Private Sector Participation in Financing and Managing Surface Irrigation

Chasing A Mirage?

S. J. Phansalkar

1. Introduction

The net sown area in India is estimated at 142 million hectares (mha.). Surface water irrigation potential of 43 mha. was created by the end of 1994 while a potential of 41 mha. under ground water irrigation was created. (National Commission for Integrated Water Resources Development (NCIWRD), 1999) of which 31 and 38 mha. respectively were actually utilized. The ratio of the gross irrigated area (GIA) to the gross sown area (GSA) thus stood at 32 per cent by 1994. India had created a storage of 174 billion cubic metres (BCM) by the end of that year and another 76 was, in under construction at the time. The net sown area has nearly reached its physical limit in the country and as the population rises and the demand for food and agricultural commodities grows, there is no option but to increase the irrigated area. The ratio GIA/GSA has to reach the levels of 40, 45 and 52 per cent by 2010, 2025 and 2050 respectively to meet the food demand. This requirement means a huge net addition to the irrigation potential. There has been a phenomenal growth in new ground water capital (wells/tube wells and pumps) in the country. Shah estimates that nearly a million such tube wells are added to the

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1 This is a pre-publication draft. The author has benefited from and is grateful for the comments received on the preliminary draft of this paper and the seminar he gave on this subject at IWMI-Tata Water Policy Programme on August 3, 2005.

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A bulk of the investment in the ground water assets is privately funded (Mukerji and Shah, 2003). In any case, the investment in ground water irrigation infrastructure occurs in such a completely decentralized and almost uncoordinated manner that it is seldom thrown up as an instance of the crisis of the investment ability. In that respect it differs sharply from the investment problem of the surface water infrastructure.

An estimate of the necessary infrastructure is an extra storage of 178 BCM with an associated huge addition to the distribution network (NCIWRD, 1999). A broad estimate of the investment needed for creating such huge storage and distribution infrastructure was given at Rs. 5,60,000 crores by the Task Force on National River Linking Project (NRLP). This excludes such investments as are necessary for maintaining the ageing and often poorly maintained existing assets (World Bank, 2005). Quite admittedly, the river interlinking project is not yet a reality and hence talking of that as a pointer to investment may not make a convincing argument. But even in the absence of the interlinking project, large sums of monies are required for implementing the irrigation schemes proposed by the various states.

For instance, Maharashtra would need to invest a whooping Rs. 30,000 crores for completing the development of the water resources deemed feasible in Maharashtra. (Report of the Water and Irrigation Commission, Mumbai 1999, Chapter 16). Maharashtra’s tax revenue was Rs. 39,737 crores in 2004-05 (Report of the Eleventh Finance Commission, Annexure V. 23, p. 210). Thus the required investment is nearly three-fourths of a full year’s tax revenue for the state. The difficulty in finding government resources for making these investments is obvious.

Nor is it quite so easy to borrow for the purpose of making these investments. In 2004-05, Maharashtra had an interest burden of Rs. 6,803 crores (Eleventh Finance Commission, op cit), interest liability amounting to a little over 15.5 per cent of its tax revenue during the five year period 1995-99. Repayment of principal amounts of these debts is yet another burden. Adding further to the debt servicing requirements would be quite ruinous to the health of the state finances. What is of most Indian States. Interest payments, is smaller than this level of most Indian States (Tamil Nadu, Karnataka, Eleventh Finance Commission, Annexure V). The situation of most Indian States would be worse than that of Maharashtra.

Can the states tap the private debt investments? This was once viewed as a financing (Gulati and Raju, 1998). Maharashtra, among the other Indian States, had created special purpose vehicles in the market for funding irrigation projects. Partly to avoid showing heavy interest liability on its balance sheet and partly to bring in greater flexibility, Maharashtra had created special purpose vehicles in the form of corporations. Maharashtra set up five corporations raised money from the market at the prevailing market rates. The bond market became a source of financing. However, the market became glutted with tranches of bonds issued by the various states. Corporations and credit rating agencies were wary of them (see for instance CRISIL, rating of Vidarbha Irrigation Development Corporation, Phansalkar and Jagdeo, 2003). The difficulty was in getting high the prevailing interest rates. In seeking agreements from bond holders, it was well known. With high interest liability and low ratings, market borrowing is not easy.

