

Public Private Partnerships
and the Poor

Series Editor: M. Sohail

Public Private Partnerships *and the Poor*

**Bolivia – a perspective on water supply
and sewerage**

Barry Walton



Water, Engineering and Development Centre
Loughborough University
Leicestershire
LE11 3TU UK

© WEDC, Loughborough University, 2003

Any part of this publication, including the illustrations (except items taken from other publications where the authors do not hold copyright) may be copied, reproduced or adapted to meet local needs, without permission from the author/s or publisher, provided the parts reproduced are distributed free, or at cost and not for commercial ends, and the source is fully acknowledged as given below. Please send copies of any materials in which text or illustrations have been used to WEDC Publications at the address given above.

A reference copy of this publication is also available online at:
<http://www.lboro.ac.uk/wedc/projects/ppp-poor/>

Halcrow Management Sciences (2003)
Public Private Partnerships and the Poor
Bolivia: a perspective on water supply and sewerage
WEDC, Loughborough University, UK
Series Editor: M Sohail

ISBN Paperback 1 84380 034 9

This document is an output from a project funded by the UK
Department for International Development (DFID)
for the benefit of low-income countries.
The views expressed are not necessarily those of DFID.

Designed and produced at WEDC

About this series

The purpose of the project *Public Private Partnerships and the Poor in Water and Sanitation* is to determine workable processes whereby the needs of the poor are promoted in strategies, which encourage public-private partnerships (PPP) in the provision of water supply and sanitation services. One of the key objectives is to fill some of the gaps, which exist in evidence-based reporting of the facts, and issues around the impacts of PPP on poor consumers. This series of reports present the interim findings and case studies of an analysis of both the pre-contract and operational phases of a number of PPP contracts. A broad view of PPPs has been taken and situations where the public sector is in partnership either with formal private sector companies, or with small-scale local entrepreneurs, or with NGOs employed in a private sector capacity have been included.

M. Sohail
Series Editor

Acknowledgements

The series editor gratefully acknowledges the many different people who have willingly contributed in knowledge, opinion and in time to the development of this work.

Special thanks to the people from low-income settlements of case locations who have contributed to the research and provided their perspective on the issue. We feel greatly indebted to them.

Contents

1. Introduction.....	1
2. General	3
3. Sector arrangements.....	7
4. SAMAPA and SEMAPA – targets for private sector involvement.....	11
5. SAMAPA	13
6. SEMAPA	15
7. SAGUAPAC	17
8. Conclusions, observations and lessons	19
References.....	21

1.

Introduction

This paper discusses aspects of the development of water supply and sewerage services over recent years in three Bolivian centres, La Paz/El Alto, Cochabamba, and Santa Cruz de la Sierra. The paper seeks to clarify some misunderstandings on performance but does not delve deeply into the technical detail, which others have already documented. An attempt is made to put the businesses in a wide context and thereby suggest some issues for future research. The information used in the paper comes from a variety of sources: the public domain, official sources that are not generally available or released, contract documents and reports that have limited or restricted access, direct contact by the author, and some is anecdotal.

These centres are considered significant as they represent very different levels of Bolivian society and highlight the disparate nature of this landlocked nation. Over 1,500,000 people live in both La Paz/El Alto and in Santa Cruz, and around 500,000 in Cochabamba. They comprise about a third of the country's population of 8,000,000. This paper contemplates how these centers are different, and investigates the origins of their successes and failures. In the case, of Cochabamba, we wonder how matters are proceeding after the dramatic failure of the water concession, such as the Vivendi/Tucumán and Azurix BA/Province of Buenos Aires contracts, and how people are getting on after the crisis. The paper also addresses the businesses that regulate the sector (Superintendencia de Aguas) and the umbrella regulator of utilities (Superintendencia General, Sistema de Regulación Sectoral – SIRESE), and the impact of national and international norms on local realities.

2.

General

Bolivia is a land of ancient peoples, a product of Spanish imperial rule, and a modern exploiter of natural mineral and agricultural resources. In 1650, the city of Potosí, based on a massive silver mine at some 4000m above sea level, had a population of 160,000 at a time when Argentina's Buenos Aires, whose urban sprawl is now around 12 million, had not reached yet 20,000 (El Saneamiento en el Área Metropolitana 2000 by Osvaldo Rey). Another, anecdotal, source suggests that Potosí had a population closer to 500,000, making it an immense centre for that time, even though only 170,000 people live there now.

