An Emerging Logic of Urban Water Management, Cochabamba, Bolivia

Simon Marvin and Nina Laurie

[Paper first received, August 1997; in final form, December 1997]

Summary. This paper examines the emergence of a new logic of water management in developing cities. We argue that water provision is characterised by two largely disconnected circuits of water supply. Formally organised distribution networks provide a publicly subsidised service to higher-income users, while an informal system of water vendors provides a more expensive supply to marginalised communities. A new style of water management is now challenging the productionist logic that has created and maintained these dual networks. The case study of water privatisation in the city of Cochabamba, Bolivia, illustrates how this emerging logic is reconfiguring the management of urban water networks with a shift from large supply options towards greater consideration of user needs and extension of the network to unconnected communities. The productionist logic is in a period of profound transition as efforts are being made to mesh together more effectively the formal and informal networks. While this process is highly contested, many of the central assumptions of the productionist logic are challenged and new opportunities for a more socially inclusionary and environmentally sensitive style of water management are emerging.

1. Introduction

The conventional productionist logic of water management has been unable to deliver effectively affordable and reliable water services to new users in developing cities. In response to these problems, there are indications that we are currently seeing a shift in the way urban water problems are perceived and managed. Within the urban water management literature, a number of separate discourses point to the emergence of a new style of water management. There are attempts to contrast the “old agenda” of water management with an emerging consensus around a “new agenda” of environmentally sustainable development (Serageldin, 1994, p. 32) that meets the needs of the urban poor (Banes et al., 1996), has a growing emphasis on community management (Chougill et al., 1993, p. 1) and focuses on demand management technologies (Falkenmark and Lundqvist, 1995). There is recognition that this emerging agenda of an integrated multi-pronged approach to water management has “resulted in radical shifts in previously accepted...
paradigms” with the acceptance of an enhanced role for private-sector participation in water management (World Bank, 1995, p.vii).

This paper argues that a new, more demand-oriented logic of water management is slowly emerging and challenging the conventional approach to water management in developing cities. But we are cautious about supporting claims that a paradigm shift in water management has taken place. We are particularly interested in how new agendas create a different style of water management which does not necessarily totally displace but could reshape key aspects of the conventional logic. The paper examines the emergence of this new logic in the debates about the process of water privatisation in the city of Cochabamba. The Bolivian government has developed a privatisation programme that includes wider social equity considerations and attempts to challenge local and international demands for the maintenance of a productionist style of water management. We examine how far the conventional productionist model of water supply is renegotiated through the privatisation process. More specifically, does the privatisation process create a new context within which the conventional productionist model is reshaped? Are large-scale supply options weakened, the efficiency of water providers increased and water distribution networks more rapidly extended? Finally, can we identify the emergence of a new, more demand-oriented, form of network management?

The paper is structured in five sections. First, we develop the concept of disconnected circuits of water management which characterise resource provision in many developing cities. Secondly, we examine the regulatory, social, environmental and commercial factors creating a shift from the productionist model of water management to a more demand-oriented logic of development. Thirdly, we review the emergence of this new logic of water management in a case study of water privatisation in the city of Cochabamba. Here we examine the way in which the public water provision has been restructured, how debates about water supply options are modified and new spaces are opened to include wider user involvement in the extension of the networks. Fourthly, we argue that a new style of water management is emerging in developing cities as attempts are made to mesh together the conventional approach with a new ‘softer’ style of water management. Finally, we conclude by briefly evaluating the significance of this new logic of water provision and how its emergence could be accelerated in developing cities.

2. Disconnected Water Circuits

Cities need to capture, transform and transport water in order to sustain almost every aspect of urban life. Modern water supply systems are extremely complex socio-technical networks which capture raw water and then treat the water for dispersal through immense distribution systems. Such systems are usually characterised by a high degree of central control and co-ordination. These networks also express social power relations both within the organisational structure and in terms of the control of the company over urban form and development. The weakest link in the detailed technical and social division of labour determines the quantity, quality and regularity of the circulating water (Swyngedouw, 1995, p. 390).

Water was usually delivered by a monopoly public-sector organisation in the form of a national, regional or municipal water utility. Initially, the development of networks kept pace with the accelerating process of urbanisation (see Goubert, 1989). However, throughout the 20th century the state has found it extremely difficult to keep pace with increasing demands for water (see Gilbert, 1992; Serageldin, 1994). Domestic underinvestment and chronic dependence on external capital resulted in the systematic exclusion of the new urban poorer residents from easy and cheap access to potable water (see Banes et al., 1996; Bhatia and Falkenmark, 1993; Black, 1995; Gilbert, 1994; Swyngedouw, 1995, 1997).

Habitat estimates that by the year 2000 an
urban population of 450 million people will be deprived of urban water services and a further 720 million will lack urban sanitation. Between 1980 and 1986 the urban population of Latin America grew from 224 to 275 million. The rapid growth of cities has generated dramatic increase in demands for urban services as governments were expected to provide more reliable electricity systems, public transport facilities and drinkable water supplies (see World Bank, 1995). In response to these demands there have been impressive improvements made to the provision of services in cities (see Gilbert, 1994; Serageldin, 1994). Over 80 per cent of the urban population in Mexico, Paraguay, Venezuela and Colombia were connected to potable water supply in 1988. Although there is considerable variation between cities, it is usually the case that the larger and more affluent were able to service their populations. However, in some countries the level of connection drops significantly—only 58 per cent of the urban population are connected in Ecuador and 52 per cent in Peru, with a low of 42 per cent in Bolivia (World Bank, 1994).