Thus neither are the states in a position to raise it from the market. Ye must be created. External multi-lateral an option with a willing and eager to quadruple its annual lending to the world. Are these volumes adequate to cover the high interest rates. Hence there is an urgent need to broaden the sources of the invest!
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year and the “ground water dying down!” (World Bank, 2005). ground water assets is privately (11)). In any case, the investment in structure occurs in such a completely dominated manner that it is seldom from the investment problem of infrastructure is an extra storage huge addition to the distribution road estimate of the investment huge storage and distribution of 6,60,000 crores by the Task Force project (NRLP). This excludes such for maintaining the ageing and assets (World Bank, 2005). Quite project is not yet a reality and debt to investment may not make a in the absence of the interlinking re required for implementing the the various states. would need to invest a whooping the development of the water Maharashtra. (Report of the Water Mumbai 1999, Chapter 16) Rs. 39,737 crores in 2004-05. Commission, Annexure V. 23, p. ent is nearly three-fourths of a full the difficulty in finding government estments is obvious. borrow for the purpose of making Maharashtra had an interest burden ance Commission, op cit), interest per 15.5 per cent of its tax revenue 99-99. Repayment of principal other burden. Adding further to s would be quite ruinous to the health of the state finances. What is true of Maharashtra is true of most Indian States. Interest payments, as a proportion of tax revenue, is smaller than this level of 15.5 per cent only for three Indian States (Tamil Nadu, Karnataka and Madhya Pradesh) (Eleventh Finance Commission, Annexure II.5). Thus clearly, the situation of most Indian States would be similar if not far worse than that of Maharashtra.

Can the states tap the private debt market for making these investments? This was once viewed as an innovation in irrigation financing (Gulati and Raju, 1995). They certainly tried. Maharashtra, among the other Indian States had raised money from the market for funding irrigation investments in the years 1998-2002. Parity to avoid showing high debt on its own balance sheet and partly to bring in greater business discipline the state had created special purpose vehicles in the Irrigation Development Corporations. Maharashtra set up five such corporations. These corporations raised money from the market by issuing bonds at the prevailing market rates. The bonds were guaranteed by the state. However, the market became weary when subsequent tranches of bonds issued by the various Irrigation Development Corporations and credit rating agencies started downgrading them (see for instance CRISIL downgraded bonds issues of Viharsha Irrigation Development Corporation as narrated in Phansalkar and Jagdeo, 2003). The difficulties faced by Gujarat in either swapping the high interest rate Narmada bonds or in seeking agreements from bond holders for their early maturity are well known. With high interest liabilities and plummeting credit ratings, market borrowing is not easy.

Thus neither are the states in a position to find money to invest in irrigation from their own revenue nor are they in a position to raise it from the market. Yet an irrigation infrastructure must be created. External multi-lateral aid can of course remain an option with a willing and eager World Bank that plans to quadruple its annual lending to the water sector. However, neither are these volumes adequate to cover the full need (the Bank is talking of raising the lending to US $ 800 million or Rs. 3,300 crores per year) nor are they free of political, social and financial costs. Hence there is an urgent need for considering options at broadening the sources of the investment funds.
2. Conceptual Issues in Irrigation Financing

The Indian State is in a difficult financial situation and cannot find money to invest in irrigation. The whole tone of the discussion on irrigation financing is one of helping the State in a difficult situation. But should this be the case? We need to understand clearly whether the State ought to be investing in irrigation at all and if so in which components of the irrigation projects and for what reasons. Merely because the State had invested in the irrigation infrastructure in the past does not mean that it ought to be doing so forever. Similarly, merely because the investments in the surface irrigation infrastructure are chunky and beyond the capacity of the private investors, that does not imply that the burden rests logically with the State. We need to understand the nature of the investment, its risk profile and the profile of the stream of benefits it creates in order to come to a focused conclusion and then, go on to suggest ways of finding feasible means of generating resources. The task is attempted in this section. The reasons why surface irrigation infrastructure is deemed fit for public investments are listed below:

Reason 1: The Ownership of the Resources Vests with the State:

The State owns the surface water resources. Individuals and groups have an easement right over the flow in the streams to which they are riparian, but the ownership rests with the State (Chhatrapati Singh, 1991). Similarly, the ownership of the forest or the revenue wastelands on which much of the infrastructure is to be located also vests with the State. It is not legally easy nor socially or politically simple for the State to assign/lease its rights away to private parties on water resources or forest lands, as recent events such as the Janmabhoomi case in the case of forest lands in Andhra Pradesh or the Sivanath river case in Chhattisgarh, demonstrate. Even if eventually the State may be able to create rights in these resources at the hands of the private investors, the process is expected to be tedious and legally problematic, thus massively increasing the risk perception.
Financing

The financial situation and cannot help the whole tone of the discussion in a difficult case? We need to understand the role of irrigation at all. The State had invested in the past does not mean that it ought merely because the investments are chunky and beyond the State. We need to understand the profile and the profile of the order to come to a focused way of finding feasible ways of finding feasible. The task is attempted in this way. The irrigation infrastructure is discussed.

Reason 2: Allocation of Resources:

Dams and canals create an opportunity for deliberate allocation of scarce economic resources between groups of people and regions, a task, which is only in the ambit of the State. For instance, who else but the State can prevent the upstream construction of a check dam (that benefits tribals) because it would reduce inflows in the reservoir of a dam that will help the people in the valley? This deliberate allocation of natural resources goes far beyond the choice of expending tax or non-tax revenues for development and affects the rights that are enjoyed/enjoyable by the people in a fundamental way.