La Paz, the relatively wealthy capital founded in 1548 that is 3,600m above sea level and lies on the silver route, is in the shadow of the high Andean plain and famously sprawls below the poorer conurbation of El Alto. Water resources are not considered to be a serious problem. Cochabamba lies in the fertile Central Valley at around 2,600m and has serious groundwater depletion and potentially expensive surface water. Santa Cruz de la Sierra (founded in 1561) lies on the great Brazilian llanos plain at a mere 400m above sea level. There is extensive groundwater exploitation and the upper aquifer is polluted, but boreholes 500 metres deep should maintain supplies for the medium term. Deeper wells or surface water capture are possibilities for the long term, but extended services and the mining of deep resources will have to be dealt with.

With almost perverse pride, Bolivians boast of the loss of some 1.1 million km² of their 2.4 million km² pre-revolutionary territory to bordering states. They now feel the loss of sea access for gas products and, symbolically wearing potpie hats, lament the deaths caused. The indigenous Guaraní people remain in a state of war with the Kingdom of Spain (Homero Carvalho Oliva – *Countenances and Souls from Eastern Bolivia* by Roger Ortíz Mercado 1999). Recent presidents have been bilingual, but in Indian and English, not Spanish, and provincial governors have mixed English with Spanish in a bewildering way. Understanding and language are not unimportant in terms of selling ideas to the population and involving them successfully in delivering the services.

Water privatisation, visited on the regional water authorities in England and Wales in 1989, was not attempted in Scotland. The technical and business cases were very nearly the same and subsequent Scottish investment has faced special problems, but it

was the cultural battle that was too much even for Mrs Thatcher, then prime minister of Britain. Dwr Cymru/Welsh Water publishes most of its principle documents in English and Welsh, and other English water sector companies publish at least some information in widely used minority languages to capture their customers. Bolivia, then, with reported high illiteracy (UNFPA, The State of World Population – 2001), may be in as great a need of indigenous language translation as of general language skills and the jargon of service sectors. In addition until such literacy is reached alternative communication strategies, such as using the radio may be considered.

In common with most of the developing world, Bolivia faces extreme population growth, somewhat disguised by percentage treatment (2.2% per annum – UNFPA) but representing an increase in absolute numbers from a current 8.5 million to 17 million by 2050. (These projections, which influence future asset requirements and can cause investment despair, need to be treated with caution; while data is not fully available yet, a recent census indicates that population increases were lower than expected.) With an urban population of around 5.4 million and a global trend of urbanisation, demand for managed water supply and sewerage systems is pressing and will become more severe. An annual GDP/PPP of US\$1,010/US\$2,193 (1999 – Selected World Development Indicators, World Development Report 2000/2001) means that simple extrapolation of international norms and solutions will be neither appropriate nor affordable. More important, perhaps, there is little likelihood of those norms being achieved unless great strides can be made in wealth creation and people are discouraged from drifting into poor urban areas. These are tall orders indeed and require some high-level pragmatism to deliver affordable but controllable systems that will last and can be financed.

A start may be made by lowering a key driver – the per capita demand assumption. This is generally about 200 litres per head per day in South America and is enshrined in laws that fly in the face of water conservation and moderation in infrastructure investment. The relevant laws, often described as national, are really applicable only to urban water use. In Bolivia's case, the 'Reglamento Nacional de Prestación de Servicios de Agua Potable y Alcantarillado para Centros Urbanos' correctly addresses urban populations. While doing less than they might for the spread of managed services, such instruments prop up excessive, legally enforceable solutions and scare off investors from planning more moderate systems. Western European demand is now managed at 100 to 150 l/h/d, home storage is flattening out demand peaking, new petrochemical materials offer lower friction and perhaps insulation properties that could influence pipe diameters and cover. Important capital cost savings can be had by using less ambitious designs, macro metering down to the 1000 property frontier, and more careful construction might be explored and implemented. On the matter of excessive demand prediction, there is a lesson from history, doubtless repeated elsewhere. In his *Water to Tyneside*, R.W. Rennison reports the steady increase in demand of the commercial, industrial, and growing population of Newcastle's (UK) urban sprawl. In 1861 demand was estimated at some 90 litres, per head per day. By 1931 the estimated use had risen to 136 l/h/d, and leapt to 227 l/h/d by 1950 and 281 l/h/d by 1979. Whether Rennison's figures included averaged out commercial and industrial use as well as domestic demand is not clear, but there is little doubt that the post second world war figures included substantial and increasing losses from ageing infrastructure deterioration.

