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## **HISTORICAL OVERVIEW OF SOCIAL MOVEMENTS IN INDIA AND WATER MANAGEMENT**

- **Kameshwar Choudhary**  
Institute of Rural Management,  
Anand – 388 001  
Gujarat, INDIA

India is a country with very deep historical roots. It has strong cultural traditions and institutions of community life. It has experienced important changes in its polity and society in different historical periods. Social movements of varied nature have played an important role in different spheres of life, including the issue of water management.

This paper gives a historical overview of social movements in India with a focus on movements related to water management. First, it touches upon the concept of social movement. Secondly, it briefly sketches the role played by the state and the people in water management in different historical periods. Thirdly, it analyses the responses of the state and the civil society, particularly NGOs in tackling the water crisis in recent years in the country. Finally, it closes with certain concluding observations.

### **SOCIAL MOVEMENT**

Studies on social movements have been very popular particularly from the mid-1960s in India. They have tried to define the term 'social movement'. But no precise definition has been accepted by scholars of different disciplines or even scholars belonging to a particular discipline.

Ghanshyam Shah (1990:16) notes that some studies use the term movement interchangeably with 'organization' or 'union'. Some use it to signify a historical trend or tendency. Some political leaders and social reformers call their activities 'movements' even if their organization has a very small following, may be less than a dozen members. Just issuing press statements on public issues is said to be launching of a movement. Obviously, the term movement is used in a very loose sense by different sets of people.

In a simple sense, social movement may be said to signify a collectivity of human beings on the move in a socio-political sense. It represents a collective endeavour which would obviously involve certain goals, means and the process to achieve the goals. While talking about social movements, MSA Rao (1978) refers to the issues of its genesis, ideology, organization, leadership, structure, internal dynamics, and social consequences. In his view, '... a social movement is an organized attempt on the part

of a section of society to bring about either partial or total change in society through collective mobilization based on an ideology' ( Rao 1978:2).

A broad definition of the concept is offered by Paul Wilkinson. He states,

A social movement is a deliberate collective endeavour to promote change in any direction and by any means, not excluding violence, illegality, revolution or withdrawal into 'utopian' community.... A social movement must evince a minimal degree of organization, though this may range from a loose, informal or partial level of organization to the highly institutionalized and bureaucratized movement and the corporate group.... A social movement's commitment to change and the *raison d'être* of its organization are founded upon the conscious volition, normative commitment to the movement's aims or beliefs, and active participation on the part of the followers or members. (Cited in Shah 1990:16-17).

Thus, it could be observed, as Shah states, that objectives, ideology, programmes, leadership, and organization are important components of social movements. These components are inter-dependent, influencing each other (ibid:18). Ranjit Guha opines that these elements are found in all types of movements or insurgencies including 'spontaneous' rebellions, their forms vary from very unstructured to well organised (cited in ibid).

Social movements involve collective action which may be both legal/institutional and illegal/non-institutional. There are actions which follow the path of acquiescence for change in situation. According to Johnson, the action which is legally permitted and 'widely accepted as binding in society or part of society' (cited by Shah 1990:18) at a given time is institutionalised action. This type of actions include e.g. petitioning and fighting legal battles in courts. Shah talks about several forms of non-institutionalized collective action which include e.g. protest, agitation, strike, satyagraha, hartal, gherao, riot. He does not think that agitation or protests are social movements in strict sense of the term. However, he notes that more often "a social movement develops in course of time, and it begins with protest or agitation which may not have the 'organisation' or 'ideology' for change" (Shah 1990:19). In his study (1990), he treats agitation, protest, strike etc as 'movements' or more as a part of a social movement of a particular stratum of society (ibid).

Shah categorizes movements as reform, revolt, rebellion and revolution in connection with changes in the political system (Shah 1990:96). Reform movement does not involve challenge the existing system per se. It is geared to changes in the relations between the parts of the system for making it more efficient, responsive and workable. In contrast, a revolt challenges the existing authority with the objective of overthrowing the ruling regime. A rebellion involves an 'attack on existing authority without any intention of seizing state power'. But in case of a revolution, a section or sections of society launch 'an organized struggle to overthrow not only the established government and regime but also the socio-economic structure which sustains it, and replace the structure by an alternative social order' Shah 1990: 26-27).

Partha Mukherji (1977) classifies movements based on the criterion of quality of change it intends to bring about or the kind of change that has been effected.

According to him the nature of movements could be 'accumulative', 'alternative', and 'transformative'. If social mobilization demands changes 'within' the system, the changes that are likely to happen would be accumulative. If the social mobilization is aimed at creating new structures which would qualitatively affect the entire system, then the change, in case attained, will be alternative. But in transformative movements social mobilization seeks to replace one structure and substitute it by another. Rao (1978:xiv) calls the accumulative movements as quasi-movements, and the other two as social movements in full sense. Rao himself talks about three types of social movements on the basis of the consequence of a movement. He says that there are movements which aim at bringing about 'reform' in some area of life or the other, involving new relationships, activities, norms and values. In contrast, 'transformative' movements are oriented towards effecting changes in power relations i.e. the super-ordinate and subordinate relationships. And there are movements which aim at 'revolutionary' changes in all domains of life and in all basic values (Rao 1978:3).

Thus, there are different types of social movements which are talked about. Essentially, they could be put into two categories – one referring to changes 'within' the system, and the other implying changes 'of' the system. In the first category could be placed the reformist and alternative/transformative movements, and in the second the revolutionary movements. This is in terms of their ideological orientations and consequences. Reformist movements would refer to changes of 'minor' nature within the system. Transformative movements would involve 'major' changes within the system. And replacement of one system by another would be the trait of revolutionary movements.

This general typology of social movements could be applied to understand the nature of changes which have taken place in the past and are presently occurring in the area of natural resource management in general, and water management in particular. There are different stakeholders of the natural resources like land, water and forest. These include different sections of the society such as different castes, classes, communities, gender etc, and the state itself.

Historically, there has taken place changes in the access, control, ownership and management of natural resources by different stakeholders. Traditionally, the natural resources have been considered as 'commons' characterized by collective/community/local control, ownership and management. But the state has gained hegemonic/dominant position in the area of natural resources especially forest and water. There has been the trend of privatization of the commons. As a result, there has emerged social movements relating to natural resources, including water in different periods of history in India.

## **MANAGEMENT OF COMMONS AND SOCIAL MOVEMENTS**

Michael Goldman (1998) has delineated very succinctly and critically the major thrusts of theories and practices of the commons' professional. He starts with the 'tragedy of the commons' school and then moves on to the 'anti-tragedy' positions, in his discussion, noting their discontent as well as their assumptions. He quotes Garrett Hardin, the pioneer of the 'tragedy' school:

The tragedy of the commons develops in this way. Picture a pasture open to all... As a rational being, each herdsman seeks to maximize his gain ... The rational herdsman concludes that the only sensible course for him to pursue is to add another animal... and another, and another... Therein is the tragedy. Each man is locked into a system which compels him to increase his herd without limit – in a world that is limited. Ruin is the destination towards which all men rush, each pursuing his own interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all. (Hardin 1968, cited in Goldman 1998:23-24).

To halt the ruin, the tragedy school advocates replacement of communal institutions (in which footloose individuals reign) with private ownership and stronger state interventions so as to reverse the actions of the world's majority who are said to indulge in overgrazing, over-consumption and over-breeding. The communal culture of shared use of resources is condemned as being 'anti-progressive' (ibid).

Elinor Ostrom cites Ophuls who held that 'because of the tragedy of the commons, environmental problems cannot be solved through cooperation ... and the rationale for government with major coercive powers is overwhelming' (Ostrom 1994:8-9). Ophuls added, 'even if we avoid the tragedy of the commons, it will only be by recourse to the tragic necessity of Leviathan'. Heilbroner affirmed the need of 'iron governments' to tackle ecological problems. Ehrenfeld suggested 'external regulation by public agencies, governments, or international authorities' (cited in ibid: 9). The policy of this tragedyists' position is to centralise the state control and regulation of natural resources. Ostrom also takes note of the other stream of tragedyists i.e. the privatizers. She quotes Robert J Smith who asserted that 'the only way to avoid the tragedy of the commons in natural resources and wildlife is to end the common-property system by creating a system of private property rights'(ibid:12). Ostrom is critical about both the approaches. She states:

Many policy prescriptions are themselves no more than metaphors. Both the centralizers and the privatizers frequently advocate oversimplified, idealized institutions – paradoxically, almost "institution-free" institutions. An assertion that central regulation is necessary tells us nothing about the way a central agency should be constituted, what authority it should have, how the limits on its authority should be maintained, how it will obtain information, or how its agents should be selected, motivated to do their work, and have their performances monitored and rewarded or sanctioned. An assertion that the imposition of private property rights is necessary tells us nothing about how that bundle of rights is to be defined, how the various attributes of the goods involved will be measured, who will pay for the costs of excluding non-owners from access, how conflicts over rights will be adjudicated, or how the residual interests of the right-holders in the resource system itself will be organized (1994: 22).

She talks about institutional options for solving commons dilemmas. This relates to developing an empirically supported theory of self-organising and self-governing forms of collective action (ibid:25). The assumption here is that 'the individuals involved gain a major part of their economic return from the CPRs, they are strongly motivated to try to solve common problems to enhance their own productivity over

time' (ibid:26). It is recognised that there are both successful and unsuccessful cases of CPRs management through collective action. Hence, the task is to 'try to identify the internal and external factors that can impede or enhance the capabilities of individuals to use and govern CPRs' (ibid:27).

The tragedy thesis is attacked by the 'anti-tragedy' school comprising a disparate group of political scientists, ecologists, anthropologists, sociologists and economists. Goldsman (1998:25) identifies within this group three tendencies represented by what he calls - the Human Ecologists, the Development Experts, and the Global Resource Managers. In the main, this school holds that the tragedy thesis seriously lack on the ground of historical, theoretical or cultural veracity. Its proponents have generated solid counterfactuals mainly from their in-the-field empirical research. The Human Ecologists, to be specific, demonstrate the complexity of the commons from a local culture- and territory-based perspective. The Development Experts programmatically show the ways to restore the degraded commons, strengthen weakened social institutions and 'modernize' the Third World poor. The Global Resource Managers affirm that the commons are not just local or the problem of the poor, but contributor to global ecological crisis. So, the three strands of the 'anti-tragedy' school have different conceptual nuances. However, Goldman (1998:25) observes that 'their assumptions and instrument-effects are quite similar'. None of the commons experts engages in the analysis of modernity, development and its institutions and the manner in which they, as northern actors, actively construct the knowledge/power relations they have with their subjects/clients. Their work affirms and legitimates the latest round of World Bank directives on modernity and development, which affirms that 'the achievement of *sustained* and equitable *development* remain the greatest challenge facing the human race' (see Goldman 1998:41).

It is observed that fine-tuning is done of the plans developed to help the commons. But the projects, programmes and processes fail again and again. Goldman (1998:41) quotes James Ferguson who argues 'that what is most important about a development project is not so much what it fails to do but what it does do'. Access for domestic and foreign capital is achieved to more remote areas of resource- and labour-rich sites. This is done through social experimentation and state expansionism in the name of 'making the commons work'. Generally Third World state development agencies become the guardians of large inflow of foreign capital. This is geared to restructure social-natural relations in 'undeveloped' zones so that the project and the state also would set foot and capitalist relations grow. This new thinking supports increased intervention into new sites and bodies (population policies).

