SHARING COMMON WATER RESOURCES

A case study on urban expansion and implications for rural and agricultural development

(Report to SIDA)

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Contents

The purpose of this paper is to present the background and the main issues of the project. Details of the four sub-projects (see chapter 4) are being worked out. A progress report containing theoretical aspects, research methodologies etc. is supposed to be ready by the beginning of 1993. The project is designed for a three year period. It is financially supported by SIDA.

1. Nordic Initiative Principles - an interpretation through case study

The project has a dual objective; it is an attempt to assess how the principles forwarded through the Nordic Initiative relate to established policies and practices (P&P) in water resources management. It will also attempt to specify the significance and the modalities in modifying P&P. Considering the mounting water scarcity in many parts of the world, especially in poor countries, and the experience of past water supply projects - many of which have been supported by the Nordic donor agencies - two principles were identified that should be implemented in water resources projects, *viz*:

* water and land resources should be managed at the lowest appropriate levels; *principle 1*

* water should be considered as an economic good with a value reflecting its most potential use; *principle 2*

The focus of the discussions during the meetings of the Nordic Initiative was on rural areas and small towns. In addition to the two principles mentioned above, it was emphasized that water management (comprising its assessment, development, allocation, pricing, utilization and disposal), must be done within the contexts of catchment areas and with due consideration to up-stream and down-stream interactions and interdependencies. It is only through this approach that it will be possible to integrate management of land and water resources. A catchment or basin approach is also a pre-requisite for assessing the relative needs of various communities and sectors and thus for the design of proper allocation criteria.

The Nordic Initiative was the result of a concern among the Nordic countries (Denmark, Finland, Norway and Sweden) about the serious challenges associated with water resources management and the inadequate implementation of the Mar del Plata Action Plan (1977). In order to contribute to the preparations for the UNCED conference (Rio, June 1992) and the International Conference on Water and Environment, ICWE, (Dublin, January/February 1992), the Nordic countries, in close cooperation with interested partners in developing countries, have played an active role by organising seminars, case studies and through active participation in various preparatory meetings.

The two principles quoted above are very much reflected in the Dublin Statement. In addition, it emphasised that water is a finite and vulnerable resource and that women play a central role in the provision, management and safeguarding of water.

1.1 Management at lowest appropriate levels

Principle 1 presumes that *if* decisions about water and land resources management are taken at level(s) where the diverse human needs and demands are articulated and where utilization occurs, *then* resource management will be more flexible, better tuned to social and cultural criteria, environmentally sound, efficient etc. All this as compared to a situation where decisions are taken on behalf of beneficiaries living far away from the level of the decision-making. Centralized decision-making and a bias towards technical and sectoral considerations have proved ineffective and inappropriate in achieving the desired objectives of water resources development on a sustained basis.

The presumptions are thus partly based on the frustrations of poor performance that has been amply demonstrated through a great number of schemes carried out during recent decades. This refers to a cross-section of projects within the irrigation as well as the household water sectors. They are also based on the simple logic that the people themselves are the best to decide what they want and to make relevant judgements about what type of facilities would serve their various needs and capacities best. Decisions made by the people themselves will be the best guarantee to invoke a sense of ownership and command of facilities and thus promote responsibility for the much needed maintenance and care of water schemes and sources.

What can be done by the communities themselves is a neglected issue and local action may even be discouraged. The role of women is a case in point. In spite of numerous references to the role of women, their possibilities of contributing to improved water management are limited. The same principles are formulated in 1992 as were hailed at the introduction of the International Drinking Water Supply and Sanitation Decade. It is with the role of women in water management as with the weather; a lot of people talk about it but few do anything serious to change the situation. It is also surprising that the role of children as a resource in this connection is not addressed. We learn about children as the victims of poor water and sanitation, but rarely as the potential agents for change and as the generation that will take over.

But there is more to it than that; for the communities to be involved and agents of their own development and to care for the environment, it will not be enough to assure them the right to participate or even to take decisions about their schemes. The decision-making levels must also be economically and legally empowered to implement the decisions taken and be responsible for them. It is through these presumptions and precondtions that the idea of a

demand-driven approach should be adopted for the development of management practices and appropriate institutions.

Principle 1 does, however, not preclude that certain decisions should be taken at higher levels or that people at those levels should be involved in decision-making concerning the local level. At least three circumstances illustrate the need to involve various levels in the decision-making process.

First, the very concepts of catchment and river basin would not make sense if there was no coordination between decisions taken by various communities at local and other levels. There is obviously a need for some institution at the regional and/or central level through which, for instance, up-stream and down-stream issues are attended to.