Although there are major variations in the quality of service provision between countries and cities, the variations between different areas within the same city are usually even more marked (see Gilbert, 1994). A common pattern of water provision has emerged within developing cities (see Banes et al., 1996; Black, 1996; World Bank, 1994). The upper- and middle-income groups are usually well serviced, while delivery to the less-affluent areas of the city is often very poor. For instance in Lima over 90 per cent of the top 10 per cent income group have direct connections to water and sewerage compared to approximately 60 per cent connection for the bottom 10 per cent of income groups (Glewwe and Hall, 1992, p. 30). The level of connection is also linked to the age of the settlement with the poor living in more well established areas tending to have access to most services while those in the newest are often less well provided for.

Those communities who do not have access to the formal water network are more likely to buy water from private vendors, have more interruptions to supply, have access to more polluted water and not be connected to sanitation services. Residents in marginal communities typically spend 10–40 per cent of their income on water services (see Black, 1996, p. 6). Paradoxically, these users also pay much higher prices for water supply with charges up to 10, 20 and even 400 times higher than that paid by domestic users from the public utility (see Black, 1996; Swyngedouw, 1995). In many cities, a form of negative redistribution operates because the non-connected poor pay very high prices for water from private water traders because the public system cannot deliver services in a comprehensive way. The deficit and underpricing of water result in a massive transfer of income from marginal users to the middle- and upper-class consumers and to commerce and industry. A study of five Latin American countries found that the rich users always benefit disproportionately from subsidies for water and sanitation services (Petrei, 1989). Utilities face increasing difficulties extending networks. The cost of new supply is often two or three times more expensive than existing supply (IBRD, 1993, p. 37) and it is estimated that complete coverage of the water network will require $5 billion investment and sewerage $7 billion over the next decade (Idelevitch and Ringskog, 1995, p. v).

Increasing evidence from studies of water resource management in developing cities indicates that many elements of the current logic of provision are based on dual circuits of supply (see Montgomerie, 1988). Table 1 illustrates the six defining features of the formal and informal circuits of water provision. First, a public monopoly is the provider of the water service in the formal circuit, while users in the informal circuit usually rely on private water traders. Secondly, higher socioeconomic users and areas of the city tend to be connected to the formal water distribution network while more marginal users and rapidly urbanising areas of the city are not connected to the network. Thirdly, users connected to the formal net-
Table 1. Dual circuits of water provision

<table>
<thead>
<tr>
<th>Formal</th>
<th>Features</th>
<th>Informal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public monopoly</td>
<td>Provider</td>
<td>Private water traders</td>
</tr>
<tr>
<td>Higher socioeconomic groups connected</td>
<td>Network</td>
<td>Marginal socioeconomic groups unconnected</td>
</tr>
<tr>
<td>Subsidised prices</td>
<td>Costs</td>
<td>Expensive</td>
</tr>
<tr>
<td>Higher quality and reliability</td>
<td>Quality</td>
<td>Lower quality and disruption</td>
</tr>
<tr>
<td>Slowly enrols new users</td>
<td>New users</td>
<td>Large numbers of new users enrolled</td>
</tr>
<tr>
<td>Low cost to users but low returns to water provider</td>
<td>Consequences</td>
<td>High health, environmental, social and economic costs to users</td>
</tr>
</tbody>
</table>

work are supplied with underpriced water and are often more likely to be in arrears to the water provider while those reliant on the informal circuit have to pay in advance at much higher costs—even though private water vendors often purchase bulk water at reduced tariffs from the formal provider. Fourthly, the quality of service and water supply is usually higher in the formal circuit in comparison with the informal circuit. Fifthly, the formal circuit is only able to enrol new users at very low rates—certainly not high enough to keep up with rapid urbanisation—so that potential users have no option but to enrol themselves into the informal circuit. Finally, the consequences of each circuit are very well known and documented (see Black, 1996; Banes et al., 1996; World Bank, 1994). In the formal sector, users benefit from low prices and lax recovery of charges with few incentives to restrict consumption, while the water provider fails to recover the costs and there is insufficient finance to extend the network to new users. In the informal sector, users suffer serious economic, health, social and environmental costs of uncertain, low-quality and expensive water supply, while the total charges paid by these users are often greater than the revenues collected by the formal provider. Many of the social, economic, health, social equity and political conflicts over urban water supply can be traced to these dual circuits of differential access to urban water resources.

While we do not claim that all these features will exist in every developing city, we would argue that water provision is broadly characterised by the distinction, and enforced separation, between informal and formalised systems. The conventional view has assumed that the policy challenge is to connect those using informal services to the formal system of supply. However, we argue that the two circuits are intimately related to each other in that the continued existence of the formal sector requires large numbers of potential users to join the informal sector. Although networks of formalised and informal supply are powerfully disconnected from each in technical terms, their continued existence is supported by social relations that institution- alise the unequal access to water resources (see Banes et al., 1996; and Swyngedouw, 1995, 1997). The management of water is caught within a series of contradictions. First, the water suppliers run structural deficits. The price charged for water is often about 35 per cent of the average cost of supplying it, while the absence of water meters prevents accurate accounting of water use (see World Bank, 1995). The high cost of water engineering requires high levels of external funding, while users demand low prices which results in chronic losses. This threatens the maintenance of the network and the supply of investment to fund extensions to the network. Secondly, a sizeable amount of water is not accounted for as a result of
Table 2. Challenges to the productionist logic