Both the tragedy and the anti-tragedy schools affirm that a new science of resource managerialism is needed, with themselves at the helm of affairs. They hold 'that the crisis of the commons must be universally tackled and rationalized by well-trained teams of international experts sensitive to local needs and ecological capacities'. Goldman (1998:43) comments on the views of the development enthusiasts thus:

The global commons crisis is still attributed to the actions or inactions of the preconceived individual subjects – most of whom live in the South and are resource-poor. Solutions rest with private actions and global organizations flush with money to transform and regulate; global agencies mobilize a whole range of financial, intellectual and political resources to transform

expeditiously the world's commons as a project of modernity. Yet these agencies are driven by discursive practices of privatization, production intensification, integration and capitalization. Each process, alone, runs the risk of degrading local commons, institutions, and eco-systems; in combination they have proved to be disastrous.

The problem with both tragedyists and anti-tragedyists is that they see the commons crisis from basically the same angle. They see local institutional breakdown, communal disintegration and social apathy. But they do not see social action, movements and conflicts. They ignore that marginalised people in the South have been engaged in anti-development and anti-state movements and insurrections (Goldman 1998:44). These struggles are partly being fought over the commons. They are challenging the legitimacy of elite discursive practices of capitalist development and expansion.

Goldman emphasizes the need to replace the prevailing hegemonic discourse of the commons with a successor science for reinventing the commons. He believes, till the commons is seen as only existing within a particular mode of knowing, called development, its advocates would continue to serve the institution of development, 'whose *raison d'être* is restructuring Third World capacities and social-natural relations to accommodate transactional capital expansion'. In contrast, a successor science would situate the commons within the contested hegemonic culture and political economy of expanding modernization and capitalism. It would also grapple with colonial and imperial practices, including historical relations between dominant and colonized social groups. It would create alternative science-for-the-people scientists/activists and help translate situated knowledge across very diverse communities with explicitly acknowledged power-differentiated relations. Goldman states,

In other words, to begin to understand the context and content of struggles over the commons, one needs a critical self-reflexive analysis of the institutional practices of development, modernity and imperialism, and the way powerful agents (e.g. IFI, developers, NGOs, and scholars) discursively reduce and rationalize human behaviour to a common metaphor (1998:47).

Against this conceptual backdrop of the typology of social movements and the development theories of the management of commons, we move on now to have a brief historical overview of social movements and water management in India.

## **THE TRADITIONAL SETTING**

There is a lack of systematic study on water structures and management in the traditional India i.e. in the ancient and medieval times. It is rather impossible to find studies on social movements relating to water issues in this period. An effort however will be made here to move in that direction.

The history of India has very deep roots. Like many other countries, the river valley settlement started in India with the growth of Indus Valley Civilization (c. 3000-1500 B.C.) in the north and western India. Afterwards, the human settlements spread to

different parts of the country covering both the river valleys and other regions as well. Evidences of water systems are found in fragments in different writings belonging to this period. CS Rangachari and SD Mukherji (2000:35) refers to the archeological evidence of artificial irrigation from the pre-Harappan and Harappan (i.e. Indus) times. This was in the form of large number of wells including with brick linings. Inamgaon is an important site on the western coast in India where a major diversion in a huge embankment (240 metres by 2.2 meters wide) was made. The river was diverted into a channel that was itself 200 metres long and 4 metres wide. Dholavira, an important site of Indus Valley, had several reservoirs to collect monsoon runoff. Like many other Indus sites (such as Mohanjodaro and Harappa now in Pakistan), it had a magnificent drainage system. Lothal (Gujarat), Inamgaon (Maharashtra) and other places in northern and western India have shown evidences of irrigation structures in the form of bunds (small dams) and canals (Bagachi 1995: ix). There are different views on the decline of the Indus civilisation. One view holds that the Aryans from the central Asia invaded the Indus people and destroyed their well organised irrigation structures, ruined their food security and ended that civilization. This is corroborated by the Vrtra myth referring to god Indra destroying the demon Vrtra and freeing the streams as mentioned in the Rigveda (see Kosambi 1956:70). The existence of channel irrigation in the Vedic period (1500-1000 B.C.) is mentioned in the Vedic literature.

The Magadhan Empire (600 B.C.) marks the establishment of first empire in India. It was succeeded by the Mauryan Empire about which the *Arthashastra* of Kautilya gives an extensive account. During this period canal irrigation is said to be practised along with lift irrigation. Dams were constructed, Embankments also were in use. Different types of taxes were collected from the cultivators depending on the nature of irrigation. The tax fixed in the Mauryan times for taking water works built by the king were:  $1/5^{\text{th}}$  of the produce if manually transported,  $1/4^{\text{th}}$  in case carried by bullocks, and  $1/3^{\text{rd}}$  when lifted mechanism into channels. The tax rate was  $1/4^{\text{th}}$  of produce for taking water form natural reservoirs like rivers, lakes, tanks and springs (Rangarajan 1987:232). Exemptions from payment of water rates were granted for building or improving irrigation facilities. Exemption given was for 5 years for new tanks and embankments, 4 years for renovating ruined or abandoned water works, and 3 years for clearing water works over-grown with weeds (ibid:231).

The *Arthashastra* mentions other provisions made for irrigation. Watercourses like reservoirs, embankments and tanks were also privately owned. The owner was free to sell or mortgage them. Owners could give water to others in return for a share of the produce. But in the absence of the owner, waterworks were to be maintained by charitable individuals or the people of a village acting together. A set of punishments were prescribed in the form of compensation in kind or cash according to the damage done on account of irrigation. The package of compensation included punishments for causing damage to another's ploughed or sown field by letting water overflow from a reservoir, channel or field; causing damage to gardens, parks and embankments; in case of a higher tank preventing the filling up of a lower one in use; failure to maintain an irrigation facility; letting water from a dam out of turn, obstructing the flow of water to a user with a right to it; obstructing a customary water course or diverting it; building a well or dam on some one else's land; and selling or mortgaging charitable waterworks in use. The severest punishment was given for

breaking a dam if the reservoir had water. It was drowning in the same place where the dam was broken (see Rangarajan 1987:232-33)

*Arthshastra* indicates that people knew about rainfall regimes, soil types and irrigation techniques. It mentions that the state extended help in construction of irrigation works initiated and managed by the people of a new settlement. Archaeological and historical records also testify construction of dams, lakes and irrigation systems in the time of Chandragupta Maurya. There was a regular category of officers to superintend rivers, measure lands and inspect sluices by which water was released into the canals (Rangachari and Mukherji 2000:35).

Irrigation was given patronage by the kings. Satvahanas (1<sup>st</sup> century BC – 2<sup>nd</sup> century AD) introduced the brick and ring wells, brick ones being mainly for irrigation. Sangam Literatures refer to lake and well irrigation during the time of Pandya, Chera and Chola dynasties in southern India (1st-3<sup>rd</sup> century AD).

Large embankments were constructed across the Cauvery and Vagai rivers and irrigation tanks were constructed. Fa Hsien's travelogue belonging to the Gupta era (300-500 AD) shows construction of embankments and practice of canal irrigation during the period. The Pallavas of the south (600 A.D.) are regarded as great patrons of irrigation works. The famous Cauvery Anicut was built in 7<sup>th</sup> century A.D. Large scale tank (tataka) construction and tapping of water was practised in Tamil Nadu in this period. Chola period (985-1205 AD) witnessed the introduction of quite advanced irrigation system promoting prosperity in the Deccan region. Extensive building of anicuts and tanks took place in this period. Chain tanks were constructed for irrigation.

Rajput dynasties (1000-1200 AD) also promoted irrigation works in the northern India. The 647 sq. km Bhopal lake was dug under king Bhoja. Pal and Sen kings of eastern India (760-1100 AD) constructed several large tanks and lakes in their kingdom. *Rajtarangini* of Kalhana described the existence of a well-maintained irrigation system in the 12<sup>th</sup> century in Kashmir.

In the Medieval Period Muhammad bin Tughlaq (1325-1351) adopted a policy to encourage farmers to dig well and reclaim fallow lands. Feroze Shah Tughlaq (1351-1388) is famous for the construction of the Western Yamuna Canal in 1355. He helped in extending irrigation facilities in the dryland tracks in northern India. In his autobiography the Mughal ruler Babur refers to the practice of groundwater irrigation by wells and tanks. Under Shah Jahans rule the defunct Western Yamuna Canal was restored. Another canal was constructed upto the Red Fort. The Bari Doab or Hasli canal was also constructed. Under the rule of Rangila Muhammad Shah, the Eastern Yamuna Canal was built, which irrigated large dry tract in the northern India (see Bagchi 1995: xix-xx).

The Vijayanagar Kingdom (1336-1546) in the south took keen interest in development of irrigation and water management in general. Reclamation of wastelands was promoted. Anantarajasagar tank was constructed with a 1,372 m long earthen embankment on the Maldevi river. The well-known work under king Krishnadevaraya was the Korrangal dam and the distributory channels. During the reign of Bahamani rulers (1388-1422) canal irrigation was introduced for the first



time in the eastern provinces of the Deccan. Sultan Zain Uddin (1420-1470) introduced extensive canal irrigation network (eg. Utpalapur, Nadashaila, Bijbihara, Advin etc) in Kashmir (Bagchi 1995:xx)

There were different types of smaller water harvesting structures built and used in different parts of traditional India. These include e.g. Johad, Khadin, Tanka, Kund and Rapats in Rajasthan; Pats in Madhya Pradesh; Guhl or Kuhl in Garhwal and Gata in Maharashtra; Himachal Pradesh; Ahar and Pynes in Bihar; Talaos, Jhils and Pukurs in West Bengal; Kata, Bandha and Munda in Orissa; Arakere, Volagere, Katte, Kolla and Koldore in Karnataka; and Surangam in the Malabar region (Bagchi 1995:113-122). There existed a variety of structures in the different regions.

It must be noted that in traditional India irrigation/water structures of all types were not built by the kings who took more initiative in case of larger structure like a few canals in the north and bigger tanks in the south. But the kings promoted the structures of lesser size and other types. Water structures were built also by individuals, village communities, and temples (see Agarwal and Narain 1997:298, box). In the management of irrigation, the Village Panchayat assemblies played the most important role. They exercised extensive control and performed various functions. These included, as indicated in medieval south Indian inscriptions, ownership of water resources; powers to arrange for construction; repairs and maintenance of tanks; powers regarding land transactions relating to tanks; management of water supply; levy and collection of cess for irrigation and powers to assign cess; powers to engage and remunerate local functionaries; maintenance of records; dispute settlement; and relations with the central government (ibid:298). The village as a whole was responsible for payment of land revenue to the government. The village bodies had the authority to sell fallow common land of the village to make bunds or dig channels to irrigate cultivable land; set apart village land for making tanks and make such land tax-free; sell land or *ayacut* and tank as part of reclamation efforts; sell wasteland covered with rubble, stone and weeds to individuals to excavate tanks; sell land of revenue defaulters; and grant land to persons who repaired tanks (ibid:300).

The rulers, both in northern and southern India, promoted irrigation/water structures. An important feature of the traditional India was the decentralised system of water/irrigation management. However, Bagchi (1995:xi) opines that 'north Indian rulers had more faith in state or king owned management of the irrigation structures and canals'. This could be true to some extent of the larger water structures and canals as, for instance, reflected in the *Arthashastra*. But the innumerable smaller structures could have been managed mainly by the village level bodies in the whole of India. Karl Wittfogel's theorisation of oriental despotism conceived as prevalence of centralised despotic states in hydraulic oriental societies does not seem to hold in case of India, as in case of many other countries.

The emergence of the two crucial social formations, the state and the class, is stated to be largely a phenomenon of the post-Vedic time in India (Sharma 1985:83). The state encouraged reclamation of uncultivated land/forests for extension of agriculture. Extension of irrigation was promoted by the state, in addition to the initiatives taken by individuals and village collectivities. One of the important interests of the state in doing this was increasing the collection of revenue for maintaining its establishment.

