall development proposals for the Narmada Basin, they do not, and cannot approach the scale of the benefits of the larger dams. First they are not as low cost as is often claimed: a study of small "tanks" (as they are called) in India by an International Research Institution found most of them to be uneconomic (partly because of the amount of the land they inundate relative to the water stored). Second, while a few good small dam remains that could be developed at modest cost, the cost escalates greatly as in the search for

the large numbers of small dams needed for storing significant volumes of water, one is compelled to tackle increasingly less suitable sites. Third, they fail to fill in the very year, the dry year, when they are needed the most. It was only the large dams that performed adequately for Gujarat in the last drought. Fourth, they inundate relatively massive areas of land; in the lower parts of basins this tends to be very fertile agricultural land, in the upper parts forest. Typically small "tanks" of around 40 to 100 ha size inundate almost as much land as they irrigate, around 0.9 of a hectare for every 1.0 hectare (usually irrigating one crop only, whereas large dams irrigate much more than one, apart from also providing power). Sardar Sarovar will inundate only about 1.6% of the area irrigated. Thus even if it were technically possible to find enough small dam sites to store the same amount of water, the land lost to inundation could well be over 1 million hectares as opposed to about 37,000 ha for the Sardar Sarovar Reservoir.

An important issue raised by the defenders of large dams is the over-exploitation of ground water for irrigation purposes. The small dams have according to them proved to be poor substitutes, as people still continue to rely on ground water for their most essential and regular requirements. With regards to the detrimental consequences of large dams, the proponents of large dams admit that large dams do submerge large tracts of forests, but also draw attention to the fact that the loss of forest in the Narmada Basin has been at the rate of about 20,000 ha per annum without the large dam in place or any other mega development project. This is a significant observation not only about the state of forest management in the country as a whole, wherein forest products are being extracted indiscriminately by encroachers and commercial interests, but also the increasing pressure on forests to fulfil subsistence needs of the people. This brings out the levels of corruption, malpractice and inefficiency that exist in India, with or without large dams. Development initiatives thereby get a bad name, as the discrepancy in the implementation process is passed on to the plan itself. Also, they are of the opinion that planting trees in the irrigation area, which can also supply 'far greater' supply of wood, can easily make up the loss. The regular supply of water from the large dams can improve general health conditions of the people, while the chances of getting water-borne diseases from the dam site can be controlled through appropriate preventive measures.

A fact that is borne out by both sides is that the costs of large dams, or for that matter any development project, escalate with time. Indian development has been plagued by a delay in completing development projects, which not only increases expenditure, but also intensifies the misery of people affected by the project who are left in an indeterminate state, neither in a state that they had lived with and adjusted to thus far (however miserable), nor settled in the "promised land", where they were to be provided with a 'better' life. As is evident, the debate is inconclusive. However, the debate has managed to arouse public interest in matters of development and increased transparency in the planning process. Hopefully, the debate will push for greater participation and involvement of concerned citizens as well as the affected persons of large development projects in directing the course of economic and social development in the country.

27.5 Dams and Displacement: Persons and Values

The government of India has tried to rescue the situation by its rehabilitation package, although there was no national level policy for resettlement and rehabilitation till 2004. In February 2004 the central government promulgated the National Rehabilitation Policy for the Project Displaced Persons. Even before that certain states such as Karnataka, Maharashtra, Punjab and Madhya Pradesh have evolved state-level policies on resettlement and rehabilitation. Most rehabilitation efforts have been to provide alternative land titles to the evictees or compensate them in cash. As for the monetary compensation, the evictees

are forced to go through the arduous bureaucratic procedures to procure what is rightfully their due. The land in the case of the Sardar Sarovar Project had been assessed according to old land records, which under-price its present value. Often, the land provided by the government has been of poor quality. The evictees are required to produce land deeds, which many don't possess. Compensation through cash has also not been an appropriate form of compensation, as it has been observed that the beneficiaries often spend the money on short-term requirements and are left without money and are homeless in a matter of a few months of rehabilitation.