Current use in the Newcastle area is of the order of 146 l/h/d (England and Wales average 149 l/h/d – OFWAT Leakage and the efficient use of water 2000-2002 Report) and is adequate to support a modern society. Much developing world planning (Bolivia aims for 200 l/h/d to 250 l/h/d according to its regulations) continues to use demand horizons that have origins in figures that include important, reducible losses and that drive investment to perhaps ill-timed resource exploitation and treatment. Having said that, meeting the unsatisfied demand for water supply and sewerage to even an acceptable base position remains a formidable problem. For Santa Cruz average domestic demand of around 113 l/h/d has been reported, but this conflicts with the year 2000 official figures tables given later in the text. In El Alto new connections are using around 45 l/h/d, a figure believed to be driven by a cultural reserve in water use. These figures suggest that average demand figures of 200 l/h/d to 250 l/h/d need to be investigated.

3.

Sector arrangements

According to the SIRESE Report on “La Regulación Sectorial en Bolivia, 1998” published in December 2000, water supply and sewerage services were provided in Bolivia by eight principal autonomous/semi-autonomous suppliers, 23 municipal companies, and co-operatives serving populations in excess of 10,000 people and others serving populations of up to 10,000. There are also isolated rural communities using quasi-natural circumstances (untreated surface water and wells) and finally some *ad hoc* illegal urban or semi-urban arrangements. There is, as previously noted, a water sector regulator, a Superintendencia de Aguas created in 1997 under the 1994 SIRESE law which introduced regulation of the water, electricity, hydrocarbons, telecommunications, and basic transportation industries (SIRESE Report, 1998). As was clear in this frank report, relations have run anything but smoothly in some areas. Troublesome as the issues may be, as a non-sanitised offering, the document provides useful information from which to understand progress.

Formal water sector providers were, in 1988, localised monopolies, vertically integrated but influenced by real and projected bulk transfer schemes not under their mandate. The companies SEMAPA (Cochabamba), ELAPAS (Sucre), AAPOS (Potosí) and SELA (Oruro), COSSALT (Tarija), COSMOL (Montero), SAGUAPAC (Santa Cruz de la Sierra) and COATRI (Trinidad) are municipal or co-operative organisations providing water and sewerage services to mainly urban populations. Additionally Aguas del Illimani (owned mainly by the Suez Ondeo Group – formerly Lyonnaise des Eaux – delivers services to La Paz/El Alto under the only international concession in operation. (The company is named after Bolivia’s highest mountain, the triple-peaked Mount Illimani, whose highest peak, Pico Sur, is 6,462m (21,200ft). The contract was let in 1997. Another concession, for SEMAPA’s activities in Cochabamba and won by International Water in 1999 following a previous, abortive move towards privatisation in 1997, collapsed within six months of handover. The newly created concessionaire, Aguas de Tunari, was reportedly expelled, (International Water Association, Water 21 report – June 2000) having been engaged on what some of us considered a doomed mission. The other main agency involved in providing the services is the Ministry of Housing and Urban Matters.

Both public and private operators come under the SIRESE Law N°1600, but as of the end of 2000 we were still waiting for the enactment of a draft regulatory decree to deliver a new Water Law. The Water Law of 1906 provided a sufficient platform for

creating a contemporary regulatory framework ('Report on the legal feasibility of private sector participation {PSP}' in *Servicios de Agua Potable y Alcantarillado, SEMAPA Cochabamba* by Ashurst Morris Crisp – March 1996). The regulatory decree project was a comprehensive work and was commented on by the author of this paper. The decree covered in depth the general aspects of the decree; institutional aspects for the sector, concessions, and other authorising instruments for providing services; regulation of the services, non-compliances and sanctions; charges and tariffs; use of publicly owned assets in service provision; and rights of access for operations and works. The document ran to over 243 clauses, and even if it remains trapped in a web of opposition is an important reference work.

Areas where evolving regulatory experience in both the UK and other South American countries would suggest some review and further development were as follows: (These follow the order of the draft rather than suggest particular priorities.)