<table>
<thead>
<tr>
<th>International funding agencies</th>
<th>Funding is used to promote increased efficiency of water utilities and involvement of the private sector in water provision</th>
</tr>
</thead>
<tbody>
<tr>
<td>International water companies</td>
<td>Support the development of new international markets in urban water networks and develop appropriate styles of management</td>
</tr>
<tr>
<td>NGOs</td>
<td>Connect disenfranchised communities to water networks by involving users in network management</td>
</tr>
<tr>
<td>Environmental organisations</td>
<td>Extend networks to new users in sustainable ways no longer simply based on supply options</td>
</tr>
<tr>
<td>National governments</td>
<td>State unable to subsidise water providers or extend water networks—new funding dependent on reorganisation and private involvement in provision</td>
</tr>
</tbody>
</table>

physical losses, free deliveries, underestimates of use and illegal connections. In Latin America, unaccounted water in cities is estimated to be between 20 and 50 per cent of production (Yepes, 1992, p. 9). Unpaid water use is considerably higher in upper-class parts of cities rather than in the lower-class periphery. Thirdly, the internal functioning of water suppliers is characterised by highly politicised and bureaucratic procedures, overstaffing, insufficient maintenance and high levels of debt. Fourthly, inadequate urban planning increases costs. Water engineering networks follow the development of spontaneous settlements where the cost of installing water networks is often high and users have to buy water privately. Fifthly, water providers are usually dependent upon international finance to maintain or expand the system which accentuates centralising tendencies and favours large-scale technologies (see Swyngedouw, 1995, 1997). International bilateral loans privilege new investment over maintenance or organisational changes and contribute to the heterogeneity of water systems. This restricts the involvement of local supplies and the development of local knowledge as water providers become dependent on overseas suppliers. As Swyngedouw shows, the key features of the productionist logic all combine to result in a preoccupation with the production and transmission of potable water and a negligence of maintenance, accounting, distribution, and, not to speak of sewerage and the treatment of waste water. This, in turn, perpetuates the systematic exclusion of large parts of the population from access to available water (Swyngedouw, 1995, p. 399).

3. Challenging the Productionist Logic

Table 2 illustrates how the conventional productionist logic has come in for increasing criticism from development agencies, environmental organisations, international aid agencies and NGOs. Increasing interest in the close links between the water sector and the environmental health, the environment, economic growth and social development of cities has focused attention on the inefficiency and ineffectiveness of the conventional model of water management (see World Bank, 1994, 1996). A series of converging academic and policy discourses has challenged the productionist logic through the increasing acceptance of a wider role for the private sector in infrastructure provision and management and greater concern about poverty reduction and environmental sustainability.

First, international lending bodies have developed a new style of funding no longer simply based on the provision of funding for large-scale infrastructural projects. The World Bank in particular has shifted from funding new and large infrastructure works to supporting institutional streamlining and improving the administrative and operational
efficiency of water providers in cities (see World Bank, 1994, 1995 and 1996). Loans are now subject to more stringent and managerial conditions which require longer-term social and political change. The World Bank has embraced the concept of a parallel-track lending strategy in which water sector policy and institutional reform and physical project implementation are pursued in tandem (see World Bank, 1995, p. 2–3). There is now the expectation that lending should in future be based on attracting private-sector participation in the water sector. Infrastructure services are being opened up to private-sector involvement and the privatisation of infrastructure networks.

Secondly, water companies in Europe are responding to these new opportunities by developing global strategies to acquire water networks in developing cities. Although formerly with mixed success, these companies are now increasingly active in seeking out new opportunities for acquisitions in developing countries (see Idelovitch and Ringskog, 1995; World Bank, 1994). They are able to bring management and technical expertise to the less well regulated markets in developing countries as they seek to manage whole urban networks.

Thirdly, the NGO sector has focused increasing attention on the need to involve users in the management of water and sanitation networks (see Black, 1996; Chougill et al., 1993; Kerr, 1989; Narayan, 1993; and Schubeler, 1996). Based on a critique of the exclusionary features of the conventional logic, the high cost of private water, low quality of water and large amounts of time women and children use in fetching water, NGOs have campaigned for a different style of water management in which users are involved in making connections to the network and managing relations with utilities. A series of successful projects has demonstrated the role that NGOs can play as intermediaries between formal organisations and community-based groups by facilitating the legal and institutional context in which self-help schemes can operate (see Kerr, 1989). Although there has yet been little connection with wider debates about privatisation, there is a recognition that public health officials, water utilities and international agencies will depend on community organisations and water associations for the extension of water networks, improvement in public health and water conservation measures (see Banes et al., 1996).

Fourthly, environmental organisations have powerfully critiqued the ecological implications of large-scale water-related development (see Pearce, 1992; Postel, 1992). In particular, there is increasing recognition of the high economic and environmental costs of large-scale dams, irrigation, hydro-electric and water engineering projects. Alternative development trajectories have been proposed which place greater emphasis on smaller-scale schemes, the role of water savings and conservation technologies and greater attention to the management and distribution of existing water resources before considering supply-side investments (see Wippeny, 1994). A related argument is that ‘softer’ forms of water management can be cheaper and more socially acceptable than large-scale supply-side investments. Environmental organisations have sought to shape the priorities of international funders to support the development of more ecologically sensitive forms of water management (see IBRD, 1993).

