Institutional constraints in the Maharashtra water sector

20th WEDC Conference Colombo, Sri Lanka, 1994

AFFORDABLE WATER SUPPLY AND SANITATION

Institutional constraints in the Maharashtra water sector

Mark Harvey, ODA (UK), Bombay, India.

THE GOVERNMENT OF MAHARASHTRA (GOM) state in west India is currently implementing a rural water supply and sanitation project supported by the Overseas Development Administration (ODA) of the UK.

Institutional difficulties have emerged at various times during the life of this project. Some of these difficulties are apparent from asking straightforward questions such as "who is responsible for Operation and Maintenance (O&M)?". Other difficulties are hidden more deeply beneath apparently solvable technical problems.

These institutional complexities are illustrated in this paper by looking at source development problems that have occurred on two regional schemes. Two different technical problems, in engineering terms, are analysed to identify institutional or sectoral problems and solutions.

Maharashtra state

Maharashtra state is the most developed of Indian states in terms of mobilisation of surface water resources through large dams. However, this utilisation of available water has a significant impact on users of water other than those of irrigated agriculture, who account for over 95% of the usage of surface water storages. This impact is largely felt by users of "small" quantities of water whose access to the substantial resources, that are locked-up by large dams, is limited.

The water sector in Maharashtra is institutionally complex. There is no over-arching state-level water resources agency, although the Irrigation Department consider themselves as such as far as surface water resources are concerned. Neither is there a state water policy, although by default National Water Policy is followed.

The Maharashtra project

The Maharashtra Rural Water Supply and Sanitation Project (MRWSSP) supported by ODA covers 4 regional (ie multi-village) piped water schemes in 3 districts.

The project's lead agency is the Rural Development Department (RDD) and the project aims to develop an integrated approach to the provision of drinking water systems to 200 villages. This approach is to be achieved by linking water supply engineering, managed by the Maharashtra Water Supply and Sewerage Board (MWSSB); with health education (HE) activities, managed by the Public Health Department (PHD); and community participation (CP) initiatives managed through the district councils (Zilla Parishads) (ZPs). The ZPs are administratively under the RDD. They are supported in their CP activities by community development consultants from the Women's Studies Unit of the Tata Institute of Social Sciences (WSU-TISS).

Without dwelling on the institutional difficulties of integrating the objectives and activities of the 5 agencies mentioned above the project can be best described as being born of an older generation. It is an engineering project that has had HE and CP components added to it.

The water supply engineering component consists of 4 large schemes of 80, 51, 22 and 56 village groups. Two of the schemes have existing reservoirs as their source, the other two are based on run-of-river sources. All schemes lift water to treatment plants and distribute it by gravity mains and occasional booster pumping to elevated service reservoirs and internal distribution systems in each village.

Currently the 51 and 22 Village schemes are suspended due to water availability problems at their run-of-river source. Last year the 56 Village scheme reservoir intake construction was delayed for the third year running due to flooding. It is these technical problems at the sources that are analysed below to demonstrate the institutional constraints to effective water resource management.

Source problem 1 - The 51 village scheme

The Tapi River was a perennial river some years ago. However it now has insufficient flow during the late dry season to sustain the source for this scheme. This problem became apparent to MWSSB during 1991, although construction work had started on some elements of the scheme prior to 1990. The Tapi is a notified river and so comes under the control of the state Irrigation Department (ID). MWSSB therefore applied to the Irrigation Department for permission to lift 3.6 Mld for this scheme. In response the ID advised that this was acceptable but that 4 months storage had to be provided to cater for the period February-May when river flows could not be "guaranteed". The period of 4 months was defined by the ID. Work done elsewhere (Vincent, 1993) suggests that things are not as simple as this, see Table 1. Not only does the water have to be available (a minimum of 3.6 Mld or 42 l/s) but it has to be capable of being drawn. Shallow flows or those which meander from the intake are of no help even if sufficient in quantity.