- Some restrictions on participation may not be practical. Some provisions would limit the potential for economies from innovative solutions.
- The replacement of regulators every five years is probably incompatible with the long-term planning needed by the services and the need for continuity.
- There was merit in combining regulation of distinct services but it was worthwhile maintaining separate information sets and activity-specific data.
- The regulations appeared to be orientated towards criminal sanctions for service failure rather than to customer compensation.
- There was a need to accept some realities in free movement of shares and to consider customer and employee ownership.
- Conflict could result from having multiple agencies – at that stage understood to be the Secretaria Nacional de Aguas and the Superintendencia Sectorial de Agua – without clearly defining their roles.
- Water pressures, sewer cleaning, and management of industrial effluents needed some further definition.
- The treatment of guarantees and relationships with construction rather than service performance, and the lost investment potential caused by 'back to back' risk transfer between lenders and contractors, could reduce investment potential and cause double indemnities.
- The continued involvement of providers with some relief after a disaster was preferable to allowing them to escape their contract because of the disaster.
- Customers should be protected from intrusion when public rights are transferred to private companies and be able to contact any appropriate authority.
- The treatment and economics of macro and micro metering, and the value of water as numbers of customers not served or as an absolute (rather than percentage) loss, needs to be considered.

- The provision of information and limits on confidentiality to neutralise asymmetric bias in favour of monopoly suppliers needs consideration.
- The use of multiple parameters for assessing service coverage to permit a reasonable view to be taken of progress was desirable.
- There should be obligations on providers to collect revenues due but with limitations on draconian rights over customers' property.
- Others' experience in facing difficulties with imposing connection charges should influence tariff structures.
- Orienting the arrangements such that the customer is recognised as the client and the state as the facilitator (rather than customer) required a cultural adjustment.
- Inclusion of levels of service and CAPEX/OPEX detail in a generic law could cause regulatory and practical difficulties.
- Concerns were raised (perhaps prophetic considering Argentina's fiscal problems) about the risks associated with financing locally paid services with international funds.

As reported by the Superintendencia de Aguas in SIREs 1998, a primary difficulty was the lack of the regulatory legislation, compounded by the unhealthy but apparently effective resistance of water supply and sewerage operators via their national trade organisation, ANESAPA (Asociación Nacional de Empresas de Servicios de Agua Potable y Alcantarillado), to payment of regulatory fees. The fallout from those circumstances were doubts about the shape of the legislation to be provided, the inability of the regulator to deal with some matters referred to it, an inability to finance regulatory staff recruitment, and the publication of only Aguas del Illimani's data. As shown by SAGUAPAC's *Memorias Anuales*, of which copies can be obtained up to the end of 1999, other organisations' performances are published and can be analysed. The lack of standardised, verified information is not helpful when the sector needs to exploit comparability, and promote efficiency and clarity to encourage investment and long-term interest.

It is understood that after a hiccup over forms of contract, setting of regulatory fees, and operators' targets, most of the substantial service providers have now signed up to concession arrangements. Certainly for year 2000, regulatory data is available and some of the information is provided here.

Indicators year 2000	Units	AISA Aguas del Illimani	SAGUAPAC Santa Cruz	SELA Oruru	COSMOL	ELAPAS Sucre	COATRI Trinidad	CAPAG
Debt Recovery	%	116.80	97.00	58.02	96.00	92.65	69.00	96.00
Customer complains satisfied	%	94	100	100	100	97	100	(*)
Measured tariff (1US\$=6Bs)	Bols/m3	2.86	3.01	2.47	2.72	3.89	3.14	1.78
Technical								
Coverage water supply	%	98.25	94.00	82.75	91.00	81.77	50.37	94.00
Coverage sewerage	%	74.76	41.00	(**)	22.60	69.51	(**)	(**)
Measured supply coverage	%	90.04	98.00	39.91	100.00	100.00	33.05	100.00
Continuity of service	%	99.74	99.76	37.51	100.00	98.70	(*)	100.00
Potable water losses	%	27.56	24.00	41.28	(*)	23.80	52.91	(*)
Water use	Litres/head/day	126	163	118	91	122	168	42
Administrative								
Internal manning levels - water supply	Emp/1000 connections	1.80	3.60	5.92	5.26	6.56	9.00	4.86
Internal manning levels - sewerage (***)	Emp/1000 connections	2.87	8.86	(**)	22.22	7.72	(**)	(**)
Combined services	Emp/1000 connections	1.11	2.53	(**)	4.25	3.69	(**)	(**)

Source: After SIRESE 2000 service delivery tables

(*) Data not available

(**) Sewerage services not provided

(***) Work contracted to third parties excluded

4.

