Chapter–6: Stakeholder Approach for Water Resource Management

- *"All the water that will ever be is, right now."*
  (National Geographic, October 1993)

- *"If there is magic on this planet, it is contained in water."*
  (Loran Eisely, 'The Immense Journey', 1957)

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STAKEHOLDER APPROACH FOR WATER RESOURCE MANAGEMENT

Besides demonstrating the practical application of stakeholder model in fathoming stakeholder issues, the case study of Sardar Sarovar Project in previous chapter has also corroborated the fact that India is faced with acute dilemma of stakeholder management for conception, execution, and operation of its vital water resource projects. Having thus diagnosed the problem, the present chapter moves on to evolve stakeholder approach for the managerial solutions of water resource development paradigm. The chapter first establishes the need for apt methodologies and justifies the route of stakeholder approach. Then with the help of illustrations from SSP the stakeholder approaches for resolution of the issues of demand and supply imbalance, and water sharing conflicts, are expounded. Again exemplifying SSP issues, the issues of impediments in project constructions and dilemmas of project operations are examined, and tools for ascertaining stakeholder relationship and measurement of stakeholder values are evolved. Detailing the '4S' functions (Sensing, Scanning, Signalling, and Strategizing) of stakeholder management, the role and needs of 'Management Information System' in affecting them are also examined. And finally, the chapter probes into the key areas of reforms (related to policies, institutional and regulatory framework, people's participation, and the constitutional set-up) needed for entailing the stakeholder management approach.

1 THE STAKEHOLDER APPROACH TO MANAGEMENT

As seen earlier, the critical problems associated with water resource projects in India are essentially stakeholder related, and besides being numerous they are varied and complex[1]. Evidently, no single solution may suffice for two different issues of a project; and a

solution found successful for an issue of one project may not succeed with similar issue of another project[2]. Further, the parameters of a problem (and hence the very definition of problem) are never static, and thus even most viable solution evolved at any point of time for a long-drawn problem may loose relevance with passage of time[3]. Hence, instead of establishing definite solutions in the continuum of problems, the need of day is to evolve an appropriate framework so as to provide the reference point for evaluating the validity and rationality of the chosen solution for a given problem.

Having established the need for a framework, the recourse to the tool of stakeholder management for the stated purpose can be justified on following grounds:

- Reasons for complexities of water resource projects are understandably many and a micro-level examination may attribute the cause of such situation to the prevalence of multiple disciplines[4] and our lack of competency in balancing them all[5]. However if we were to look macroscopically getting an overall view, all problems associated with the projects may appear pertaining to the single spectrum of stakeholders encompassing all associated disciplines.
- Despite the interdisciplinary reality, the management of water resource development in India is unfortunately compartmentalised. Barrier between various fields exists not only from research study point-of-view, but also from project implementation[6] stand as well. The stakeholder approach provides the much-needed interdisciplinary outlook to the water resource development in comprehending the issues in right perspective.
- Though homogeneity amongst a set of entities may lead to the constitution of common-interest stakeholder groups, yet there are several such groups and they are exceedingly heterogeneous. Since each category of problem is the result of

interaction between the project and a specified stakeholder group, no two problems are alike. For the same reason, problems cannot be fathomed using same yardstick, or solutions attempted in a unified manner; and the veracity of this situation can be appreciated by stakeholder approach alone.

- None of the stakeholder-group parameters (e.g. its internal composition, perception of project effect, timing of effect, ability to respond and influence project, capacity to network with other stakeholder groups, etc.) or the net resultant vector of their combined influence on the project can be considered as static. However, the resulting vibrant pulse of water resource problems can be deciphered judiciously by stakeholder approach.

In the past and even in recent cases, water resource projects have been conceived and planned without acknowledging the existence or importance of many of the stakeholder entities, especially adversely affected ones. The flaw has continued at construction stages and reflected at the operational stages of completed projects. Manifestly because of the stated flaw, the management of such projects failed in anticipating or evolving appropriate solutions for the multiplicity of stakeholder issues. And, palpably if all stakeholders were to be identified and empathized by the project managements, then many of the issues would appear simpler and open for resolution. Also, the bi-directional and knowledgeable stakeholder interaction would improve the stakeholder relationships, avoiding occurrence of undreamt of issues in future.

Considering the gravity of India's water crisis, there is unquestionably an urgent need for incorporating stakeholder approach in its entirety. The stakeholder approach for tackling the earlier deliberated key issues of water management are discussed below; and the

pristine scenarios that unfold from the apposite approach are exemplified by using Sardar Sarovar Project as a case, and all such references are highlighted in box.

2 THE ISSUE OF DEMAND AND SUPPLY IMBALANCE

The arduous situation of demand and supply gap in India's utilizable water resources and the challenges posed by both supply-side and demand-side solutions have already been critically examined in the earlier chapter. Attempting to evolve a practically viable approach, the below mentioned paragraphs look at the issue afresh with a bigger picture involving complete stakeholder spectrum.

2.1 Shortcomings of Present Approach

Till now, the whole issue of water crisis has been viewed solely from the angle of meeting needs of ever rising population, though it constituted only one segment of the stakeholder continuum. Evidently with such an approach, all initiatives taken for reducing demand and supply gap have been focused on supply-side solutions alone. However, the supply oriented projects for specified regions and specified population encountered problems because of their adverse impact on all other stakeholder entities. The diverse project effects - ranging from excessive incursion into limited financial resources of states, penetration in to the existing water domains of an upstream or downstream project, submergence of vast land and displacement of substantial population, and degradation of environmental and ecological conditions in submergence and downstream riverine stretches – resulted in fervent stakeholder influences that not only impeded the ongoing supply schemes, but also jeopardised future ones.

Even then, in absence of an in-depth realization of stated situation the futility of exclusive reliance on supply-side solution has been continuing. If and only if a change in our perspective is realized through the stakeholder approach, then the options of demand-side solution would come into prominence to receive merited attention. The approach would amply highlight the shortcomings of today's supply-side solutions and whereby emphasise the need for leaning towards demand-side solutions as well, as brought out below:

- Since independence and up till 1997, about Rs. 1,32,390 crores (at 1996-97 price level) were spent on major and medium projects. The figure stands at a gross amount of Rs. 2,31,387 crores if expenditures on flood control, minor projects and command area development are also added (NCIWRD, 1999). Though at planning stages, economic returns of above investment were estimated to be positive, yet conclusive studies are not available to prove so.
- Some projects that started in the 1950s have still not been completed. Out of 292 major and multipurpose projects taken up till the end of Eighth Five-year Plan, only 130 have been completed. For the remaining, the spillover cost at the beginning of the Ninth Plan worked out to Rs. 1,36,133 crores (NCIWRD, 1999). Even all the completed projects are not complete in true sense of potential utilisation, and remain open ended for want of further investment. The next few Five-year Plans are going to remain in the vicious trap of cost-spillover of ongoing projects, owing to scarcity of funds with the government.
- In the initial stages of development, India gave highest priority to irrigation. But with other sectors of economy demanding equal or higher attention, the percentage of plan outlays went down from 22.5% in the initial plans to 6.5% in recent ones (NCIWRD, 1999). Presently, when large investments are required in

the areas of education, health, infrastructure, research & developments, besides agricultural and industrial sectors, the central or state governments can ill afford total reliance on the expensive supply-side solution.

- The financial scenarios of supply-side solution are not attractive for private sector participation. The average cost of irrigation water on the basis of investment is estimated to be about 90 paise per thousand litres, while the average prevailing water rates for different crops are in range of 1.33 to 3.50 paise. The financial returns from water resources projects are not sufficient to recover even operational and maintenance charges. Against an average working expenditure (including interest on capital) of about Rs.1032 per hectare of irrigated land, the average gross receipt in 1991-92 was a meagre Rs.82 (Navalavala, 2001[a]).
- The time delays associated with early projects were mostly on account of financial constraints. But today, social, environmental and political aspects have also become limiting factors for the supply-side management. Thus, the three challenges of supply-side solution have not only become individually difficult but also pose the mammoth problem of tackling them concurrently. Relatively, the three challenges of demand-side solution are softer and can be tackled separately.

Since every unit of water saved adds to the potential of created supply, the demand management can curtail the requirement of supply creations to significant extent. Demand-side solution projects can be taken up at smaller scales and can be efficiently distributed over both time and space. They can also be planned to yield early financial returns, and hence attract private participation. Evidently, while seeking a total supply-side solution is increasingly becoming unattainable, the demand-side solution, though not easy, is attainable. However, since a demand-side solution in itself cannot provide a

whole solution to the problem, the supply-side solution cannot be discarded entirely; and hence there is a strong case for attaining a balance in the two solutions.

Box 6.1: SSP - Not A Pinnacle Solution For Gujarat's Water Problem

The overbearing reliance of the state of Gujarat on the long cherished Sardar Sarovar Project also has its share of shortcomings. Even in the present situation, the three drought prone regions of Gujarat (namely North Gujarat, Saurashtra, and Kutch) have an apparent annual shortage of over 22.10 MAF of water, after accounting for the 75% dependable yield from the existing river systems of these regions (Vyas, 2000). Assuming a pro rata share in the 9.0 MAF of Narmada water available to Gujarat (NWDT, 1978[a]), the 75% drought prone area of SSP command will at best receive a supply of 6.75 MAF per year. Further, even looking at the overall Gujarat situation, the annual supply of 9.0 MAF of water from SSP is not a pinnacle solution for Gujarat's gross water demand, which is likely to be around 43 MAF by the year 2025 (Vyas, 2000); especially so because the share of Gujarat in Narmada water is not renewable till that point of time.

Even after realizing full utilizable surface water resources and groundwater potential and even including the benefits proposed for Gujarat under the much talked about scheme of interlinking of rivers[7], the estimated shortfall of water in the year 2025 would be large enough to demand another supply project of the scale of SSP. Evidently, the water for another such project in Gujarat is just not in sight. Even if new resources were to get identified as viable supply potentials (e.g. the likely case of Kalpasar Project[8]), the factors of colossal costs and large gestation periods owing to intense stakeholder influences would become major deterrents. Manifestly, with the larger stakeholder perspective Gujarat may hopefully draw its attention towards balancing supply-side solutions with

demand-side solutions, so as to meet its present and future demands in sustainable manner.

2.2 The Balanced Water Management Approach

When the per capita Annual Water Resources (AWR) available in a country or region falls below 1700 cubic metres, it is considered to be indicative of a water-stress[9] situation. If the annual availability is below 1000 cubic metres per person, the situation is labelled as that of water-scarcity. And when the per capita availability falls below 500 cubic metres, it is said to be a situation of absolute scarcity (Engelman and Leory, 1993). The finite availability of water in the face of growing demand from the ever-rising population is the most serious challenge before India. Because of the uncontrolled growth of population the annual availability of water per capita has been continuously declining[10] and is expected to fall below 1000 m^3 by year 2010 thereby pushing India to the list of water stressed countries (Navalavala, 2001[b]).

At macro levels, some parts of the country are already facing the water-scarcity or absolutely-scarcity levels because of population's spread being out of sync with geographical spread of water[11]. Though there is considerable realisation of the present and impending crisis, a rigid and conventional approach is still being adopted for seeking solutions to the water resource relates aspects of planning, investments, construction, conflict resolutions, benefit utilisation etc. Such situation evidently continues to exist because of the paucity of understanding and appreciation of stakeholder issues in totality. Adopting the stakeholder management approach, the much needed paradigm shift in India's philosophy for water resource development – involving a shift in focus from "Water Supply" to "Water Management" - can be attained. With focus riveted on water

management, a balanced approach to the issue of demand and supply gap, involving both supply-side and demand-side solutions, can then be evolved. The key initiatives needed for implementation of the said balanced management approach are listed as under:

- Objective of water resources development should be to maximise water utilisation instead of increasing supplies alone. Focus of planning should shift from supply-side solution to a balance of demand and supply solutions, which would mean planning for bare necessary new supplies after accounting for potential of demand management and supply-side improvements in existing supply capacities.
- The existing storage capacities are falling due to siltation of reservoirs, generally at rates higher than the designed siltation rates. It is estimated that almost 65km^3 of the 385 km^3 live storage capacity (about 17%) available today would be lost by 2050 (NCIWRD, 1999). Appropriate Catchment Area Treatment (CAT) measures can reduce siltation of reservoirs. The storage salvaged by CAT will be equivalent to new storage creation at lesser costs, without creating new delivery networks and without social or environmental repercussions
- Nationwide uniform norms for domestic supplies, or for agricultural and industrial developments, will lead to creation of water-stressed pockets. Local potential and possibilities of outsourcing of water should be determined on realistic basis keeping in view political, social, topographical, environmental and economic constraints. The sustainable supply potential thus estimated should govern the norms of domestic supply and growth of agriculture and industries.
- To create global competitive advantage for agriculture (with the liberalization of world trade), India needs to make agricultural produce globally competitive in real value terms by reducing input-costs and subsidies. Financial inefficiency of irrigation projects needs to be corrected to reduce farm-water subsidies.

- Large-scale projects are mostly found to fail in meeting their targets (Parasuraman, 2001). Adopting an incremental approach to developments, meaningful phasing of large projects should be carried out. This will allow for better time and cost controls; manageable number of oustees; gradual impact on ecosystem; lesser potential-utilisation gap; and better planning of the next phase with updated data and access to newer technologies.
- Often, the initial command areas of the supply projects are completed at early stages of the project, while development of balance command lingers on for prolonged durations; else never gets completed. This leads to overfeeding of the limited areas with abundance of water, while other areas remain water starved even within project's command. Though such a situation is harmful even to the initial command reaches, yet it gets established over a period of time and becomes practically irreversible. For the long-term balanced management, the development of the whole of project command should be taken up simultaneously.
- To the extent supply projects are needed, they ought to be taken up with prudence and speed. Benefits of the Projects should be assured in terms of time, quality, and quantity, and charged at rational prices.
- Encouragement and incentives for water marketing, irrigation technology industries, rural venture capital funds etc. would help in bringing private investment for water resources development.
- With increased media coverage for environmentalists' viewpoints, a countrywide debate has been generated on the theme of 'large' versus 'small' dams. In reality, the choice of dam-type for supply-side projects is mostly governed by site-specific parameters, and as such very few cases permit for large dams[12]. For a given source, since a larger dam generally allows for more units of storage per unit of

investment, its choice is seldom discarded. Perchance when viewed from total stakeholder perspective, the option of larger dam would still be favoured[13] (even for non-monitory reasons); and hence should be adopted wherever found feasible.