Second, access and entitlement to resources, like land and water, and community services at the local level - or at any level for that matter - are seldom uniform. And community-based decisions are certainly no guarantee that intra-community disparities and repressive behaviour (which could be based on gender, age, caste, religion, land ownership etc.) are curbed. Livelihood conditions in local communities guarded by sometimes unfair attitudes can be quite harsh and far away from lofty visions of harmonious and self-contained units. It is an important task for the authorities to support the common (Wo)Man - and Child - wherever injustice occurs and to neutralize the forces striving to sustain inequalities and status quo.

Third, there is an increasing need to consider a regional and sectoral re-allocation of water. People living in areas well endowed with water will have to share the water that is currently accessible to them with people living elsewhere who are less fortunate in this regard. A special case in this regard is the growing need and demand for water in expanding agglomerations.

In large parts of Coimbatore District, which is a hard-rock area with erratic and low precipitation, it is extremely difficult for village communities to cater for their own water needs, even for household drinking water. The groundwater table has been lowered continuously for decades. The Tamil Nadu Water Supply and Drainage Board (TWAD) has equipped many villages with hand- and power-operated water lifting devices. However, these do not meet the full requirements and during summer seasons water availability gets substantially reduced, partly due to frequent cuts in power supply. Under these conditions, one of the main options for many villages and townships is now to get water from upper reaches of the Bhavani river, like the Pillur diversion. The Bhavani river, however, is also the main water source for irrigation in down-stream areas (see map on p 6).

The role of central bodies is to stimulate the inter- and intra-community decision making process towards a just, efficient and sound management of water (and other) resources. In the jargon of the international seminars; the role of the central authorities is to enable communities to carry out what they consider best, not to command them to do what the centre thinks best.

1.2 Water as an economic good

Water has generally been taken as a free good. Even in connection with very costly water development schemes, the subsidies (in one form or another) have been and still are quite substantial. Free or heavily subsidized goods with a high use value, like water, will often be conspicuously wasted regardless if it is scarce or not. However, the rationale for subsidies in the water sector is primarily to satisfy social objectives, not to lower the costs of viable economic activities. The failure to charge well-to-do consumers in accordance with the cost to supply water (or its opportunity cost) and to include external, environmental costs is obviously due to many circumstances, among other things strong lobbies that thwart any attempt to have a proper pricing policy and legislation. Expressed in other words: the institutions that are involved in the management of water resources do not have the capacity to deal with the challenge in an appropriate manner.

Current P&P foster inefficient allocation and stimulate non-sustainable withdrawal rates, for example, from groundwater sources, and often lead to significant pollution. Increasing scarcity together with the escalating social, economic and environmental costs of water management, necessitate a new approach. The increased awareness of growing scarcity, which recently has been demonstrated in many fora, is certainly important for promoting institutions that may adequately deal with the current and future challenges.

Three issues are of special relevance in this project. One is cost recovery. This is assumed to be much less of a problem if *principle 1* is adhered to. Anyway, the capital and recurrent costs of schemes which are currently under construction are in general significantly higher as compared to previous schemes. This is, for instance, the case with the Pillur project (see 2.2, page 8). It is relevant to analyse how costs of various schemes differ and at what decision-making level pricing policies are formulated and executed.

The second issue is related to this and concerns the question of who should be charged and to what extent subsidies should be used. Related to this is the

question of how much water should be supplied to various communities and how to get the priorities right between the various users in times of scarcity.

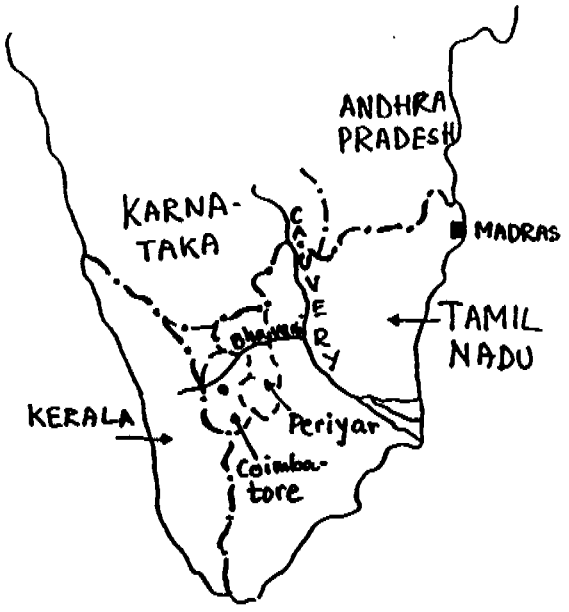
Although it is politically sensitive to decide about subsidies - especially their removal - a third issue is much more complex. It refers to the potential benefits that could be achieved with an alternative allocation of water. In other words, what are the opportunity costs associated with the current allocation of water. Conventionally, the opportunity cost is equated with the "value" attached to water by a consumer, who is deprived of water because somebodey else gets it. The value is supposed to be reflected in the consumer's willingness-to-pay for the water foregone. However, in settings where water for long has been conceived as "free" to have and to pollute, such estimates are bound to miss essential aspects of the problem.