Finally, national governments have increasingly recognised the difficulties of funding the development of the conventional logic of water management. Large-scale supply-side investments are extremely expensive requiring packages of international funding while often diverting attention away from extensions of the network to unconnected areas of cities. Governments are only able to gain international support for the reform of water providers if they embrace three shifts: first, acceptance of increased private, particularly international water utility, involvement in the provision of water services; secondly, the development of new roles for users in the extension and management of water networks with the objective of rolling-out the networks to unconnected communities; and,
finally, increased sensitivity to the environmental costs of large supply-oriented options and greater consideration of smaller-scale more demand-oriented technologies.

These separate critical discourses are rarely linked together into a coherent alternative programme that could displace the conventional productionist logic. There are still powerful interests who want to maintain the productionist logic because the development of large-scale projects supports large construction and engineering companies. But, taken together, the different elements of the discourse signal the emergence of a new style of water management that pays more attention to the efficiency and effectiveness of water providers, questions the validity of large-scale supply-oriented approaches and attempts to consider wider questions about the distribution of water resources and the involvement of users in the extension of networks. These shifts imply a major reordering of urban water networks with major implications and adjustments required by government, water engineers, users and international agencies. We now examine a case study to review how the new logic is mediated through particular national and local interests involved in the privatisation of an urban water network.

4. Reconfiguring Water Management in Cochabamba

Debates about water privatisation have dramatically reshaped conventional views of water resources and the role of water users in the city of Cochabamba in Bolivia. Privatisation has to be seen in the context of the wider structural changes in the ‘Bolivia la nueva’ programme. Bolivia is negotiating its own particular pathway through structural adjustment that allows national interests to be reasserted rather than simply closed down. Following the election of President Sanchez in 1993, a modified form of privatisation ‘the capitalisation programme’ was introduced with World Bank support. The proceeds of selling a 49 per cent stake in the enterprise are added to the balance sheet as a source of funding for new investment. Begun in 1995, electricity, telecommunications, oil and gas have been included in the first round of the capitalisation programme.

Water is being included in the second round of capitalisation where the process is focused on the disposal of the water utilities in the administrative capital La Paz, the second industrial city of Santa Cruz and the third city Cochabamba. The water utilities in La Paz and Santa Cruz are relatively unproblematic—the networks have had a high degree of investment, they have almost complete coverage, do not operate at a deficit and are relatively attractive acquisitions for large European or North American water companies. A total of nine companies have indicated an interest in purchasing the water utilities including the French-owned Lyonaise des Eaux and Général des Eaux, and the British utility North West Water. However, the privatisation of the water utility in Cochabamba is much more problematic because the network has not kept pace with rapid urbanisation, there has been a low level of central government investment and there is a need to develop a major new water resource (see Anton, 1993). Much of the privatisation debate has therefore focused on the problem of making the city’s water utility an attractive proposition for an external buyer, either as a stand-alone network or as part of a larger package with the utilities in La Paz and Santa Cruz.

The city of Cochabamba and its metropolitan area are undergoing rapid urban growth (See Ministry of Capitalisation, 1996). The population has increased from 22 000 in 1900, to 80 000 in 1950 to 412 000 in 1992. Economic migrants are responsible for 67 per cent of population growth and, on average, 13 500 new inhabitants arrived in the city each year between 1978 and 1992. Projections indicate that by the year 2005 the total population will be 800 000, rising to 2.3 million by 2025. Although urban growth is regulated through a plan which establishes zoning rules, much of the new population has moved to squatter settlements in the suburbs of the city. Only 60 per cent of the urban area
and 53 per cent of the population are connected to water systems either inside or outside the home and only 23 per cent of those connected receive a 24-hour supply service. At a local level, there is major concern that Cochabamba has been left to deal with the problems of rapid urban growth and cutbacks in state expenditure. The city is compared unfavourably with the huge amounts of state investment in the oil city of Santa Cruz and the lack of “any compensation for its suffering in taking on this urban growth which has had a huge effect on Cochabamban life” (personal interview with former Semapa director).

There is now a powerful assumption that SEMAPA (Servicio Municipal de Agua potable y Alcantarillado) needs to be privatised to address these shortfalls and provide the new networks to distribute the water from the new supply. But the debates about privatisation and capitalisation are being shaped by aid agencies, NGOs, foreign consultants and international water companies who have the power to set agendas and demand certain courses of action. Central, regional and local voices have to find ways of expressing their needs within this complex and often externally oriented context. We show how privatisation is now reshaping the social organisation of water provision in Cochabamba as central government is able to reconfigure debates about water management in the city. There are three aspects to the reframing of the water problems and privatisation: the efficiency and effectiveness of the water utility; insufficient water and the need for new supply; and the lack of connection to new users.

Reconfiguring the Water Utility: SEMAPA

The first set of shifts concerns the internal organisation of the city’s water utility SEMAPA. We trace the main shifts in the social organisation of the water utility, in particular indicating how the government has used the privatisation programme to reduce the degree of local political control over the utility, to improve the technical and managerial competence of the utility and to increase the spatial scale and scope of its operations. These shifts were important in making the utility more attractive to an outside purchaser and enabling the government to reshape local debates about new water resources and the role of users.

SEMAPA was created in 1972 by the municipalities to provide water and waste services to Cochabamba, but income from water charges did not necessarily get returned to the water undertaking. In the interest of greater efficiency, SEMAPA was restructured as a separate legal entity in 1986 so that it would gain all the income from water charges. SEMAPA runs the network in parallel with the municipality and the mayor is responsible for setting the strategic objectives of the utility. However, there are felt to be a number of operational problems with the water utility.