SAMAPA and SEMAPA – Targets for private sector involvement

As major centres needing investment and, potentially, private sector management, water supply and sewerage services for La Paz/El Alto (SAMAPA) and Cochabamba (SEMAPA) became targets for operational privatisation no later than 1996. A World Bank mission investigated the options for PSP. At that time consultants were deeply involved in a Cochabamba study to identify a privatised programme for the Central Valley. By then Cochabamba had enjoyed – or suffered, depending on one's perspective – a master plan (SEURECA-BRGM-SOGREAH-CGL in 1995), an institution strengthening programme, and an investigation into the provision of raw water from a new dam – the Misicuni scheme – at a disproportionate estimated cost approaching US\$1 billion. Subsequent planned phasing projected a six-year construction first stage costing some US\$470 million. An alternative supply from the Corani hydroelectric project appeared to be more immediately feasible but practically impossible to deliver in the short term due to requirements to construct raw water and potable water bulk transfer tunnels, mains, and treatment works. Again subsequent planning has suggested a three-year construction programme delivering a bulk transfer system. Contract terms proposed by the power concessionaire were severely biased in his favour and, though not unreasonable from his point of view, were extremely onerous for SEMAPA and almost certain to lead to default. In reporting to the Bank, I noted that the Corani proposed water supply terms were 'chillingly simplistic'. By June 1999 an agreement was reportedly reached whereby water could have been supplied from Corani at a manageable price of around US\$0.30 per m³.

The consultants set out the range of PSP options and the requirements for modelling privatisation scenarios, highlighting the many difficulties being faced and in prospect for SEMAPA. They made recommendations on tariffs and on modelling future revenues and costs. What conclusions they drew on the viability of the options are not readily available but it is possible that they closed the financial/economic envelope with revenue increases that were unachievable. Signs from the English and Welsh water sectors and the Aguas Argentinas concession were already suggesting that high infrastructure charges for expansion and substantial annual price increases were precarious tools for boosting revenue. Not only did they make customers unhappy, but had become cannon fodder for a hostile press and political opportunists.

SEMAPA's water resources problems, piled on top of the normal list of deficiencies usually expected to be solved by introducing PSP, gave little confidence that the privatisation exercise would be successful. SAMAPA's situation and empathy with PSP change suggested that it would be possible to use private sector involvement at the water service level to improve quality and expand coverage. It was the author's view at the time (1996) – and little in the sector indicates otherwise – that SEMAPA's circumstances, where large strategic assets were required to avoid catastrophic depletion of natural resources, that local sector-specific solutions were unlikely to be successful. Still less was the private sector willing to invest without specific guarantees and payment periods that are compatible with short to medium-term financing. Acceptable tariffs will not be adequate to meet OPEX and CAPEX needs. The financial/economic necessities are undeliverable and both internal cross subsidy and mechanisms to spread capital costs over asset lives are essential to make step changes to the base position.

Nevertheless, both SAMAPA and SEMAPA were put up for privatisation under a mandate with an organisation late in 1996. In parallel, another consultants (out of Buenos Aires) commenced modelling techno-financial/economic scenarios for the two businesses. The issue of information memoranda early in 1997 to companies and organisations interested in participating in the tender process triggered the process. Information contained in information memoranda is normally provided under strict confidentiality rules both to protect valuable client data from general disclosure but also to ring-fence the bidding process. The process here was no exception, but later reporting suggests that while the structures of the bids and following contracts would be similar, (the legal framework and centralised source of bidding would promote that), the priorities were different, the winning parameters distinct, and the business environments were critically favourable in one case and hostile in the other.

For La Paz/El Alto, expanding the of water supply and sewerage coverage were the key drivers and bids were based on extension of coverage. As noted previously, exploitation of water resources was not a critical matter.

For Cochabamba, the lowest tariff offer would decide who won the contract, but the winning number would still be a double-digit rise in tariff at transfer. Probably essential to support CAPEX in water resources, such an increase faced possible severe customer resistance. As it turned out, the 1997 bid process did not produce a concession. A view expressed to the author is that delivering water from Corani under the 1997 proposal could have produced a manageable tariff increase. However insistence on the Misicuni scheme and the effects of bringing tariff information up to date under the Aguas de Tunari contract generated percentage changes approaching 200% for some customers – a time bomb.

5.

SAMAPA

SAMAPA was successfully transferred to the purpose-made company Aguas del Illimani in 1997 and is the only company reported on in the SIRESE 1998 report. The Company is owned by ONDEO (54%), the Bolivian Investment Corporation (22%), Invesora en Servicios (9%), the International Finance Corporation of the World Bank, CONNAL S.A. (5%), and staff (2%). Information extracted from the report and rounded indicates the following.