The recognition of water as an economic good *does not* mean that the plight and burdens of poorer sections of the community will increase. To recognize the value and the cost of water does not mean that charges should be levied on all segments of the population on an equal basis. Allocation of water must first satisfy fundamental human needs. Assurance must be given so that enough water of adequate quality is provided to guarantee subsistance. This notion is a basic feature in Tamil Nadu where drinking water has first priority which is widely accepted. Water supplied through community taps is not charged for because of the above premise.

But the number of taps and the volume of supply through these taps is far below the need. Under these circumstances, the poor have either to rely on unsecure and unsafe water or to get it from vendors. As confirmed by many studies, the poor are often paying proportionately more than the well-to-do sections of the communities, in terms of cash expenditure, efforts and in terms of health hazards. This is, for example, the case where water vendors operate. They sell water at high prices and this trade has assumed significant proportions, not only in cities but also in rural areas, as a consequence of increasingly diminishing water supply status. What holds true for most spheres of life, is also applicable to the water sector, - it is costly to be poor.

Treating water as an economic good is primarily intended to raise awareness about the value and scarcity of water and to develop criteria to allocate water to such uses where it can best serve social and economic needs and demands. In addition, it will provide a basis for judgements about how and whom to charge. It is the *ability* rather than the *willingness to pay* which must be the guiding principle for pricing policies.

2. Case Study: Escalating and New Demands on Bhavani River Waters , Tamil Nadu



Tamil Nadu is one of the States in India where livelihood and environmental issues are very much related to options in water resources development and management. In the semi-arid Coimbatore and Periyar districts, for instance, the annual precipitation is about 650 mm while the potential evapotranspiration is as high as 2000 mm. A number of rivers, most of which originate in the Nilgiris and the Western Ghats, run through the area and feed ground water reserves, reservoirs and tanks for irrigation and also serve direct water uses (Figure 1).

Figure 1. Location of area for case study

The use of wells to exploit ground water resources has a long tradition in the area. Open wells dot the landscape and recently borewells have become common. Pumping of ground water from these wells has expanded much beyond the recharge of the aquifers. This development is facilitated by the fact that Coimbatore is one of the main centres in India for manufacturing pumps. The result for the environment and accessibilty to water is, however, alarming. Water tables in wells have annually been lowered on average by one meter or more for several decades, or by some 40 to 50 meters since Independence. The consequences for poor people in particular are - as usual - quite noticeable with increasing hardship to draw water from these depths.

Availability of surface water in the area is very much conditioned by erratic and low rainfall. River flow is also showing significant variations (see Figure 3 showing inflow to the Bhavani Reservoir). Although there might be particular problems related to the various water sources, they are intimately related with each other. The total water resource in the area is limited, vulnerable and, for all practical purposes, finite.

The main use of water in this area, as well as in many other parts of India, is for agricultural purposes. About 90 per cent of the water extracted goes to the production of food (paddy, cholam, ragi) and raw material to the industrial sector (cotton, sugarcane, groundnut). The water consumption of households, public utilities and industries is, however, increasing due to population growth and social and economic development. In particular, the demand and need in cities and other agglomerations is escalating.

2.1 Re-allocation of water a new problem

Since the demand of water is growing while the hydrological characteristics of the area put a limit to how much water can be made accessible, problems of water allocation and its reallocation will increasingly be much more challenging and important than conventional concerns about its development and supply. This is compounded by the growing voice of urban interest groups that will pressurize authorities to meet their requests. A number of circumstances seem to strengthen the "urban bias". At the same time it is true that the majority of the population are rural. The vote bank may thus not coincide with the public voice influencing day-to-day policy.

The comforting circumstance in the escalating and potentially conflicting demand for water (re)sources is that the urban need for water for most industries, households etc. is fairly limited in quantitative terms compared to the amounts used in irrigated agriculture. In theory, the additional demand from the urban areas could be met if water use efficiency (WUE) in the agricultural sector increased only marginally. A great number of studies on WUE in irrigated agriculture, and with particular reference to surface canal irrigated agriculture, suggest that WUE is about 50% or below.

By increasing efficiency in conveyance, duties, etc., substantial amounts of water could be released from the agricultural sector and diverted to meet growing urban demand *without* loss of production, employment opportunities etc. in the agricultural sector. Expressed in economic terms, there is a high opportunity cost associated with current allocation of water between the rural and urban sectors. Even if the agricultural sector is analysed separately, the tendency to go for water-intensive crops, like paddy and sugercane, reveals that a low value is attached to water. This is the case also in water scarce areas. Official signals to the farmers tend to support this attitude. Electricity supplied to pumpsets to lift water is, for instance, free in Tamil Nadu since a few years back. In surface irrigated schemes, the farmers are paying a nominal per-acre fee which by far undercuts the recovery of capital and recurrent costs.