The state was empowered to levy extra cesses to finance costly works of public utility, including irrigation, to meet unforeseen calamities. The *Arthashastra* calls these extra cesses as *pranayas* or benevolences. It states that the farmers may be called upon to pay around 25% and merchants from 5 to 50% as per their circumstances (Altekar 1972:282). The people had to pay tax for irrigation.

The evidences of agrarian movements are very hard to find for both the period in India. The incidents of some protests are found. These mainly relate to higher rate of taxation and oppression of the peasantry. Royal panegyrist represented the subjects as happy and prosperous. But there are clear evidence in contemporary literature and inscriptions showing that 'taxation very often pressed oppressively on the people' (Altekar 1972:283). One Tataka narrates the pitiable condition of the people of a village, who had deserted their homesteads en masse to live in forests to get ride of the tyranny of the tax-gatherers. King Lalitaditya of Kashmir is stated to have suggested his successors to 'tax the agriculturists so heavily that they should have with them corn just sufficient for the current year'. Under king Sankaravarmani of that kingdom it is said that 'the taxation was so heavy that people were left only with air to live upon' (ibid).

There are records saying that the agriculturists of some village in Tanjore district gave up all cultivation as a protest against heavy taxation. A feudatory of king Kulottunga III imposed an unjust tax even on wastelands. The protests of the Village Assembly was of no avail. Members of the village council were imprisoned for failure to pay the dues. They were released only when the amount was paid by selling away some land of the Assembly. Even the grantees of Brahmadeya villages often suffered from high handedness and were made to stand in the sun or in water. They could get no relief against such action (see Altekar 1972:203). However, it is opined that no undue importance should be attached to these cases. Kashmir kings referred to were exceptional tyrants. Most of the cases relating to south India, mentioned above, belong to the closing decades of the Chola dynasty, when there was a serious deterioration in administration (ibid :284).

There are evidences showing that people could successfully oppose the levy of unjust taxes and imports imposed by the state. There is an instance of Assemblies of some *nadus* in Tanjore district meeting and resolving that they would pay only legitimate dues and oppose all other demands. An Assembly in Karnataka resolved that taxes on cows and she-buffaloes would not be paid because it was not sanctioned by the usage of the district since immemorial times. It also specified the rates of land tax that would be paid. Thus, people often tried to declare and protect their rights against unjust encroachments. 'They might not have been successful in their efforts, when kings were tyrannical and self-willed; but there can be no doubt that they had strength enough to press their claims successfully when kings and their officers were of the normal type... the village assemblies and their executives were usually strong enough to resist encroachments on their legitimate rights and interests (Altekar 1972:204).

Some elements of agrarian problems could also be found in the religious movements, Buddhism and Jainism, which emerged in the 6<sup>th</sup> century BC. The growth of new forces of production in the age of Budha emphasised the need for promoting agriculture. The existing Vedic practice of cattle sacrifice in the name of religion and the continuity of the hunting practice of the non-vedic tribals hampered the

preservation of cattle for agriculture. Hence, the *Suttanipata* stressed the evil impact of cattle slaughter and held that cattle have to be preserved as they confer food, beauty and happiness on the people (see Sharma 1985: 109).

Some cases of peasant protests and revolts are reported for the Early Medieval India (7<sup>th</sup>-12<sup>th</sup> century). These were mainly related to the issue of land revenue. It is difficult to separate out the ones specifically concerned with the tax on irrigation. 'The economic exploitation of the peasantry by the rulers and landed aristocracy was found to result in protest, rebellion, revolt and other forms of agrarian struggle by the peasantry' (Kar 1990:89). Land grants made by the rulers maintain silence on this count. But some literary texts mention the peasants reaction against state oppression. Some literary sources state that peasants deserted villages en masse due to over-taxation. A verse in the *Subhasitratnakosha* of Vidyakore (12<sup>th</sup> c) says that the peasants left the villages because of unwarranted oppression of the *Bhogapati* (landlord or the feudal chief). The *Brhannaradiya Purana* states that because of oppressive taxes people could and did migrate en masse to regions rich in wheat and barley (see *ibid*).

There are some historical instances of peasant uprisings found in literary sources. In his *Ramcarita* Sandhyakara Nandi describes the revolt of the Kaivarttas in eastern Bengal. This seems to have happened, as mentioned in the copper plate inscription of Mahipala I, because they were deprived of their plots of land given as service tenures. A Kaivartta chief, Bhima led the revolt against the Pala ruler who had to mobilise his own sources and those of all his feudal lords to crush this revolt. It was the ordinary peasants involved in the revolt is clear from Nandi who describes them as naked soldiers riding buffaloes and fighting with bows and arrows. *Rajatarangini* refers to the revolt of the Damaras in Kashmir. It is said that they were cultivators who carried arms and took sides even in the struggle for the throne. The Kashmir king Lalitaditya (699-736) on his deathbed advised his successors not to allow villagers to accumulate property because 'if they should keep more wealth, they would become in a single year formidable damaras and strong enough to neglect the commands of the king'. Lahadapura inscription, found in the Ghazipur district of Uttar Pradesh, of Jayachandra's time talks about an extremely abnormal situation created by the turbulent people who seem to be mostly peasants. However, 'It seems that because of their limited resources and military experience peasants have been ill-fitted to organise and carry through successful revolts' (see Kar 1990: 90-92).

Nurnal Hasan (2000:31) observes that the Mughal empire was basically dependent on cooperation and support of the zamindars of three categories – the chieftain (some of them were rajas), the intermediary, and the primary non-cultivating zamindar. Broadly speaking, all these three types of zamindars were intermediaries between the Mughal ruler and the cultivating peasants. Their principal duty was to submit the full revenue returns, to maintain law and order through their troops, to keep ferries and irrigation works in good order, and to ensure that assessments were reasonably made and complaints properly attended. In return they got a percentage of the revenue collected and other perquisites. They played a very important political, administrative and economic role (*ibid*:29).

Imperial exaction, particularly increase in land revenue, was a very important issue of tussle/struggle (a) between the peasant and the rulers and (b) zamindars/intermediaries

and the central power. Muhammad Tughlaq, a ruler of the Sultanate time tried to raise land revenue demand to one-half all over the empire. This created a serious peasant uprising in the Doab region (Chandra 1997:149). In contrast, Firoz Tughlaq was successful in levying an extra charge of 10 percent for providing water to the peasants of Haryana by his canal system (ibid:150). Defiance against oppression by the peasant was expressed as refusal to pay land revenue. Shah Waliullah, a 18<sup>th</sup> century writer saw a connection between growth of oppression and popular revolts. He held that the 'ruin of the countries' in his time was due, first, to the strain on the treasury from maintaining a large class of idlers. The second reason, he says, was the imposition of heavy taxes on the peasants, merchants and artisans, and, then, the oppression inflicted upon them. As a result 'the submissive ones flee and are destroyed and those who have got the strength to do so rise in rebellion' (cited in Habib 19: 378 fn). Many a time peasant revolts were led by zamindars against the heavy exactions of the central ruler, frequently utilising the caste and clan appeal to garner support. In case where revolts were not feasible, many zamindars refused to pay the revenue until force was used against them (Hasan 2000:27) by the *fauzdar* or the *jagirdar*.

Conflict between the imperial authorities and the zamindars was on account of the latter's share in the land revenue or in the surplus produce. The zamindars were considered mere tax gatherers by the ruler in the imperial territories. They were given a share in the revenue as compensation for this work. The imperial power fixed restricted the land revenue collected from the peasants by formal regulations. This revenue demand was high. It left little with the peasants to be claimed by others. 'In such a situation it became difficult for the zamindar to collect the revenue and pass it on to the authorities without harming his own interests. A similar situation was confronted the autonomous chiefs, who had to pay revenue or tribute or both (Habib 1999:384).

There were several incidents of resistance and revolts by the zamindars in the Mughal period. The rebellion of Sobha Singh, 'the zamindar of Chitwa and Bard (?)' in south-western Bengal seriously shook the Mughal authority in 1695-98. He was joined by Rahim Khan, the chief of the tribe of the perdition-marked Afgans of the area. The area on both sides of the Hugli river was ravaged. The loyal zamindar of Burwan was killed. It took time for the Mughals to stamp out the rebellion. According to Habib(1999-386), the zamindars are said to have declined to pay the revenue to the authorities 'without a fight' even near the capital city of Agra. Of the late 18<sup>th</sup> century, the letters of Radandaz Khan, the faujdar of Baiswara in Awadh, talks about leading or sending expeditions against zamindars whose usual fault was refusal to pay the revenue. The struggle between the imperial administration and the zamindars was a common feature of the later medieval time. Around 1700, Manuchy wrote, 'Usually the viceroys and governors are in a constant state of quarrel with the Hindu princes and zamindars - with some because they wish to seize their land, with others, to force them to pay more revenue than is customary' (cited in Habib 1999:386).

Many zamindars adopted a conciliatory attitude towards their peasants whose support they needed for their defence and also in flight. This was because they were locked into an unequal contest with the imperial power. Such zamindars made more flexible arrangements with the peasants under their control. The officials of the *Khalisa*

(direct revenue collection by the imperial power) or the jagirdars were mainly interested in raising the revenue. Even the official historian of Aurangzeb observed that the zamindars 'conduct themselves gently in exacting the revenue in the *mahals* of their zamindari, and do not apply the regulations and laws followed in the imperial dominions' (Habib 1999:387).

There were instances of the peasants deserting the raiyati (directly under imperial revenue administration) areas due to the extortion by the mansabdars (holding jagirs) and settling down in the territory of rebellious zamindars. Azam Khan was the Mughal governor of Gujarat (1632-42). Under him, the peasants were highly oppressed. Due to this 'most of them fled and took refuge with the zamindars in distant places. Azam Khan led an expedition against the zamindars of Navanagar to bring the peasants back to his area. In 1644, a similar campaign was launched in Malwa against the zamindars of Ginnur who had not paid the revenue in the desired way and the fugitive peasants of the Jagir area who came here also evaded paying the revenue. Further, the kingdom of Kuch Bihar was annexed by the Mughals in 1661, and the imperial system of revenue assessment and collection was introduced. The peasants had strong attachments with their deposed raja Bim Narayan who treated them with much leniency. The peasants rose in revolt against the annexation and expelled the Mughal troops and officials. In the time of Aurangzeb, when the oppression of peasants increased, they took to arms themselves. It enabled zamindars to organise peasants into large bands, and even armies. They employed the peasants in predatory warfare to extend their own zamindaris or area of dominance. 'The peasants and zamindars thus frequently became associated in the struggle against Mughal authorities' (Habib 1999:388). However, 'the zamindars leadership was not uniformly established over all the peasant risings; nor is there any reason to believe that all rebellions actions by *zamindars* were supported by the peasants' (ibid:389).

Habib has briefly discussed some prominent revolts which occurred during the Mughal time. The Jat revolt was a continuing phenomenon in the region of Agra. Speaking of this province, Abul Fazl stated that the peasant masses of that territory were notorious for their rebelliousness, bravery and courage. The Mughals had to launch frequent military operations against rebellious peasantry in this region. The Jats living in this area were mainly a peasant caste, and some of them were also entered as zamindars. The Jat rebellion first started under the leadership of Gokula Jat, the zamindar of Talpat near Mathura. He 'assembled a large army of Jats and other villagers and raised a rebellion'. He was killed in 1670. But leadership of the rebellion passed on successively to other Jat zamindars. The peasants refused to pay revenue and took to arms over large area in this region.