Coverage	1997	1998	Rate of Increase
La Paz	(%)	(%)	(%)
Water supply coverage	89	95	7
Sewerage coverage	73	74	3
El Alto	(%)	(%)	(%)
Water supply coverage	77	82	7
Sewerage coverage	36	40	11
Expansion of services	Programmed	Delivered	Against target
La Paz August 97/December 98	n°	n°	(%) Over target
Water supply new connections	4,700	6,100	30
Sewerage new connections	2,300	2,600	29
El Alto August 97/December 98	n°	n°	(%) Over target
Water supply new connections	17,900	23,100	29
Sewerage new connections	10,700	14,400	34

Source: SIRESE/Aguas del Illimani – Regulatory report on 1998

The report also notes that tariff levels were maintained at constant dollar prices of between US\$0.22/m³ and US\$1.18/m³ for domestic supply, between US\$0.66/m³ and US\$1.18/m³ for commercial, and at US\$1.18/m³ for industrial. Bills were raised in Bolivianos at the official exchange rates, however, affording the concessionaire inflation or currency protection not afforded to customers. This facility is understood to be common to all service suppliers. Tariffs include nominal sums for sewerage.

Comparison of charges is extremely difficult due to exchange rates, PPP rates, investment intensity, positions on the expansion and improvement continuum, and extent of services provided. However levels do not look like outliers when compared to an international set of billing data (note error could be 100% but is not 1000%) but they do suggest a strong bias towards subsidy for poorer, low-use customers and the commercial/industrial subsidy of domestic supply. A feature of supply uptake is understood to be restraint by El Alto customers, who have limited their use to their

needs within spending constraints. A consequence of this, of course, is that recovery of infrastructure and connection costs based on much higher demand becomes problematic. Apart from raising complex issues associated with wealth generation, its distribution and social fairness, there is a pressing effect on business modelling and technical assumptions. Although different in scale, it is a feature of water supply in Britain, for example, that without extensive metering, per capita use has never drifted up to the 200 to 300 l/h/d figures typical in the USA and Australia where domestic use measurement is extensive, or to the spectacular 400 l/h/d plus evident in Buenos Aires, where measurement is rare. El Alto may provide a valuable lesson for estimating future demand and an explanation as to why many predictions of water shortage doom are not realised.

The regulator reports (from a government paper) capital expenditure of US\$317 million in water supply and basic sanitation over the period 1994 to 1998, and investment rising from US\$36 million per annum in 1994, US\$79 million in 1997, and US\$82 million in 1998. Of those latter figures, Aguas del Illimani invested some US\$24 million. It is understood that turnover for the business is less (than US \$ 20 million) so the investment in the first 18 months or so was substantial. The scale of investment must also raise a question over the ability of a business of this size to command cheap borrowing and enjoy economies of scale in procuring goods and services for a relatively low-income industry. Consolidation with higher value providers such as gas and electricity or other sector suppliers may be inevitable to benefit from scale savings.

There were some 34,000 customer contacts/complaints registered in 1998, 25,000 of which were to do with water supply from a customer base of around 140,000 connections. Most claims related to billing and some (222) were directed straight to the regulator. Water quality, both in bacteriological and chemical terms, was reported as satisfactory.

The Company published a report ‘Aguas del Illimani 1^{er} Quinquenio’ early in 2002 and while the water regulator has not necessarily audited the source information it indicates that the concession has delivered on expansion and improvements and is now pushing beyond the original concession boundaries to include new customers. Importantly, those customers are at the lower end of the ability-to-pay scale but, quoting the company, face daily water charges seven times lower than a loaf of bread.

According to company figures over the contract period to the end of 2001, water supply coverage in La Paz and El Alto has reached 100% of the contractual target involving respectively 20,800 and 43,500 new connections while sewerage has risen respectively to 88% (14,500 new connections) and 54% (29,800 new connections).

6.

SEMAPA

In an editorial from the Los Tiempo.Com website on 24 February 2002, it was reported that ‘La ligereza con que Semapa se propone echar por la borda un crédito de 18 millones de dólares, lo que privaría a Cochabamba de la única fuente de financiamiento para paliar la escasez de agua potable, supera el límite de lo tolerable. Es necesario evitar que la Coordinadora aseste un nuevo golpe a nuestra región’. (The ease with which SEMAPA proposes to throw overboard a US\$18 million credit, which would have provided the only funding to reduce our water shortages, is beyond what is tolerable. It is necessary to avoid the Coordinator {this may be the coalition for the defence of water and life, for which see below} firing another blow at our region. BW translation)