2.2 The Pillur diversion

Presently, the World Bank is financing a diversion project that by its completion in 1993 will divert water from Pillur (the point of withdrawal along the Bhavani river) to Coimbatore city, 20 small towns and 523 villages located along the pipeline. The scheme is expected to mainly satisfy urban household water needs apart from some supply to public utilities and drinking water to industries. However, it will naturally cause a reduced inflow to the Bhavani Reservoir and may thus affect the two irrigation schemes below the reservoir (Figure 2).

When in operation, the Pillur diversion will mean that about 2 TMC (Thousand Million Cubic feet) of water will annually be withdrawn from Bhavani river. This represents about 3% of the 70 TMC of water that is supposed to be available for the two irrigation schemes in the lower reaches of the Bhavani river (see map on Figure 2). Farmers in the Old Bhavani (OB) irrigation scheme have riparian rights to 34 TMC of water, that is, they have priority rights over the farmers in the Lower Bhavani (LB) scheme who are supposed to receive the remaining 36 TMC.

Now, the problem is that quite often the amount of water available in the Bhavani Reservoir has been substantially below the presumed 70 TMC (Figure 3). During years when the amount is, say, 50 TMC or below, it means that the farmers in LB will only get 16 TMC or less after the 34 TMC have been allotted to the OB. In those years, a withdrawal of another 2 TMC through the Pillur diversion, will represent 1/8 (12.5%) or more from the water that LB farmers would get, had the diversion not been there. This is, of course, quite another situation for the farmers as compared to the overall 3% in years of good water supply. But it might be worse than that. The farmers argue that the amounts withdrawn to the urban system will multiply. In a pamphlet distributed by farmers in the LB scheme (December 1991), they argued that 10 TMC will be diverted - and not 2 as officially stated. If 10 TMC were to be subtracted from 16 TMC in the example above, *ceteris paribus*, it would certainly be a drastic blow to the farmers in LB and leave them with only 6 TMC against the supposed 36 TMC.

The allegation by the farmers was echoed in the press. It is obviously an exaggeration simply because the tunnel through which the water will be taken does not have a capacity to deliver more than about 4 TMC (personal communication at project site, September 1992). Anyway, the claims by the farmers could be seen as a strategy to pressurize the authorities to find other