From January 1992 to the present time MWSSB have been attempting to find a viable solution to this problem. They have had assistance from ODA, the state Ground-

Table 1: Periods of low flow at Sukwad gauging station, Tapi River

Year	< 10 m3/s	< 2 m3/s	< 1 m3/s	< 0.5 m3/s
1985/86	15 Nov – 16 Jun	12 Apr – 16 Jun	1 Jun – 16 Jun	1 Jun – 16 Jun
1986/87	1 Oct – 17 Jun	9 Feb – 17 Jun	15 Apr – 31 May	28 Apr – 31 May
	11 Jul – 16 Jul			
1987/88	15 Sep – 13 Jun	17 Jan – 10 Apr	1 Feb – 16 Mar	1 Jun – 13 Jun
		1 Jun – 13 Jun	4 May – 15 May	
			1 Jun – 13 Jun	
1988/89	1 Dec – 16 Mar	1 Mar – 23 Mar	27 Apr – 6 May	
	1 Apr – 31 May	15 Apr – 6 May		
	1 Jun – 18 Jun	30 May – 31 May		
1989/90	28 Feb – 1 Apr	6 May – 14 May	6 May – 14 May	6 May – 14 May
	13 Apr – 17 May	1 Jun – 12 Jun		
	1 Jun – 12 Jun			

water Survey and Development Agency (GSDA), the ID, consultants (both local and from UK) and local communities (by providing local knowledge).

It is now emerging that the most likely solution to MWSSB's problem is one identified by local communities. It took some time for MWSSB and others to be alert to this local knowledge.

The problem can be defined as one of hydrological information and water resource management. However other factors have had a bearing and these are discussed below. It should not be forgotten that different stakeholders would define the problem in different ways. There are institutional limits to the ways in which a problem will be defined. It follows therefore that there can be institutional solutions to such problems.

Source problem 2 - the 56 village scheme

The existing Girna irrigation reservoir is the source for this scheme. There is no problem of water availability here, the problem was one of "too much" water which caused construction delays at the intake.

Construction of the headworks (intake) started in 1990. During the monsoons of 1990, 1991 and 1992 the construction site was inundated by rising water levels in the reservoir. In fact, in 1991 and 1992 the water levels did not fall sufficiently low, for a long enough period of time in the later months of the dry season (January-May), to allow any substantial construction work to be undertaken.

Figure 1 shows a plot of reservoir level against time over the past few years since the Girna Dam was impounded. Key construction levels are shown. The plot shows that a low-level cofferdam will only allow short periods for construction. The risk taken by the contractor was to build such a cofferdam to a level high enough to allow the works to be constructed but low enough to keep costs to a minimum. The gamble failed in 1991 and 1992.

The risk taken by the contractor was understandable when the contractor is only likely to win the work by tendering the lowest cost. Since this time MWSSB have considered developing procedures for pre-qualification of contractors where works are particularly difficult.

Eventually advice was sought by MWSSB from the ID regarding the height and safety aspects of the cofferdam. In response the ID recommended construction of a cofferdam to the same level as the crest of the Girna Dam itself, with substantial zoning and clay core material in its structure, enough to make it worthy of a permanent earth embankment. Such a proposal was the lowest risk option, very cautionary, but prohibitively costly as far as the contractor was concerned.

In 1993 the contractor gambled again, and won. A new, "medium" height, cofferdam was built, MWSSB revised some construction details and good progress on site enabled permanent works to reach a level above any possible water levels during that year's wet season.

Unlike the 51 village scheme the problem here has been solved. It was essentially a site investigation and construction management problem. But, as stated above different stakeholders would define the problem in different ways. The contractor might define it as a problem of natural causes that was outside his capacity to solve; MWSSB might define it as a problem of contractors' tendering and appointment procedures (lowest cost = least experienced ?); the donor might define it as a problem of poor management or poor design.

Problems encountered - engineering or institutional?

The two problems described above are different - one was a problem of insufficient water, the other was one of abundant water. The two problems can also be considered as similar - both having their roots in inadequate source assessment in its broadest sense; that is, source assessment for security, quality, quantity, time, place, construction, operation, legality, etc.