The IWA’s Water 21 reported on the collapse of the short-lived Aguas de Tunari concession late in 2000. A web search shows this event to have been much more than a contract breakdown, calmly worked through by technocrats. It was a very nasty affair involving local and international passions, historic ‘rights’, and peasants versus the upper classes. There was even a Cochabamba declaration, noble in character, global in scope, but light on practicalities, consequences, and the protection of customers under properly regulated service provision. Protests in February 2000 against water charge increases escalated into an extended and deadly skirmish between protesters and the police and military. Interests as diverse as coca growers from 280km away (not directly affected by the concession presumably) and truckers (potentially much more challenged by piped water supplies replacing tankers) were represented on the field of conflict and at subsequent strikes over official violence. It may be educational to know how much water infrastructure this battle would have financed.

The upshot of all this was that the government reverted to water tariffs pre-privatisation modified by the Coordinadora, exited itself from the agreement with Aguas de Tunari, and devolved de facto control of SEMAPA to the ‘Coordinadora de Defensa del Agua y de la Vida’, a popular movement. The triggers for contract termination were reportedly the public disturbances and non-availability of Aguas de Tunari senior management to discuss the situation. At a distance this may seem bizarre, but on the frontline the situation was well beyond any recognisable contract process. Although there was a flurry of angry correspondence, accusation, and counter accusation throughout 2000, some of it harrowing and a far cry from treating and

delivering potable water, there has been little on what the Coordinadora and SEMAPA have since achieved in meeting demand and standards. Many of their vociferous backers seem to have drifted away, although a January 2001 report from Maude Barlow, National Volunteer Chairperson for a group called The Council of Canadians suggested a need for practical solutions in the everyday and less heady business of delivering sustainable services. Matters were to be discussed at a conference on 'Water for People and Nature: A Forum on Conservation and Human Rights in Vancouver, July 5-8, 2001'. While assistance may have been provided, website conference notes do not confirm what practical measures have been put in place.

SEMAPA, with a customer base of more than 500,000 people, should be a rather neat water business but is beset by difficulties, unable to satisfy those it serves under whatever structure. Turnover at around US\$4 million in 1995 was set against operating costs of over US\$6 million (including depreciation of around US\$2 million). Increased revenues as a result of a 30% price hike in 1996 would have pushed billings to over US\$6 million. Further increases, some abandoned after the 1999 revolt against privatisation, would have strengthened revenue so long as they were actually collected, but collection rates in 1996 were not very encouraging. Opposition to further price rises may have worsened the debt position. Gleaned features of SEMAPA's progress suggest that structural problems may continue to dog the services and raise the following questions:

- Does migration to Cochabamba continues to stress an overloaded system?
- Are the poverty of new urban dwellers and their resistance/desperation hitting potential revenues and involvement of sustainable assistance?
- Successful means to mobilise Corani or Misicuni raw water resources have not been put in place. The Corani option may no longer be available, so what now are raw water supply solutions?
- Has consolidation of municipalities to generate benefits of scale taken place in accordance with Supreme Decree N° 24298 of May 1996?

7.

SAGUAPAC

The Cooperativa de Servicios Públicos – ‘Santa Cruz’ Ltda (SAUAPAC) is a co-operative organisation that provides water supply and sewerage services to the central zone and northern and southern parts of the city. It operates out of an open plan headquarters and appears to be a transparent and tightly run business conscious of its duties to its customers-cum-owners. Senior management has few illusions about economic realities. Service bills project that understanding to customers noting among other matters that:

- A monthly bill will be delivered to a client and in his/her absence returned to HQ from whence the client shall request and settle the account.
- Where bills are not settled or collected and settled they will fall as debts for rebilling with the next account.
- Bills are issued around the same date each month, hence customers should expect them.
- Supply will be cut off in five days following failure to settle outstanding sums (although this facility is reported not to be used).

SAGUAPAC publishes a bimonthly news sheet (*SAGUAPAC Informa*) and annual reports including summarised accounts and an Auditor’s short report (*Memória Anual 1999* and Price Waterhouse Coopers audit statement of 14 April 2000). The 1999 figures give a turnover of Bols.101.4 million, direct operating costs of Bols.45.8 million, administration costs of Bols.49.7 million, and other costs including financial charges, amortisation of assets, inflation provisions and other non-operational costs totalling Bols5.8 million, leaving a marginal surplus of Bols0.1 million for that year (less than 1% of costs). Restated figures from the same report for 1998 indicate a turnover of Bols.89.6 million, costs of Bols90.2 million and a negative residual of Bols0.6 millions, a deficit of 7% of costs. These results are as expected, the Co-operative being required to balance its books annually.