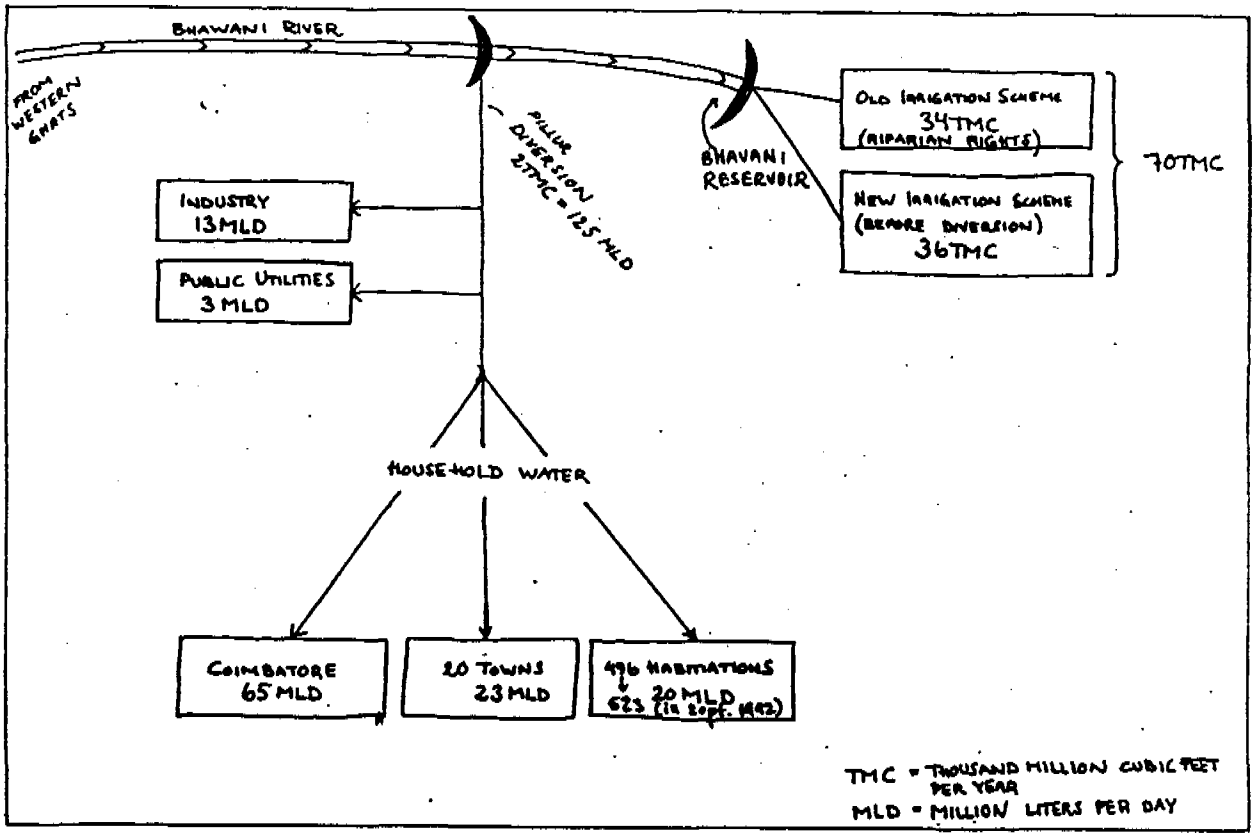


Figure 2. Schematical map of the main current and future water use an d allocations of the Bhavani River waters

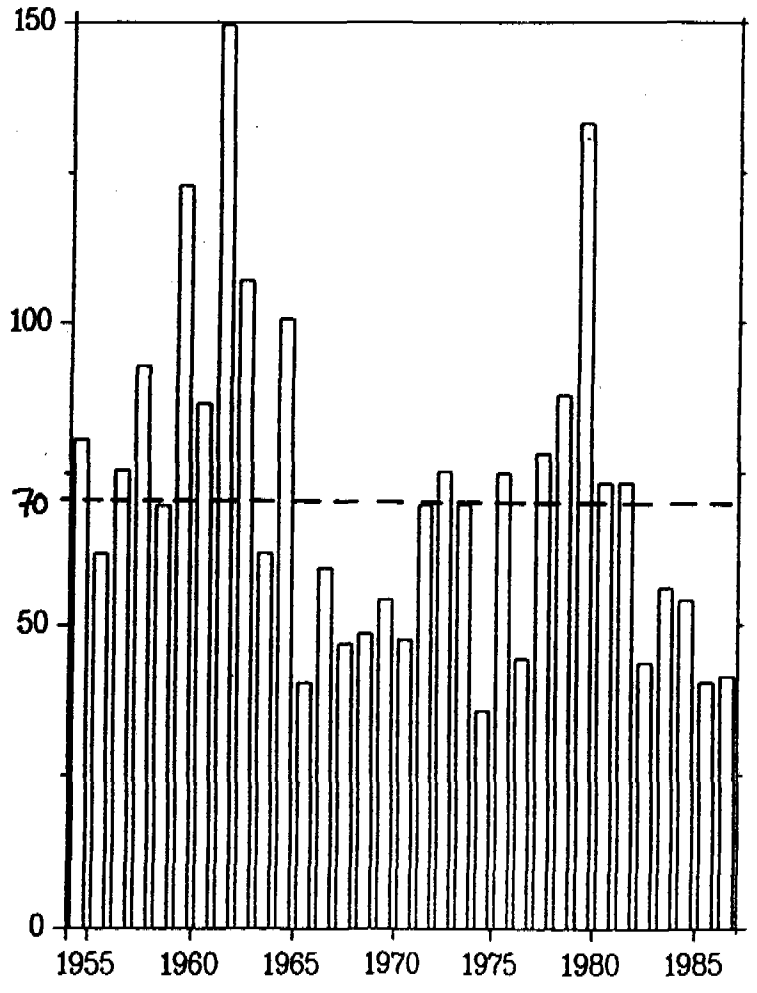


Figure 3.
Total inflow to the Bhavani Reservoir (TMC - Thousand Million Cubic feet)

solutions. (For instance, demands for a project that will link major rivers in the southern part of India.). But it could also be seen as a sign of real worries about growing demands for water from interest groups in urban areas. A support for this worry is that apart from the Pillur diversion, there are two other big diversions from Bhavani now being built. And there are diversion schemes in other parts of Tamil Nadu. It is furthermore important to note that during the period from initiation of the Pillur project till today (from 1988 to September 1992), the number of villages that will be supplied with water from the project have increased from 476 to 523. Villages located along the pipeline have simply been included in the scheme.