In cases of rehabilitation through alternative land titles, the problem faced by the government has been of locating land to settle the displaced. Large parts of forest or other areas have been cut down to distribute land to the displaced, as is evident in Nandurbar district of Maharashtra. The rehabilitated population in Nandurbar have still not received formal, registered copies of the land they have been settled on. The forests have been encroached upon by the rehabilitated population, much to the resentment of the local tribes who derive large part of their sustenance from the forests. There is a direct relation between environment destruction and the impoverishment of the evictees. For one, both are victims of dam projects. Secondly and most importantly, forests are the alternative lifelines of the rural poor. Much of the subsistence is derived from forest products. Forests also help them pull through the seasonal lean period, as they make do with fruits, herbs, green leaves and game available in the forests. This fact has not been given serious thought while considering the issue of rehabilitation. Growing tensions between the rehabilitated population and the local tribes has become a cause for concern. 40% of the forest in Nandurbar has been declared as degraded. The policy of 'land-for-land' is based on the premise that there is excess public land available for distribution among the evictees, which is questionable. The land available most often than not is poor quality land or non-cultivable. This premise also reveals the linear perception of livelihood options. As illustrated above, livelihood includes a host of economic activities (as quite often, land holdings are small) and there is no one activity from which livelihood is derived. Compensation of land then is only a partial remuneration of the losses incurred by the evictees. Ideally the replacement of the livelihood lost only can provide any kind of relief to the displaced people. Neither the National Policy nor the State policies/laws have provision for this.

The debate on large dams has focused on displacement and its effect on the ecology and human beings. Large dams however represent a larger purpose or vision of society. They were considered as symbols of a modern, progressive world. They demonstrated the capacity of human intelligence and ingenuity to tap and use natural resources for human advancement. They stood for the ability of modern science and technology to overcome the constraints of nature for the benefit of humankind. The issue, which is equally important and often overlooked, is as to what is the type of society that was and is sought to be 'displaced' by this modern vision of progress and development. Also, who are the people most adversely affected by this displacement? As mentioned earlier, the peoples and communities who are displaced through development programmes live on the margins of society such as tribes, pastoralists and subsistence agriculturists. These groups have inhabited forests and survived in the fringes of the mainstream civilisation for centuries. The benefits of development programmes rarely accrue to them. Although monetary compensation is provided to them (the evaluation of loss is yet again a contentious issue), scant attention is given to their customs and traditions while rehabilitating them. The rehabilitation policies reveal intolerance to cultural and social issues. The displaced are a 'number' among the large mass to be rehabilitated.

The reasoning that has predominated the issue of rehabilitation of displaced persons is largely economic. Economic issues are supposed to be survival issues,

while the destruction of culture is considered as secondary. Economic and cultural rehabilitation are seen as distinct from each other. In most traditional, agricultural societies, it is difficult to separate the two. Economic skills are disseminated through cultural practices and the process of socialisation, while culture is renewed and reinstated in society in the process of economic production. Needless to say, almost all festivals and ritual functions in traditional societies mark different stages of work over the various seasons in the year. In such a scenario, the prioritisation of the economic over the cultural aspect of life demonstrates the secularisation and modernisation of life evident in modern industrial society. Displacement through large dams then has not just meant moving people from one place to another, but has also entailed destroying an entire way of life built over generations, economic and cultural skills accumulated through ages to survive in, often, the harshest of environmental conditions.

In an unrelenting effort to find solutions to the problem of poverty, the development planners have evolved projects involving unimaginable expenses, encouraged investments in agricultural and industrial production, which has created drought-like conditions in many parts of the country as well as increased economic inequality. Thus in a quest to dispel poverty, poor are displaced and rendered homeless. In an attempt to deal with the drought-like conditions and the crisis of water for drinking and irrigation, they have acquiesced to destroy existing natural resources to create new ones. This circuitous attempt at development or the pursuance of modern development that aggravates the resource crisis while simultaneously addressing the problem by further exploiting existing resources has caused greater harm than gain. It has proved to be unsustainable, both in terms of environmental consequences and as a model for alleviating poverty. Rather, it has come to symbolise a politics of development that is highly materialistic and aggressive, catering to the needs of a select population.