Reason 3: Lumpy Investments, Long Gestation and Longer Payback Periods:

The investments needed for creating surface water infrastructure are truly massive. Historically, till the Sixth Five Year Plan they averaged some Rs. 17,000 per hectare of the design command area. Even then, in more “difficult” (in the sense of the combination of paucity of rain or topographic conditions) states, such as Maharashtra and Gujarat, the investments were nearly double of that level. More recently, the figures have gone up to over Rs. 1.3 lakhs per hectare of the design command area. Thus a dam with a design command of 10,000 ha. needs a gross investment of Rs. 130 crores. The time that elapses between the conception of the project and its completion tends to be long, running to several years and perhaps in a few unfortunate cases like the Narmada dams, decades.

Reason 4: Generation of a Combination of Private Goods and Public Goods:

Surface irrigation assets create some private goods but mainly, essentially public goods. This is so even when water for irrigation is viewed as an economic good, to be priced in relation to volume consumed or benefit derived thereof. The types of benefits that can accrue from a dam are as follows (adopted from the Report of the Commission on Water and Irrigation (Chitale Commission), Chapter 16, GoM, 1999):
Private Goods are:

- Facilitation of cultivation of crops in the second and the third season in the command area;
- Production of electricity where the hydro-electric project facility is a part of the project;
- Production of fish in the reservoir;
- Supply of water for domestic and industrial purposes to nearby townships/industrial estates; and
- Creation of recreational possibilities in the reservoirs and in the gardens on the embankment.

Public Goods are:

- Avoidance or significant mitigation of floods in the downstream areas and hence avoidance of consequent loss to life and property;
- Avoidance of famine-like conditions and consequent acute distress to a mass of population by creating the potential for providing protective irrigation to staple crops;
- Avoidance of acute distress arising out of paucity of water in dry seasons as the stored water can and often is used for the supply for drinking purpose to human settlements;
- Accretion in ground water storages arising out of seepage of surface water and return flows; and
- Generation of employment as a result of direct effect on double cropping as well as indirect, secondary and multiplier type effects.

It is not possible and certainly not desirable to even remotely "privatize" at least the famine and flood and drinking water distress avoidance benefits of the surface water infrastructure. Technically it is difficult to measure and value the ground water accretion. And economically it is difficult to measure and attribute the second order economic effects.

The infrastructure also generates "bads" (negative externalities); again some accrue to individuals and some remain as public bads. For instance, water logging results in driving a lot of land out of communities to livelihoods. The dams generally induce floods in downstream possibilities of either to excessivly in Morbi or more and less dramatically. Dam waters are not a possible inflow in the reservoir.

Since the infrastructure both and "public bads" made by the public are the consensus end in the irrigation projects are assessed here is discussed below.

3. Assessment of Net Present Cost

The question as infrastructure been thinly veiled, "commercial" via Net Present Value finance theory surely here? To whom assumes that it is doing so set of questions the private investor, the economic returns?

If the investor, then he
of crops in the second and the third area; here the hydro-electric project facility reservoir; hortic and industrial purposes to trial estates; and possibilities in the reservoirs and in unkinment.

mitigation of floods in the down avoidance of consequent loss to life conditions and consequent acute population by creating the potential for gation to staple crops; less arising out of paucity of water in water can and often is used for the pose to human settlements; storages arising out of seepage of in flows; and nt as a result of direct effect on double direct, secondary and multiplier type nually not desirable to even remotely time and flood and drinking water of the surface water infrastructure. measure and value the ground water it is difficult to measure and attribute effects. Also generates "bads" (negative to individuals and some remain water logging results in driving a lot of land out of agriculture. There is land submergence forcing communities to abandon their habitation and losing their livelihoods. There are negative ecological consequences as well. Also, a point no engineer would like mentioned is that while dams generally reduce the incidence and frequency of seasonal floods in downstream areas, they also create small but ever present possibilities of huge flash floods when their walls give way (due either to excessive inflows or earthquake, et cetera) as it happened in Morbi or more recently in Digras in Maharashtra. More frequent and less dramatic perhaps are the dislocations caused when the dam waters are released as a preventive measure fearing excessive inflow in the reservoir.

Since the investment is bound to create these public goods and "public bads", it is arguable that the investments must be made by the public agency. It may be noted that even if tomorrow the consensus emerges for allowing the private sector to participate in the irrigation projects, there is a hitch in terms of the way the projects are assessed and the way the water charges are levied as is discussed below:

3. Assessment of Feasibility and Fixation of Water Charges:

The question as to when should a dam or some other irrigation infrastructure be deemed techno-economically feasible evokes thinly veiled, ideologically rooted answers. The "purely commercial" viability of the project would mean the assessment of Net Present Value or Internal Rate of Return in the way the finance theory suggests. The mechanics of the calculation is simple, but the logic behind them is not so. Who is the project holder here? To whom do the benefits accrue? To start with, if one assumes that it is the State which is investing in the project and that, it is doing so on behalf of society, then one raises a different set of questions than if one were to assume that the investor is a private investor investing on his own behalf and looking for economic returns.