2.3 Scenario implications

In addition to the usual threat of insecure and insufficient amounts of water as a result of the vagaries of Nature, the farmers are naturally concerned with what they obviously see as a growing threat to their trade. The variation in water availability as a result of variations in precipitation is evidently much greater in quantitative terms than the reduction caused by the diversion schemes currently under construction. Reductions through Mother Nature are certainly unpredictable. But the man-made reductions through diversions are permanent and they are likely to increase.

In summary, the Pillur diversion highlights the need to develop a coherent policy on a watershed basis with regard to the allocation of scarce but common water resources between competing users in a rural-urban context. Prevailing policies are supply and site oriented and cater mainly for individual user demands and needs in specific locations (households, irrigation, etc.). Re-allocation of water from the current to another use pattern has generally not been taken into consideration. As indicated above, a number of circumstances contribute to a radically new situation that is emerging in large parts of Third World countries. *In theory*, the transfer of water resources from the irrigation-rural sector to urban sectors is not seen as much of a problem. *In practice*, however, the transfer is likely to be infested by socio-political disturbances and be hampered by the lack of appropriate institutional and administrative capacities.

With reference to the principles of the Nordic Initiative, some significant issues may be noted. It does not require much imagination to assume that if all the various communities, who are increasingly dependant on waters from Bhavani River - the farmer communities in OB and LB Schemes, thousands of villages, people in a number of townships and in Coimbatore city -, were to decide about how much water they should have, then the aggregate demand on the shared water resources would most likely outstrip available

supply. With a rapidly expanding population such a situation will, of course, be even more problematic in the future. On the other hand, it seems obvious that it is the combination of centralized and sector-oriented decision-making *without* a catchment approach and in the void of a realistic pricing policy, that contributes to the problematic situation.

This case study may illustrate the need to stimulate and enable the various local communities - not single interest groups - to improved water management. It will probably also illustrate the need to coordinate many levels in the decision-making process. Finally, the multi-facetted value and significance of water and its scarcity must be better reflected in policies and decision-making processes.

3. Focus of Project

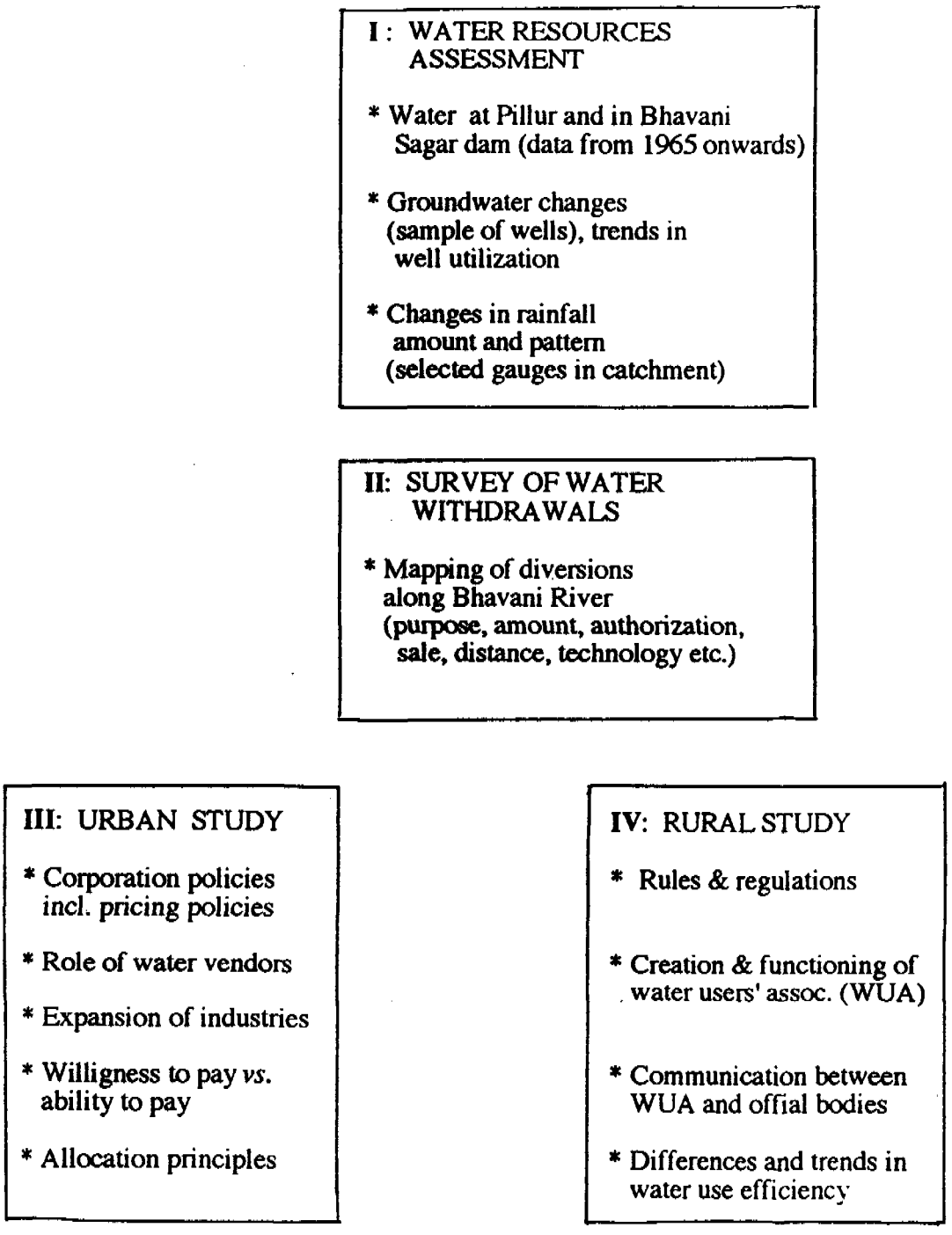
A prime objective is to identify weaknesses and strengths in the current P&P. Attention will be paid to competing and conflicting demands over shared water resources, that is, within and between the urban - rural complex. Special concern should be given to the creation and functioning of formal and informal institutions involved in the water sector like water users' associations and how they represent various interest groups. The creation and functioning of the various institutions must be seen in relation to (i) decision-making units representing various geographical areas and sectors, and (ii) rules & regulations - policies - implementation and how the flow of ideas, directives, decisions move in the social and political-administrative systems.