The Jat rebellion was largely caste based. But in case of the Satnamis and Sikh rebellions, caste was replaced by religion as the binding force among the rebels. In fact, the Satnamis were a sect of the Bairagis with an allegiance to Kabir. This monotheistic and anti-caste system sect appealed most to the lower classes. Their revolt (1672) broke as a result of an altercation with a *piyada* (foot trooper) who was guarding cornheap in a village. It turned into a full-fledged conflict with the Mughal troops. They inflicted repeated defeats on the troops and occupied Narnaul and Bairat. They were finally crushed by a large army. An official chronicler of Aurangzeb calls them 'rebellious, murderous, destitute gang of goldsmiths (peasants), carpenters, sweepers and tanners and other men of ignoble artisan castes'. He stated, 'this huge

horde of mischief-makers of the region of Mewat all of a sudden sprang up from the earth like moths and fell down from the sky like locusts...' (Habib 1999:396).

Sikkism is said to be a peasant religion. Gradually, its followers became a military power and had frequent armed collision with Mughal power. Most of the followers of this religion belonged to the relatively lower castes like Jats and Khatri of the Punjab and other lower castes. This was because its emphasis on accepting a rough equality.

Several revolts occurred in northern India. Imposition of uniform revenue rate in Bhakkar in 1575-76 increased the oppression of peasants. As a result the Mangcha tribe revolted and killed the tax gatherers, though they were defeated later and expelled from their land. The Meos of Mewat were constantly in rebellion and made plundering raids. The peasants of Lakhi Jungle were 'notorious for rebellion and mischief' in the Sutlej-Beas region. They belonged to the castes of Wattus, Dogars and Gujars. The Kolis of Gujarat constituted lower peasantry, traditionally bearing arms and ready to commit depredations. The Bundela rebellion started after Shahjahan's annexation of Orchetra in 1635. It continued intermittently for many years. The peasants evaded paying the revenue whenever the rebels became active.

Thus, it is observed that several rebellions and revolts occurred during the medieval period. These were resorted to by the zamindars as well as the peasants, together under the leadership of zamindars or independently by the peasants. The major reason of revolts was the issue of land revenue, especially in case of the peasants. The land revenue also concerned with the irrigation tax wherever arrangements for irrigation were made by the imperial and local rulers. It is difficult to pinpoint which revolt specifically dealt with the issue of water. The zamindars had their own ambition of expanding zamindaris and rising high in the landed aristocracy. The ties of caste and sect acted as a base for mobilisation in the struggle. The thrust of the agrarian movements was bringing changes within the existing system only. Also, there was a strong wave of socio-religious movement, popularly known as the Bhakti movement, in the period. It appealed most to the lower castes/classes people because of its thrust on socio-religious equality in the spiritual domain. It was opposed to oppression in the temporal world. However, it largely talked of reforms within the existing socio-economic system.

Artificial irrigation improved the Indian agriculture by adding to the natural bounty of the monsoons. It mainly involved the use of wells, tanks and (inundation) canals. The antiquity of irrigation tanks in south India is testified by archaeological remains. Buchanan describes in his survey of south India (1800-1801) many remains of the dams (anicut), tanks and canals. As a natural process, seasonal inundation of the rivers served the purpose of both irrigation and fertilisation in many regions in the north, more so in the north-west by the Indus and its tributaries. In the south, there was an ancient system of laying of small canals from rivers and streams for the purpose of irrigation. But it was in northern India where some really large (inundation) canals were excavated during the medieval time (Habib 1999:33).

## COLONIAL INDIA

In traditional India, the kings had no army of engineers or public works departments. They supported and encouraged local nobles, common people and even temples to construct water harvesting structures by giving grants of revenue-free lands for the construction and maintenance irrigation structures.

The Indian villages were largely autonomous managing their own resources, though the governance structures differed from one region to the other. 'Water harvesting structures were left to the local communities to manage and maintain, including the establishment of rulers for sharing water, penalising offenders, and making payments to those who managed the water distribution' (Agarwal and Narain 1997: 268).

But during the British colonial rule both the traditional water harvesting structures and the people-centric village-based decentralised management system were gradually destroyed. This happened due to several reasons. The basic interest of the colonial rulers was to increase government revenues. Agarwal and Narain state :

The British administrators had their hearts set on increasing government revenue and, in the process, they destroyed the financial resource base of the Indian villages and their internal capacity to manage their natural resources. They destroyed the village-based water management systems by taxing the people too much. They raised land revenue to such an extent, even during drought years, that it meant handing over the entire crop in the form of taxes. Many people became landless and destitute (1997:269).

The village community lost its capacity to raise sufficient internal resources to manage its irrigation structures. There was sharp fall in agriculture and incomes making the country chronically affected by famines and destitution.

The landed rural aristocracy lost interest in managing and maintaining the traditional water structures. This resulted due to introduction of new land revenue systems by the colonial rulers. The new systems were variously known as the Zamindari system, the Ryotwari System and the Mahalwari system in different parts of the country, but on the whole these system had the similar impact. Under the new systems, hereditary rights of ownership were given to the zamindars who in the past only had rights to a part of the collected revenue. The share of the state in land revenue was fixed permanently under the zamindari system and upwardly revised periodically in the ryotwari areas. The zamindars were free to raise rent, as they wished, and give only the agreed share to the state. The rent had to be paid in cash. Running short of cash, the peasants had to borrow money for paying rent from the moneylenders. In case of default, their land was taken over and rented out to others, making them poorer and more insecure.

The cases of alienation of peasants from their land became a common phenomenon. Moreover, many old zamindars, who were lenient towards their peasant masses, also lost their zamindaris due to default in meeting high revenue demands of the colonial state. In their place came the new zamindars, many absentee ones, whose main interest was to collect more and more revenue from the peasantry. There emerged a nexus of the state, landlord and moneylender which impoverished the peasants

leading to a series of rebellions all over the country (Singh 1997:42). The overall effect was a serious decline in the traditional system of irrigation in the country.

Initially, the British rule showed no interest in irrigation activities. But it was forced to take up the role of maintaining irrigation works in the south due to absence of (formal) intermediaries under the Ryotwari system of direct revenue collection from the peasants. The irrigation activities showed substantial financial benefits. This prompted the colonial state to take interest in irrigation in the north as well. Large amount was spent on development of irrigation mainly through perennial canal system. The state even resorted to borrowings for financing new irrigation projects. Mainly two types of irrigation works were undertaken – the productive and the protective types. But emphasis was given on the former with the main purpose of making commercial profits by imposing and collecting from the peasants tax on irrigation. The British made profits mainly as a result of renovating and enlarging the old canal system in the north and the tank system in the south. They incurred losses in case of several new canal irrigation projects. A broad idea about the development of irrigation in the British time can be had from Tables 1,2, and 3.

In the beginning, the East India Company undertook the work of the revival of the irrigation systems of Delhi and Tanjor with a consideration that ‘the interests of charity (protection against drought) and the interests of commerce (profit) could happily be seen to coincide’. This objective was met in the early works. Then commercial motive became dominant and the government adopted the policy of raising loans for the construction of irrigation works. Elizabeth Whitcombe observes,

Irrigation was now admittedly a large-scale commercial operation, the provision of protection against drought being by now a somewhat subsidiary consideration. But for the most part, with the honourable exception of the oldest works, public irrigation works did not pay (1982:678).

Under the British directed canal system the government only built the main distributaries. The zamindars were granted permission to build the minor ones. Whitecombe indicates that the zamindars used the construction of distributaries as a tool against each other and against recalcitrant cultivators in the United Provinces (see Singh 1997:40). Distribution of local power played an important role in deciding access to water in the regions through which the canals passed. ‘Powerful interests were created in villages, which derived their influence from control over both land and water, and acted as the pillars supporting the British State’ (ibid :42).

In place of the state supported village community based decentralised traditional system, the British colonial rulers established a state-centric top down bureaucratic system of irrigation management in India. The role of traditional knowledge/wisdom of the people and the community social structure was derecognised in water management. The colonial ruler had the ethos of domination over nature which symbolised the rise of middle class government in Britain. Though expressing reservations about a single factorial explanation of colonialism, David Gilmartin (1995:211) holds that ‘the definition of the environment as a natural field to be dominated for productive use, and the definition of the British as a distinctive colonial ruling class over alien peoples, went hand in hand’. The British irrigation engineers viewed the environment as a mathematically modeled system, which included



modeling of flow, distribution and use of water. The capitalist state promoted science and technology 'to extract from every river whatever cash it can produce' and thus transforming the water into a commodity (Donald Worster cited in Gilmartin 1995 :213). Mathematical modeling keeps the observer separate from the systems being modeled, which had implications for the conceptual separation of the state from the ruled. 'The political imperatives of colonial domination largely precluded the concept of partnership between maximising water user and the state' (ibid). The British conceived the local communities "in a language of 'naturalism' that defined them as parts of the 'natural' environment to be modeled and controlled" (ibid:214). Under the British, water for the first time was carried on a vast scale from one river to another, each now regarded as a part of a broader environmental system defined by state science and state control. 'For some engineers (and other administrators), the effective control of the state over the larger environment simply empowered the state to frame rules of proper irrigator behaviour that would allow them to control people as canals controlled water' (ibid:224). No wonder an elaborate set of rules were framed by the state for most canals defining correct irrigating practice and to punish offenders. These covered rules for the proper application of water to the fields, waste of water, village watercourses, sowing of crops etc. the Irrigation Department bureaucracy was empowered to monitor the system and to levy the fines. There emerged a highly centralised system of irrigation management with a huge bureaucratic structure extending even to England. Chart 1 gives an overview of the system of irrigation management in the colonial times particularly by the crown from the company.

A variety of social movements occurred during the colonial rule in India. These movements broadly falls into three categories – the socio-religious reform movements of the nineteenth century led by leaders like Raja Rammohan Roy, the nationalist movements most notably led by the Indian National Congress, and the agrarian movements. Increased oppression and exploitation of the peasantry forced them to resist and revolt against the local oppressors like landlords and moneylenders, and the British rule which had introduced a new land revenue system causing discontent among the peasants and many older zamindars.

D.N. Dhanagare and A. R. Desai have given, in their studies, a broad overview of different peasant movements launched during the colonial rule. The movements were launched by older zamindars, tribal chiefs, and the common peasantry. Some important movements which occurred include Kol and Bhumij revolts (1831-33), Santhal insurrection (1855-56), the Revolt of 1857, Pabna and Bogra risings (1872-75), Deccan riots (1875), Moplahs uprising (1921), Peasant movements in Oudh (1920-22, 1930-32), Kishan Sabha movements in 1930s, and 1940s, Tebhaga movement (1946-47), and Telengana Peasant insurrection (1945-51). These movements were mainly concerned with the issues of land alienation, high rent, interest rates, and illegal exactions and later, broadly speaking, as abolition of zamindari and tenancy reforms.

An important fact of this period is that the peasantry was politicised both along the rightist (reformist) and leftist path. The Congress Party mobilised peasantry on the reformist line and the left parties and the Kishan Sabhas (later phase) on revolutionary lines for redressal of their grievances. Dhangare states, 'The agrarian movements were led or encouraged by the Congress, so long as they did not hamper its anti-

imperialist national struggle or arouse political consciousness along class lines' (1986:125). Largely, the mobilisation on left line also did not prove to be revolutionary. Dhanagare observes, 'No matter whether politicisation took place along the rightist or leftist path in India, it always followed the Congress model of liberal reformism' (ibid:226).

There took place some movements specifically related to water in the colonial times. The north Indian irrigation systems caused disaffection with the Company's rule. The irrigation structures had created swamped and saline tracks in villages such as in Karnal and Muzaffarnagar. This affected agriculture very much adversely. There was also problem of continual intimidation of weak by strong in operation of the rajbuha system on the Eastern Jamuna Canal. These problems contributed to the revolt of 1857-58 which also involved attacks on canal installations by no means infrequently (Whitcombe 1982:692).