If the investor is seen to be a profit seeking private sector investor, then he would wish to price the products of his project,
namely water supplied for electricity production, for irrigation and for domestic/industrial application, with clear intent. He would wish to cover all the Operations and Maintenance (O&M) and establishment costs from the sale of water to its users and expect a market rate of return on his investment. In fact, he would derive the price of water from his assessment of O&M and establishment costs and his expectation of the return. Alternately, he would consider the project commercially viable if he expects to get the benchmark rate of return when he charges the “most practical” price for water. Basically, the purely profit seeking private sector investor is unlikely to be swayed by the public goods of avoidance of famine or avoidance of distress caused by the drinking water crisis.

In India, the State justifies the irrigation projects chiefly from the public goods they create. The First Irrigation Commission explicitly recommended in 1901 that the level of investment in an irrigation project should be assessed to be reasonable by relating it to the “famine relief expenditure the State would have to incur if the project were not implemented”. The view was tenable principally because it was the Commission appointed by a Colonial Government. The Second Irrigation Commission appointed by the Government of India after Independence talked of benefit cost ratio as the guiding criterion and pegged the cut-off at 1:5. The benefit is to the farmers and the cost is to the State. It also suggested that the water rates should be linked to the benefits received by farmers and not to the cost of implementing the irrigation project.

As expected, the criteria for fixing water charges has remained rather than economic criteria. The Commission was dubious economic logic at times in accepting projects on grounds such as “extraordinary instances of distress” (Phansalkar, 2003). The government services to the poor being able to recover what is due. The case of water charged projects in most of the States during 1995–2005, while the expenditure (Rs. 121 crores) was Rs. 594 crores. Most of the irrigation schemes of the Tenth Finance Commission (III.7). The maintenance cost amounted to 3% of the irrigation projects and Rs. 9,891 crores in the period 2000–2005 for the projects from water charges were as per the Eleventh Finance Commission.

“The Commission took into consideration such factors as the estimated total cost of famine relief works in a tract for the preceding 25 years; the population of the tract; the per capita area, which should be protected by irrigation, and the area already protected. After weighing these factors, it concluded that the Government should be prepared to face an expenditure equal to three times the future annual cost of famine relief and remissions of revenue, for the sake of preventing famine altogether. According to the Commission, protective works could be sanctioned, without hesitation, when the capital cost was not likely to exceed thirty times the net revenue, or whenever a net return of three per cent on the actual outlay could be anticipated.”
V.7) This is despite the fact that there have been numerous Committees and Commissions that have recommended that water charges must not only recover O&M and establishment costs but also contribute some return on investment.¹

4. Basic Requirements of the Private Sector Participation in Infrastructural Investments

It is important to understand the basic requirements that need to be fulfilled before the private sector considers investment in infrastructure. Only when such requirements are met, can one proceed to “structure the deal” to make the investment opportunity attractive to the private sector. There has been significant discussion on when Public-Private Partnerships (PPP) work. Some of the conditions deemed necessary for PPP to work are:

- A general move to shift from input based contracting to output based contracting in the sphere of public services and infrastructure;
- Changes in procurement processes, procedures and instruments that reflect the above shift;
- Clear legal structure and due diligence to cater to contractual issues, define scope and limit of PPP and its implementation and the basic scope for long term financing;
-Creation of a sound and functioning regulatory framework including laws and institutions for regulations; and
- Macro-economic and macro-political stability.²

Some of these trends are visible in India in sectors such as telecom and highway construction. The extent to which these conditions can be created in the water sector is moot. So far we only have the negative history of PPP in the water sector, the most celebrated case being the abortive attempt to bring in a PPP in urban water supply in Pune, Maharashtra. The above paper also mentions the need for create to become pro-poor but it is difficult to envisage. For instance, the legal structure is clear. The greatest difficulty would have inter-state situation of water rights. There appears no encouraging the arrangement. One can state the absence of macro-political sector involvement in the process. It is to be noted that regarding the urgency of national importance, etc, the issues listed above is serious private sector action. State Governments will have to be seen.

We proceed to explore the infrastructure can be structured to attract sector investors, assuming above tricky and contentious issues.

5. Areas in Which Private Sector Participation

The initial section of this chapter explores possible private sector involvement in irrigational sector participation in irrigation management. A possible role of the private sector in irrigation management.

¹ For instance, the Vaidyanathan Committee on Water Pricing recommended in 1994 that water charges to be fixed so as to recover O&M costs and give 1 per cent return on the investment.