The functioning of many local level organizations in the area is very much disrupted since a few years back due to a postponement of elections to political bodies. Moreover, most decision-making units have very weak executive power due to lack of revenue and other funds.

With reference to *principle 2*, it is important to state that the objective of this project is not to make a detailed economic calculation as such. The purpose is to highlight the magnitude of the social and economic gains and losses that are associated with the current and proposed allocation of water from Bhavani river. Based on this analysis and various possible scenarios, the purpose is to discuss the institutional aspects of water management. Special attention will be given to the institutional implications of the re-allocation of water through the diversion schemes from Bhavani.

4. Sub-projects

The graph below summerizes the various sub-projects.



The four sub-projects have been agreed upon in discussions with project leaders in Coimbatore and Madras (see next page).

5. Time Table and Practicalities

The orientation of the project and the focus on the sub-projects have been discussed during the spring-summer of 1992. Contacts have been established with key persons to be involved in the project and with institutions responsible for various aspects in the water management complex. Repeated visits to the various field sites for the study have been conducted and the logistics of the work has been worked out (transport, writing equipment; PC and printer, communication; fax etc.). Equally important, we have access to official information which is not readily available.

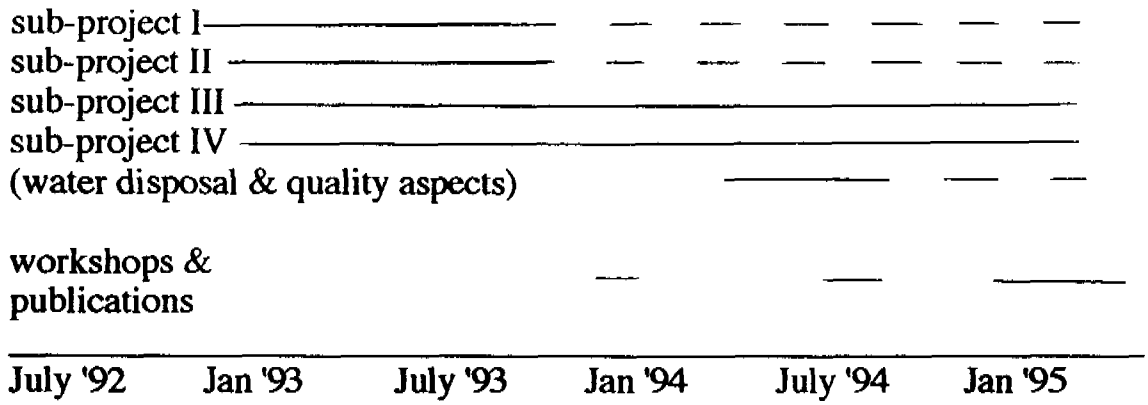
A lot of information on sub-project I is already collected. The analyses are, however, quite complex and data need to be scrutinized. For sub-project II, the major diversions are known but in addition there are a number of small schemes which have not been looked into. A survey about water withdrawals from the Bhavani river can be carried out within a limited period of time. Based on this, we will decide how to proceed.

A number of studies related to sub-project IV have been carried out by members of the research group. Especially concerning the downstream use of water in the two irrigation schemes: Old Bhavani Scheme and the Lower Bhavani Scheme. There are, however, no studies about the institutional aspects and how the communities react on the increasing need and demand for water from other sections and groups in the District downstream. Similarly, there are no studies related to sub-project III.