First, there are perceived to be difficulties with the mayor’s role in appointing the general manager of SEMAPA. While recent managers were viewed as highly competent, they were unable to develop a clear strategy and vision because they were easily and regularly replaced. In response, the government restructured the board of SEMAPA reducing the level of local political control over senior appointments but including new representatives from the prefecture, the ministry of capitalisation and one representative from the municipalities in the new spatially extended SEMAPA (see below). Although representation was extended, it became more difficult for local politicians to set the wider agenda and style of SEMAPA’s management while the new voices represented a wider central government and regional perspective.

Secondly, there are perceived difficulties with undertaking further improvement to the efficiency and effectiveness of SEMAPA while it remains under public control. SEMAPA’s levels of organisation and efficiency are higher than those of many other companies that have been privatised in Bolivia. SEMAPA has a good record for the recovery of water charges, a competent managerial team, an efficient administration
and good relations with the World Bank who invested $15 million in building and strengthening institutional support within the utility. There are, however, some inherent problems with its operation as a public institution. These include very rigid and inflexible systems for purchasing and hiring personnel, the difficulties of gaining interest from its $5.7 million deposits in the bank and its inability to lend money from the public sector. Even with good management, there are serious restrictions on the flexibility and the financial development of the utility which it is argued could be addressed through privatisation.

The final problem is the geographical scope of SEMAPA’s operation. The water resources lie outside the central core area of Cochabamba which has traditionally been SEMAPA’s responsibility, thereby creating major conflicts over access to surface and ground water wells with the five neighbouring cities. These municipalities run their own extremely inefficient municipal water undertakings and rejected merger offers with the incentive of free connection to the SEMAPA network. In response, the government has created a new legal framework which allows SEMAPA to extend its boundaries to include the surrounding cities. In 1996 the SEMAPA area of influence was increased from 9500 hectares to 13 500 hectares with an increase of population from 480 00 to 660 000. This strategy brings water sources and demands within one organisation covering the same area and therefore removes the political tensions between the wet and the dry areas.

The logic of this series of centrally imposed shifts was to reduce the degree of local control over SEMAPA, to allow further changes to improve the efficiency and effectiveness of the utility and to create a bigger operating area that reduces conflict over water resources while increasing potential demand in order to make SEMAPA more attractive to the private sector.

Reshaping Water Supply Options

Cochabamba is in a very dry valley whose ground water supplies have been overexploited due to a combination of population growth and agricultural use (see Anton, 1993). The main sources of further water supply lie to the north of the city. But most of the watersheds in this area drain away from the valley so that large-scale engineering schemes would be needed to redirect water towards the south. There is insufficient water provision to meet existing levels of demand. SEMAPA has a water source capacity of 20.4 million cubic metres and a treatment capacity of 19.8 million m$^3$. The production capacity is already insufficient to meet the existing demands of the connected population estimated at 29 million m$^3$ taking into account 43 per cent losses. Forecasts of future population increase mean that new sources of supply will need to be developed.

A number of options for dealing with the problem of additional water supply have been proposed. Although presented as a technical issue, the problem is seen in different ways. Each option is supported by particular configurations of local, national and international actors, each making different assumptions about rising demand and requiring different types of institutional restructuring both to provide and to distribute the water produced. Privatisation has dramatically shifted the context within which these debates have traditionally been framed—in particular, it has challenged the logic of the Misicuni scheme which the city has been attempting to develop for the past 50 years.

The Misicuni scheme is an integrated irrigation, water supply and HEP-generating project that would solve the region’s water supply and irrigation needs well into the next century. Misicuni is not only a massive engineering project, but powerfully embodies and symbolises strong representations of Cochabamban identity and the completion of a local pathway to development. These include addressing the water supply problem through a local independent solution, the maintenance of local control rather than reliance on external sources, and ideas of modernisation and progress expressed through
plentiful supplies of water and energy. All the attempts to develop the project since the 1950s had failed, but the privatisation proposals stimulated a new attempt to support the scheme (see Laurie and Marvin forthcoming). The Alcaldía (the mayor’s office) provided a cash injection to fund development work on a much less ambitious core scheme—the Trasvase Titiri—which focused on water resource development and dropped the proposals for irrigation and HEP.

During 1996, however, an alternative option for water supply emerged based on the Corani HEP scheme to the north-east of Cochabamba. Corani was initially developed in the early 1960s by the state-owned electricity company ENDE and was capitalised in 1995\textsuperscript{1}. The new owners have extended the watershed and interconnecting rivers to increase the water available in the Corani Lake to increase HEP production and are developing new income streams to diversify its electricity generating base. Consequently, central government have encouraged Corani to look at the possibility of taking water to Cochabamba, recognising that SEMAPA could only be privatised if the utility had secure water supplies. Because Misicuni was going to take much longer to develop, and its financial position was in some question, Corani could provide the water supplies that would help to make SEMAPA look like a much more attractive purchase much more quickly and without the need for central government or international finance. The Corani scheme, Proyecto Sacaba, was relatively simple—involving the construction of a 16-km pipe to a small 5-mw HEP plant at a cost of $100 million. Once it buys this water, SEMAPA would be responsible for treating the water and distributing it in Cochabamba.

The main issues in the water debate have focused on the cost of the water purchase and the contractual guarantees that Corani can provide the water and that SEMAPA will purchase it. Initially, Corani have offered 2000 l/s (litres per second) at a cost of 30–40 cents per m\textsuperscript{3} although it is not clear if SEMAPA needs all this capacity in the early stages. The three projects to increase the capacity of Corani Lake are going to start anyway, regardless of an agreement with SEMAPA, and eventually Corani argues that it can provide SEMAPA with 4000 l/s, although smaller extensions to the Corani watershed will be needed to protect HEP production.