Box 6.2: The Balanced Management Approach in SSP

The Sardar Sarovar Project is perhaps an example of first Indian project where elements of balanced approach to supply and demand management have been incorporated. Conjunctive use of surface and ground water has been envisaged throughout the project command. In the irrigation planning, a limited water delta of 53 cm (as against 75 cm in existing projects) has been adopted, and water application is proposed based on agro-climatic zoning (GID, 1980). Practically the whole of canal network would be lined, so as to minimize seepage losses. Also proposed are the systems of fully automated canal regulations for prompt response, and volumetric and rotational supplies to group of farmers (rather than individuals) for effecting utilization efficiencies.

However, the irrigation planning of SSP is at least two decades old; and in this long period no serious research has been funded for exploring new avenues of reducing irrigation demand, improving application efficiency, or reducing canal losses. Apparently, even with a miniscule proportion of SSP's cost, the breakthrough in these areas could have significantly enhanced the benefits to Gujarat from its limited allocation of Narmada water. Instead, Government of Gujarat has been studying possibilities of enhancing supplies from Narmada - above its allocated share - with a likely situation of under utilization of Narmada water by the upstream state of Madhya Pradesh. Ostensibly, considering the fact that unutilised water of Narmada beyond the terminal SSP would

only be wasted to sea, the stated efforts might look rational and laudable. On the contrary, such opportunistic uses are also fraught with the risk of creating new 'established requirements' which may lead to intense interstate conflicts, or even serious conflicts within beneficiaries of SSP.

Taken up at a massive scale besides being excessively afflicted by the time and cost overruns, the SSP can also be blamed for cornering the share of many small-scale supply projects and other alternate schemes. Understandably, Gujarat for decades has struggled through recurrent droughts with temporary measures of supplying water to its thirsty vast population in North Gujarat, Saurashtra, and Kuchchh through railway wagons, and tankers. But, despite of frequent and prolonged scarcities, Gujarat did not attune itself to the needs of demand management, evidently because of the possibilities of getting abundant water from SSP, which is the deemed lifeline of Gujarat.

Another limitation of SSP - contradictory to the requirements of balanced management - is the disproportionate development of its command. Though originally planned for simultaneous growth, the works in initial command under first phase have seen heightened construction activities resulting in early completion of not only main canal portion, but also of branch canals and distribution network; while the activities under second and third phases have been somewhat retarded, and in the fourth phase they are just being initiated. Understandably this has happened because of the constraints of financial resources. Besides, the past few years have seen greater prioritisation of drinking water aspect, perhaps at the cost of envisaged irrigation development. But, with only about 45% of the estimated cost of canal work having been met (by June 2003), the

financial requirements of balance work at about Rs. 8965 crore (at 1996-97 price level) are mammoth.

Also, if the future funding needs of the project are not met timely, or appropriated judiciously, the project stands at the risk of retarding the pace of command expansion. Looking at its present financial predicament, the possibilities of skewed development of command cannot be discounted altogether. With the construction of Irrigation Bye-Pass Tunnel, the initial command has already started getting water since year 2002; and with the increasing dam heights, this limited developed command (less than 5% of the total command) would be reaping higher and higher quantum of water supplies. Evidently, continuance of this situation may soon cause problems of water logging in initial command areas, apart from provoking intense user conflicts.

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3 ISSUES OF WATER RIGHTS AND RIVER WATER SHARING CONFLICTS

The issue of sharing the limited waters of rivers by different co-riparian states and their lower domains, and establishing constitutional rights of people within and outside river basins, is perhaps the trickiest stakeholder issue of water resource management. The river systems of India can be characteristically classified into four major groups[14], and they are: (a) 'Himalayan Rivers' which include Indus, and Ganga-Brahmaputra-Megna systems; (b) 'Deccan Rivers' comprising of Sabarmati, Mahi, Narmada, Tapi, Brahmani, Mahanadı, Godavari, Krishna, Pennar, and Cauvery; (c) 'Coastal Rivers' comprising of about 600 small rivers on West Coast, and a handful on the East Coast; (d) 'Rivers of the inland drainage basin' which includes the rivers of the Western Rajasthan (CBIP 1998). Since several rivers merge together before draining into sea, the combined watershed of all such rivers define the larger river-basin system. Total drainage area of the country has been

divided into 24 such major and medium basins[15] and pictorially presented at Plate V. However, ironically none of the identified major river basins of India practically confine to the political boundaries of states (as illustrated in Annexure V) presenting the gargantuan problem of river water sharing. The issue, though discussed earlier, is now re-examined with stakeholders' perspective endeavouring for an optimal solution incorporating stakeholder concerns in entirety.

Since the river basins form the natural hydrological units, it is apposite to execute any of the river valley projects under a master plan for the overall basin. Going further – and as appropriately prioritised in the National Water Policy - the utilization of the waters of rivers with disproportionate spread should not to be kept restricted to the geographical limits of river basins alone. Keeping this in view, it is obvious that the issue of sharing of river waters cannot be confined to the set of stakeholder groups within a state, or to the sets of stakeholder groups of multiple states within the river basin. Hence, it would be apt to widen the perspective of present discussion to a larger stakeholder domain, comprising the whole nation. Hence for current discussion, whole of the country is considered as the total basket of all stakeholders of national resources; while the states are considered as sub-stakeholder-domains; and districts, talukas, cities, villages, and finally individuals, are considered constituting the sequentially lowering levels of stakeholder-domains. Though the spectrum actually includes all the entities affected by the decisions of river water sharing, yet current discussion is directed on human stakeholder entities only as they alone constitute the active segment of disputes and provide meaning to it.

3.1 Shortcomings of the Present Approach to River Water Sharing Issues

The present approach for resolution of all interstate river disputes of India is through the route of Judicial Tribunals. And, the nature of dispute and the manner in which Tribunals have sought to adjudicate them appears to be unique in each case of interstate river dispute. So, for understanding the manner in which Tribunals approach the issue of water rights, and for understanding their limitations, the case study of the Narmada Water Dispute is taken up for discussion from stakeholders' point of view, rather than for its legal contents. The discussion is thus aiming to reflect upon (a) limitations of tackling the complex issues of river resources through limited perspectives of Judicial Tribunals under present constitutional set-up, and (b) irreversible loss caused to the larger stakeholder-domain by narrowness in our approach in sharing the national river resources.

Box 6.3: Limitations of Narmada Water Disputes Tribunal

Looking back at the history of Narmada conflict, it may be said with some confidence that when Late Pandit Jawaharlal Nehru inaugurated the first stage of the Navagam Project in Gujarat (in April 1961), there were no water sharing conflicts amongst stakeholders of the numerous possible projects on river Narmada. The planned project (in two stages) with a maximum reservoir level of 320 feet (97.54 m) was intended to benefit Gujarat in terms of 7.53 lacs hectares of irrigation and about 625 MW of power. However, later when the Government of Gujarat came up with a proposal to raise the reservoir level to 460 feet (140.21m) so as to extend irrigation to an additional 8 lacs hectares, the turning point came brining Gujarat (one of the stakeholders) in direct conflict with other stakeholders, namely Madhya Pradesh and Maharashtra.

The state of Rajasthan became another constituent of the stakeholder group, because of its proximity and similarity (in terms of water availability situation) to the larger part of Gujarat. However, the NWDT (1978[a]) in its judgement on preliminary issues concluded that Rajasthan was not entitled to any portion of the waters of Narmada on the ground that it was not a co-riparian state and that no portion of its territory was situated in the basin of river Narmada. During argument on the status of Rajasthan, though Union of India indicated its interest for promoting national interest transcending basin and state boundaries, and Rajasthan requested the Tribunal to go beyond (strict) legal sense and look for the interest of famine prone peasants along international border, yet the Tribunal concluded that the use of words 'adjudication' and 'decision' in the 1956 Act shows that the decision of the Tribunal must be based upon legal principles only (NWDT, 1978[a]).

At a later stage, with the reduced task of apportioning Narmada water between Gujarat and Madhya Pradesh only, the NWDT approached the matter in below listed manner:

- The Tribunal applied the '*doctrine of equitable apportionment*' (and not the '*doctrine of sovereignty*' or the '*doctrine of riparian rights*'). Emphasizing the need for avoidance of waste, Tribunal was of the view that the *doctrine of equitable apportionment* was not concerned with the protection of abstract or hypothetical rights of riparian states, but with protection of use that must be of beneficial nature.
- The Tribunal also interpreted the *principle of equitable apportionment* as *principle of equality of right*, meaning whereby equality of consideration and economic opportunity (and not equal division of water resources). The Tribunal thus emphasized upon (state's) factors such as (a) culturable area, (b) population dependent on waters of basin, (c) drought areas, and (d) economic needs including

irrigation requirements. Factors like drainage areas and contribution of water by basin states were not considered important for influencing water share allocation.

- In determining what is the state's reasonable and equitable share in the beneficial use of waters, the needs of the state as a whole were taken into account (and not merely the basin proportion thereof). Needs of the areas outside river basin were considered as relevant factor for equitable proportion on the ground that watershed line couldn't be treated as strict and impassable legal barrier. The '*doctrine of Area of Origin*' – meaning requirements of areas of origin have priority or right in perpetuity as against users in the areas of import – was rejected by the Tribunal.

The narrow perspectives of Judicial Tribunals

The basic limitation in NWDT's approach was related to its contradiction in ascertaining the role of river basin in water conflicts involving larger gamut of stakeholders. On one hand, the boundaries of river basin were used as barrier for denying Narmada-water benefits to one set of needy stakeholder group (namely, the people of Rajasthan). On the other hand, basin-boundaries were not considered as hindrance for extending Narmada-water benefits to another set of trans-basin stakeholder group (namely, the people of Saurashtra and Kachch regions of Gujarat). Though both sets of stakeholders were outside Narmada Basin and nearly equidistant from the river, yet different yardsticks were used for them on the ground that one set belonged to a state (Rajasthan) with no portion of its territory falling in the river basin, while the other set belonged to a state (Gujarat) with a short portion of its territory extending over the river basin.

Clearly in Tribunal's view, the restrictions in a stakeholder entity's claim to river water were because of the manmade lines of state boundaries, and not owing to the limitations

of his location vis-à-vis geographical setting of the river, or due to the constraints created by natural watershed lines of river basin. While formulating this approach, the Tribunal – though legally correct – seems to have erred on two logical counts. Firstly, the Tribunal rejected the principles of 'doctrine of sovereignty', 'doctrine of riparian rights' and the 'doctrine of area of origin' at micro level; while at macro level the very same principles were imbibed to turndown equitable rights of stakeholders on the river water. This evidently happened due to the legal limitations imposed on the Tribunal by the constitutional provisions. Secondly, the Tribunal had heavily relied upon historical judgements on international river conflicts, though in most cases the conflicts were amongst two or more nations (rather than amongst states within a nation). Thus, concepts of national rights on river water (implying equality of rights to every individual of the nation) were prescribed to mean state's rights on river water (limiting the equality of rights to people within a state). Understandably, with this limited perspective the Tribunal failed in seeing the total stakeholder spectrum; and evolved a solution focussing on concerns of only on a part stakeholder segment.

Despite NWDT's legal and landmark judgement, the Narmada Dispute cannot be considered as over yet. Even the construction of Navagam Project (now called Sardar Sarovar Project) – which laid the foundation of Narmada conflict – has not been smooth, despite the fact that all aspects of project construction were extensively covered in the award of Tribunal. Evidently, the impediments to SSP are not entirely owing to the shortcomings of NWDT to resolve inter-state conflicts. Understandably, issues like rehabilitation of project oustees and related litigation by NBA in the Supreme Court delayed the construction of main dam; however, even these factors attained notable proportions because of the discontentment of Madhya Pradesh on construction of SSP as

envisaged by NWDT Award. Clearly, Madhya Pradesh's persistence with its past views was to some extent due to its dissatisfaction with the final verdict of NWDT. Also, since NWDT Award may come up for revision in the year 2024(NWDT, 1978[b]), perhaps apprehensions about future share allocation are also deeply rooted in the rigid postures taken by the states of Gujarat and Madhya Pradesh on most of the conflicting issues. A noteworthy point on SSP stalemate is that the states of Maharashtra and Rajasthan do not seem to have any serious conflicts, except for minor issues related to cost sharing. Coincidentally, major contentions of both these states were resolved out-of-Tribunal.

Price paid by the Nation (the larger stakeholder-domain) for Narmada dispute

If we go back to the no dispute scenario and consider a gestation period of 10 years for project construction, the original (Navagam) Project – foundation for which was laid in April 1961 – would have given the benefits of 7.53 lacs hectares of irrigation and about 625 MW of power for over three decades till now. Though the present formulation of Sardar Sarovar project with irrigation benefit of about 18 lacs hectares and power benefits of 1450 MW seems to have a notional advantage, yet under present (and also likely) situation of intense and conflicting stakeholder influences, the project may still be decades away from giving full-intended benefits.

Timely realization of even the lesser extent of benefits under conflict-free Navagam project would have easily translated into a quantum jump for the national economy, apart from substantially diluting the impact of recurring droughts in Gujarat. It need not be emphasized that apart from the accumulated loss of accruable benefits over four decades, the stakeholders of SSP are also incurring a heavy price for project construction due to cost escalations caused by delays. Other than the Navagam project, the fate of many other

projects of river Narmada (in Madhya Pradesh) has also been altered due to the prolonged dispute, thus affecting the larger stakeholder environment.

The total accumulated losses due to the foregone benefits and cost escalation would easily run into several thousand crore rupees. Besides, the unrelenting stakeholder conflict situation has also lead to decades of (a) uncertainties in the lives of a large stakeholder segment awaiting displacement by reservoir impounding, (b) lack of civic improvement in the marked submergence areas, and (c) lack of development for alternative resources in planned command areas. And, the price paid by the nation (total- stakeholder-domain) in terms of intangible social cost of above factors, and that of ill-will breeding amongst people of neighbouring states (sub-stakeholder-domains), is measureless.