27.6 Experiments with Alternatives to Large Dams

What then is the alternative? Are there no other alternatives to large dams? Is there no other way of addressing the water crisis and yet reduce the human and ecological costs entailed in the construction of large dams? Are 'small' technologies or community level initiatives sustainable, and have they always been environmentally and socially appropriate? In India, it is common knowledge that low castes such as the untouchables were, and still are in some parts of the country, denied access to community-based water resources. The debate on dams and displacement has brought these questions and issues to the forefront. Thus it is necessary to move beyond the rhetoric of 'small is beautiful' or the unending debate over tradition versus modernity, and dwell on some of the experiments (which have borrowed techniques big and small, traditional and modern) taken up to address the water crisis. There are ongoing alternatives to big dams that are being experimented with, by grassroots organisations in various parts of the country as well as the world. According to the UN Food and Agriculture Organisation research, almost half of the five million hectares irrigated land receives water from small scale and traditional systems. Similarly, according to official sources in India, three-fifths of the irrigated area receives water from traditional wells or small reservoirs known locally as 'tanks' (Figures of the World Bank as quoted by McCully 1998: 184).

Reflection and Action 27.3

Now that you have learnt about some potential alternatives to large dams. You have also learnt the potential dangers of large dams. In view of your experience suggest a few measures, which may be implemented as alternative to large dams in your area.

Box 27.1: Alternatives suggestion

What do you think of these suggestions as measures to ease the water crisis in north Gujarat? Are they practicable and can these suggestions be considered for India as a whole? How effective would these suggestions be within the existing socio-economic and political environment in the country?

Suggestions made by a group consisting of economists, NGO workers, hydrologists, and village level workers for dealing with the water crisis:

- Recognition of the traditional sources of water such as *talavs* (lakes), *virdas* (shallow holes into which groundwater slowly seeps and is collected for drinking) and *vava* (stepped wells). This, along with village-level water harvesting measures such as check-dams and storage dams, can alleviate scarcity situations.
- Modify the present structure of property rights over groundwater. Currently groundwater is not a common resource; it belongs to people who dig bore-wells in their land. This has resulted in landowners trying to exploit as much of the groundwater as possible regardless of the extent of their needs.
- Limit the depths of bore-wells. An attempt to amend the Bombay Irrigation Act was made in 1970 in order to prevent the digging of bore-wells beyond 45 metres. But ordinary ordinances that might have made this a reality have been allowed to lapse.
- The state monitor groundwater levels with a view to halt the use of a particular well if it goes below a stipulated level. This method may be applied only if alternative water sources are available in the area.
- Return to pro-rate pricing of electricity instead of the existing flat rate. Gujarat had fixed a flat rate, but the farmers' lobby got it changed.
- If agriculture is to remain the mainstay of these regions, implement an extension approach for irrigation using methods such as drip irrigation. If this is done, some of the cash crops responsible for straining water resources would automatically be phased out, since extension irrigation is not suitable for all crops.
- Adopt widely dry farming methods and alteration in cropping patterns.
- Alter the pricing policy in order to attract people to other crops. Saurashtra is the world's largest supplier of the groundnut crop. It is possible that any attempt to alter this will be opposed by the rich farmers of the region.

Source: *Frontline* 9 June 2000

Alternatives to large dams have concentrated on two broad aspects of water management: recharging ground water and water conservation. One of the biggest impediments to water conservation has been the indiscriminate use and waste of water in urban areas as well as for irrigation. Many modern techniques such as drip irrigation, in which water is delivered directly to the root of the plant through porous pipes, and sprinklers are commonly known prudent methods of irrigation. Similarly, urban domestic consumption of water has been a matter of concern in advanced societies. A set of measures introduced in Arizona helped to bring down household consumption of water from 760 litres to 590 litres per day per person. These measures include subsidising the distribution of water-efficient technologies like low flush toilets that uses 6 litres of water instead of the 16 litres used by a conventional flush system, initiating campaigns on water conservation as well as fitting meters to monitor water consumption in each household. Another method that has been successfully used in Israel is the utilisation of treated sewage or municipal wastewater for irrigation (McCully 1998).