Misicuni have attempted to neutralise the Corani bid by arguing that they could produce the same amount of water for 20 cents per m\textsuperscript{3} in the year 2000. But Misicuni were unable to offer SEMAPA a contract backed by financial guarantees because they did not have a serious financial study of how much the water could be realistically sold for. SEMAPA and central government continue to argue that Corani is not in competition with Misicuni because demand will eventually increase and the scheme will need to be built. The time-scale for this could be at least 25 years because if Corani is able to produce 4000 l/s, Misicuni would not be needed to meet projected demand until 2020.

Privatisation has created a new context within which regional water resources are viewed. The ‘Misicuni Dream’ represents an old logic of large-scale integrated technical solutions which clashes with a market-based logic driven by central government and international funding agencies. While attempts are made to keep the Misicuni dream alive, it is being pushed further away as the new logic accelerates the development of Corani. The need to privatise SEMAPA has widened the debate about which water supply options are cost-effective and can be available in particular time-scales. The water resources made available by Corani increase the potential for the successful privatisation of SEMAPA as it has the resources it needs to expand the network and meet hidden and future demands. New externally driven forces and ideas have thus dramatically reshaped the development of what was previously a largely local and regional debate around the Misicuni Dream (for a more detailed account of the regional debate over the Misicuni dream, see Laurie and Marvin, forthcoming).
Reconfiguring Users

SEMAPA’s water network has not been able to keep up with the growth of the city and currently it is estimated that approximately 100,000 people are not connected to the system. Industrial, commercial and higher socioeconomic areas have the high rates of connection, reaching 99 per cent in Casco Viejo. Yet 50 per cent of homes in Cochabamba are located in the northern and southern suburbs of the city, and in some districts in these areas, 1992 data indicate that less than 4 per cent of homes had a potable water connection inside the house; 18 per cent had access to water outside the house; and 80–90 per cent of the population had water supplied in cistern trucks. Water supply sources in Cochabamba are 61 per cent SEMAPA, 25 per cent private wells, 12 per cent cistern trucks and 2 per cent private nets. Those areas of the city with higher socioeconomic income-groups are more likely to have connection to the mains network or to private wells, while the lower socioeconomic areas are less likely to be connected to the mains and have to rely on cistern trucks. Only 46 per cent of the population have a connection to the sewerage network.

SEMAPA have not been able to increase significantly the level of connection to the water network. The coverage of the network increased from 57 per cent in 1977 to 60 per cent in 1992. This is closely linked to an argument about the inefficiency of SEMAPA— with accusations of corruption and the failure to use foreign aid efficiently (a recent $72 million aid package for the water network was spent on the existing network and ignored new connections). However, the rapid rate of urban growth creates problems for SEMAPA. Cochabamba is becoming a metropolis and expansion to the east and west is increasing the complexity of the water problem. For instance, SEMAPA was involved in a local scheme to connect an area with 500 houses but, by the end of the scheme, a year later, the number of houses had doubled to 1000 and there were two new communities next to the project area also demanding connections.

While water supply issues have tended to dominate the construction of the ‘water problem’ in Cochabamba, an emerging theme has been important in shifting the way in which users are viewed. World Bank structural adjustment funds have created an opportunity for developing new approaches to the connection of users to the water network. In particular, new sets of relations are established in the search for strategies to increase levels of connection to the network through users taking a central role in the installation, management and administration of these networks. For instance, in response to the high levels of unemployment in Bolivia, World Bank funding was used to attempt to ameliorate the worst effects of structural adjustment. Between 1988 and 1992, the Fondo Social de Emergencia (FSE: Social Emergency Fund) was given funding to develop programmes of emergency work. The focus was on job-creation through infrastructure construction including the connection of communities to water and waste networks. But, according to personnel from the Fondo de Inversión Social (FIS: Social Investment Fund), the organisation which replaced the FSE, these programmes were not particularly successful because without education and training programmes people did not know how to use the waste and water services.

When World Bank funding was reduced, there was a major reassessment of how FSE had worked and what the programmes needed to do next. In an attempt to work in a much more strategic fashion, the programme was reorganised and FIS was created to focus on two themes—education and health—rather than on direct investment in infrastructure. FIS works with communities of less than 5000 people to provide up to 70 per cent funding for infrastructure, training supervision and general administration costs while local communities generate the remaining 30 per cent funding. As a result of further restructuring in 1993, FIS worked in a more strategic context with SEMAPA and the municipalities through a five-year programme of priorities and an annual plan for the allocation of funding. In partnership with SEMAPA, FIS helped with the development of new training and education
programmes, especially in communities recently connected to water networks. Training focused on the efficient use of water resources, use of infrastructure networks and the maintenance of infrastructure. Co-operatives were formed to involve the community in all these aspects of local water management. The programme provided all the training necessary for the organisation of the community involving the construction of the network, distribution and use of water, billing, calculation of amount used and transfer of charges to SEMAPA. Although NGOs provided the early training, SEMAPA later organised its own team to provide training programmes in 12 communities.