The Sarda Canal project generated resistance in Uttar Pradesh in the early 20<sup>th</sup> century. The local opinion was confident in the performance of existing wells in the proposed command area of the canal. It considered the canal unnecessary on the ground of its probable negative effects on the rate of land revenue, on the condition of the soil, and on public health. It regarded the expenditure on the canal as unwarranted. But the local opinion made a volte face when the government proposed to transfer the Sarda Water to other states such as Punjab. The talukdars attacked vehemently the scheme of transfer of water. Later an enquiry showed that the local opinion was overwhelmingly in favour of the use of Sarda water for canal irrigation in Oudh and also some neighbouring districts (Whitcombe 1982:725).

Protest against multipurpose irrigation projects began during the colonial rule itself. The first electrical water-power plant was built by the Darjeeling municipality in 1897. Then other municipalities in the hills followed e.g. Srinagar (1908), Mussoorie (1909), Shimla (1913) and Naini Tal (1922). In 1904, a hydro-electric installation was set up at Karteri Falls in the Nilgiri hills to supply power to the ordinance factory at nearby Aruvankadu. The Krishnaraja Sagar Hydro-electric station was completed in 1931.

The Tatas had set up a Hydro-Electric Power Supply Company in 1910 under government guarantee to supply hydro-electric power to Bombay. One of their projects created furore in the early 1920s. The Tatas had a plan to construct a series of dams on the Sahyadri hills near Poona. This was to adversely affect 54 villages. The first dam was built by the Tatas at Lonavala. But no compensation was paid to the oustees. The second dam was to be built at Mulshi. Here the peasants protested under the Congress leadership of Senapati Bapat. The people were totally opposed to dams. It was argued that the 'Tatas intended to extinguish the wick lamps in the rural areas to light up the latrines of Bombay' (Singh 1997:51). The construction of dam was delayed by three years. After promulgation of an ordinance by the government on compensation for land acquisition and prolonged negotiations, the cultivators finally agreed to accept the compensation of Rs.500 offered by the Tatas. The resistance against displacement ended. But the Tatas decided to stop going ahead for other projects in the Sahyadries (ibid).

Gilmartin sees the movements of rural cultural and political reform in the Indus Basin partly as an effort to come to terms with the realities of colonial environmental transformation (the new canal system) and the colonial state structure. Rural movements of religious reform such as the Gurudwara reform movement of the 1920s and the rise of Akalis among the Sikhs symbolized partly linking of locally based communities into large community structures (and community conceptions) having capability of influencing integrated networks of environmental control. In several instances Sikh religious ideas were linked to local community control of irrigation in Punjab. Gilmartin cites the case of a village called Lyalpur with a departmental *Warabandi*, in which the zamindars 'arranged for a watch and a bell to be kept with the Gurudwara priest who announces by the bell when the turn of one zamindar ceases and that of another begins' (see Gilmartin 1995:232-33, fn29). In the 1930s, the Akalis (with their notions of a *panth* composed of many smaller, linked communities) were in the forefront in organizing co-ordinated village closures of outlets in the canal colonies to protest against the Punjab Irrigation Department. Most Muslims, despite having similar local grievances, but no religious reformist organization, could not participate effectively in such protests. Moga Committees (outlet committees) held protests in 1938 on particular distributaries against many issues like canal department charges, enforcement of rules, and reduction of water supply due to the engineering remodeling of channels. At that time committees were not exclusive Akali organizations. But government officials noted a strong correlation between Akali strength on outlets and the co-ordinated closing of outlets as a protest (see *ibid*:233 fn).

The Damodar Canal Tax Movement occurred in the late 1930s in Bengal. The Bengal Development Act 1935 created a serious popular discontent in the canal areas of the river Damodar due to levying of an irrigation levy. In fact, till the end of the 18<sup>th</sup> century the Damodar river had a number of spill-channels, streams and watercourses. It served well the purpose of irrigation in the whole of the Burdwan zamindary. The ryots paid a cess called 'pool bundy' for the repair and maintenance of the river. But later the British relieved the Burdwan Raj of its responsibilities and took over the task of repair and maintenance. But it failed to perform this duty properly which led to silting up of the river bed. The one time healthy and prosperous tract of Damodar became prone to malaria and dire poverty. Hence, the government built the Damodar canal and opened it in 1933. It wanted to tax the ryots to realise its expenditure on canal construction and make benefits.

So the Bengal Development Bill 1935 was introduced in the Provincial Legislative Assembly. The Bill raised a bitter popular struggle against its provisions. The Bill proposed for wide and drastic powers for the government. Its provisions included – the non-interference by civil courts, the rule-making power, the assessment by executive authority, the refusal to recognize right to compensation etc. Despite opposition to some of the provisions by some members, the Bill was passed in October 1935. And under this Bengal Development Act the Government imposed a levy of Rs.5-8-0 per acre per year irrespective of the benefits derived or likely to be derived from the irrigation facilities of the canal (Bhattacharyaa 1979:379).

The Act provoked the local peasantry to protest and resist especially the imposition of a heavy rate of improvement levy for providing irrigation. It provided an opportunity to different organizations and political parties to mobilize the peasantry against the

colonial rule, besides redressing the grievances of the peasantry. Some members of the Provincial Assembly opposed the Bill. The Bill also stirred the Burdwan Bar Association and other educated people of the town. The Burdwan District Raiyats' Association organized several meetings, including the mass meetings of the peasants, to protest against the Bill. It passed resolutions and submitted to the district authorities. Conference of the representatives of the cultivators was organized to express opposition to the Act. The Act was labeled as totally illegal, unjust, unreasonable, arbitrary, and contrary to facts and opposed to natural justice. The District Congress Committee constituted an enquiry committee to investigate the issue and made recommendations which included reduction in tax rate for removal of grievances of the peasants. The cultivators marched in processions to the District Collectorate with the demands for reduction in the canal tax and suspension of the collection of this levy. The Government was forced to constitute an enquiry committee which recommended some remission in the tax rate but continuation of this collection of levy. Large scale *satyagraha* agitations were organized in different villages in which the peasants participated with confidence and enthusiasm. The provincial Kishan Sabha and also the Communist Party were involved in organizing the peasants for the movement. The *satyagraha* movement continued unabated till 1939. The police repression and arrests could not demoralize the illiterate masses of the canal area. Finally, the people had to accept the reduced government rate of Rs.2-9-0 and paid the arrears.

Bhattacharyaa (1979:379) observes that the primary motive behind the canal tax agitation was political. It was aimed at mobilizing resistance against the British rule. Secondly, the movement tried to redress the grievances of the local peasantry caused due to heavy rate of improvement levy. Different organizations were involved in the movement with varying perceptions, perspectives and interests. The Burdwan District Raiyats' Association first took up the issue and jumped into the agitation. The motivating factor in its case was that the pleaders and advocates who were leaders of the Association had landed interests in the canal area and hence were adversely affected by the new levy. They accepted the utility of the canal and never opposed the scheme as such. Their means of agitation included 'appeals' and 'prayers' to persuade the government to reduce the canal tax. The Association organized several public meetings and made contact with the masses through direct personal approach and propaganda by bringing out pamphlets and booklets and issuing appeals and statements in newspapers. They also met the members of the legislature to provide them facts and figures.

The Congress participated actively in the movement. It supported the peasants till its acceptance of the modified rate of canal tax fixed by the Government. The Enquiry Committee set up by the party advised the peasants to accept the canal as a drought insurance and to pay one maund of paddy and one pan of straw per acre, a little less amount than the modified rate of the government. The party held meetings and demonstrations. Its leaders made appeals to the government for reducing the canal rate and published statements in newspapers expressing grievances of the peasants or the government approach and the high canal rate. The Congress MLAs moved cut motions in the Legislature and forced the government to set up an enquiry committee to investigate the matter. But 'the Congress did not urge the local people to launch any *satyagraha* movement or no-tax campaign against the government when the latter

refused to accept the rate recommended by it' (ibid:403). When the Government intensified repression of the people, the party only made statements in protest and appealed to the government for an early settlement of the dispute. Moreover, it advised the people to pay the arrears at the rate fixed by the government.

It was the Krishak Samiti that mainly organized the satyagraha movement. Its members formed the 'left wing' of the Congress. They cooperated with the Congress in the movement. The Krishak Samiti and the Communists had to fall in line with the Congress on several occasions as they wanted to follow a policy of 'united front' to give the movement a 'national revolutionary orientation'. However, in mid-1938 the alliance fell apart. This happened due to basic difference in the approach to the problem. The Communists and the Krishak Samiti had a different view of the issue. According to one of their leaders,

The Burdwan Canal Tax Movement was based on the stand that availability of irrigation was to be there as a matter of course. As a matter of fact, it was claimed that there had been an irrigation system prevailing when the British established their regime. If the system broke down, it was maintained that such breakdown was caused due to the failings of the administration and the landlords in commission and omission. So whatever irrigation arrangement was being made was a belated compensation and a meager compensation at that for damages that had already been done. Hence no levy was due from the raiyats (cited in Bhattacharyaa 1995:404).

They began the satyagraha movement when the government stuck to its stand and the Congress accepted the rate. They asked the people to refuse payment at new official rate of Rs.2-9-0, to surrender their movable goods for recovery of arrears on demand by the officials. They gave 'no-bid' calls to foil the government attempt to auction the attached articles. As a result of the movement the canal rate was reduced, but not to Rs.1-8-0 as demanded by the Krishak Samiti. In this sense, the movement was partially successful. But it 'set in motion the politically inert peasants and taught them to remain alert, even when engaged in a movement, about the leadership which was often guided by its own class interests' (ibid:408).

## **POST-INDEPENDENCE SCENARIO**

After Independence, the Government of India aimed at accelerated development. In this the production of foodgrains was considered a major constraint. Hence, public investment in irrigation was thought to be essential. It became an important item under the Five Year Plans which started in 1951. Under the first two Plans, investment was mostly targeted at the creation of large-scale surface irrigation works, often as a part of multi-purpose hydel projects. The giant projects like Bhakra-Nangal, the Damodar Valley, and Hirakud were undertaken. Minor irrigation projects received significant attention through the sixties under the Third and Fourth Plans and the Annual Plans. But on the whole emphasis remained on the major and medium irrigation after independence. The details of Plan-wise expenditure on irrigation, and area irrigated are given in Tables 4,5 and 6.

It is observed that the Indian state was fascinated by big projects, Also, there developed vested interests in the construction of large dams in the hydel projects. This included the professional group of civil engineers, other related middle class professionals (irrigation bureaucracy), politicians and contractors. Singh states,

The British left behind them a professional group of civil engineers, through their network of engineering institutions. The interest of this group and other middle-class professionals, in conjunction with the ruling class, was to ensure the continuation of this technology. They also aligned the politicians with the contractors of independent India to guarantee the continuance of this technology without any changes. This technology was further developed to construct super large dams (1999:52).

The big dam irrigation technology with the huge size of reservoirs and of the main canals and distributary created enormous social and ecological problems, besides huge capital requirements and lower degree of actual utilization of the generated potential of irrigation. It led to the problems of submergence and resettlement, large-scale water-logging and salinity, siltation, threat of floods, seismicity, and the irreversibility and uncertainty of investment.