3.2 Need for Realistic Assessment of Water Requirements

Many of our appealing projects are susceptible to interstate conflicts. However, some of the successfully completed major river valley projects – unscarred by narrow political compulsions – stand out as a silver lining in the clouds of conflicts. For example, river Ganga – the longest river with eight states in its sub-basin – has not been subjected to any form of notable interstate conflict, though several projects with benefits to multiple states have been constructed on it. One may argue that Ganga's situation is different owing to large availability of snow-fed water (and groundwater in its basin). Nonetheless, comparable is the case of river Narmada, whose utilisable component of 3082 m^3 per capita is the highest in India, and of which about 90% remains unutilised even today.

Apparently, the situation of conflict on sharing of river water resources amongst different states (sub-stakeholder-domains) may not be because of real deficiencies, but because of the notion of deficiency in availability of river water to a state. Since 'deficiency in availability' is in relation with the 'assessment of requirement', the flawed notion of deficiency is largely owing to inaccurate measure of water requirements by states. These inaccurate and inflated measures of requirements are due to reasons of (a) imprudence, (b) absence of valid and reliable data, (c) tendency for generalization, and (d) non-scientific approach to the assessment process. Assessed requirements are not weighted towards scarcity factor. Consumption data are generally not available, and if available, they are nothing but derivatives from supply data without thrift considerations. National (uniform) norms for per-capita, per-hectare and industry-specific consumption are applied with scant regard for factors like age-old consumption levels, traditional crops & agro-climatic conditions, and real cost viabilities of industrial water. While seeking possibilities for surface water supply, groundwater potentials are generally ignored. Options for enhancing existing supply situation by demand management are definitely not considered. Also, since demand assessments are done as mere planning exercise, they are not really subjected to any technical or financial constraints of sourcing water from distant places (resource – abundance – syndrome). In many cases, demand assessment is done while planning for a supply project and demand is tailored to match estimated supply potential which itself may not be a reality. With the general and unfounded notion that water is surplus and cheaply available, errors are compounded at every level of estimate leading to wild demand estimates.

Ballooning the requirements may be unintentional in most cases; but under deemed possibilities of interstate river conflicts, some states may intentionally inflate their

(civil) right to have a fair quantum of water. This legal right of its people shall entail each state the right to have rational share in the waters of important river resources, irrespective of the riparian status of the state.

For meaningful conflict resolutions, the rationally assessed water requirements – based upon scientifically established norms – could be considered as a measure of the 'fair quantum of water' for establishment of water rights. With this constitutional provision, rationally assessed water requirements of the states (aggregated from lower domains) could be translated as the state's water rights. Such legally tenable water rights would enable the water-scarce states to outsource their water requirements to the extent they are unable to meet the demand from own sources.

The case for creation of rational water rights - suggested with the total stakeholder perspective - is focused on conflict avoidance, rather than on conflict resolution. However, even under conflict situations the suggested recourse will broaden the legal perspective of river dispute tribunals, and also empower them to impart national status to all major river resources. The notable points outlining the direction of stakeholder approach for creation of water rights and resolution of river sharing conflicts are as under:

- Water rights essentially mean an authorisation to use certain amount of water for specific beneficial purposes. Since the broad sources of water supply are surface water and ground water, the water rights should be established on the cumulative use from both the sources.
- The realistic water requirements of states (macro level) should be assessed by integration of requirements from lower domains (micro levels) of individuals, villages / towns, Talukas and districts. For true empowerment of lower domains,

the water rights of the state should be considered as a mere form of community right, which it has derived, by integration of water rights from lower domain levels.

- The ecology and environment of the state should be treated as a separate entity with appropriate water rights. Thus, water rights of each state should reflect their aggregate water requirements for domestic, farming, municipal and industrial sectors; and also reflect water requirement for forests and other ecological / environmental needs affecting present and future generations.
- The domestic consumption of water may be limited to an individual's basic needs of drinking and hygiene, or may involve little luxurious uses. Similarly water consumption for economic needs of farming and industries may be constrictive, or liberal, depending upon cropping patterns and type of industries. Historically, a correlation has always existed between the extent of consumption and the availability of water. However, in modern times with prospects for magnanimity in delivering water at negligible costs to even consistently drought-affected areas, this relation seems to have become defunct. This trend needs to be corrected while creating water rights, by suitable appropriation, with adequate weights given to factors of historical usage and actual costs of water supplies.
- Looking at the total stakeholder concerns - involving aspects of population pressure, social awakening, environmental concerns, and depletion in advantageous project locations - the demand-side solutions appear softer and attainable as compared to supply enhancement options now available. All options of demand-side solutions ought to be exhausted before exploiting new supply sources; and hence water rights should be suitably tailored to meet such scenarios.

- The excessive usage of water (over and above the allocated rights) for domestic or economic needs of an individual or collective entity should be permitted if such usages are viable. However, since such situations can arise only when one or more entities (including ecology and environment) forgo a part of their allocated share, the trade-off should be affected with suitable compensations.

4 ISSUES OF PROJECT CONSTRUCTION AND OPERATION

The complex issues of construction and operation of the water resource projects can be addressed with stakeholders' perspective using the stakeholder model evolved in previous chapter. Expectedly, the stakeholder model would help in (a) identifying and classifying the major and diverse groups of stakeholders, (b) understanding the extent to which project affects them, (c) gauging the intensity and directions of their return influences, and (d) grasping the manner in which such influences would be brought about. The stakeholder model thus can provide a vital management tool for comprehending and resolving the formidable challenges put forth by stakeholders during construction or operational stages of the project. The model can also be used for evaluating project's status of stakeholder-awareness and level of stakeholder-relationship; and for analysing past decisions that have gone wrong, and for effecting corrective measures. We seek to apply stakeholder model here under in the context of Sardar Sarovar Project using it as illustrative case.

Since the SSP is in advanced stages of completion, many of its references deal with past situations, which may give an impression that they are seen only because of hindsight. However, the issues are being re-examined in the framework of stakeholder model to underline the fact that many of the imponderables associated with SSP could have been

harnessed timely with the stakeholder approach. Not only this would have speeded the project implementation but also set right the course of future operations.

4.1 Optimum Realisation of Stakeholder Value

Depending upon the numerous stakeholders, the progress of water resource projects is either immensely facilitated making them stand out as successful ventures or subjected to severe impediments, which are detrimental to their successful completion and operation. It is in this context that the stakeholders of the water resource projects are to be seen as important social and economic assets for public good. For maximum realization of stakeholder value, it is necessary for the project to inculcate positive relationships with its stakeholders. But, this may not be easy to achieve as the stakeholders espouse the cause of extremely conflicting stakes. The best recourse is to create a win-win situation for all of its stakeholders or, alternatively, work out a balance in relationships with its diverse constituents for optimum realization of stakeholder value. Evidently, such objectives can be achieved only if one can identify all constituents of stakeholder groups, achieve a proper understanding of their diverse concerns, and assess the extent (and manner) of their influence on the project.

Box 6.4: The Stakeholder Value in SSP

The stakeholder model for the Sardar Sarovar Project can be looked at for understanding stakeholders as important assets. For successful completion and operation of the project, three of its components – dam, powerhouse complex, and canal network – are required to be completed on time and in a cost-effective manner. As of today, progress on all the three components has been severely retarded by the negative influences brought about by the project stakeholders. The most crucial influence on the project has been that of the

primary social adversely affected group (mainly the oustees) and the secondary social adversely affected group (championed by NBA). The pressures brought by these groups were felt right from the beginning of project construction. Apart from bringing direct influence on land acquisition activities – thereby affecting dam progress – they also networked[16] with other stakeholders, triggering a chain of influences that brought crippling effects on all three project components.

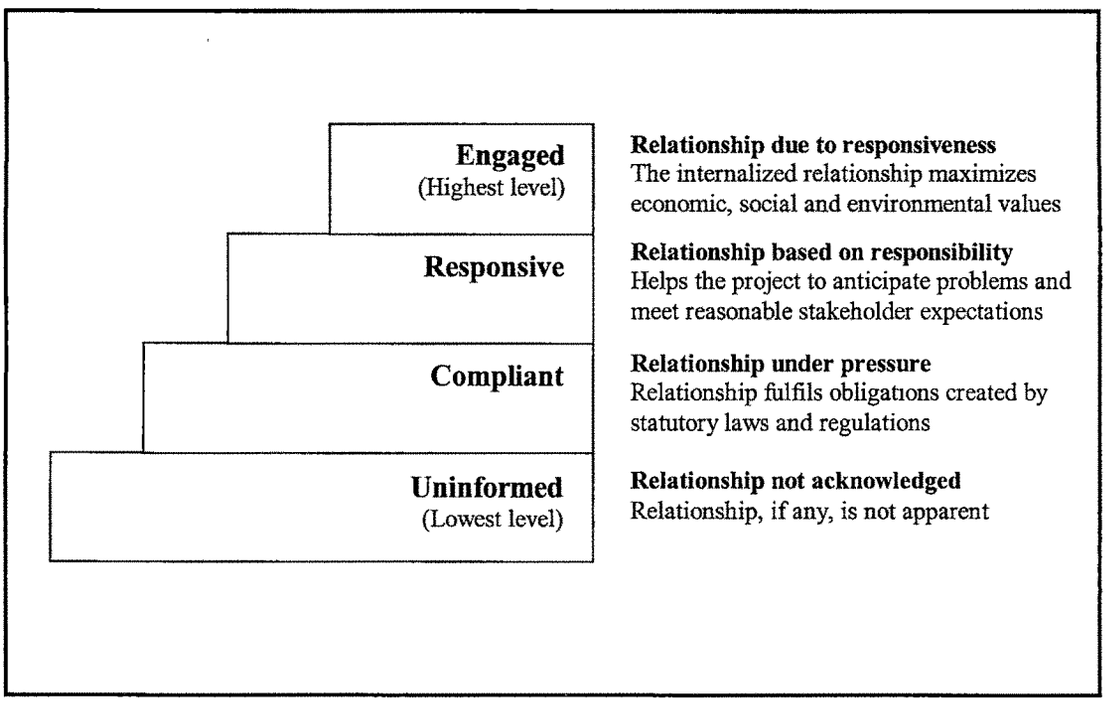
The use of such terms as 'asset value' or 'stakeholder value' for the project oustees or NBA may seem at odds with the outcome of the anti-project roles played by them. But, such an impression is created solely because of a lack of understanding of the stakeholders' concept for either of the parties. The roles played by these stakeholder groups – in opposing the project, or in networking with other stakeholder groups to bring resonant adverse effect on the project – are in tune with the stakeholder characteristics discussed earlier. Perhaps, with a proper understanding of the stakeholders' concept and its appropriate managerial use, the negative influences of these stakeholder groups could have been anticipated and addressed in time. This would have helped in the sustenance of all the advantageous situations for the project by generating appropriate information as input to the decision-making process. For example, most of the grievances of oustees could have been anticipated and resolved in a proactive manner instead of doing so under pressure mounted by secondary adversely affected stakeholders or the directions of Grievance Redressal Authorities constituted as per the directives of the Supreme Court. Also, these stakeholder groups could have been involved in designing the rehabilitation policy and scheduling the reservoir submergence. The optimum 'stakeholder value' so realized would have placed the project in a substantially more encouraging position than that existing now.

4.2 Ascertaining and Improving the Level of Stakeholder Relationship

Having amply demonstrated the importance of 'stakeholder value', the necessity of ascertaining the level of 'stakeholder relationship' needs hardly any emphasis. The extent of project's stakeholder relationship can be evaluated, and if needed improved upon through clear understanding of the concerns of various classes of stakeholders; and the stakeholders' model can be advantageously used to this end.

Three levels of stakeholder relationships have been identified by Svendsen *et al.* (2002) in the context of business enterprises; however, for want of a proper stakeholder framework and in the absence of socially (or morally) binding, market-driven or legally compelling obligations, most of the cases of water resource projects fail in fulfilling the criterion of even the lowest level. Hence, a modified four-level stakeholder relationship model is suggested, as illustrated in Figure 6.1.

Figure 6.1: The Four Levels of Stakeholder Relationship



In this model, the lowest level is termed 'uninformed' which is indicative of a project situation where even the basic understanding of stakeholder concept is lacking. Evidently, in such cases, any project-stakeholder relationship that may exist is not with the knowledge of the project management or stakeholders. The second level of stakeholder relationship is called 'compliant' which is attained by the project due to administrative and legal compulsions. The third level is called 'responsive' and is attained when the project is able to internalize its stakeholder responsibility. Apparently, the project is able to enter the 'responsive' level of stakeholder relationship when stakeholder responsibility is realized at every stratum of the project organization and the extent of responsibility is in agreement with the framework of identified needs of the stakeholders. The fourth level (also the highest level) is called 'engaged' which is attained when the project develops competency to navigate uncertainty and maximizes opportunity in engaging stakeholders on all issues. At this level of stakeholder relationship, the project is able to create a synergy among all the elements of the relationship network so as to realize optimum stakeholder value.

The past and most of the recent projects fall in the 'uninformed' level of stakeholder relationship. In these projects, the most wanting areas for stakeholder relationships are related to social and non-social adversely affected groups because of the absence of a suitable framework for enforcing the project's stakeholder responsibilities for adversely affected groups. In this respect, the Government of India was able to formulate a national policy for resettlement and rehabilitation of the project-affected families - that could force projects to the 'compliant' level - only recently (published in Gazette of India, Part-I, Section-I, No.46, dated 17th February 2004). The prestigious Tehri (on river Ganga) and Sardar Sarovar projects have seen unprecedented stakeholder activism and were

compelled to fulfil a part of their stakeholder obligations by administrative or legal dictum. Seemingly, such projects have been forced to graduate to the 'compliant' level of stakeholder relationship. We can safely assume that none of the water resource projects in India falls in the third or fourth levels of stakeholder relationship.