If the problems are considered as being different technically, in engineering terms, but at another level having the same root cause, then this proposition can be analysed

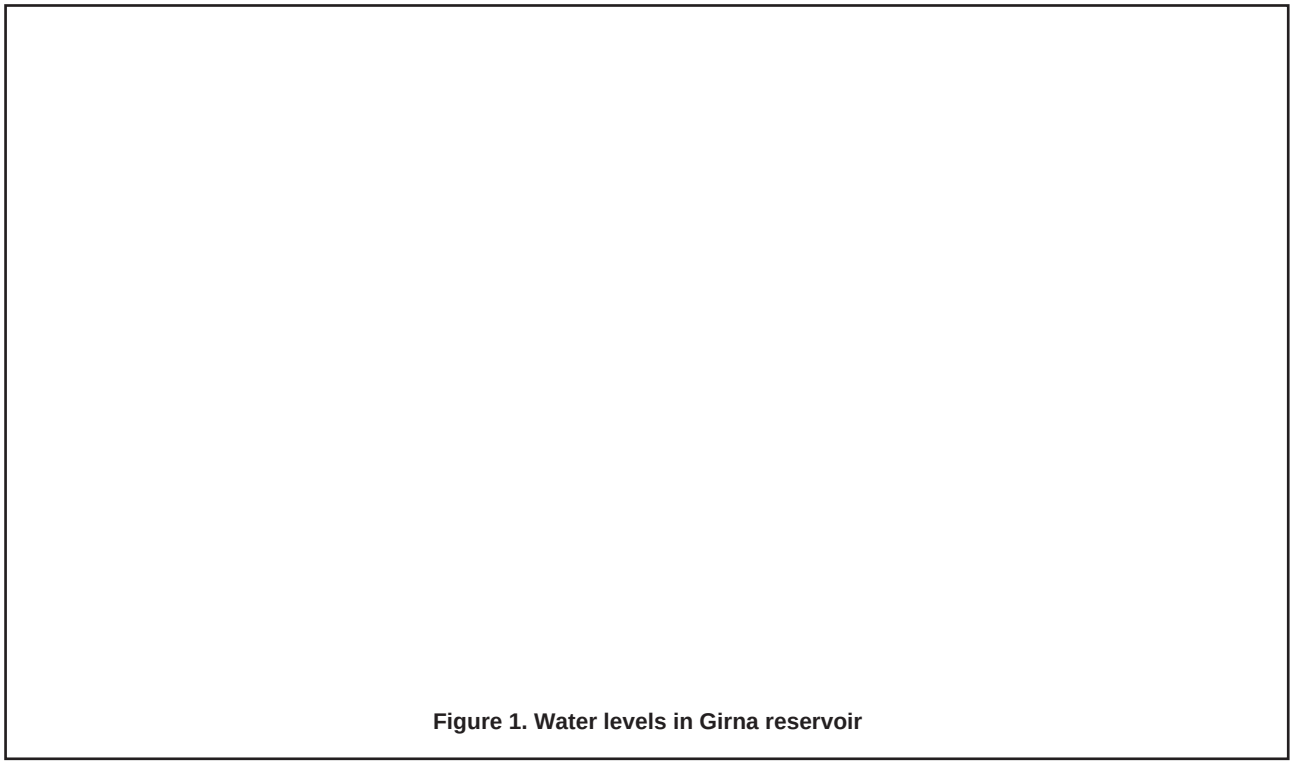

Figure 1. Water levels in Girna reservoir

further to identify institutional or sectoral problems and solutions.

Institutional analysis

The MWSSB was created as a semi-autonomous board in 1979. It was created out of the GoM Public Health Engineering Department (PHED) which came under the authority of the Urban Development Department (UDD) at that time.

The MWSSB is staffed professionally by public health engineers with their main activity being domestic water supply. The main scope for gaining different experiences is to move between urban and rural work. Occasionally senior staff have been deputed to the Maharashtra Pollution Control Board (MPCB).

In a similar way engineers of the Irrigation Department do not move outside major, medium and minor projects work. Different roles between those involved with resource mobilisation and command area development do exist.

On the emergence of the problems described above, good communication and co-operation was required between these 2 agencies who have different views of the water resource, different needs and different available skills and experience.

The ID are primarily concerned with storing as much water as possible by the end of the monsoon period and releasing it in 2 main crop growing periods. Their water planning is in terms of large volumes of water (millions of cubic metres) in blocks of releases at intermittent times.