In the early 1990s, the catchphrase in India was 'watershed development'. It was considered as alternatives to big dams, a natural way of harnessing and

collecting runaway river water and rainwater by diverting it into tanks and wells through trenches, etc. Government circles, the international funding agencies as well as NGOs were taken in by this method and community level initiatives were started all over the country. The principle was to work along the topography of the area. Rivers are supplied by numerous sources of water that channel rainwater to the rivers. These sources from which rivers catch their water are called catchments. The idea is to harness the water from the catchments by planting shrubs and plants on the natural slopes to slow down the momentum of its flow and reduce soil erosion as well as hold water in the area for local use. The water thus weighed down is then channelled through trenches, troughs, etc. into tanks, bandhs or wells. Watershed development has succeeded in a number of villages but has not really taken off on a large scale as an alternative for harnessing water.

Experiments in watershed management have certain common characteristics in that they require small-scale efforts at the village level, with each village creating their systems to tap water, but all the individual efforts come together as a part of a larger scheme. The scheme therefore requires an equally efficient management, cooperation of people as well as technical guidance, as each area has a distinct topographical and watershed profile. It requires technical and management experts to acquiesce on the scheme in as much as it requires careful consultation with the community on the efficacy of the design. Practical knowledge about the terrain and climatic behaviour are often crucial tests of scientific experiments, as observed in most cases across the country. The success of watershed development has usually depended upon how well the programme has been received by the community and whether they have actively participated in its conception and implementation. At the community level, the issues of water rights of socially and economically disadvantaged groups have been crucial. Conflicts over resources have become highly volatile, with the rich and the socially powerful trying to corner the benefits of the hitherto common resources and fortifying the conditions of deprivation and poverty.

Thus alternatives to large dams or macro irrigation projects have typically their own constraints - social, technical and managerial. Micro irrigation efforts have been dismissed for its limited scope and scale. Yet they have been appreciated for the use of diversity of cost effective techniques as well as for initiating community based programmes instead of the top-down administration of water projects, as in the case of large dams, thereby introducing transparency and people's participation in maintaining and managing natural resources.

Reflection and Action: 27.4

Listed here are some of the ongoing and successful Watershed Development initiatives in perennially drought-prone areas. *Samaj Pragati Sahayog*, Bagli Tehsil of Dewas District, Madhya Pradesh, *Hiwre Bazaar* in Ahmednagar District, Maharashtra, Ralegansiddhi in Ahmednagar District, Maharashtra, Tarun Bharat Sangh in Alwar, Rajasthan. You may be having information about many such development initiatives. Either best on your experience or information collected from secondary sources write a detail note about the functioning and effectiveness of watershed development initiatives.

27.7 Conclusion

The unit began with a short note on dams, enunciating their historical significance as well as the role of the state and community in managing water resources through the ages. Clearly, famines and droughts have always concerned human civilisation, but the problem has intensified in the modern era. This millennium is characterised by a water crisis, which is aggravating by the day. While human civilisation has been able to tap natural resources for the benefit of humankind with the advancement of modern science and technology, the latter has also disregarded the rhythm of nature leading to the

present ecological crisis. The debate on dam and displacement also demonstrated how large dams not only displaced people, but also that the displaced persons belong to the marginalised sections of the society such as tribes, poor peasants and the landless. The section on alternatives demonstrated how alternatives to large dams, taking cue from the experience with large dams the world over, have tried to focus on environmentally friendly and viable techniques of harnessing water as well as evolving greater participation of people so as to ensure equal accessibility to water resources across social and economic divisions. Although the alternatives have also been subjected to criticisms regarding their efficacy and sustainability, they illustrate the relentless endeavour to experiment and seek solutions to one of the world's most critical concerns - water.

27.8 Further Reading

Lokayan Bulletin, Editorial Piece 1991. *Dams on the River Narmada: A Call to Conscience*. May-August Vol. 9, No.3 and 4, Pp 1-10

Mathur, Hari Mohan and David Marsden (ed.) 1998. *Development Projects and Impoverishment Risks*. Oxford University Press: Delhi

McCully, Patrick 1998. *Silenced Rivers. The Ecology and Politics of Large Dams*. Orient Longman Ltd.: Delhi