Box 6.5: SSP's Stakeholder Relationship Level

In the case of Sardar Sarovar Project, the Narmada Water Disputes Tribunal (NWDT) itself laid down the first stepping-stone for the project to reach the 'compliant' level. The NWDT, through its resettlement and rehabilitation-related directives – which can be considered as way ahead of its time – made it binding for the project to fulfil its stakeholder obligations towards the project-affected people. Despite the NWDT Award (1979) having provided a machinery (namely, the Narmada Control Authority) for implementation of its directives, the Supreme Court – during the course of NBA's litigation – felt the need for reinforcing the 'compliant' level by creating separate Grievance Redressal Authorities for overseeing the resettlement and rehabilitation progress of the project. Even with such extraordinary measures, the status of the 'compliant' level for the Sardar Sarovar Project seems to exist in respect of adversely affected social groups only. The regulatory mechanism for ensuring fulfilment of project's obligations towards some of the adversely affected non-social groups (e.g. river reaches downstream of the project) is still not in place. Furthermore, as seen in the case of former projects that often failed in extending the canal network or delivering equitable water to the tail-end commands, the Sardar Sarovar Project also lacks an unassailable mechanism for fulfilling its obligations to all beneficiary stakeholders (including those in Rajasthan) indicating thereby the absence of compelling obligations.

All major projects in India are subjected to environmental and social scrutiny at clearance stages. Similarly, during techno-economic clearances, the project extents are critically examined for viabilities of canal construction and equitable distribution of limited supplies. The shortcoming, however, lies in the near absence of project-monitoring measures (physical as well as financial) during construction and operational stages of the projects and this ought to be corrected for ensuring 'compliant' level of stakeholder relationship for all projects. Instruments of 'social audit' and 'environmental audit' should also be enforced for moving projects to the 'compliant' level of stakeholder relationship. Audits are needed when accountability can no longer be sustained by informal relations of trust alone but must be formalised, made visible and subjected to independent validation (Power, 1994). For implementation of such measures, appropriate performance indicators and benchmarks are required to be evolved from the perspectives of both adversely affected stakeholders and the beneficiary stakeholders besides empowering and making accountable the central government organizations such as the Central Water Commission and the Narmada Control Authority.

Projects such as the Sardar Sarovar that are close to the 'complaint' level can ascend to the 'responsive' level by internalizing stakeholder concepts and incorporating stakeholder responsibility in the mission statement of the project, thereby crafting suitable strategy and action plan for implementation. Although proactive actions from every echelon of project management are necessary for efficient resolution of stakeholder grievances, there is a need for guarding against distributive and unaccountable activities while dealing with adversely affected stakeholders. Superfluous interactions by officials, often seen in the case of Sardar Sarovar Project because of multiplicity of agencies, build up expectations

of adversely affected stakeholders to untenable levels, thereby leaving them dissatisfied despite the best efforts of project management.

Box 6.6: Improving the Level of SSP's Stakeholder Relationship

The Sardar Sarovar Project (and similarly placed other projects) can also attain the 'engaged level' by positively engaging the adversely affected groups (apparently, the opponents of the project) leading to a win-win situation. At present engaging the project oustees (primary social adversely affected group) and NBA (secondary social adversely affected group) in a positive stakeholder relationship can help the project immensely in maximizing the opportunities. The project also needs to engage in positive relationship the secondary stakeholders representing non-social adversely affected groups especially to effect decisions concerning minimum flow requirements of downstream river reaches and the drainage aspects of command area. With the commencement of partial operation – for supply of irrigation and drinking water to limited command reaches – the project also needs to engage in positive stakeholder relationships the likely tail-end users (i.e., beneficiary social stakeholder groups) in order to answer their immediate concerns for speedy completion of canal network and command area development.

Stakeholder engagement is also needed for effectively navigating the likely upper and tail-end users' conflicts during uncertain periods of river flows. Instead of contemplating towards ways of expanding the volumes of irrigation supplies at the source – with possibilities of confrontation with power beneficiaries, mainly the governments of Madhya Pradesh and Maharashtra – the project should tackle the distress situations by means of effecting structural and non-structural measures for equitable and judicious supplies. Another way for attaining the 'engaged' level is that the project should provide

an umbrella of insurance to all beneficiary farmers, adequately compensating for losses entailed on account of the project's failure in delivering promised supplies. Implementation of this proposal would not only soothe the tail-end users but also tackle the urban area (domestic usage) versus rural area (irrigation usage) conflicts, besides emphasizing the project's need for efficient management and rationalization of water tariff.

4.3 Comparative Measurement of Stakeholder Values

The measurement of stakeholder values which a project has created or omitted over a prolonged period of time is of immense importance to the project. Since the large and influential external environment of water resource projects is complex and dynamic, proper measurement systems are the only way to understand and respond to shifts in stakeholder expectations and reactions. Unfortunately, developments in this managerial area are in a primitive phase of evolution even in case of business enterprises. The promising broad criteria for measurement of stakeholder values under development relate to (i) the 'quality' of stakeholder relationship that exists between the project and the stakeholders, and (ii) the 'impact' of project's stakeholder-related actions. The quality indicators, though focused on the drivers of performance, have the disadvantage of being perceptual. On the other hand, the 'impact' indicators, though observable and verifiable, have the disadvantage of being retrospective (i.e. not reflective of stakeholders' expectations in the first place).

Another approach – perhaps being suggested for the first time but which can be useful in case of water resource projects – relates to the measure of 'comparative impact' of project's stakeholder-related decisions. Based on impact indicators, this approach of

comparative measurement of stakeholder values has the advantage of being discernible. Since the suggested measurement is applied on the project's decision (rather than the project's actions), it also has the advantage of being forward-looking though it can be applied retrospectively as well. Finally, the element of perception in measurement – which may come while anticipating impact of a prospective action – is made irrelevant by taking a comparative (rather than absolute) measure of the impact on opposite (i.e., beneficiary and adversely affected) groups of stakeholders.

For example, a particular decision of a project may create positive impact – say, with stakeholder value measuring 'A' – on a specific group of stakeholder and negative impact – say, with stakeholder value measuring 'B' – on the opposite group of stakeholders. It follows that the comparative measurement indicator of the stakeholder value of the decision would be 'A-B.' The decision will be considered as having created stakeholder value (or 'asset value') for the project only if the indicator thus arrived is positive. Understandably, any decision with negative value for the indicator ought to be discarded, irrespective of its nature of impact on the beneficiary or the adversely affected groups. If alternative options are available, then the decision that maximizes the comparative measurement indicator reflects optimisation of stakeholder value and ought to be preferred. Thus, the comparative measurement indicators can be used for acceptance or rejection of decisions (based on the positive or negative sign of indicators) or for prioritisation of decisions (based on the ordinal values of the indicators) thereby helping in identification of the series of decisions/actions that leads to optimisation of a project's stakeholder values. Clearly, in this approach, the numerical values of indicators become irrelevant in the final outcome and the bias, on assigning a value to the decision's impact perceived by stakeholders, is nearly eliminated.

The impact of stakeholder-related decisions has social and environmental connotations that cannot be evaluated in financial terms though indirect measurements[17] can be used. Also, since the measure of impact has to be evaluated in reference to the effect perceived by the stakeholder, the exercise is all the more complicated. The desired objective can be met only by way of moral reasoning involving a rational valuation of emotions (joy or grief) in case of social stakeholders and conditions (favourable or unfavourable) in case of non-social stakeholders. Obviously, the net stakeholder values of social and that of non-social stakeholders cannot be clubbed together for any arithmetic operation and a comparative valuation of these two stakeholder segments can be made on the basis of moral reasoning only. To arrive at a better understanding of the stated situation and the utility of stakeholders' model in this respect, the application of comparative measurement approach in the case of the Sardar Sarovar Project is described below.

Box 6.7: Decision For Truncating SSP Dam Height

We can examine a bygone situation concerned with the acceptance (or rejection) of a demand for truncating the height of Sardar Sarovar dam. The demand for reduction in the height of Sardar Sarovar Dam – from the full reservoir level of 138.68m (455 feet) to 132.89m (436 feet) – was made by the Government of Madhya Pradesh (co-sharer and primary social beneficiary stakeholder) primarily to save about 38,000 people from displacement. In turn, the height reduction was to cause a loss in power generation capacity of the project estimated to the tune of 630 million units per year (Pillai, 1999). Assuming a power consumption rate of 1,000 units per family per year, and four members per family, the decision to reduce the dam height would deprive about 2,500,000 people of power (admittedly, the figure is indicative and not actual). Using a scale of 1 to 10 for

joy (i.e., 10 for utmost joy and 1 for absence of any joy), we may choose to assign a mark of 10 (per stakeholder) for the stakeholder value created by positive impact of the decision (of truncating dam height) on the people saved by displacement. Again, using the same scale for grief (i.e., -10 for maximum grief and -1 for slightest grief), we may choose to assign a mark of -4 (per stakeholder) for the (-ve) stakeholder value created by negative impact of the decision (of truncating dam height) on the consumers of power spread over the states of Madhya Pradesh (57%), Maharashtra (27%), and Gujarat (16%). Thus, the decision to accept the demand for truncating the dam height would create a positive stakeholder value of 380,000 against the negative stakeholder value of (-) 10,000,000, out of which the stakeholder value of (-) 5,700,000 would be created in Madhya Pradesh itself. The comparative measurement of the stakeholder value of the decision (to truncate dam height) would be negative (-9620,000) and hence the decision would not be sound for the project (or for the state of Madhya Pradesh) from social stakeholders' point of view.

The limited 'comparative stakeholder value' computation discussed above could be further refined by rationally incorporating a positive stakeholder value that would be created amongst secondary social adversely affected group (e.g. NBA, environmentalists, seismologists, etc.), and the government of Madhya Pradesh. However, this would easily be offset by the negative stakeholder (rational) value created amongst other entities of primary social beneficiary group (e.g., governments of Gujarat, Maharashtra, and Rajasthan; project contractors and suppliers; financiers, etc.) and the secondary social beneficiary group (e.g., associations of industries and trade bodies).

1 2 3 4 5 6 7

The decision to reduce dam height would have a positive impact on the non-social entities that would be affected by submergence. If the claim of the government of Madhya Pradesh that reduction in dam height would not affect the supply of water to the states of Gujarat and Rajasthan – though debatable – is agreed, there would be no non-social entities negatively impacted by the decision. Hence, the comparative stakeholder value of the decision for reducing dam height would be positive (hence favourable) in case of non-social stakeholders. The comparative evaluation of the stakeholder values of social and non-social stakeholder groups needs to be carried out on the basis of moral reasoning only. Since harm to environment essentially (though indirectly) means harming the social entities only, the justification for raising the dam height would tantamount to accepting some harm for the attainment of greater good. Looking at the issue rationally, alternate source of power generation is thermal power generation which too would have greater harmful consequences on the environment. Moreover, in the case of the Sardar Sarovar Project, no known species is endangered because of the creation of reservoir and the project envisages compensatory afforestation in an area three times the forest area going in submergence. Thus, since the 'moral minimum' – for raising the dam to designed height – is met, the demand for truncating dam height need not be implemented by the project.

The approach described above amply manifests the fact that numerical values assumed for the measure of 'emotions' or 'conditions,' will not make any difference to the final outcome as long as a rational scale is adopted for measurement and the exercise is carried out with moral reasoning. The suggested exercise does not allow for an absolute quantification of stakeholder values of the project's decisions/actions; however, future

studies in this field may take up measurement of stakeholder values on a net basis for the project as a whole.

4.4 The Advantages of Stakeholder Model as Project Management Tool

In today's civil society, the route of stakeholder model appears to be the only approach that would satisfy the competing demands of different constituents of the society. The stakeholder model approach can hopefully help the water resource project in understanding the extent of its effects on various classes of stakeholders, and vice-versa.

The project's relationship with its stakeholders is two-way process. It enables the project to fathom the concerns and reactions of stakeholders; and also allows stakeholders to comprehend the actions of project managers correctly by appreciating the rationalities of management decisions, thereby eliminating the chances of misinformation. Thus, the stakeholder relationship not only gets strengthened by the two-way interaction of project with beneficiary group, but it's prime advantage is to be seen in helping the interaction with adversely affected group also. Though, the adversely affected group - with effective networking - can bring influences capable of halting the project completely, yet the reality of their existence is generally ignored during conceptualisation and planning stages of the project. This happens because some of the adversely affected stakeholders are so subtle (e.g. a rare plant species) that we tend to ignore them, and some are so obvious (e.g. people to be displaced) that we take them for granted and hence ignore them. Both of the dissonant reasons can be overcome with proper understanding of stakeholder concerns and application of stakeholders' model, which will help in putting the adversely affected stakeholders in correct perspective right from the formative stages of water resource projects.

Although water resource projects in India are not profit oriented, nonetheless they are increasingly being subjected to financial scrutiny with vociferous demands for cutting down of capital costs and recovery of at least operational and maintenance (O&M) costs. In the past, project's stakeholder aloofness was due to lack of awareness. But, in the emerging scenario where projects are subjected to the much-needed financial prudence, project's stakeholder responsibilities are likely to be knowledgably ignored, leading to stagnation of their stakeholder relationships at the 'compliant' level (presuming, regulatory laws will get formulated in near future). However, the real benefits of stakeholder values can be realised only by improving the stakeholder relationship beyond the 'compliant' level. Evidently, with the appropriate application of stakeholder model the projects can aim to attain the highest level of stakeholder relationship, which will lead to maximization of economic, social and environmental values; thereby achieving true sustainable development in all three dimensions

The stakeholders of water resource projects are characteristically diverse and widely spread, and hence are affected by the project differently; moreover the effect may differ at different point of time as well. They have varying capacities to absorb the project effects (accordingly they perceive the project effects differently) and also varying capabilities to bring return influences on the project. Due to these inherent differentiations amongst stakeholders and because of stakeholder activism being limited to a select few (which may not be in proportion to project's effect on them), the projects tend to develop bias in perceiving and reacting to stakeholder concerns. This bias may swing either way; i.e. promote the cause of beneficiaries at the cost of adversely affected stakeholders; or vice-versa[18]. With the help of a comprehensive stakeholder model and rational approach

(involving moral reasoning) for comparative measure of stakeholder values, the stated bias and its consequent effect on stakeholder related decisions could be corrected. The tool can also be employed for convincing with justification the project stakeholders - especially secondary stakeholders like media, social and environmental activists, and judiciary - about the rationality of project's stakeholder related decisions; thus checking the networked impact of activism of a few stakeholders.