On the 51 Village scheme problem of water availability, the need for a continuous flow at the source of about 1 cumec is very small compared with agricultural demands. The matter for the ID is perhaps one of routine administration of a small abstraction request whereas for the MWSSB it is the critical need. It is therefore not surprising that the ID's proposition that MWSSB provide 4 months storage was superficially dealt with by a statement on the abstraction permit without the full consequences being considered.

On the 56 Village scheme problem of inundation of works, the need for good analysis and understanding of reservoir levels during the drawing down period was essential. This is essentially the opposite of the ID's main concern which is about how full the reservoir is and how much water is available for use in the next growing season.

The ID dam projects are currently moving from planning dam projects based on 75% reliability to 50% reliability as there are fewer good sites available. This has very significant consequences for domestic water supplies which need 95% reliability. There is a conflict of interests between the ID, who "control" large surface water sources, and domestic water suppliers who need relatively small but regular flows.

In both cases described above the divergent needs of MWSSB and the ID have been simplified but they are very real. They appear again in the ID's response to the design of a temporary cofferdam, while a cautionary solution was provided it had limited practical application in the circumstances.

A similar divergence of data needs has recently emerged at the 80 Village scheme source in the Hatnur Reservoir on the Tapi River. The Hatnur Dam reservoir levels have

only been recorded in many years during the monsoon months, when it is filling. Few levels have been recorded since impoundment for the dry summer months. The security of this source now requires further checking.

Lessons to be learned

The main lesson to be learned from these experiences is that the various agencies involved with water in the state - ID, MWSSB, GSDA, MPCB, ZPs, PHD (water quality) and Maharashtra Industrial Development Corporation (MIDC) - need to increase their awareness of the resource needs, data needs and uses that other agencies have for water.

The solution to increasing this awareness between agencies may lie in training, regulations, information exchange and career development, or combinations of these. It can start on occasions such as the WEDC seminar.

Many people call for a river basin management approach to water resources, the author would support this but appreciates that it may not be a simple solution. Maharashtra does not need another layer of bureaucracy that might centralise data and information. Initiatives need to be taken that promote skill development and integrated information resources at local level, where the needs are.

In the interim MWSSB could consider setting up a "Source Assessment Cell" along the lines of their recently created Quality Control Cell. Such a specialist cell would be called upon to assess source adequacy and security or at least be responsible for co-ordinating the work of other specialists. It is understood that as a result of the difficulties encountered on the 51 Village scheme, in the World Bank supported project in the state, intakes are being limited to existing surface water bodies, no run-of-river intakes are to be used.

The Irrigation Department should be encouraged to gather and store data in SI units conforming to international norms and the needs of other users. They should also ensure that adequate data sets are maintained that cover periods of the year or regimes of flow that may differ from the ID's main needs but are likely to be of value to other water users.

Further institutional difficulties and institutional development

The above analysis has concentrated on one aspect of co-ordination and co-operation between organisations in the water sector in Maharashtra that could be improved. Others that could be discussed in a similar way include water quality monitoring, operation and maintenance and the overall planning process for rural water supply.

However, the difficulties that have arisen provide a wealth of information and experience that must not be forgotten. Improving the institutional memory is an important responsibility that all of us have (Kletz, 1993). This can be done by spreading the message on occasions such as the WEDC Conference, discussing the issues amongst colleagues, remembering the messages and creating comprehensive data bases of reports of problems in site investigation, design, construction and operation and maintenance.

By improving the institutional memory, the institutional environment can be analysed and understood more readily and in turn this will lead to sound institutional development taking place - an essential ingredient in producing well designed projects and sustainable development.

The costs of not developing the institutions, not making information more freely available and not making institutions and professionals accountable for their performance will be serious for Maharashtra towards the turn of the century.

Institutional constraints must be relaxed if water resource constraints are not to have severe consequences for the people of Maharashtra.

References

[1] Kletz, Trevor; Lessons From Disaster - How Organisations Have No Memory and Accidents Recur; Institution of Chemical Engineers; Rugby; 1993.

[2] Vincent, Linden; Water Resources Availability and Water Development Institutions in Maharashtra State; unpublished project consultant's report; Overseas Development Institute; 1993.