Some reorientation of policy took place during the Third and Fourth Plan periods. Minor irrigation was paid attention like the major and medium ones. Use of groundwater was encouraged by installing state tube-wells. Institutional support was extended to farmers to have their own tube-wells and pumping sets for irrigation to raise productivity. This mainly benefited the rich farmers. 'Once again, like the canal and dam technology, affluent sections of society benefited from tube-wells (Singh 1997:53). The bulk of investment was again made by the state in the major and medium projects from the Fifth Plan onwards. It is observed that the emphasis on creating massive irrigation works led to the neglect of the development, and even continuation, of earlier existing indigenous irrigation arrangement (Bhardwaj 1990:12).

The structure of water management remained statist, bureaucratic and top-down in nature. The people did not find a place in it. Their traditional wisdom and knowledge relating to water management remained neglected as in the colonial times.

As a result the management of water sector landed into a serious crisis. There is no paucity of water as such in the country, thought it is unevenly distributed. But people started facing the problem of availability of adequate water for different uses like drinking, irrigation. Also the quality of available water deteriorated due to increased urbanization and industrialization without much concern for the water issue. There was a large gap in potential and actual utilization of irrigation waters. Maintenance and operation of the canal system became a big problem. Also there emerged conflicts over use of water. The poorer sections, especially women suffered the most due to increasing water crisis in the country. So, the nature of the crisis is manifold. It is quantitative, qualitative, socio-economic, and managerial.

Different types of social movements have been witnessed in the post-Independence India. These have been concerned with the issues of land, water, forest, gender, political power, wages, etc. Those related to water management are in the sense of

initiating collective mobilization to tackle the problems in this matter. The responses to the current water crisis are manifold. These are mainly statist (state-centred), market-guided, and civil society/NGO-centred.

The major programmatic efforts made by the government to respond to the water crisis include – CADP, PIM and WSD. The Central Government initiated in 1974-75, the Command Area Development Programme (CADP). It envisaged execution mainly of on-farm development works such as field channels, land leveling, field drains and conjunctive use of ground and surface water, the introduction of Warabandi or the rotational system of water distribution to ensure equitable and timely supply of water to each holding, and evolving and propagating crop patterns and water management practices appropriate to each command area (GOI 1992:60). But the Eighth Plan noted a very meager progress under this programme in the country.

The objective of CADP was to ensure that water below the outlet should reach all the holdings in the command area and that the water management become more efficient. To achieve this it made a provision for giving management subsidy to farmers' associations. In fact, a large number of farmers' associations were formed at the outlet level. These were variously known as pipe committees, outlet committees and water users' associations (WUAs). However, these remained largely cosmetic due to lack of authority and responsibility.

Further, the National Water Policy (1987) emphasized the need for participation of farmers in management of irrigation systems, particularly in water distribution and collection of water charges. It stated,

Efforts should be made to involve farmers progressively in various aspects of management of irrigation systems, particularly in water distribution and collection of water rates. Assistance of voluntary agencies should be enlisted in educating the farmers in efficient water-use and water management (see Randhawa and Sharma eds 1997:464).

The Eighth Plan (1992-97) affirmed, 'more than setting targets in terms of numbers, potential, etc, the perspective of irrigation water management in future should be based on the vision of an equitable and sustainable irrigated agriculture with the farmer being central to all considerations' (GOI 1992:67). It added, 'Greater user participation in major and medium irrigation projects will be encouraged both at the system level and at local level. Local initiatives by users or non-government organizations to set up user's organization to manage water below government outlets will be actively supported by the Government' (ibid:70). A Committee on pricing of irrigation water (1992) also suggested farmers' participation in management of irrigation system. Vaidyanathan Committee on water pricing (1992) also advocated the management of irrigation water by farmers' group. In line with these recommendations, the Central Government has taken steps for expanding 'participatory irrigation management' (PIM). Water and Land Management Institutes (WALMIs) of the Government have experimented in promoting PIM in different states in the country. Some experiences of PIM are already there in the states like Gujarat, Maharashtra, Bihar, Kerala, Andhra Pradesh, Karnataka, Tamil Nadu, West Bengal and Uttar Pradesh.

Recently, the Government of Andhra Pradesh has passed a radical AP Farmer's Management of Irrigation Systems Act to boost PIM. It envisages increased farmers' participation in irrigation management at different levels through WUA at the primary level, Distributory Committee (DC) at the distributory level and Project Committee (PC) at the command level. Finally, there is an Apex Committee chaired by the minister of major and medium projects to formulate broad policy guidelines for the various committees in its command and act as the final decision making body for resolving disputes (Jairath 1999:2834). The three levels of committees are composed of farmers, representatives.

The programme is already being implemented in the state. It has shown some positive results with certain serious drawbacks as well. The channel improvement work has been undertaken in right earnest. Wastage of water due to conveyance losses has been reduced. It has increased water availability by 15 to 20 per cent. It has raised the efficiency of water use at a macro level. But the question is that of sustainability of the scheme. If the funds stop coming, then what will happen to the maintenance and repair works from which will follow the predictable (negative) consequences. Collection of water rates has emerged as a serious problem sooner or later in the PIM experiments. Moreover, women and landless people are excluded from any involvement in water management in the AP scheme. Only landholders and head of the family are the members of WUAs and other bodies. Traditional discrimination based on locational advantages (head and tail-enders) continues to prevail. So, equity (including land-based) is a serious problem. Then, the cropping pattern is left completely to the choice of the farmer. The whole effort is mainly geared to improve the supply-side efficiency such as the desilting, construction of lining, drops, pipe outlets, clearing of weeds, strengthening of embankment channels, etc. Jasveen Jairath observes, 'This generates a sense of euphoria and complacency that all is well and we can doze off peacefully, However, one cannot help feeling somewhat uneasy at this emerging state of stupor' (ibid:2835).

Obviously, there are so many serious drawbacks with the state-directed PIM schemes. The government does not think about people's participation in water management in other areas like drinking water (particularly in urban areas) and industrial and other uses of water. Eighth Plan (1992:62) notes that there is 'strong case for a major effort at renewing and improving the traditional local systems'. But it leaves this task completely to the Panchayats, though some technical help would come from Irrigation Departments. So, the government's view of people's participation in water management is irrigation-centric and segmental, not integrated in scope.

In case of the civil society/NGO-centred responses to the water crisis, three main trends could be identified viz. collaborationist, autonomous and confrontationist (protest) in respect of the state. Also there are instances of an autonomous initiative later turning collaborationist in its approach. In fact, there are today a number of NGOs engaged in implementing watershed development programmes and lift irrigation projects with the financial support of the government in different parts of the country. They also get funding from external northern donor agencies for such works. Some of these NGOs are doing credible innovative work with high level of (local) people's participation. They have made significant socio-economic impact in their areas of operation. The works of the NGO Sadguru in Gujarat is a case in point



here. It has built a series of check dams for water harvesting in a semi-arid area with people's participation right from the planning of the project. It has achieved remarkable success in tackling the water crisis regarding drinking water and irrigation. It has utilised both the government financial support and external funding for the work. A collaborationist approach adopted by the organization has paid rich dividends to the people (see Pandey 1998). Similarly, another NGO called PRADAN is working in about 7 states in India. One of its concerns is water management through implementing lift irrigation projects and watershed development. It is engaged in this kind of projects, for instance in Ranchi and Lohardaga areas of Bihar. Besides foreign funding, the organization takes financial assistance from the government for its projects. So are working several developmentalist NGOs in different parts of the country, some having both foreign and internal funding and many others, particularly smaller ones depending more/solely on the government funding.

The example of an autonomous mobilization of the people for water management is the well known case of Gram Gaurav Partisthan (GGP) a voluntary organization set up by Vilasrao B Salunke in Purandhar Taluka (block) of Maharashtra. In fact, Salunke, formerly an engineer who owned a factory manufacturing precision instrument in Pune, came to village Naigaon in the Purandhar Taluka in 1972, a year of severe drought there. He mobilized the villagers to build check dams to conserve rainwater and plant trees to prevent erosion. The result came soon with first monsoon leading to 10-times increase in the crop yield. The groundwater table also started rising in the area. Migration of people has drastically reduced. To ensure sustainability of the project, water councils have been formed in the villages and every household made a shareholder. Five principles have been formulated for operation, which include:

- Water distribution would not be done in terms of landholdings. There would be per capita distribution of water.
- In times of scarcity, water would be given for the area that can be cultivated by the family members themselves without any outside help. Crops which require less water would be cultivated with the reserved water.
- The people realized that landless villagers were also entitled to water. So to put their quota to best use, landowners who had excess land gave it to them for cultivation.
- Water rights were made non-transferable, that is, even if the owner decides to sell his land, he is not permitted to sell the water rights.
- The villagers contribute 20 per cent of the cost of the project, the rest being contributed by the government, to make them realise that it was their own resources they were conserving. (Ahmed 2000:45).

The movement spread to other villages having seen the big success of the first experiment. Presently, GGP is engaged in 55 water-harvesting projects in 25 villages of Pune. Committees are formed in every project village for water management. Every committee has a group leader and five executive members. All villagers

(households) are members/shareholders of the committee. All the groups together constitute the *Pani Panchayat* (water council). Presently the panchayat consists of 15,000 members. The village committees meet regularly. But the Pani Panchayat meets only once annually. GGP only offers counselling and technical guidance to the people. All the rest is handled and managed by the villagers themselves. 'Salunke's vision was to bring about a harmony between land, water and human beings. With the land filled with flowers, trees and crops, there is good reason to believe that the vision can come true' (ibid).

Another notable example of an autonomous movement is that of the Tarun Bharat Sangh, a voluntary organization of Alwar district (Rajasthan). It was in 1985 that just five young men of the organization with its secretary Rajendra Singh came to Kishori village in Thanagazi block of the Alwar district. 'There was not a single blade of grass for grazing cattle'. Crop yields were very low. Merely 3 per cent of the cultivable area was irrigated. Around 90 per cent villagers were marginal farmers with their own land. Migration was acute. In such a grim situation the TBS intervened as per the advice of the locals through restoration of the traditional water harvesting structures called *Johads* (earthen check dams) in the region to capture and conserve rainwater which improved percolation and groundwater recharge. Government authorities opposed this organization as it directly interacted with the people and mobilized them for the work. TBS received assistance from reputed funding agencies. At present the organization has 3000 water harvesting structures in 650 villages of Alwar district. It engaged no engineer for consultation. It was solely guided by the traditional wisdom and knowledge of the people for its projects. 'Now, prosperity is returning, as naked as the poverty of yore, but with an unmistakable touch of glory. Its greatest symbols are five rivers of the region, which have started flowing perennially after decades of drought, a direct result of conserving water in *johads*' (Mahapatra 1999:30). More water has yielded better crops for the people, better conditions of soil, health, education and a rich community life. People need not migrate for employment. 'For every Rs.100 invested in making *johads*, the economic production in the villages has risen by as much as Rs.400 per capital per annum' (ibid).

A spiritually tempered movement called Swadhyaya has renovated a number of tanks and also constructed a few new ones (474 Nirmal Neer – pure water tanks) in the villages of Gujarat. The followers of this sect work collectively for this purpose only with spiritual, not economic, motivation (see Raju 1999).

There are some sub-types of the confrontationist movements related to water. The anti-(big) dam movements are well known such as the Koel-Karo hydel project near Ranchi in Bihar opposed by the local tribals, the Jungle Bachao organization in eastern Maharashtra lobbying against the Bhopal Patnam Inchampalli dams; and recent ones like the Tehri dam and the highly controversial Narmada Bachao Andolan (Singh 1992). In these anti-dam movements the major issues of concern are of ecological balance and displacement and sufferings of the marginalized people. The opponents of the dam hold protest meetings, organize march, dharna etc. and use especially the print media for highlighting their concerns, resentments and protest to pressurize the government to accept their demands. They have been only very partially successful in their struggle. There is also a very strong lobby of pro-dam

interests who occasionally try to mobilize themselves and protest against the anti-dam people.