Recourse to the tool of stakeholders' model would also help in attaining an in-depth understanding of the total stakeholder spectrum; thus broadening the perspectives of water resource planners and policy makers. The 'moral reasoning' is an integral part of stakeholder-oriented approach for project management. However, the exercise of moral reasoning relates with the morality of the society, which in turn is related to the customs accepted by the society as being right or wrong. Since no society can remain static, the stakeholder concept for water resource management will have dynamism in tune with changing needs of the society. Thus, stakeholders' model can be aptly used for guiding the continuous process of national water resource reforms, targeting for balanced and sustainable development with minimum conflicts.

5 IMPLEMENTATION OF STAKEHOLDER MANAGEMENT

5.1 The Cycle of '4S' Functions

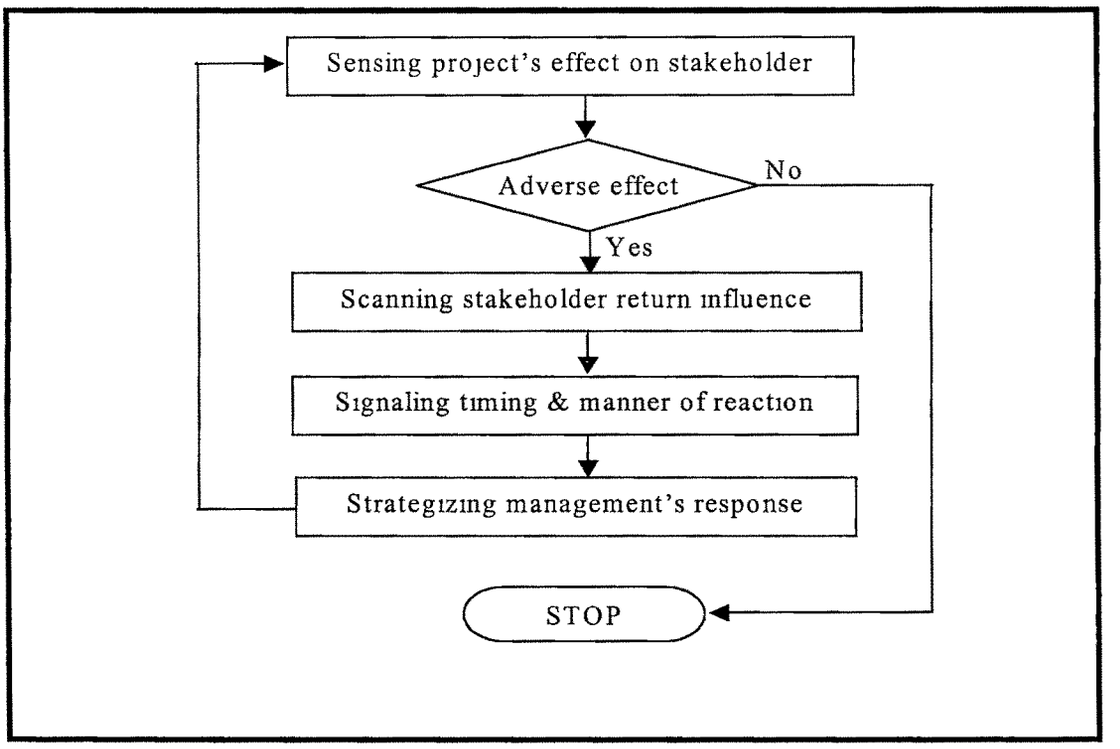
The foregoing discussion has highlighted the significance of stakeholder approach in management of water resources. The stakeholder approach not only helps in tackling the issues encountered during project execution and the subsequent operational phase, but also offers solutions to the primary issues that are encountered even before project

inceptions. Apart from covering the total span of water resource development issues, the stakeholder approach also brings in dynamics to the process of managing such issues. The tool of stakeholder management in this respect serves in perpetuity the '4S' functions of Sensing, Scanning, Signalling, and Strategizing, elaborated hereunder.

Firstly, the stakeholder management approach helps in **sensing** the effects of project and project related decisions on all conceivable stakeholders. Secondly, this management tool helps in **scanning** the intensities and directions of stakeholders' return influences. Thirdly, it carries out the task of **signalling** the timing and manner of stakeholder reactions. Fourthly and finally, it helps the project in carrying out the eventual managerial task of **strategizing** its response to the stakeholder influences. All these activities are aided by appropriately designed management information system to provide timely decision support. Thus, the approach of stakeholder management is a continuous process. So when applied with respect to a particular stakeholder-entity in response to a particular project decision, the cycle of '4S' is continued in a loop till the project's combined response ceases to cause any significant adverse effect on the stated stakeholder entity.

The approach is thus solution driven and not problem focussed; it continuously enhances stakeholder value; and it is predisposed to attain the highest, i.e. 'engaged', level of stakeholder relationship. A flowchart of the cycle of '4S' functions of stakeholder management approach is illustrated in Figure 6.2.

Figure 6.2: The Cycle of '4S' Functions of Stakeholder Management Approach



Box: 6.8: The Dilemma of Designing the Kachchh Branch Canal System

The need for the application of '4S' functions in stakeholder management of Sardar Sarovar Project can be appreciated by looking at a long pending stakeholder-issue related to the design of Kachchh Branch Canal (KBC). The 352 kms long KBC will be the longest branch canal of the Narmada canal network. Planned to take off from the main canal at 386 kms reach, it will traverse through Banaskantha and Patan districts in a length up to 98 kms, and thereafter crossing the 'Little Rann of Kachchh' it will enter Kachchh district at a chainage of 105 kms. Estimated to benefit a vast command of about 1.13 Lacs hectares in Kachchh, the branch canal was originally planned for negotiating the depression of 'Little Rann of Kuchch' through a series of falls and lifts (NCA, 2003). However, this design of canal was disapproved by a segment of Kuchcch people

ostensibly on the ground that power required for pumping water at points of lifts would never be available sufficiently, thus depriving Narmada water to Kauchch people. On the other hand, the alternative suggested by the stakeholders for a high-bank gravity canal passing through the depression was not acceptable to the project management on the grounds of economy and safety.

The intensity of stakeholder influence on the issue was however strong enough for the management to put the original proposal on hold. Thus the issue has remained unresolved for close to a decade now; indicating a situation disadvantageous to both stakeholders and project management. Evidently the stakeholders would be deprived of the project benefits for a longer time, while the cost of KBC would go up by many folds for the management. Rather than putting the issue on back burner, perhaps a better strategy would be to resort to the application of '4S' functions of stakeholder management. This would demonstratively give a better opportunity for the management to sense real concerns of stakeholder segment; respond to their concerns and re-sense their reactions; and finally tailor an appropriate decision acceptable to all. Without the stated approach, the project management not only would face the extensive time and cost overruns, but also would be ill equipped to gauge the intensity, timing, and manner of future reactions of KBC stakeholder group.

5.2 Framework for Multi-stakeholder Interactions

The traditional and bureaucratic framework of the present-day water resource project functioning is not suitable for the proposed stakeholder inclusive approach for fruitful conceptualization, construction and operations of the projects. The hitherto followed approach is characterised by the fire-fighting tactics for overcoming situations evolving

out of multiple stakeholder influences, rather than for a collaborative process, which is the hallmark of the suggested '4S' functions of stakeholder management.

The overall framework of water resource project functioning is affected by the working styles of different state governments, the conditions created by resource mobilization and resource sharing, and the organizational structure of the project. The organizational structure of the project varies further depending upon such factors as: (i) the nature of organization (e.g. government department, autonomous board / agency, and public sector company); the project functions and the extent of coverage (e.g. irrigation, drinking-water, hydropower, and flood protection); and (iii) the stage of project (e.g. conceptualization, investigation, construction, and operation). Reforms in the organizational structure for imparting efficiency in the water resource development sector is a widely debated issue, and dealt by the National Commission for Integrated Water Resource Development (1999). However, precious little efforts have been devoted to the development of stakeholder responsive framework for the organizational functioning so as to impart efficacy to its stakeholder interactions.

The stakeholder issues and interactions are not confined to any one, or a few, specified aspects of project functioning; instead they are widely spread and bring sizeable effect on almost all working divisions of the project organization. Thus, the objective of transforming the project for stakeholder inclusiveness cannot be achieved by mere strengthening of the organizational structure with additions and alterations in one or two working divisions for improved stakeholder interactions. More appropriate approach would be to orient the overall functional framework of project organization toward stakeholder responsiveness; and this can be achieved by making following enquiries with

respect to each division of the organizational structure, and for every aspect of the project functioning:

- How does the organization handle the issue of its openness for stakeholder responsibility / accountability?
- To what extent the general public, intelligentsia, industry, environmental group, academicians, etc. have been given opportunity to influence projects stakeholder related functioning? What tools have been employed for enabling such stakeholder influences (formal representations / recommendations, working with groups to develop consensus agreements, roundtables, constituency meetings, information gathering sessions, websites, etc.)?
- Has the organization released a public document that guides and encourages early communication and collaboration between the organization and the affected communities?
- To what extent organization is willing for decimation of project related information and by what means (advertisements, event sponsorships, amenities for public visits, etc.)?
- Is the credibility of information given to stakeholder being confirmed by an outside and independent agency?
- Has the organization created codes of ethics, principles, and mission statements? Is organization catering to any ethical philosophy, or having any affiliations in this respect (e.g. quality commitments, eco-friendliness, ISO Certifications, etc.)?
- Is the organization having responsible policies and practices in dealing with adversely affected stakeholders in a positive and non-discriminatory manner?

1 2 3 4 5 6 7

- Is the organizational staff involved in stakeholder and public participation trained to understand the value and use of their activities, and on how to conduct themselves properly?
- Has the organization identified the areas that may require stakeholder negotiations? Are the goals of negotiations, process of negotiations, and the need for facilitator, identified?
- Is the organization having sufficient stakeholder representations in its Board or decision-making committee(s)?
- To what extent the facilities provided to organizational employees has been extended to external stakeholders as well (e.g. schools, parks, hospitals, transport facilities, sport grounds, etc.)?
- To what extent the stakeholders have been encouraged to create shareholdings in the organization (e.g. the land-value of displaced people can be counted as their share in the assets of the project).
- Has the organization made any socially and environmentally responsive investments (e.g. investment for increased workmen safety, or for controlling pollution levels)?
- Does the organization promote any long-term stakeholder benefit programs (e.g. crop insurance)?
- Is the organization making efforts for collectively documenting the lessons learned from its stakeholder interactions for the purpose of improvements in existing ways of stakeholder interactions and for implementing innovative ways?

Trust between organization and the public is a crucial component of any stakeholder related initiative in order to ensure an effective working relationship. The United States

Environmental Protection Agency (2001) has identified eight actions for enhancing the stakeholders' trust. These action points – which can be incorporated in the functional framework of water resource project organizations – are: (i) meeting with the community early; (ii) responding to community concerns and clearly explaining what action will be taken to address their concerns; (iii) maintaining a presence in the community; (iv) working with the community on equal footing; (v) openly sharing information; (vi) involving stakeholders in decision making and data gathering; (vii) linking up with trusted local officials; and (viii) keeping communication channels open. These actions will help the project organization to integrate its economic objectives with the social and environmental concerns of the stakeholders.

Despite the willingness of the organization, appropriate stakeholder response may not be forthcoming at all times. It may so happen because of: (i) inadequate understanding / explanation of the technical issue; (ii) difficulties in expressing their viewpoints; (iii) inadequate feedback / minutes and follow-up actions of the previous interactions; (iv) perceived inabilities to influence project decisions; (iv) lack of time and convenience for participation in project's stakeholder-interaction initiatives; and (v) to protest against the project, or project related decisions. Appropriate analysis of such 'stakeholder turned-off' situation needs to be carried out for affecting the timely remedial measures for gaining stakeholders' confidence.

5.3 The Management Information System

As pointed out earlier, the application of '4S' functions of stakeholder management is to be practically continued as a perpetual assignment. For this continual exercise and for affecting it on all stakeholders, the project would be required to deal with enormous

amount of stakeholder related data. Understandably, for a meaningful stakeholder management approach, the pertinent stakeholder data are required to be identified; gradually built upon from scratch; stored in an appropriate way; and queried upon in a manner that would deliver the desired information. Peter Drucker (1971) states the fact that the most basic and important economic resource is no longer money or labour or power or natural resources; rather it is knowledge[19], which is seasoned information that takes values into account. Considering the diversities, spread, and number of stakeholder entities, the task of managing the stakeholder-data in stated manner might however look arduous. However, the task can be made simpler with the help of stakeholder model and employing the tool of an appropriate Management Information System (MIS) - that would also encourage decentralized decision making.

5.3.1 Information Requirements for Management of Stakeholders

The information required to manage the stakeholders of water resource projects will be of varying types because of the diverse characteristics of its stakeholder groups. The eight categories of stakeholders constituting the stakeholder model give a general indication of the nature of information needed for each category. Since, these eight categories have been evolved from the three-tier classification system, the same approach could also be used for building up the characteristic needs of information for different categories. Thus, the information on beneficiary stakeholders will require to focus upon such indicators that may be subjected to an upward revision with the completion of water resource project (e.g. cropping frequency, crop-yield, livestock, annual income, etc. in case of a beneficiary farmer); while in case of adversely-affected stakeholders, the focus of information will be on those indicators that may slide down with the upcoming of project or during resettlement and rehabilitation process, and hence require prompt redressal (e.g.

living conditions, health, education, livelihood, social-milieu, etc. of a project displaced person). In case of social stakeholders, the information indicators will be essentially of the social and economic types; while for the non-social stakeholders, environmental and ecological indicators will be evidently used. In case of primary stakeholders, the requirement will be for such information that emphasizes the direct effect of project on the stakeholders; while in case of secondary stakeholders, the information sought will pivot around indirect effects of project, or project related decisions, on the stakeholders.

As pointed out earlier, the measurement criteria for many aspects of stakeholders are not yet appropriately developed, and hence the information on such aspects may not be fully quantifiable. Besides, some of the effects of project on stakeholders may not be tangible (especially in case of non-social stakeholders) and they will have to be merely perceived in a scientific and rational manner. Therefore, the needed stakeholder information will expansively rely upon qualitative indicators, besides using quantitative indicators wherever possible. In some cases (e.g. non-social stakeholders) the cluster / group data may generally suffice; but, in most cases of social stakeholders, specific details up to the level of individual, or at least to the level of family, may also be required.