² See for a detailed discussion Pengabbean (2005).
Private Sector Participation in Water Management

There have been numerous recommendations that water management requires establishment costs but investment.

1. Basic Requirements that Need to Be Met

Basic requirements that need to be met before a private sector investor considers investment in a project include:

- Legal, regulatory, and institutional framework
- Financial and economic feasibility
- Proper institutional framework for water management
- Transparency and accountability

2. Partnership (PPP) Work

In India, there have been significant efforts to promote PPPs. Some key requirements for PPPs to work include:

- Clear and transparent procurement processes
- Adequate and predictable financial arrangements
- Proper risk management and allocation
- Effective dispute resolution mechanisms

3. Indian Case Studies

- In the Indian context, PPPs have been implemented in sectors such as irrigation and transportation. The extent to which these sectors have been successful is debatable.

4. Legal and Political Stability

- In the Indian context, legal and regulatory frameworks have been unclear, leading to uncertainty and instability.

5. Micro-Public and Private Sector Participation

- The Indian polity has been facing micro-economic challenges, leading to uncertainty in private sector participation.

6. Areas in Which Private Sector Participation is Feasible

The initial section of this paper has highlighted the need for possible private sector investment in new dams. It ignores the possible role of the private sector in other aspects of surface irrigation management. Again, there is room for private sector participation in irrigation financing that falls short of equity investment.

7. Private Sector Participation

- There have been numerous recommendations that water management requires establishment costs but investment.

8. Conclusion

- The initial section of this paper has highlighted the need for possible private sector investment in new dams. It ignores the possible role of the private sector in other aspects of surface irrigation management. Again, there is room for private sector participation in irrigation financing that falls short of equity investment.

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7 See Patkar and Arvinda “Interlinking mirages”, in The Hindu, December 3, 2002 among other instances of public outcry against the move to “privatize” a 23 km stretch of river Shivnath in Chhattisgarh by the then government. The move has subsequently been cancelled by the next government.
PRIVATE SECTOR PARTICIPATION

contribution in specific dams. This section discusses possible areas in which the private sector participation is possible without involving such equity contribution.

5.1 "Bridge Finance" for Irrigation

It was pointed out that in the case of Maharashtra, in 1999, the total financial need was estimated at Rs. 30,000 crores while the annual Own Tax Revenue of the state is just Rs. 39,737 crores. A similar if not worse situation is observed in all states. There are many calls on the State revenue. Under the circumstances, the State Government makes provisions for irrigation construction in its annual budget and its Five-Year Plan outlays at levels that are much smaller than the total projected need. This is inevitable. However, what makes it worse and perhaps not always inevitable is that these smaller allocations are then further spread thin across several projects within the state. This becomes necessary on account of political pressures emanating from different geographic parts of the state and the need for the State Government to be and also seem to be fair. In consequence, the actual allocation to any specific dam project becomes miniscule compared to the projected capital cost. Thus, the projects take much longer to complete, involving as it must, sharp cost escalations over time. For example, the Gosikhurd project on Wainganga was slated to cost Rs. 150 crores in the eighties. Its cost was revised upwards by the time it was cleared through the environmental, technical, political, and administrative hurdles – the last two being specific to the issue of regional politics in Maharashtra and documented in Phansalkar 2003. During the entire period of the nineties, allocations to the project were at ridiculous levels of a few crores each year. The project has still not moved much beyond the survey and drawing board stage despite a passage of 20 years since its conception. While the extreme pro-Western Maharashtra biased manner of irrigation financing was the principal reason behind this, the phenomenon of piecemeal financing of a large number of dams is very common and the consequences of each of them getting delayed and costlier is equally common.

It is possible to explore the possibility of a consortium of private sector investment bankers offering a form of bridge finance for the purpose of a consortium would be Rs. 30,000 crores a huge amount of money. The allocation of a pre-transaction to the state is that the state would be able to avoid funds available from the transaction between the State Government and the consortium in which the states would amount to the irrigation projects by its loan and credit worthiness, guarantees, and also amount to the states. The subject to be discussed on desilting and improving the canal is the existing canal system well below their capacities. As is common in most scenario described.
5.2 Possible Role of Private Economic Actors in Canal Systems Management: Filling an Emerging Institutional Void

The subject to be discussed now is much more specific to the existing canal systems that have been created but are operating well below their potential essentially because of management reasons. As is commonly experienced, the canal systems fail to perform to their potential for reasons described in the most typical scenario described in Box 1.
Box 1
Correcting the Woes of Stagnation in Canals

Water is released from dams into main and branch canals for conveyance and eventual release in distributaries which take them to farmers' fields. Ideally, farmers ought to get water just in time to irrigate their crops. This happens more by chance than by design for a large number of farmers in most of the systems in India. In fact what tends to happen is that farmers in "head reaches" routinely suffer from flooding and water logging arising out of excess flows and the farmers in "tail reaches" wait for the water and often cope with its absence by resorting to ground water irrigation. Water does not reach the tail end due to plugs and obstructions in the channels in its length. These are not cleaned due to a paucity of budgets and a bureaucratic system of administration. In effect only a small proportion of the potential users get water when they want and in quantities they require and these are the only groups of farmers who have a concrete positive stake in system performance. Other farmers get a raw deal and are hence not at all willing to pay for water. As a result the recoveries of water charges plummet and the system is progressively starved of funds for maintaining itself.