Another strand of confrontationist movement is reflected in the farmers' movement for lower water rates/free supply of electricity for irrigation. This is observed particularly in the green revolution areas of Punjab, Haryana, Maharashtra, Karnataka and Tamil Nadu etc. The purpose is to make crop production cheaper and then make more profit by selling the produce. The movement involves meetings, demonstrations, rallies, gherao etc. to force the government to accede to the demand. It has been successful to a significant extent in several states.

Takari Peasants' struggles in Maharashtra involves the issue of equity in water. The official name of the Takari scheme is the Krishna-Koyna Lift Irrigation Project. It is known as Takari scheme because the lifting of water begins in this village. The scheme is planned to give water for irrigation to eight villages fully and 22 villages only partly in the Khanapur taluka. But the taluka has 108 drought affected villages. A similar plan of water distribution is proposed for the nearby Tasgaon Taluka. 'Clearly the scheme is not planned for the abolition of drought but for the prosperity of a few' (Omvedt and Patankar 1991:955). So, the people in the taluka organized under the leadership of Mukti Sangarsh against this injustice. In 1989, a Takari Equal Water Distribution Committee was formed. It included the representatives of non-beneficiary villages and also of partial beneficiary villages. It also included the demands of project affected persons for adequate compensation. The movement started with a poster exhibition and a campaign in the villages. Direct discussions were held with the Government engineers to thrash out the problem. In 1990 a conference of the peasants of affected villages was held which included even the Left leaders of the state. Later a month long campaign involved a padyatra and then the 'rasta roko' blocking all the roads in the taluka. The local people participated enthusiastically, but the local PWP leaders were absent. The 'rasta roko' threat led the chief minister to send the modified projects proposal submitted by the Takari Committee for sanction to the irrigation ministry. The committee had proposed that the same amount of water allotted to the Khanapur taluka could provide water to each family in 60 villages on the basis of 30,000 cubic metres of water per family which would be adequate for irrigating 3 acres of land each. Thus, it would prove to be a big drought relief for a large number of people, and hence more equitarian in effect. But the authorities took a negative stance and tried to harass the activists of the movement in one way or the other. The peasants also had to struggle in case of the Bali Raja Dam which was based on the principle of 'Using the resources of the area not to enrich a few but to abolish drought for many' (ibid).

## **CONCLUSION**

On the basis of the foregoing discussion, the following conclusion could be drawn:

- 1) Social movements of varied types have occurred in the different historical periods in India. But only a few relate directly to the issue of water management, and these have taken place mainly during the British period and after Independence. In traditional India, the issues of water and land were closely interlinked. Movements emerged at that time due to the

problem of land revenue exaction. Some of these would have included the question of water (irrigation).

- 2) India is facing today an acute water crisis reflecting the tragedy of the commons. This is not due to shortage of water. A major problem is that of management of the water resources. The traditional water harvesting structures and the community based management practices and wisdom have been ignored apace since the onset of the British colonial rule. The British introduced a highly centralised bureaucratic top-down management system for water management based on profit making and the scientific vision of conquest of nature. The people, including the local elites who played an important role in the past, were given no space to contribute to promote better water management. This continued even after independence with a big push for big dam technology. This approach has caused serious social and ecological problems, including availability of (adequate) water for its multiple uses. The statist approach has failed. The emergence of water markets has serious implications like depletion of groundwater and inequities in access.
- 3) There are varied responses to tackle the water crisis in the country. The state-directed programmes (e.g. CAD, PIM, WSDP) give a very limited space for people's participation even if NGOs are involved in this exercise. Moreover, the approach is essentially segmental in nature. The collaborationist approach has no concern for changing the existing water management system. It is largely an exercise in limited change, that too mainly at the lower level, *within* the system. Even the confrontationist approach adopted in some social movements related to water today is essentially for modifying the Government policy on certain issues (no big dam, lowering the height of dam), without questioning the existing management system. The new and better institutional alternatives of water management are reflected only in the autonomous initiatives undertaken by some NGOs who have shown the efficacy of traditional and smaller structures and people's organisations in water management. But such organisations are few and far between. The Government has and would like to draw only some peripheral lessons but have not and would not replicate the model adopted by such organisations.
- 4) The need of the hour is to chalk out an integrated innovative response to resolve the water crisis in the country. This would require a coordinated and systematic effort on the part of the different players in the arena of civil society. Such an united endeavor would lead to the reorientation and major shifts in the management system towards people-centredness. A balanced blending of the traditional and the modern, scientific visions would be essential. The State/Government would not change much its system on its own. The civil society (not traditional caste society) has to be strengthened and invigorated to make the state responsive to create an enabling environment for effecting a paradigm shift in water management which would adequately address the related social and ecological problems. This would, besides others, require a genuine concern for the marginalised and their mobilisation for the change of the existing system

of water management. The need is, in fact, for a structural change *of the system*. This would not be possible without social movements gaining accelerated momentum and aiming at change of the system.

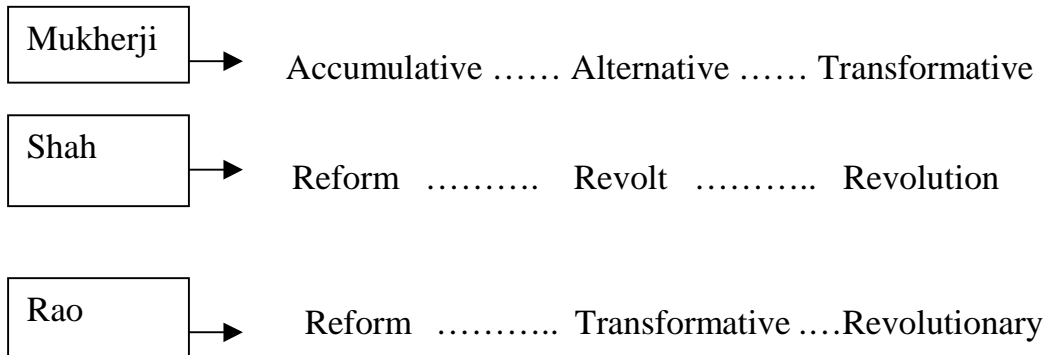
## REFERENCES

- Ahmed, Kazimuddin (2000), "A Dream Come True", *Down to Earth*, January 15.
- Altekar, A. S. (1972), *State and Government In Ancient India*, Delhi, Motilal Banarsidass, (First Publication 1958).
- Bagchi, Kathakali S. (1995), *Irrigation In India: History & Potential of Social Management*, New Delhi, Upalabdh Trust for Development Initiatives.
- Bhardwaj, Krishna (1990), *Irrigation In India: Alternative Perspectives*, New Delhi, ICSSR.
- Bhattacharyaa, Buddhadeva et al (1979), "Damodar Canal Tax Movement", in A. R. Desai ed. (1979), *Peasant Struggles in India*, Bombay, Oxford University Press.
- Chandra, Satish (1997), *Medieval India: From Sultanat To The Mughals* (Part I – Delhi Sultanat, 1206 – 1526), New Delhi, Har-Anand Publications Pvt. Ltd.
- Dhanagare, D. N. (1986), *Peasant Movements in India, 1920-1950*, Delhi, Oxford University Press (First Publication 1983)
- Gilmartin, David (1995), "Models of Hydraulic Environment: Colonial Irrigation, State Power and Community in the Indus Basin", in David Arnold & R. Guha eds (1995), *Nature, Culture, Imperialism: Essays on the Environmental History of South Asia*, Delhi, Oxford University Press.
- Goldman, Michael (1998), "Inventing the Commons: Theories and Practices of the Commons' Professional", in his edited book (1998), *Privatizing Nature: Political Struggles for the Global Commons*, London, Pluto Press in association with Transnational Institute (TNI).
- Government of India (1987), "National Water Policy", New Delhi, Ministry of Water Resources, September, (Reproduced in V. S. Randhawa & P.B.S. Sharma eds (1997), *National Water Policy*, New Delhi, National Academy of Agricultural Sciences.
- Government of India (1992), *Eighth Five Year Plan, 1992-97*, (Volume II), New Delhi, Planning Commission.
- Habib, Irfan (1999), *The Agrarian System of Mughal India, 1556-1707*, New Delhi, Oxford University Press, (Second revised edition).

- Hasan, S. Nurul (2000), *Thoughts On Agrarian Relations In Mughal India*, New Delhi, People's Publishing House, (First Publication 1973).
- Jairath, Jasveen (1999), "Participatory Irrigation Management: Experiments in Andhra Pradesh", *Economic and Political Weekly*, XXXIV (40), October 2-8.
- Kar, S. (1990), *Agrarian System In Northern India*, Bombay, Himalaya Publishing House.
- Kosambi, D. D. (1956), *An Introduction to the Study of Indian History*, Bombay, Popular Book Depot.
- Mahapatra, Richard (1999), "Waters of Life", *Down To Earth*, March 15.
- Mukherji, Partha (1977), "Social Movement and Social Change: To a Conceptual Clarification and Theoretical Framework", *Sociological Bulletin*, 26 (1).
- Ostrom, Elinor (1994), *Governing the Commons: The Evolution of Institutions for Collective Action*, Cambridge, Cambridge University Press, (First Publication 1990).
- Rangachari, C S and S D Mukherji (2000), *Old Roots, New Shoots : A Study of Joint Forest Management in Andhra Pradesh, India*, New Delhi, Winrock International and the Ford Foundation.
- Raju, K. V. et al (1999), "Non-Economic Motivation for Improving Natural Resource Management: Example of *Swadhyaya* from a village in Gujarat, India", Working Paper 135, Institute of Rural Management, Anand.
- Pandey, Rakesh (1998), "Water Harvesting Concept – An Experience in Eastern Panchmahals", *Journal of Rural Development*, 17 (4).
- Rangarajan, L.N. (1992), *Kautilya: The Arthashastra*, (edited, rearranged, translated and introduced by Rangarajan), New Delhi, Penguin Books India (P) Ltd.
- Rao, M.S.A. ed (1970), *Social Movements In India* (Volume I – Peasant and Backward Classes Movements), New Delhi, Manohar Publications.
- Shah, Ghanshyam (1990), *Social Movements In India: A Review of the Literature*, New Delhi, Sage Publications India Pvt. Ltd.
- Sharma, R.S. (1985), *Material Culture And Social Formations In Ancient India*, Delhi, Macmillan India Ltd., (First Publication 1983).
- Singh, Satyajit (1997), *Taming the Waters: The Political Economy of Large Dams in India*, Delhi, Oxford University Press.
- Vaidyanathan, A. (1999), *Water Resource Management: Institutions and Irrigation Development in India*, New Delhi, Oxford University Press.