The exact nature of the information will vary from project to project depending upon composition of their stakeholder groups. Nevertheless, for a general understanding, the broad information requirements in respect of key stakeholder entities of the Sardar Sarovar Project are tabulated in Box 6.9.

Box 6.9: Broad Stakeholder Information Required for SSP Management

Stakeholder Entity	Group Information	Specific Information
Farmers in Gujarat (PSB)	Number of beneficiary farmers; Details of village, taluka, and district; Geographical and climatic classification; Cooperatives, education, and health facilities; Transport, storage, market, and banking facilities; Cultural, religious, and social composition.	Name of farmer, age, address, education; Family composition, general level of education and health; Size and location of land holdings; Crop preferences, cropping frequency, and crop-yield; Alternate sources of water; No. of farm labourers and level of mechanization; Farm animals and livestock; Annual income.
Beneficiaries of drinking water in Gujarat (PSB)	Number of beneficiary people; Details of village / towns / cities, and taluka / district; Geographical and climatic conditions; Education, health, and recreational facilities; Cultural, religious, and social composition.	Name of beneficiary, age, address, education; Family composition, general level of education and health; Water consuming facilities in kitchen, bath, toilet, garden etc.; Annual income.
Beneficiaries of Hydropower (PSB)	Number of beneficiary people / industries / farm sectors serviced by the State Electricity Boards (SEB) of Madhya Pradesh, Maharashtra, and Gujarat; Power consumption levels in terms of Watt and Units, and the translated economic benefits.	*(Because of the power-grid system, the specific beneficiaries of SSP's power cannot be identified. The full basket of the stakeholders of the three SEBs will benefit from the project in the same proportion in which the individual SEB's capacity is enhanced.)*
Beneficiaries of Industrial water (PSB)	Number of beneficiary industries; Details of cities, districts, etc.; Sectors and scale of industries; Employment potential; Economic benefits and potentials for exports.	Name and such details of the company as location, industry type, manpower, product, annual turnover, etc.; Consumptive or cyclic nature of water use; Level of consumption; Level and quality of the industrial effluent;
Beneficiaries of flood protection (PSB)	Number of beneficiary people; Details of village / towns / cities, and taluka / district; Geographical location; Level of flood and flood frequencies; Annual losses in terms of human lives, cattle-heads, properties, and productive man-hours.	*(Specific information not required - SSP is not designed particularly for flood benefits, and any benefits on this account are only incidental and not guaranteed. SSP is neither charging for such benefits, nor will it be liable for compensation in failing to provide the flood protections.)*
Beneficiaries of irrigation and drinking water in Rajasthan (PSB)	Number of beneficiary farmers; Details of village, taluka, and district; Geographical and climatic classification; Cooperatives, education, health, and recreational facilities, Transport, storage, market, and banking facilities; Cultural, religious, and social composition.	*(Specific information not required as the water is being passed on to the Irrigation Department of Rajasthan at Gujarat-Rajasthan Boarder. However, Rajasthan Irrigation Department may develop the specific information as suggested in cases of 'farmers' and 'drinking water beneficiaries' of Gujarat.)*
Cattle and livestock in command area (PNB)	Number and types of cattle and livestock in the project's command area; Their general health conditions, availability of fodder, and drinking water; Total economic value to the owners.	*(Specific information not relevant.)*
People displaced by the project (PSA)	Number of displaced people; Details of village, taluka, district, and state; Extent of submergence and displacement; Sources of livelihood and dependence on natural local resources	Name of displaced person, age, address, education, caste / tribe; Family composition, general level of education and health; Size and location of land holdings; Nature of ownership (joint holdings, *benami*,

	for food and fuel; General education, health, and other civic facilities; Proximity with mainstream society; Cultural, religious, and social composition. Religious and cultural attachments to deities / temples / rivers / ponds / trees etc.; Social and cultural customs, festivals etc.	encroacher, etc.); Crop preferences and cropping frequency; Crop quality, yield and market value; sources and manner of irrigation; Other sources of livelihood; Dependence on forest and river; Economic value of landholdings, huts, timber, cattle, etc.; Social and family links with other displaced, or non-displaced, persons.
Organizations opposing the project (SSA / SNA)	Number and types of Non-Governmental Organizations (NGOs) actively opposing the project construction; Their Networked characteristics.	Name, type, registration, affiliation, office address, etc. of the organization; Focussed areas, objectives, and targeted group; Names and relevant details of organizational leadership; Manner / route of bringing influences; Extent of influence with the targeted people / media / political parties / intellectuals / institutions / government / international bodies; Legal support; Manpower, and other resources at disposal; Financial strengths and sources of funding; Links with other national / international organizations
Submergence affected topology, ecology, tectonics (PNA)	Extent and locations of submergence areas; Wealth of forest, mineral, and places of archaeological values getting lost to the submergence; Endangerment to any species of flora / fauna; Geological layout of the submergence areas, its influence on plate tectonics of the region, possibilities of reservoir induced seismicity; Impact on river morphology; Impact on riverine ecology both upstream and downstream of the project.	*(Specific information not relevant.)*
Catchment areas and compensatory afforestation areas (PNB)	Extent and locations of areas identified for Catchment Area Treatment and Compensatory Afforestation Programs at project costs; Value of forest cover and soil conservation achieved by these measures; Benefits to the flora / fauna and overall ecology; Impact on general environmental factors such as ground water table, ambient temperature, precipitation, etc.	*(Specific information not relevant.)*
Ecology of command areas (PNB)	River-flow and groundwater table data of different parts of the command area; Measurements of regenerated flows and contributions to the groundwater and their economic value; details of flora, fauna and other ecological factors in command areas benefiting from project.	*(Specific information not relevant.)*
Construction and supervisory organizations (PSB)	Identification of no. and types of organizations connected with construction and supervision of project works.	Name, type, structure, and affiliation of the organization, Specific roles in the project construction / supervision; Concerned officials and their details such as names, designations, contact addresses, phone numbers, etc; Details of financial and other resource sharing.

Contractors and suppliers (PSB)	Identification of no. and types of contractors and suppliers that are connected with various work components of the project.	Name, type, and class of contractor / supplier; Details such as registration numbers / affiliations, Permanent Income Tax Number, Employee Provident Fund Registration, contact persons, contact addresses, phone numbers, etc; Areas of specialities; Present assignments and their values; Financial details such as annual turnover, value of largest assignment in past three years, etc; Details of the strengths of manpower, mechanization, automation, etc; Details of specialist professionals and consultants; Details of safety records, etc.

All of the vastly listed requirements of stakeholder information may not appear to provide a direct input for stakeholder related decisions all the time. At the same time, assertion that this extent of information would suffice the requirements of all stakeholder-related decisions may also be wrong because of the undreamt of issues that may unfold in the unforeseen future horizon. In case of water resource project stakeholders, even simple and seemingly irrelevant information may sometimes prove very pertinent for affecting a meaningful decision, as is evident from the Box 6.10.

Box 6.10: Project Affected Persons and the Pertinent Information

The SSP management at some point of time had decided to provide built-up houses for the project affected families (PAF) in a few resettlement sites. However, the major flaw in the plans of such resettlement sites was the inclusion of toilets in each housing unit. The affected tribal people could not fathom the appropriate use of toilets, despite lot of communication. Some of the people decided to put toilets for better-perceived uses such as: as cages for chickens, for storing firewood, or even for storing food-grains. Evidently, provision of toilets in housing units of the latter-day plans of resettlement sites was dispensed with. However, the requirement of providing open fields for meeting PAF's

needs of defecation could not be met in all the cases, leading to rejection of R&R package by some of the PAFs in such resettlement locations.

5.3.2 Implementation of Management Information System

To begin with, at the conceptualisation stage of the project the framework of its stakeholder model should be developed, and appropriate tools for the MIS should be identified. As the scope of project gets defined and enlarged and the pre-feasibility studies are carried out, the preliminary stakeholder model should be progressively built upon, and the MIS adequately tailored to incorporate the added stakeholder data. By the time the detailed project report is completed, the final shape of its stakeholder model (with all identifiable stakeholder groups and appropriate classifications), and the final design of MIS (with adequate format and updated stakeholder data) should also get completed. Though the progressively growing stakeholder model and the stakeholder data would certainly be of help in managerial decisions during formative phase, yet its real application would come to fore with the commencement of project construction.

A large part of primary stakeholder data - pertaining to both beneficiaries and adversely affected segments - will have to be evolved through specialised studies and surveys. In such cases, the tasks of designing the MIS and that of collecting and recording of data can be entrusted to specialised departments, institutions (say universities), or private consultants. Ddata pertaining to other primary stakeholders such as employees, contractors, financiers, suppliers etc. can easily be assembled in-house using any of the commercially available MIS packages or by developing MIS tailored to management needs.

As already pointed out, the backbone of stakeholder management approach is the two-way interaction between the project and the stakeholder. The MIS can also be put to best use for strengthening this interaction. Logically, if the project can improve its response through enhanced and correct picture of the stakeholder entity, the stakeholders can also perceive the project effects and project decisions in a true manner with updated and correct information about project, other stakeholders, and stakeholder relationships.

With appropriate information base, not only the stakeholder will respond more rationally to project effects, but also be perceptive to management's sincerity in mitigating adverse effects. Evidently, for a good proportion of stakeholders (e.g. illiterate oustees, farmers, etc.) the MIS as such may not be able to provide information directly. Such segments can be educated with project related information only in conventional ways, either by project management or by secondary stakeholder groups. However, the secondary stakeholder groups and the literate segment of primary stakeholder groups can easily take full advantage of a resourceful MIS.

Identification of the secondary stakeholder groups and generating of pertinent data concerning them should be handled carefully, and in a law-abiding manner. It is also important to note that data in a project-MIS should not be used or distorted with prejudice to any of the stakeholder entities. Also, a system of transparency should be maintained so as to gain stakeholder confidence; and the endeavour of MIS should be to improve project's stakeholder-oriented decisions, and enhance stakeholder relationships. Finally, if not put to use wisely, MIS can cause unwanted complications in stakeholder relationships; and an example of such a situation can be seen from the illustration given in Box 6.11.

Box 6.11: Potential Pitfalls of Information-Distortions

Complications can happen when specific information gets presented or overemphasized in such a manner that they do not reflect upon true aspects of an issue. A case in sight is the overemphasis being given by SSP management on raising of the dam height to 110m level; leading people to confuse it with the final height of dam. In reality, the dam at 110m level can only enhance drawl capacities of project, but will not create any storage. With the raising of dam height to this level, the project will build-up the hopes of a large stakeholder segment craving for Narmada water, and thus activate them. But in essence, the project may not be able to fulfil the needs of even a fraction of such activated stakeholders; thus creating new stakeholder conflicts.

Since the diverse stakeholder segments of water resource projects are spread over large geographical areas - crisscrossing state and even national boundaries - the Internet based MIS will be an apt tool for assimilating stakeholder data as well as for disseminating project related information to desiring stakeholders. The MIS development will thus involve (a) development of a robust database integrating project related information and data pertaining to every stakeholder group, (b) development of web based techniques for generation of meaningful and comprehensive information from project database. For the (back-end) database development of MIS, any of the enterprise level database system (with capacity for large-scale database access) from commercially available RDBMS (Relational Data Base Management System) packages – such as Microsoft SQL Server, Oracle, Sybase, DB2, Informix, etc. - can be used; while for the front-end part of the MIS, software can be developed for information retrieval (form database) by query building using HTML and Active Server Pages (ASP).

The more complicated part of MIS development is the component of database management that incorporates integrated collection of data, and also the system for storing and organizing data in a manner that facilitates sophisticated queries and processing of data. A weak design of database may not give the desired result in terms of convenient access to information, and may also entail frequent redesigning of database structure. On the other hand, a good database planning with full knowledge of the requirements of MIS can lead to creation of an effective, efficient, and long-lasting database structure. Unmistakably, the tool of stakeholder model will be of extensive help in this respect.

6 REFORMS ENTAILING STAKEHOLDER MANAGEMENT APPROACH

6.1 Restructuring of Policies, and Institutional and Regulatory Framework

Paradoxically, policies pursued over the last fifty years seem to have accentuated the inequity in access to water resources instead of eliminating it, thereby accentuating poverty instead of alleviating it. The legal, institutional and policy framework for regulating groundwater withdrawals, for instance, has favoured its pre-emption by the resource-rich, while the poor have typically been left behind literally 'chasing the water table' (TERI, 1998). And, despite having a national water policy[20], only in a few cases, it has been translated into specific state-level policies; while in some cases, it is actually contradicted by the existing water laws (MOWR 1999).

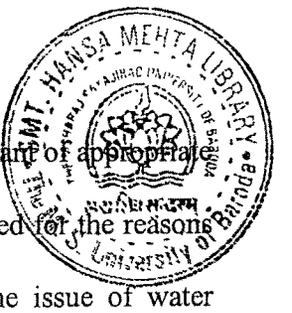
The flaws in our policies, and the institutional and regulatory framework impacts all dimensions of water resource development, be it demand and supply imbalance, river

water sharing, project construction, or project operation. Given below are the crucial limitations of development resulting from such flaws, indicating also the areas calling attention for urgent restructuring:

- The basic flaw in the overall policy framework for water resource development has been the failure of realizing that there are limits to finding more water[21]. The focus of approach has remained on enhancing the supply potentials to meet the ever-rising demand, rather than on restricting the demand by way of population control or efficient resource utilization.
- Over the entire half a century, agriculture has continued to be the largest single component of GDP[22]. However, there has been increasing misuse of policy to favour vested interests resulting in serious distortions in agricultural economy. For example, there have been serious distortions in cropping patterns caused by price signals that make growing water-intensive crops increasingly attractive[23]. Changes in cropping pattern have been triggered by prices such products fetch in the market, which are artificially set by government (e.g. edible oilseeds). The switch towards cash crops has also meant that the farmer is able to invest more on such inputs as fertilizers and pesticides, apart from increasing water-use. However, only large-scale farmers have benefited, while there is inadequate improvements in the productivity of farmers of the marginal and small landholdings, though they constitute 80% of the operational holdings and account for about 33% of the area under cultivation (TERI, 1998).
- In addition, the government has subsidized the cost of many inputs in order to propitiate rural vote-banks. The subsidized power has led to overexploitation of the groundwater resource[24] in several parts of the country. The electricity for agriculture is either free or significantly below cost of generation, and the price of

diesel is almost half of that in many other countries. Besides, there are no royalties to be paid on groundwater, and no controls or limits on water that can be drawn.