This downward spiral is a result of the management system characterized by agencies, which are not accountable to users and personnel who have no incentive to perform their tasks. As states experience increasing financial strain, they cut back on staff and their facilities. The canal management wings have been the most frequent victims of state neglect. Other farmers get a raw deal and are hence not at all willing to pay for water. As a result the recoveries of water charges plummet and the system is progressively starved of funds for maintaining itself.

States have been tinkering with "partial privatization" such as contracting out canal system cleaning to private operators and have also been stressing on the complete transfer of irrigation management to the Water Users Association. The latter has not come of age and has to travel a long distance to meet the expectancy of the promise its propagandists make on its behalf.

While the involvement of private corporate sector entities is not meant to be, there is abundant room for thinking about the possible role of the private economic actors who will undertake tasks of canal system cleaning, proper operations of regulators and gates and thus contributing to better water delivery to farmers. It is necessary to think hard on how to structure their roles as well as incentives in such a manner that they stand to gain only from an overall improvement in the overall performance of the system.

Now we return to the role of private sector participation in the management system.

Diverse mechanisms for the private sector in the creation, an\r
Competitive tendering on a defined scale for a specific project, or\nwell in the telecom sector in India. The last few years highlights a huge\n
- Risk and Returns: the management of a small area such as a field in three phases with the services of a consultant and the use of field survey, etc., to arriving at an"
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in Canals

Private sector participation in irrigation financing can become possible. Diverse mechanisms have been tried out, in involving private sector in the creation and maintenance of infrastructure in India. Competitive tendering and award of licenses to operate in well-defined circles for a specified fee and other obligations was the chosen option in the telecom sector. This method has worked very well in the telecom sector as the experience of the last several years highlights a huge expansion in reach and a sharp decline in the consumer prices. Perhaps the sector made competition possible and hence the result was desirable. The experience in the power sector is a mixed one. Several potential investors such as Cogentrix walked out mid-way through the process of negotiation and contracting. Poor negotiation on the part of the government and a suggestion of fraud on the part of the private contractor has made Dabhol Power a pariah for all opponents of private sector participation in the infrastructure in India. The experience in the road sector is quite positive. Build, Own, Operate, and Transfer (BOOT) or Build, Operate and Transfer (BOT) are the mechanisms that have been experimented within the road sector and may be tried out in ports as well. What arrangement would be best for irrigation infrastructure assuming all the above issues are sorted out? Some of the key issues are listed below.

1. Risk and Returns: The entire process of construction and management of a surface water system can be broken down in three phases with differing risk and return profiles (Gamble, 2002). The “feasibility and resource consent” phase is the one in which investments have to be made for carrying out tasks of field survey, et cetera, with a view to arrive at a preliminary design and the feasibility of the project. The phase extends up to arriving at an agreement between all relevant parties for
appropriating and allocating the land and water resources for the project. This is considered the most risky phase with no return to the investor whatsoever. The second phase is the construction phase, which has modest risks of cost and time over runs and small return possibilities. The third phase of operations and management has low risk and a possibility of a fairly stable profile of returns from water charges and so on. The relative attractiveness for the private investor will thus be the highest for the third phase and the lowest for the first phase.

- How much investment can be expected from a private investor? This question becomes important as major positive externalities from surface infrastructure give it the status of a public good. To expect purely economic goods (water for irrigation, water for power production, fish) to pay for huge investments in creating assets may be putting too onerous a load on the economic goods. Just as an illustration, if the whole investment of Rs. 1.3 lakhs per ha. of the design command area is to come from private investment, the water charges would have to be extraordinarily high.

- Who will guarantee recoveries? Water charges have to be recovered from thousands of farmers in the command. The task of recovery from the farmers in a polity where they form a sizeable vote bank is not to be considered simple. Private sector investors are bound to baulk at the prospect of having to face farm lobbies ever willing to agitate and block traffic. Will the investor agree to do the process other than the one that may be considered as the most efficient and effective? Specific arrangements would have to be made for the harvesting of returns from mere service contracts, which will have differing implications for the managing working capital and the responsibility for collection of charges. Resource Society, 2004, p. 8.