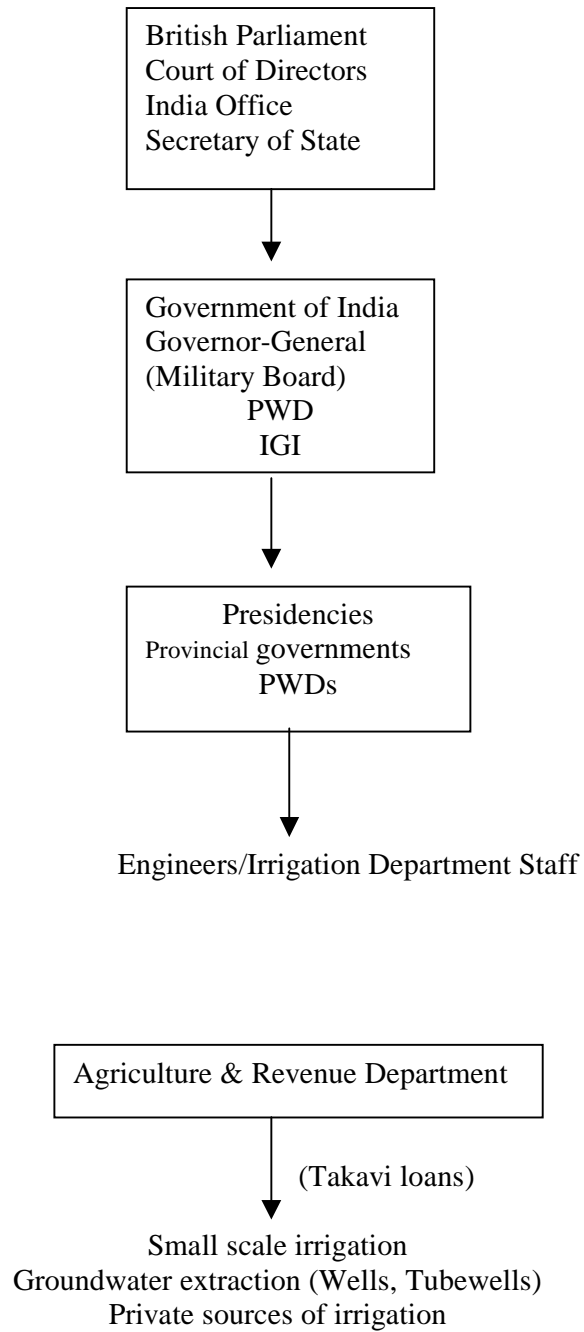
Whitcombe, Elizabeth (1982), "Irrigation And Railways", in Dharma Kumar ed. (1982), *The Cambridge Economic History of India*, Vol. II (1757-1970), Orient Longman in association with Cambridge University Press.

### Chart 1: Typology of Movements





**Chart 2: Management Structure of the Canal Irrigation (Major & Minor) in the British Period**



**Table 1: India PWD. Growth of the irrigation system, by provinces, 1880- 1, 1885-6, 1895-6**

Province	Main canals			Distributaries			Area irrigated			% inc. in irrigated area 1895-6, over 1885-6
	1880-1	1885-6	1895-6	1880-1	1885-6	1895-6	1880-1	1885-6	1895-6	
	Miles			Miles			Acres			
Madras	880*	2346	3494	4788*	3153	6792	927009*	2216001	2940317	33
Bombay-Sind	453	612	2462	1783	1852	124**	819923	943074	1205030	28
Dccan, Gujarat	328	516	643	235	481	559	34591	60530	76149	26
Total Bombay	781	1120	3105	2018	2333	683	854514	1003604	1281179	28
Bengal	628	614	2093	1840	2054	2604	428708	451422	579693	28
North Western Provinces	1438	1445	1447	5195	6243	9794	1732149	1709676	3879663	127
Punjab	2247	3815	4344	1613	3688	9441	1157228	1787569	3458381	93
Total (5 Provinces)	6755	9340	14483	17472	17471	19314	5954122	7168272	13420412	87

\* Approximate figures only. Information on dimensions of Cauvery, Chembraanbakan Tank and Palar Anicut systems not available in office of chief engineer, Irrigation Branch, Government of India Public Works Department.

\*\* Channels formerly classed as distributaries now included under head 'main canal'.

Source: India. Irrigation Revenue Reports, 1880-95, p.a.

Drawn from Whitcombe in Dharma Kumar (ed.) 1982, p 713, Table 8.3.

**Table 2: India PWD. Growth of the irrigation system, Its expenditure and revenue, by provinces  
1885-6 to 1895-6**

Province	% Main canals		% Distributaries		% Area irrigated		% Total capital outlay		% Total net revenue excl. interest		% Net revenue excl. interest on total provincial sum at charge*		% Net revenue incl. interest on total sum at charge	
	1885-6	1895-6	1885-6	1895-6	1885-6	1895-6	1885-6	1895-6	1885-6	1895-6	1885-6	1895-6	1885-6	1895-6
Madras	25	24	18	23	31	22	20	23	26	38	8.7	31	4.7	24.5
Bombay-Sind	6.5	7	11	-	13	9	4	4	10	6.9	21	-	17	-
Deccan, Gujarat	5.5	4	2	2	0.8	0.5	7	6.8	0.9	2	0.3	0.7	-17	-1.2
Total Bombay	12	21	13	2	13.8	9.5	11	10.8	10.9	8.9	2.6	3.1	-1	-0.9
Bengal	6.5	14	12	9	6	4	23	19.6	8	1.9	0.9	0.2	-3	-3.7
North Western provinces	15.5	10	43	34	24	30	24	22	36	18.8	4.6	3.6	0.7	-0.4
Punjab	41	30	25	32	25	26	22	25	20	32	5.3	7.2	1.3	3.3
	Miles		Miles		Acres		£	Rs.	£	Rs.				
Total 5 Provinces	9340	14483	17471	29314	7168272	13420412	28862341	38255950	880665	1425811	-	-		

\* Total sum at charge = capital + interest to date.

Sowce: India Irrigation Revenue Reports, 1885-6 to 1895-6.

Drawn from Whitcombe in Dharma Kumar (ed.) 1982, p 714, Table 8.4.

**Table 3: India. Extent of the irrigation system and its financial results, by provinces, for the triennium 1943-4 to 1945-6**

Provinces	% for each province of total for British India										Average % net revenue per annum on total capital outlay for province	
	Mileage in operation				Average area irrigated per annum		Total capital outlay		Average net revenue			
	Productive		Total		Productive	Total	Productive	Total	Productive	Total	Productive	Total
	Main canals	Distrib.	Main canals	Distrib.								
Madras	28	7	25	18	13	12	15	13	10	9	8	5
Bombay	0.6	-	6	2	-	1	0.1	7	0.2	2	17	10
Sind	28	12	22	10	16	14	24	17	19	18	10	5
Bengal	-	-	0.8	0.8	-	0.8	-	1	-	-	-	0.4
Bihar and Orissa	3	3	5	5	3	4	3	5	1	1	7	5
United Province	13	21	16	26	15	17	17	21	12	14	9	6
Punjab	26	39	21	30	53	46	39	30	57	53	19	9
North Western Province	0.7	0.4	1	1	0.8	2	0.7	2	0.9	2	17	4

Source: India. Department of Industries and Labour Public Works Branch. Statements showing the Financial Results of ...irrigation ... works, 1943-44 to 1945-46.

Drawn from Whitcombe in Dharma Kumar (ed.) 1982, p 736, Table 8.8.

**Table 4: Magnitude and Composition of Investment Through Plan Periods in the Irrigation and Flood Control Sectors in India, 1951-97**

(Rs. in crores)

Plans	Major & medium irrigation	Minor irrigation			Command area development	Flood control	Total (2+5+6+7)	Total public sector outlay (2+3+6+7)
		Plan outlay	Institutional credit	Total (3+4)				
1	2	3	4	5	6	7	8	9
I Plan (1951-56)	380	66	Neg.	66	NA	14	460	460
II Plan (1956-61)	380	142	19	161	NA	49	590	571
III Plan (1961-66)	581	328	115	443	NA	86	1110	995
Annual (1966-69)	434	326	235	561	NA	44	1039	804
IV Plan (1969-74)	1237	513	661	1174	NA	172	2583	1922
V Plan (1974-78)	2442	631	780	1411	122	299	4274	3494
Annual (1978-80)	2056	497	490	987	88	228	3359	2869
VI Plan (1980-85)	7516	1802	1438	3240	521	596	11873	10435
VII Plan (1985-90)	11343	3228	3312	6540	1428	942	20253	16941
Annual (1990-92)	5320	1809	NA	1809	640	493	8262	8262
VIII Plan (1992-97)	22415	5977	NA	5977	2510	1623	32525	32525
Total (1951-97)	54104	15319	7050	22369	5309	4546	86328	79278
Ratio of total/Total Public Sector outlay	68.2	19.3			6.7	5.7		100.0

Note: NA= Not available. Total (1951-97) excludes the institutional investments under Annual Plan (1990-92) and the Eighth Plan (1992-97); and also command area development outlays up to the IV Plan (1969-74).

Source: GOI, Ministry of Water Resources 1989 a:108, 112-3  
b: 2, A11, A12

GOI, 1992: 72, 86-91

Drawn from Vaidyanathan, 1999, pp 57-58.

**Table 5: Planwise Development of Irrigation (Potential/Utilization) in India, 1950/51-1993/94**

(Million ha.)

Period/Year	Major & Medium irrigation		Minor irrigation						Total irrigation		Gross Irri. Area as per land utilization statistics
			Groundwater		Surface water		Total				
	P	U	P	U	P	U	P	U	P	U	
Pre Plan	9.70	9.70	6.50	6.50	6.40	6.40	12.90	12.90	22.60	22.60	22.60
1955-56	12.20	11.00	7.60	7.60	6.40	6.40	14.00	14.00	26.20	25.10	25.60
1960-61	14.30	13.10	8.30	8.30	6.50	6.50	14.80	14.80	29.10	28.10	28.00
1965-66	16.60	15.20	10.50	10.50	6.50	6.50	17.00	17.00	36.60	32.20	30.90
1973-74	20.70	18.70	16.50	16.50	7.0	7.0	23.50	23.50	44.20	42.20	40.30
1984-85	30.50	25.30	27.80	26.20	9.70	9.00	37.50	35.20	67.50	60.60	54.50
1993-94	33.80	29.30	NA	NA	NA	NA	60.30	55.40	87.80	75.70	68.00

Note: P= potential, U = utilization, NA= not available. Up to the Annual Plan period 1978-80, no separate data for utilization of Groundwater and Surface water are available. Hence, it is referred in the VIII Planning Commission report that the 'Potential' figures also to be used for 'Utilization' for analytical purposes.

Source: GOI, Ministry of Water Resources, *Report of the Working Group on Minor Irrigation* (pages 108; 110-1; 141, 146, 147) and *Major and Medium Irrigation* (pages 2; II-8,9,10; V-4; A-B) for Formulation GOI, Indian Agricultural Statistics, 1985/86-1989/90, Vol.I (Summary Table), p.4, GOI, PC, Eighth FYP, 1992-97, Vol. II, New Delhi, 1992, pp.86, 89.

Drawn from Vaidyanathan, 1999, p 60.

**Table 6: Growth of Net Irrigated Area Under Different Sources, All India from 1950/51-1993/94**

(in million hectares)

	Canals			Tanks	Groundwater			Other sources	Total net irrigated area	Gross irrigated area
	Govt.	Private	Total		Tube-wells	Other wells	Total			
1950-51	7.20	1.10	8.30	3.60	-	6.0	6.0	3.0	20.90	22.60
1955-56	8.0	1.40	9.60	4.40	-	6.8	6.8	2.2	22.80	25.60
1960-61	9.2	1.20	10.40	4.60	0.20	7.2	7.4	2.4	24.80	27.90
1965-66	9.8	1.10	10.90	4.40	-	8.6	8.6	2.5	26.40	30.90
1970-71	12.0	0.90	12.90	6.10	4.50	7.4	11.9	2.3	31.20	38.20
1975-76	12.9	0.90	13.80	4.0	6.80	7.6	14.4	2.4	34.60	43.40
1980-81	14.5	0.80	15.30	3.20	9.50	8.2	17.7	2.6	38.80	49.80
1990-91	16.1	0.30	16.10	3.30	14.20	9.90	24.10	2.80	46.30	60.70
1993-94	16.6	0.50	17.10	3.20	15.00	10.70	26.50	3.2	50.10	67.90

Source: GOI, Ministry of Agriculture, India.

Drawn from Vaidyanathan, 1999, p 61.