Sub-projects III and IV will therefore require more careful study and involve the current situation, that is, before the Pillur diversion is in operation, and how the situation will change as a result of water being taken from Bhavani and supplied to Coimbatore city, the 20 townships and the 523 villages.

An important part of the project will be workshops where the findings of the various sub-projects will be presented and discussed. It is not only the academic aspects that should be discussed but also the policy implications.

The duration of the various sub-projects are tentatively outlined in the graph on next page.



6. Personnel

It is essential to have people involved in various capacities:

Capacity	Main task	Group
Advisory & contact group	assist in design of the study, participate in seminars, individual consultations; to assist in designing startegies for implementing the modification of the P&P	To be decided
Project leaders	responsible for the execution of sub-projects	R.K. Sivanappan P. K. Aiyasamy K. Palanisami P. Appasamy
Principle project leader	coordination of sub-projects, contacts with and reporting to authorities in India, SIDA and colloborative partners	Jan Lundqvist
Researchers & field assistants	field work, tabulation, analyses	Students from Sweden and India

7. Charge for Water - an example

To give an idea of the variation in the charge for water some figures about how it applies to individual household connections in Coimbatore city and to farmers in the Lower Bhavani Project (LBP) will be given.

For irrigation water: The farmers in LBP pay a land tax which is supposed to include the payment for water. The tax varies between the 1st season (August 15 - Decemebr 15) when they get relatively more water to be able to cultivate paddy, and the 2nd season (December 15 - April 15) during which the farmers are supposed to cultivate "dry irrigated crops" requiring comparatively less water. During the 1st season the water duty is 1 cusec (cubic foot/second) for 60 acres. This roughly corresponds to 1.5 meters of water for the entire season. The amount of water supplied to the farmer is thus 1.5 x 4,000 = 6,000 m3 / acre for the 1st season. They thus get about 400 m3 of water for each rupee paid as land tax.

House connection in Coimbatore: A minimum charge of 6 Rs/month is levied regardless of the amount used. This minimum charge will allow a "free supply" of 270 liters/day or about 8 m3/month. For additional water above the 8 m3, the household has to pay 5 Rs. up to 4.5 m3, another 5 Rs. for the next 4.5 m3 and so on. For a couple of ordinary households that we checked, the amount used during the last months is in the range of 10 to 12 m3. For this they are charged 11 Rs or about 1 Rs/m3.

If we compare the charge for water supplied to individual households in Coimbatore with the charge levied for irrigation water in LBP, the household pays about 400 times more per unit of water (1/400 Rs per m3 of irrigation water versus 1 Rs per m3 of household water supplied through private taps in Coimbatore).

A further comparison could be made with regard to how the above charges relate to the cost of providing water. Due to lack of time, it has not been possible to get any details on this aspect. However, some figures on the pumping water from bore wells may be of interest. For an "ordinary" well in Coimbatore District, the water table would be about 60 meters below ground. To operate the pump, a 5 hp engine is required. As it is now, the farmers do not pay for the electricity they use for pumping. If they had been charged the same rate as currently is being charged to the industrial sector, that is 1.8 Rs/KWh, the cost would be about 1 Rs. for 1.5 m3 (personal communication pump manufacturers in Coimbatore). There is now a suggestion that the farmers should be charged 0.20 Rs./KWh , which means that they could pump about 13.5 m3 of water for 1 Rs. To these figures should then be added the capital expenditure, maintenance etc.

As indicated from these very rough and preliminary calculations, the charge for water varies quite significantly. So far we have, however, not been able to make any detailed calculations on how charges relate to cost.

8. Budget (in 1,000 skr)

	92/93	93/94	94/95
A. Dept. of Water and Environmental Studies			
Faculty members, 4 personmonths á 45	180		
Researchers (Ph D students), 6 months á 25	150		
Travel and per diem	100		
University fee (12%)	52		
Sub-total	482	482	482
B. Collaborating partners in India			
Project leaders, 4 persons 4 months each*)	100		
Field workers, incl. local travel and per diem	30		
PC, stationary, fax communication etc.	40		
University fee	20		
Sub-total	190	190	190
C. Advisory & Contact Group			
Meetings and consultancy fees	25	50	50
Workshops and publications	-	65	65
University fee (12%)	3	13	13
Sub-total	28	128	128
TOTAL	700	800	800

*). I have used the same level of payment as practiced in other similar projects. The agreement means that we will pay a lump sum of 40,000 Rs per month for a project leader, which includes "everything". In reality it includes field workers. For a better view of various items, I have, however, split up the payment to project leader (and used 30,000 Rs/month) and payment to field personnel.