- One of the major instrument of the state policy under minor irrigation schemes has been the state tube-well programmes, which suffer on account of poor maintenance, lack of accountability of operators to the community, domination by local bigwigs, frequent power cuts, delays in repairs, etc. Though heavily subsidized, they have lost their clientele to private operators of water extraction mechanisms (Shah, 1993).
- Most of the groundwater structures are thus privately owned and therefore outside the purview of direct regulation by the state. Measures to regulate groundwater extraction through restrictions on credit or electricity have had a very limited impact. Licenses issued for electric connections are widely misused. If electricity is in short supply, farmers use diesel pump-sets. Well-off farmers have access to credit from private sources or can even self-finance their groundwater structures. Besides, the norms for establishment of groundwater structures do not extend to the amount of groundwater extracted (Shah, 1993).
- Groundwater is essentially viewed as a chattel attached to land, with two implications: first, the landless have no legal access to groundwater and second, there is no limit to the water that may be withdrawn by groundwater users. The legal framework[25] for the management of groundwater, therefore, is conducive neither to equity nor to sustainability (TERI, 1998). The focus has been on regulating water extraction structures, and not on withdrawals of the water. Spacing norms, for instance, calculated to prevent interference among water extracting mechanisms, creates monopolies and 'water lords'[26].



- The groundwater conditions have come to such a pass also for want of appropriate development of surface water resources, which again has suffered for the reasons of policy failures. A major challenge has been to address the issue of water resource planning at the level of river basins, by overcoming political inhibitions. A plethora of water sharing issues amongst co-riparian states remains unresolved hindering new projects. Though several projects have been taken up, their standards of scrutiny are quite lax. Projects that are unviable are cleared under political pressure, cost estimates are revised arbitrarily, and gaps between projected and actual costs are substantial. There is an urgent need to curb the tendency to clear projects that are not viable. In case of completed projects, there is a need to operate and maintain irrigation facilities cost effectively.
- The rather poor state of repairs and routine maintenance of projects has encouraged waste and inefficiency in use of limited water. Resources to maintain and upgrade existing projects are in short supply also because of low internal accruals by the state irrigation departments. Low internal accruals are primarily because of under pricing and partly due to lax assessment and collection of dues. Estimate show that revenues realized from major and medium schemes do not cover even operation and maintenance cost, let alone meet depreciation charges or part of capital expenditure. It is hence essential that pricing of water[27] should get the importance it deserves.
- Even projects that are subjected to excessive cost overruns due to delays get justified on Benefit-Cost-Ratio (BCR) reviews because of project benefits getting subjected to same escalation as project costs. Ironically, some times the BCR of delayed projects indicate improvements because of the freezing of already incurred cost components while envisaged benefits remain open to inflations. To

correct the stated anomaly, focus of construction should shift from cost controls to time controls, which lays emphasis on the opportunity cost of money and on the time barred benefits of project.

6.2 Need for People's Participation

In the post independence era, the active participation of people in water resource sector has been declining. Indigenous institutions at the grass-roots level, promoting a variety of local-level traditional water-harvesting mechanisms[28] that had been successful in regulating the management of water resources in the past, have been gradually wiped out. The situation has been caused partly due to higher productivity of tube-wells and canal irrigation, and partly due to waning of the local institutions after the abolition of *zamindari* system (TERI, 1998). The lack of people's participation and their wilful exclusion has also affected the drinking water supply schemes initiated by government in many parts of the country (Venkateshwaran, 1995).

In recent past, there have been odd cases of initiatives at the local levels for maintenance of water resources, with varying degrees of successes; these include the irrigation cooperatives and tube-wells companies in parts of Gujarat, and the well-known *Pani-Panchayats* in Maharashtra. The *Pani Panchayat*, in operation in the Purandhar taluka of the Pune district of Maharashtra also offers a significant lesson in achieving growth-with-equity and substantive poverty alleviation. The scheme essentially involved impounding the run-off surface water by constructing appropriately located small works like water embankments, checking dams, percolation tanks etc., at the village and mini-water-shed level. The critical element of the scheme is however to treat water as community asset and share it equitably[29] for its optimum utilization. However the journey of *Pani*

Panchayat has not been smooth sailing[30]. It has remained confined to Purandhar block only, and only about 50 such irrigation schemes could be put in operation - covering around 1200 hectares of land owned by around 1500 farmers - in 20 villages (Mandal 1992).

It is argued that merely having the rights to resources, without economic benefit from the resources or the economic power to maintain and use them, would be a deterrent to the effective working and maintenance of the common pool resources. It is the local people who can protect, maintain, and develop the local resources, but cannot do so as long as external agencies continue to be the beneficiaries of their resources. Hence, the need for amending the Panchayati Acts suitably to confer upon the people greater power to maintain and develop local resources – such as tanks - has often been emphasized (Saleth, 1996). Evidently the need of the hour is to achieve a level of decentralization that ensures both accountability and performance at the local level.

6.3 Amendment in the Constitutional Set-up

Approach to water resource planning has been so far fragmentary and needs to be corrected with appropriate initiatives to be taken up by the central government. Though India has a federal set-up with strong central government, practically all powers related to growth and management of water resource sector are constitutionally[31] delegated to state governments. Thus, the limited control[32] disenables central government from playing the much-needed role in transforming country's water resources sector.

Since the river basin forms the natural hydrologic unit for surface water, groundwater replenishment is intricately linked to surface-water availability, and most of the river

basins extend beyond the boundaries of individual states; an equitable and integrated supply-side development will not be possible by incoherent efforts of state governments alone. Similarly the issue of demand-side management cannot be entirely left as responsibilities of state governments. In doing so, the water-endowed states will show little interest in reducing demand; and even if they curtail their demand, the benefits of surplus capacities thus generated will not pass on to deficient states. The issue of pollution control of river water also traverses state boundaries, with the downstream states benefiting most from pollution control efforts of upstream states.

Understandably, the apt stakeholder solution discussed for the troublesome and recurring issue of river water sharing may also suffer from inefficient implementation in the present constitutional set-up. The suggested scheme for creation of rational water rights for all the stakeholder entities will have little sense unless taken up with the national perspective. And even if so created, the rational water rights will be meaningless unless natural boundaries of river basins, along with the man-made boundaries of states, are penetrated for delivering water to all stakeholder segments to the extent of established rights. In this respect, the much talked about scheme of interlinking of rivers is perhaps a move in right direction, but overstepping the primary step. The NWDA's present scheme of river interlinking, or the similar earlier schemes (Garland canals, and National water grid) are the vital structural measures; implementation of which ought to be preceded by non-structural measures of evolving and establishing rational water rights for all stakeholder entities of the nation.

The case for stakeholder approach to project construction and operation also calls for many changes in policies, and institutional and regulatory framework that can only come

from centre's initiative. Thus, for implementation of meaningful water management reforms from the overall stakeholder point of view, the present situation of a weak central-role needs to be altered. This can be achieved, only by bringing water in the concurrent-list from its present position under state-list of the constitution. Undeniably though resistance from different quarters is inevitable, yet looking at its win-win situation such a move may entail only a fraction of efforts, time, and money in comparison to that needed for the colossal river-interlinking scheme.

Apart from the above-stated constitutional amendment, there is also an urgent need for re-appropriating the roles of the central and state governments, and the institutional and regulatory bodies, in the below listed functional areas and manner:

- Scientifically developed guidelines for assessment of water requirements of different entities (under varying conditions) should be promulgated by central government. Based on these guidelines, each state government should workout their aggregate requirement by integrating assessed requirements of all lower domains. After validation of such assessment by a central agency (e.g. Central Water Commission), these rational requirements of states should be construed as their water rights.
- The state governments and the central government (wherever concerned) should estimate the utilisable water resource potential of each state and that of all interstate rivers. Allocations from interstate rivers to any state, established by past agreements or by tribunals, should be counted as the resource of concerned state. Each of the state governments should also formulate a 'state water plan' indicating details of present and prospective demand patterns, and proposed supply schemes.

- The central government - through Central Water Commission - may scrutinise 'state water plans' and propose 'integrated water plans' for balancing surplus and deficit situations amongst different states in the best technically and commercially viable ways. It needs no emphasis that from the larger point-of-view of stakeholders, the manmade boundaries of state should become pervious for water resource sharing. Hence, surplus water available within any state (over and above its total water rights) should be passed on to water deficit states on no-profit basis.
- Even after a reasonable centre-states dialogue, the 'integrated water plans' may not become acceptable to all, and situations of interstate conflicts may arise. However, with a broadened legal perspective, the river dispute tribunals will be best suited to resolve the issue rationally and judiciously. Nevertheless, the exercise by the tribunals should be completed in a time bound manner, without interference from courts, and its decisions should be enforceable.
- The pollution added by states to inter-state rivers should be monitored by the central government, and the allocation of water to these states should be subjected to penal adjustments to account for their pollution levels as also the pollution abatement efforts.
- A national registry of water users should also be created to serve as the technical and information base for water allocation at various levels (Saleth, 2000).
- Water resource projects on inter-state rivers have become a source of continuous stakeholder friction, and major factor for retarded pace of supply-side development. Considering this situation, the responsibility for planning and construction of storages on all major inter-state rivers - with focus on basin level development - should be entrusted to the central government. However the

responsibilities for distribution of water below the off-take points of such national projects should be vested with the state governments.

- The responsibilities for water resources confined to administrative boundaries of states should continue to rest with state governments, but with a need for greater involvement of the people in their management.
- The importance of stakeholder value for successful completion and operation of water resource projects can no longer be ignored. Projects in future will also be required to continuously strive for enhancing the stakeholder values, for achieving higher levels of stakeholder relationships. A formal presence of common-interest groups - representing diverse stakeholder segments of the project - will immensely help in attaining this objective. Efforts should hence be directed for creating and institutionalising such formal groups, especially amongst adversely affected stakeholder segment[33], right from the time of conceptualisation of projects.
- Each conceived water resource project, before put to execution, should obligatorily develop the framework of its stakeholder model. The preliminary model should be progressively grown and updated using the MIS; and put to use to evaluate stakeholder-oriented decisions. Using stakeholder model, the intangible and indirect effects of project on adversely affected groups - which are often imparted even before commencement of construction - should also be contemplated, and early efforts should be made to mitigate[34] them at project costs.
- The state departments are largely accountable for the present underdeveloped status of water resources in the country (despite heavy investment and sound technical knowledge) for reasons like financial indiscipline, disjointed and uncoordinated efforts, myopic political interference, sectorial bias, policy and administrative weaknesses, and resistance to reforms. Water user groups[35] should

come forward to take some of the responsibilities of state machineries, especially in development, operation and maintenance of the canal and distribution systems.

- The inter-sectoral and regional allocation of water within states should be judiciously carried out, preferably on the basis of information obtained from national registry. This would facilitate sharing of responsibilities by water users' associations at the planning and construction stages itself, and greater stakeholders' participation. A system for allocation of water would also facilitate private sector participation, especially for development and management of resources in urban areas.
- Any surplus over and above the allocated share - created by efficient demand management - should be made tradable to generate reasonable profit margins to the states, or to its regional / sectoral sub-domains. This stipulation would provide the desired incentive needed for encouraging demand management, especially in the sectors of agriculture and industries, in both deficit and surplus states.

Evidently, the above-suggested stakeholder focussed reforms would impart the much-needed impetus and dynamism to management of water resources in India. Despite this, the recommended reforms may face resistance from many quarters. Otherwise also, it may have unforeseen aspects, which may come to notice only after closer examination and detailing. Hence, the proposed reforms (in policies, institutional and regulatory framework, and the constitutional set-up) call for an in-depth and wider discussion with all concerned parties, leading to the healthy stakeholder participation.

1 2 3 4 5 6 7

Notes:

1. For example, when examined intricately, we will find that the issue of groundwater depletion has such varied dimensions as: (a) the rainfall pattern - intensity, frequency, timings, long-term variations, etc – that affects recharge potential (subject matters of Metrology); (b) water bodies - like rivers, lakes, ponds, etc. - and vegetation cover that affects groundwater percolation levels (hydrology / topology); (c) composition and layout of soil and sub-soil strata (geology); (d) agricultural pattern and practices (agricultural science); (e) financing of tubewells for deeper extractions (economics); (f) increased extraction due population pressure (demography); (g) disparities in water utilization capacities of different segments (sociology); (h) subsidies for groundwater pumping (power management / politics); (i) quality of groundwater and impact on human health (pollution control / public health); (j) effect of depletion on flora, fauna, and general environment (ecology / environmental sciences), etc. Further, these factors are interwoven often forming vicious circles of cause and effect. Thus, groundwater depletion situation may be caused by the scanty rainfall conditions of a place; and this may cause degradation of local vegetation cover, which in turn, may make the rainfall further scantier.

2. As an example, let us look at hypothetical case of an interstate disputed river with possibilities of co-riparian states agreeing to a solution involving sharing of river water on the basis of proportionate length of river passing through respective states. Having overcome the issue of rightful share in total quantum of river water, the involved states may now face the dilemma of sharing water amongst different regions of state. Application of the earlier established and rationally looking solution - involving water allocation on the basis of proportionate length of water courses passing through different regions of the state - may however now look absurd and useless. Not only this, the rational principal approach may even fail in another but similar case of a interstate-river dispute involving different set of states with different geographical and sociological conditions.

3. Let us reconsider the hypothetical example of interstate-river (discussed in note 2) where co-riparian states have agreed to share water in proportion to length of river passing through each state. At any point of time, if one of the states were to bifurcate with possibilities of any one part not retaining any portion of the river, then the very nature (and definition) of dispute would change; and the stated solution would loose relevance.