7. Investment in Surface Water Harvesting

Based on the discussion on structuring investments suggested below. This is to illustrate the principles discussed.

a. It is proposed that the construction process is split into two phases. Each entity is meant to build facilities namely structures and distributaries. The construction of the reservoir, and responsible for their apexes as they would be an important part of the design command area. The dam site, it will be an important part of the urban centres do not have a responsibility for "

Illustratively a target rate of return of 10 per cent is fixed, and this means that Rs. 13,000 must come from each hectare of the design command net of O&M costs. This figure could shrink somewhat when adjusted for the returns from fish and from power if any, but the order of magnitude will remain the same. Considering that O&M costs are about Rs. 700 per ha. of the design command and the incremental crop output even from a three crops a year system will be about Rs. 75-80,000, one may be asking for 15-20 per cent of the maximum incremental crop income from farmers who grow three crops a year with water from the surface water system. A lot of farmers will get water for just two crops and some will be able to grow just one crop. Clearly the water charges are very high and indeed as high as cost of running diesel pumps for 200-250 hours.
PRIVATE SECTOR PARTICIPATION

The land and water resources considered the most risky phase with whatsoever. The second phase has the lowest for the private investor will thus be phase and the highest for the first

Specific arrangements for the private sector participation vary from mere service contracts to complete divestiture and have differing implications for financing of initial fixed investments, managing working capital, management of O&M, fixation of tariff, responsibility for collection etc. (Chairman, Indian Water Resource Society, 2004).

7. Investment in Surface Water

Based on the discussion above, a specific arrangement for structuring investment in the surface water infrastructure is suggested below. This is meant to serve only as a basis of discussion.

a. It is proposed that three entities will be involved in the process in addition to the water user associations (WUAs). Each entity is meant to invest and construct surface water facilities namely a dam, the hydro-power generation structures and equipment and main canals and distributaries. The task of O&M, water distribution, conflict resolution, and recovery of water charges below the distributaries are assumed to be delegated to the WUA and their apexes as the Participatory Irrigation Management (PIM) Bills/Acts in many states now propose.

b. The dam construction entity and the concerned government will invest in the capital cost of the dam in a proportion that is determined by the relative size of the public and private goods that are being created in the specific case of the dam (for instance the control of recurring floods would be an important public good for dams on streams that flow past many concentrations of urban population close to the dam site, it will be of much less significance where such urban centres do not exist). The government will be solely responsible for "resource consent", that is arriving at
agreements on water sharing, submergence and R and R of the PAP. Generally the share of private investment can be quite high where private goods such as hydel power and irrigation benefits dominate and negative externalities of submergence or ecological costs are deemed to be low. The public share of investment will have to be much higher where public goods dominate the benefit streams. The dam entity will be fully responsible for the construction of the dam once the dam design is finalized and approved by all the concerned parties (River Basin Authority, State Government, Tribunals under the Inter-State Water Disputes (ISWD) Act, National Development Council (NDC), Courts, et cetera, as the case may be).

c. The flow of water for irrigation – domestic and industrial purposes and electricity generation will be regarded as the sole income source of the dam entity. The government will pay the entity at pre-determined rate per unit of volume for such volumes of water as are released by the entity in accordance with the schedule supplied to it. The conditions of "75 per cent reliability" will apply, that is the obligation to supply water for irrigation/electricity is contingent upon the adequacy of rainfall in the catchment area. The division of the charges to be paid by the government and the electricity entity will be a matter to be negotiated between them.

d. Linking payment to BOOT 1 company to volume of water creates an incentive for aiming as high an ability to supply water as is possible given the dam design. This could distort the governance away from prudent management of the dam. The monsoon falls are erratic and often have short spells of very heavy precipitation. Prudent dam management requires watchful monitoring of inflows and controlled release of water to obviate any danger of excess inflow leading to disastrous consequences such as bursting of the dam. Yet the desire to maximize revenue could tempt the BOOT 1 company to aim for as high pondage as is possible. Given these conflicting factors, the agreement will have to contain foolproof systems of monitoring inflows in monsoon so that a moral hazard of this kind is obviated.

e. The government will be responsible for the creation and the entity for the charges body. Similar of irrigation will be regulated by the public share of investment will have to be much higher.

f. The canal of water released to the entity will be fully responsible for the construction of the dam once the dam design is finalized and approved by all the concerned parties.

g. The water released to the entity will be fully responsible for the construction of the dam once the dam design is finalized and approved by all the concerned parties.

h. The electricity produce entity will be fully responsible for the construction of the dam once the dam design is finalized and approved by all the concerned parties.

i. The dam entity will be fully responsible for the construction of the dam once the dam design is finalized and approved by all the concerned parties.
PRIVATE SECTOR PARTICIPATION

...e. The government will create a regulatory body that will govern the inter-relationship between these three entities and the entities and the government. The rate of discharge of water from the dam to the hydel electricity utility and the charges to be levied will be governed by the regulatory body. Similarly, the verification and monitoring of release of irrigation water into the main canals to the canal entity will be regulated by this agency.