It has been argued by some critics that these training programmes only focused on making users familiar with billing procedures in order to decrease the number of bill defaulters (fieldwork interview; the informant wished to remain anonymous). The empowerment aspects of these programmes become apparent, however, when the contents and target groups of individual courses are examined. While the title of one of the training manuals did indeed focus on “organisation and accountancy”, billing only constituted one-third of the material in the book; community organisation and technical classes in plumbing comprised the other two-thirds. The majority of these programmes targeted women and children as key water users and managers. While the gender elements of these courses have not been analysed to the same extent as the impact of training on children (see for example, Sanchez, 1994, 1995), video tape recordings of classes and interviews with individual women suggest that these courses have made a lasting impression and have changed the way in which many women view their roles as water users and community managers.

By 1996, FIS was no longer active in training or provision of infrastructure arguing that the municipalities had the funds for connections and that SEMAPA could provide the training. SEMAPA have not been able to continue the training programme. The unit established to provide training was employed on a contractual basis and could not be included in the permanent establishment of the utility. But the utility does expect the privatised provider to restart the training and education strategy, arguing that it extends the network more cheaply than conventional approaches, that people become more conscious of the cost of water, and that education and training develop a more direct relationship with the client. At this stage, it is not clear if any of the potential bidders will have the expertise and knowledge to utilise this approach.

Privatising SEMAPA

SEMAPA will be privatised in quite an unusual way. Sealed bids will be invited which will be assessed against two key criteria: the percentage of the population to be connected to the network (above a minimum percentage) and how SEMAPA’s debts will be serviced within the first five years of ownership. This is seen as the best way of achieving the social objective of completing the network and ensuring that the undertaking is run as efficiently as possible. The concession should run for about 40 years. In parallel, a water regulator responsible for fixing tariffs for the first five years will be created. It will specify the quality of service and define the growth of the network in terms of space and sectors. The new water superintendent will be appointed for 10 years in order to create a stable framework for regulation by ensuring that the incumbent cannot be changed by a new government.

The government has attempted to provide a simple framework for selecting a buyer to ensure that the indicators cannot be manipulated and the process is not open to corruption. However, the potential buyers will know relatively little about Cochabamba’s distinct experience of water—the city has had water shortages for the past 40 years, so everyone in the city has a view about the nature of the problem. Because of these distinct views of the nature of the water crisis and the many different responses, the new company will have to develop a clear and
strong view of the need for concerted action. New types of relationships will have to be developed with water clients. The government’s restructuring of the water problem in the city has created a context which is much more attractive to potential purchasers; the utility has greater autonomy; it has a cost-effective supply option; and new models have been developed for rapidly extending connections to the network. The challenge for the eventual purchaser will be the development of a new style of management no longer solely based on the productionist logic that effectively meshes together the informal and formal circuits of water distribution in the city.

5. An Emerging Logic of Water Management

External restructuring has dramatically shifted the debate about the style of water management in the city of Cochabamba with some evidence of a shift from a productionist to a more demand-oriented form of management. The case study has found evidence which indicates that the key assumptions underpinning the productionist logic have been challenged and the technocratic and political priorities of water engineers and local politicians have been reshaped through the privatisation process. Central government has a key role, often in partnership with the World Bank, in reshaping the context within which debates about water privatisation are discussed at a local level. At the same time, the priorities of the World Bank have been reshaped as they have included a commitment to network extension in the privatisation programme. We can group these shifts into three themes.

Shifts in the social organisation of water provision in Cochabamba. While the public water provider has not yet been privatised, a series of changes have taken place to make the utility much more attractive to international water companies. These include the distancing of the water utility from local politics through the exclusion of local politicians from the management board and the appointment of more professional management. At the same time, the spatial coverage of the water utility has been extended across the city to create a more coherent structure which can exploit greater economies of scope and scale. A lot of attention has been paid to improving the internal efficiency of the utility with a series of externally funded initiatives to improve management, administrative and financial systems to increase the attractiveness of the company. At the same time, external consultants have been brought in to collect a lot of more accurate and up-to-date information on the company and the water resource problems. These initiatives imposed by the Bolivian government, with advice from the World Bank and external consultants, have been designed to create what is assumed to be a more rational and efficient water utility which is more widely distanced from local politics but also more attractive to external investors.

The weakening of major supply options. Restructuring of the water provider has been closely linked to the ‘postponement’ of the city’s large-scale Misicuni scheme in favour of the cheaper and more readily exploitable Corani scheme. While there has not been the wholesale rejection of supply options—as all actors agree that additional supply is required—the privatisation process has carefully shifted the city away from the Misicuni scheme and has introduced the less-expensive supply option offered by Corani which follows a neo-liberal approach towards economic restructuring. A series of arguments has been mobilised by the city and its international consultants against the postponement of Misicuni—but once Corani is developed, there is unlikely ever to be a market rationale for the exploitation of Misicuni, even though other factors which promote Misicuni as a cultural resource may be brought to bear on the situation (see Laurie and Marvin, forthcoming).

The role of users in the extension of the water network. Although not initially linked to privatisation debates, the government used
World Bank emergency funding to organise an emergency work initiative. A central part of this was a series of programmes to involve users in the extension, construction and management of water networks. Involving community and voluntary groups, new training and educational programmes were established to enrol users in the extension of connections to the formal water network, particularly in squatter and marginal communities. The formal water provider became involved as a partner in these programmes, although they were mainly led by informal organisations. While these programmes have not been institutionalised within the management strategy adopted by the public water provider, there is an expectation that these user-involvement programmes will be organised by the new private water provider. But there is also concern that they will not have access to the knowledge and expertise that has been built up within the informal organisations which have designed, organised and implemented these user-involvement programmes. However, the government has specified that international companies interested in bidding for the water company must have plans to connect at least 90 per cent of the population within 5 years. It is expected that this could only be achieved with substantial finance and the involvement of users in the construction and management of the networks, but it is not clear if international water companies have this expertise as they operate to higher engineering standards and do not have much experience of working closely with users.