4. From developmental viewpoint the water resource spectrum has acquired social, political, financial, environmental, and managerial dimensions. The social issues of water resource development projects may relate with problems of project-displaced people, or with disputes on equitable distribution of water amongst project beneficiaries, which in turn have political overtones. The financial issue essentially concerns with uncertainties of huge investment over a long period of time and meagre returns. The environmental issues emerge due to adverse impact of project submergence - such as loss to flora and fauna, reservoir-induced seismicity, impact on river morphology, and riverine and esturine ecology - besides water logging and soil salinity problems in command areas. The managerial issues relate with specific functions of resource scheduling, procurement and inventory management, contractual management, human resource management, management information system, etc, besides managing diverse public concerns. Evidently, water resource management is multi-dimensional and multi-disciplinary.

5. For example, problems of one project may be because of neglecting of some specific disciplines (e.g. social and environmental areas). But ironically, in another project problems may occur because of overemphasizing of the very same disciplines.

6. Even at central level, water resource development is supervised by getting tunnel vision from at least six different ministries. These ministries pertain to: Water Resources, Power, Agriculture, Environment and Forests, Social Justice and Empowerment, Rural Area Development, and Urban Area Development.

7. About 1.3 MAF of Himalayan water is being envisaged for Gujarat under the interlinking of rivers scheme. The scheme involving about 1,835 kms long Sharda-Yamuna-Rajasthan-Sabarmati link is estimated to cost about Rs.13,162 crore at 1993-94 price level, and may not get implemented easily (NWR&WSD, 2003; and Jain, 2003).

8. The newly proposed Kalpasar Project of Gujarat envisages a gigantic fresh water lake to be created by closing the gulf of Khambhat (in the Arabian Sea) across Ghogha in Bhavnagar district and Hansot in Bharuch district and thereby harness the excess waters of Narmada, Mahi, Sabarmati, and Dhadar rivers. Besides generating tidal power to the tune of 5880 MW, the project is expected to provide annual irrigation water to the tune of 5461 Million m^3 and domestic and industrial waters of the order of 900 Million m^3 and 500 Million m^3 respectively (NWR&WSD, 2004).

9. Water stress: This concept has been propounded by Malin Falkenmark on the premise that 100 litres a day (36.5 cubic metres a year) is roughly the minimum per capita requirement for basic household needs and to maintain good health; roughly 5 to 20 times that amount is needed to satisfy the requirements of agriculture, industry, and energy (TERI, 1998).

10. The annual availability of water per capita has declined from about 5400 cubic metres in 1951 to just over 1900 in 2001 as brought out in Table 6.1 below:

Table 6.1: Population and Per-capita Water Availability

Year	Population (Million)	Per capita water availability (Cubic meters)
1911	252.09	7747.23
1921	251.32	7770.97
1931	278.98	7000.50
1941	318.66	6128.79
1951	361.09	5408.62
1961	439.23	4446.42
1971	548.16	3562.83
1981	683.33	2858.06
1991	846.3	2307.69
2001	1027.01*	1901.64

*(Source: TERI, 1998: and *Census India, 2001)*

11. From as high as 18417 cubic metres in Brahmaputra valley, per capita water availability (in 1991) comes down to a low of 411 cubic metres in the east-flowing rivers between Pennar and Kanyakumari. Even within the Ganga basin, the availability varies from 740 cubic metres in the Yamuna to 3379 cubic metres in the Gandak (Chitale, 1992).

12. As per International Commission on Large Dams, the large dams are defined as (i) dams more 15 m high, and (ii) dams 10-15 m high with a storage capacity in excess of 1 hectare m^3, or more than 500 m long, or designed to discharge floods of more than 2000 m^3/seconds, or with unusual characteristics (ICOLD, 1997).

13. The option of large dam may have an edge over smaller one for reasons such as: smaller submergence per unit of storage, advantage of carry-over storage and reliability of system, possibility of cheap and environment friendly power, creation of flood cushion, lesser evaporation losses, longer project life, wider command spread, larger employment potential, and better impact on social and economic development of the region.

14. The Himalayan rivers are perennial; receiving heavy rainfall during monsoon months they cause frequent floods; and are also fed by the melting of snow and glaciers during summer months; and the lean flow period for them is the winter. They are highly unpredictable and some are meandering in their flows. The Deccan rivers are rain fed, and some of them are non-perennial. Comparatively, they originate at lower altitudes and flow through geologically more stable areas; and so their behaviour is predictable. The coastal rivers are short in length and have limited catchment areas; and most of them are non-perennial. The streams of inland drainage basins of Western Rajasthan are few and do not drain into the sea; they drain into salt lakes, or get lost in the sand with no outlet to sea (CBIP, 1998).

15. The categorization of river basins is on the basis of catchment's extent; and the three categories are: (a) 'Major River Basins' with catchment area of 20,000 sq. km or above; (b) 'Medium River Basins' with catchment area between 20,000 and 2,000 sq. km; and (c) 'Minor River Basins' with catchment area below 2,000 sq. km (CBIP, 1998). The Ganga-Brahmaputra-Megna system, with about 43% of combined extent of all major river basins, is the largest river basin (NCIWRD, 1999).

16. The networked influence of NBA on the World Bank lead to annulment of a loan agreement for US$ 450 million, thus chocking mainline finances that resulted in costly market borrowings. They also brought influence on the Government of Japan that lead to termination of its Overseas Economic Corporation Fund (OECF) assistance of 27 Billion Yen resulting in immense delays in powerhouse completion schedule. At times their agitation also influenced the governments of Madhya Pradesh and Maharashtra in matters related to dam height clearances, affecting the dam construction progress.

17. Indirectly, the financial value of an environment-related action could be found by aggregating the cost of various measures needed for mitigating the adverse environmental impacts (TERI, 1998). In case of action involving adverse social impacts, the quality of life indicators could be used to measure the level of social degradation and the cost of raising the 'quality of life' could be indicative of the financial value of the action.

18. For example, an ineffectual scheme may get conceived under influence of strident demands of a few people, ignoring concerns of many more people and other stakeholder entities. Similarly, the activism of few stakeholders may disrupt a worthwhile scheme, denying (or delaying) its benefits to a much larger group of stakeholders.

19. Data: Raw facts and figures generated by some kind of analysis; Information: Data combined in a way that makes it useful; Knowledge: Information that incorporates values, which can be either positive or negative.

20. The most comprehensive water policy statement issued at the Government of India level is the National Water Policy adopted by the National Water Council in 1987; with below listed salient directives (MOWR, 1999):
    (i) Water allocation priorities to broadly follow the order: Drinking water, Irrigation, Hydropower, Navigation, and Industrial and other uses.
    (ii) Consideration of drainage basin as a planning unit.
    (iii) Conjunctive use of surface and groundwater.
    (iv) Recycling and reuse of wastewater to form an integral part of water resource development.
    (v) Water rates to be such as to convey the scarcity value of resources to the users and to foster motivation for economy in water use.
    (vi) Periodic assessment of groundwater potential.
    (vii) Development of National Information System on Water Resources.

21. The total amount of water on earth is about 1400 million Km^3, enough to cover the earth with a water layer of about 3000 m depth. However, nearly 98% of the earth's water is in the oceans and seas. Fresh water constitutes only 2.7% of the total water available on the earth; and of this over 75% lies frozen in Polar Regions and about 23% is present as underground water, a part of which is too far underground to be of any use. Only a tiny fraction of world's water is renewed and made fresh through nature's solar powered hydrological cycle. The total precipitation through the annual hydrological cycle is estimated to be 3,00,000 Km^3 over the seas, and 1,00,000 Km^3 over land, resulting in an average annual flow of 40,000 Km^3 from the land to the sea, which constitutes world's fresh water supply. This water, though renewable, constitutes only a finite resource (NCIWRD 1999).

22. Agriculture, which contributed 50% to the GDP in 1950-51, contributed only 29% in 1994-95; though the value of its contribution in real terms rose 3.2 times. The average agricultural growth rate showed improvements in the 1950s, in the late 1960s, in the 1980s, and has continued through 1990s. The combination of agro-business with farming has been encouraged in recent years in order to raise the average level of agricultural incomes, enhance export possibilities, and raise the share of value-added components in agricultural exports; and thus during the last three decades, India has become a significant exporter of agricultural and allied products (TERI, 1998).

23. While overall production of food grains rose from an index of 47 in 1951 (base year 1981-82) to 155 in 1994-95, for commodities other than food grains the rise was from 45 to 179. Thus, there has been a rising trend of growing crops other than food grains (cereals and pulses). The gross cropped area under food grains dropped from 83% in

1950-51 to 76% in 1994-95 while that under other cops rose from 17% to 24%; and the distortion has resulted in decline of per capita availability of proteins (TERI, 1998).

24. In Haryana, while groundwater transformed the traditional cultivation into commercial cultivation, the average depth of groundwater is estimated to have fallen by 1 to 33 cm annually in different parts of states in 1980s. In Gujarat, during the same period, water table in over 90% of all the observation wells monitored by the CGWB dropped by 0.5m to as much as 9.5m (Vaidyanathan, 1994). In Ahemedabad alone, the water table is estimated to have fallen by 2 to 2.5metres annually during the 1980s (Mathur, 1994).

25. Efforts for legislation have been made through model groundwater bills of 1970 and 1992, with thrust on creating a groundwater authority consisting essentially of representatives of the government and technocracy to approve installation of water extraction mechanisms. However, the case for successful implementation through localized, participative approach (to suit sociological and hydro-geological conditions) has been ignored (TERI, 1998).

26. The historical dimension of groundwater regulation laws creates the conditions of monopolies. Those farmers who established their extraction mechanisms earlier are not covered by the norms introduced in the last two decades. For instance, in Gujarat, the owner of a modern groundwater extraction mechanism can prevent any other farmer located within an area of 144 hectares from setting up another water extracting mechanism, thus making him a 'water lord' (Shah, 1993; and Saleth, 1996)

27. The second irrigation commission (1972) has recommended that charges should be at least 5% of the gross income from food crops, and 12% of that from cash crops. However, under political and administrative compulsions, it was not implemented, and the receipts by way of water tariff amount to only about 1%-3% of gross farm income (TERI, 1998).

28. A case in point is that of tanks, whose share in net irrigated area has declined steadily from 20% in 1958-59 to about 5% in 1997-98 (TERI, 1998). The near exclusive focus of planned irrigation development on large and medium projects lead to the neglect of local institutional arrangements; and except during the 1950s, the government played very little, if any, role in the development and maintenance of tank irrigation (CSE, 1985).

29. For an equitable irrigation system under *Pani Panchayat* following rules were evolved:
    (i) Irrigation schemes are undertaken for groups of farmers only, not for individuals, thus fostering community spirit.
    (ii) Water is shared according to the family size and not in proportion to the landholding, i.e. half an acre per capita, subject to a maximum of one hectare per family. Land in excess of one hectare would still fall under rain-fed cultivation. This promotes optimum utilization of scare irrigation water.
    (iii) Water rights are not transferable with land; if land is sold the rights of water revert to the Pani Panchayat, thus preventing land speculation.
    (iv) The beneficiaries share 20% of the capital cost of the irrigation project, according to their share of water, after which credit facilities become available to them. This 20% contribution gives the people a feeling of involvement. The remaining 80%

is in the form of a government subsidy, or an interest free loan, or a combination of both.

(v) The beneficiaries must administer and operate all aspects of the project; leadership capabilities and skills of the beneficiaries are thus promoted.

(vi) Growing of crops that consume considerable amounts of water such as sugarcane, banana and turmeric, are forbidden. This ban makes protective irrigation of a larger area of seasonal crops possible, and benefiting a larger number of people.

(vii) The landless can also share water and can, consequently, get employment in the village itself, by becoming sharecroppers to farmers with more land. This would check their migration to cities.

Adhering to above rules, the *Pani-Panchayat* evidently enabled the poorest farmer and even the agricultural labourer to gain advantage from modern technology, thus becoming an ideal program for growth with equity (Mandal, 1992).

30. It has been a struggle sometimes to get people interested in *Pani Panchayat*. Beside, other hurdles were erected in the way, such as court cases on charges of illegally appropriating ground water, government reluctance to tap water from existing reservoirs, refusal or delay in power connection for electric plumpest, etc. Moreover the movement has been focused around a lone crusader, Shri Vilas Balwant Salunke, who took much of the initiative by lobbying, organizing farmers for sit-in-demonstrations, courting arrest, and even undertaking contesting of an election on the plank of *Pani-Panchayat* (Mandal, 1992).

31. As listed in schedule VII, the responsibilities apportioned to the states and the union by the constitution fall into three categories, which are brought out below:

(a) List I (Union List)
Entry 56: "Regulation and development of interstate rivers and river valleys to the extent to which such regulation and development under the control of the Union is declared by Parliament by Law to be expedient in the public interest"

(b) List II (State List)
Entry 17: "Water, that is to say, water supplies, irrigation and canals, drainage, and embankments, water storage and water power, subject to provisions of entry 56 of List I".
Article 262: "(i) Parliament may by law provide for the adjudication of any dispute or complaint with respect to the use, distribution or control of the waters of, or in, any interstate river or river valleys, (ii) Notwithstanding anything in this constitution, parliament may by law provide that neither the Supreme Court nor any other Court shall exercise jurisdiction in respect of any such dispute or complaint as is referred to in clause (I)".

(c) List III (Concurrent List)
Entry 20 (related to social and economic planning): "The economic development further depends on the agricultural development and for agriculture development, water is very important input. As such, water development could be covered under this provision of the concurrent list."

Not withstanding the apparent powers conferred upon the union government in Entry 56, water has come to be accepted as a state subject, as per Entry 17 (MOWR,1999).

32. The limited water resource related control vested with central government essentially relates to: clearances for certain categories of projects, partial funding in specific cases, and imparting of technical advices in specialized cases.

33. It may not be out of place to mention that absence of formally recognised common-interest groups of Sardar Sarovar Project stakeholders, created pockets of vacuum in project-stakeholder interactions that were later filled by the unstructured and uni-focussed NBA group.

34. For example, in case of Sardar Sarovar Project some of the difficulties of project-displaced people could have been mitigated by initiating parts of rehabilitation process - such as: education, healthcare, imparting farming skills, vocational training etc. - even before affecting their resettlement to newer locations.

35. Lessons can be learnt from the experience of Mexico, where public irrigation system to an extent of 2.6 million hectare meter was transferred to about 386 water user associations, which lead to dramatic improvement in cost recovery, system maintenance, staff reduction and even notable improvements in yield and water use efficiency (Saleth, 2000).

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