..f. The canal entity will be responsible for taking the water released for irrigation as per schedule agreed to by the entity and delivering it at the pre-determined points in the distributary network to the apex Federations of the WUA. The task of the entity is basically to ensure that the conveyance is unencumbered, canals are clean and gates are operated as per the agreed schedule. It will be paid on the basis of water delivered at the distributary points as verified by the WUA federations. The government will be responsible for making these payments.

..g. The water charges to be levied on farmers and their mode of collection and payments into the government treasury is a matter to be sorted out by the government with the farmer associations, WUA and their Federations. Irrespective of the level of water charges fixed for the farmers by the government, the government will pay the dam entity for the release of water as per schedule and volumes and to the canal entity as per the distribution of water at the distributary points.

..h. The electricity entity will receive and pay for the water, produce electricity and supply it to the grid. Its income will arise from the sale of electricity to the grid and is governed by an entirely different set of agreements with the grid authority.

..i. The dam entity will regulate subsidiary income generating activities such as leasing of reservoir fishing, recreational facilities on the embankment and the reservoir, et cetera; seasonal lease of reservoir beds for farming after water levels subside, et cetera, and will make such charges as it deems fit.
8. Conclusion: Chasing a Mirage?

Clearly, at this stage, the above kinds of arrangements are thinkable only on paper. Much work needs to be done to prepare the ground for such arrangements to become feasible socially and politically. The following can be taken as elements of the groundwork:

a. It may possibly be simple and would attract least resistance if some ways are devised to improve the existing canal system management by "partial privatization"; i.e., by involving the private sector economic actors by structuring their engagement in a manner that their incentives are linked to an overall system performance and they are also made accountable to the users.

b. There is a need to generate discussions and a consensus on the desirability of a role for the private sector in the irrigation infrastructure. Right now the air is full of the battle cries of the spirited and noisy opponents of privatization. The case of dams is particularly complex in this regard as it touches the emotional issues of ecology, tribal rights and rights of the "small folk" for water for subsistence. Unless the idea of private sector engagement in surface irrigation becomes socially legitimate, it has no hope of taking off in the Indian polity.

c. There is a major issue involved in persuading the private sector investor that the state and the farmer lobbies will actually deliver on their promises, just as there is a major issue involved in ensuring that the risk of moral hazard from the private sector entity does not become a reality. Considering that the investments are so large and have no possibility of earning returns except through the supply of water, there is perhaps a greater need to offer credible arrangements for the payments to private sector before the latter consider the investments worthwhile.

d. The suggested arrangements implicitly assume that it is very important to have upfront investments coming from the private sector and that the State will manage to make recurring annual charges for the volumes of water delivered. It amounts to subsidizing the private sector on transparent terms, reducing the necessity of water resource charges.

Given the flux of political stakeholders, one of the three: That is why seek to be tantamount to...
above kinds of arrangements are crucial. Work needs to be done to prepare projects to become feasible socially and can be taken as elements of the private sector participation or "partial privatization"; i.e., by structuring economic actors by structuring their incentives such that their incentives are compatible with performance and they are also in line with users.

Rate discussions and a consensus role for the private sector in the right now the air is full of the threat and noisy opponents of dams is particularly complex in the emotional issues of ecology, of the "small folk" for water for the idea of private sector engagement comes socially legitimate, it has no role in the Indian polity.

Involving in persuading the private state and the farmer lobbies will promises, just as there is a major danger that the risk of moral hazard entity does not become a reality. Investments are so large and have no turns except through the supply of a greater need to offer credible investments to private sector before the investments worthwhile.

Investments implicitly assume that it is upfront investments coming from the State will manage to make the volumes of water delivered. The difference between these charges and the amounts collected from farmers will represent the net subsidy on water. The presence of such implicit and transparent mechanism for determining the extent of subsidy itself may prove a beneficial tool for the State in reducing the level of subsidy. Yet, careful financial analysis is necessary to persuade the State that it is better to have water resources created by upfront investment from the private sector with recurring subsidy from the State on water charges rather than having no infrastructure at all.

Given the fluid state of the polity and the stance of the major political stakeholders, there is little room for optimism about any one of the three steps of the ground work actually happening. That is why seeking private sector investment in irrigation may be tantamount to chasing a mirage.

* If the State does not share investments in the dam with the private investor, then the rate at which the actor will have to be paid will be significantly higher. This is because while a chunk of the dam "output" is in the nature of public goods, mere "marginal costing" water rate would compensate only for the private goods component. Thus, in effect, the "subsidy" thus calculated would be artificially high, a substantial part of the subsidy would in fact be the recurring charges born by the State in return for the public goods being created and kept available when needed by the BOOT company. I am grateful to Shilp Verma for pointing this out to me in a seminar I gave at IWM/Tata programme on August 3, 2005.
References


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