Overall, we can see that the privatisation process has exposed, and then challenged, the key features that have traditionally sustained the productionist logic. But there are still unresolved issues. It is not clear if the commitments sought from companies for complete network coverage are achievable; there are major questions about the level of tariffs, especially for the poor; and uncertainty about whether international companies have the expertise and knowledge to cope with the complexity of involving users in the extension of the networks. These issues need further research, but what is apparent is that privatisation has radically challenged the local and international interests that have been able to maintain the productionist logic and institutionalise the widespread exclusion of the urban population from the water network.

6. Conclusion: Recombining Networks?

A new style of water management may be emerging in developing cities within the space created by shifts to the private provision of water services. While we are not arguing that the productionist logic is completely replaced, our case study does show that new priorities and objectives are reshaping the conventional approach to water management. A new emphasis on internal efficiency and cost recovery starts to address cross-subsides to high socioeconomic income and commercial users. There is greater questioning of large-scale supply-oriented projects—especially of their high economic and environmental costs. Finally, greater attention seems to be given to issues of water demand and distribution, with greater efforts to enrol users in the extension and management of the network. However, there are a number of wider issues that need to be addressed before we are able to argue that a new paradigm of water management is emerging.

The power relations between cities, central governments and international development agencies have a key role in creating spaces for renegotiating forms of urban water management. The case study illustrates how the Bolivia la Nueva project was able to reshape the priorities of the city of Cochabamba and the context in which decisions about water were made. Central to this was the weakening of local control and autonomy in decision-making about water supply options exemplified by the attempted postponement of the ‘Miticuni Dream’ (which to date is still contested at a regional level—see Laurie and Marvin, forthcoming). The government still has to insert wider social equity and water distribution issues into the privatisation programme. The opportunity to make these
shifts may be highly contingent and based on the continuation of the particular set of relations that Bolivia has been able to develop with the World Bank. These particular social relations may not easily be replicable in other contexts, but the Bolivia example does show that the potential exists to introduce particular national and social interests into privatisation programmes.

There are also major uncertainties about how effectively the informal and formal circuits of water management can be meshed together. Although international funding agencies, consultants and water companies are committed to increasing the role of the private sector in water provision, there is still uncertainty about their commitment to network extension, social equity and the involvement of users in water networks. Developing cities face a very specific water problem—a large percentage of the population has never been connected to the network and the conventional productionist logic is not able to deliver complete networks. But meshing the incorporation of informal circuits with the formal water network will require the development of: new types of knowledge no longer monopolised by engineers; innovative and more complex social relations with users; and, a social context for the use of smaller-scale water management technologies. Rather than export conventional Western models of water management, international agencies will have to create spaces in which the new knowledge and expertise developed by informal-sector initiatives in including users in water provision can be built into a more demand-oriented logic of water management.

The challenges to the conventional productionist logic mean that debates about water provision are in a state of rapid transition. But we would not yet accept that there has been a major paradigm shift because we are cautious of avoiding simple dualisms; the new logic is emerging slowly and has powerful echoes to past practice. Instead, we have proposed a framework that allows us to examine how the transition creates new spaces for the development of a different style of water management. While the emerging logic may reduce local autonomy and control over water resource issues by local political elites, it may also allow the social and distributional issues of central concern to potential users to be heard more clearly. The central challenge is to ensure that we do not simply focus on the cost and benefits of the privatisation debate, but that we also use it as an opportunity to reshape the conventional productionist logic of water management to create a more socially inclusive style of water management that more effectively meets the needs of users forced to enrol in informal water circuits.

Notes

1. Three different electricity companies were created. The thermal electricity resources were split between two new companies—Waracachi in Santa Cruz and Valle Hermoso in Cochabamba. The HEP resources of Corani passed to Empressa. The national grid interconnector remains under state control, although this may be privatised. Bolivia power in La Paz and a number of smaller generators are connected through the transmission authority.

2. A series of training materials were produced by SEMAPA and FIS: Cartilla educativa sobre sanaemiento básico (Education folder on basic sanitation); Manual de organización y contabilidad para sistemas de agua (Organisation and accountancy manual for water systems) and a radio initiative (PROESA) supported by a book for group work was also launched: Programa de educación en sanaemiento básico por radio (Radio education programme in basic sanitation).

3. Fieldwork carried out by Nina Laurie in August 1995.

4. A number of international water companies are continuing to examine the feasibility of submitting bids for the undertakings, but there is still uncertainty about whether the largest cities’ water supplies will be offered separately or as a package.

5. While these changes are underway, they have not, however, gone uncontested. Regional interests have challenged the influence of the central state over restructuring (see Laurie and Marvin, forthcoming) and, at the national level, different sectors of the water industry have questioned the top-down approach of privatisation (Anesapa, 1996).
References


FIS Y SEMAPA (nd) Cartilla educativa sobre sanaemiento básico. FIS y SEMAPA, Cochabamba.

FIS Y SEMAPA (nd) Manual de organización y contabilidad para sistemas de agua. FIS y SEMAPA, Cochabamba.

FIS Y SEMAPA (nd) Programa de educación en sanaemiento básico por radio (PROESA). FIS y SEMAPA, Cochabamba.


WORLD BANK (1995) Meeting the Infrastructure Challenge in Latin America and the Caribbean.


Directions in Development, World Bank, Washington, DC.