The Bimonthly sheet of December 2000 advised consumers that average per capita use ranged from 80 to 100 l/h/d and carried a strong message about water conservation and the nature of losses. Information on expansion of sewerage services,

including contract price, funding provisions, and projected works was provided as well as some global perspectives of the water sector. The Cooperative also published a graph of a November/December 2000 opinion poll by independent marketing consultants MKT and PAT (Periodistas Asociados de Televisión) on how customers view SAGUAPAC. In an OFWAT/ONCC (England and Wales) document 'Understanding Customers' Views' of October 2001, views of customers on a range of issues were reported. Figures from the two studies are compared below. The design of the MKT/PAC sampling and analysis is not known and SAGUAPAC, facing an important expansion programme, may be subject to greater opportunity for complaint than UK companies.

Overall satisfaction (per sample survey)	E&W water 2001	E&W sewerage 2001	SAGUAPAC 2000
Very satisfied	50%	51%	4%
Satisfied	N/A	N/A	50%
Fairly satisfied	40%	40%	N/A
Neither satisfied nor dissatisfied	6%	6%	5%
Fairly dissatisfied	3%	2%	N/A
Dissatisfied	N/A	N/A	19%
Very dissatisfied	1%	1%	6%

A simple comparison indicates that while satisfaction is less than that in the UK, more than 50% of SAGUAPAC's customers are satisfied with the services they receive.

In August of 1999, SAGUAPAC, signed a 40-year concession contract with the Superintendencia de Saneamiento Básico, thereby regularising itself within the national regulated water and sewerage framework.

SAGUAPAC is known to be expanding its services in response to customer demand and has carried out a strategic planning exercise to 2039. Details are not on general release but the plan will have to confront incorporation of less well-off customers and an estimated threefold increase in population served. Interim issues to be dealt with will be capturing funding, the genuine interests of casual water suppliers as the supply borders are pushed out, and perhaps radical thinking on revenues and CAPEX/OPEX if per capita demand can be contained at 100 l/h/d or less.

8.

Conclusions, observations and lessons

Bolivia's water supply and sewerage services face formidable problems in extending coverage to a growing and mobile population. While major funding is and will be required, project scale will be an impediment to low-cost private sector funding. Conversely managing demand and containing per capita use may generate projects that can be bundled or financed via revenue surpluses.

Experience in the sector as a whole shows variable but real progress in delivering a regulated service and including public and private suppliers in comparative competition.

For the three centres discussed, perhaps the widest spectrum of outcomes has been exposed. These range from the successful transformation of La Paz/El Alto SAMAPA services to a PSP operation, the continued calm development of Santa Cruz services under SAUGAPAC, and the stormy path of Cochabamba and uncertainty about how SEMAPA is performing.

What lessons seem to be apparent? A first generalisation might be the need to establish the availability of and access to information so that needs and possibilities are transparent. This paper was produced to clarify a perception that the SAMAPA concession had not delivered on expansion of services. That perception does not now appear to have been reasonable and the concession is looking beyond initial targets to include those outside the regulated areas. A second generalisation is that whereas information on SAMAPA and SEMAPA was relatively easy to track down, current information on SEMAPA seems to be scant, and hence the conclusions drawn here are subject to possible asymmetric bias. Some bullet points follow:

- A hard lesson is that if a great deal of the available energy is set against change then failure is assured. To overcome that, it would appear to be an essential pre-project activity to advise all stakeholders of the options, the likely outcomes of their actions, and the responses of others to those actions. If there were profound stakeholder opposition and little intent to fulfil obligations (a classic and frequent circumstance being of public bodies not paying their service charges) then it would be better for the PPP concept not to proceed. Those opposed can then face up to delivering by themselves and divert their energy to that end.

- An equally important matter is to set realistic but tough targets that are achievable, giving the changed organisation the chance but no easy ride to deliver. The basket of required changes should not be so extensive as to render some early success practically impossible. For instance, identifying operational improvements, initiating training, and establishing customer relations may deliver early gains for customers, providers, and public promoters while a desired, undeliverable in the short-term, capital programme will not.
- There seems to be ample evidence that increasing charges to the relatively poor (normally the charging pressure is upwards where expansion and achieving basic quality standards are fundamentals) in advance of delivering benefits is untenable and explosive. Promoting cross subsidy however should not be feared and should be exploited. Boosting revenue from those who can and will pay will improve cash flow and financial borrowing credibility.
- The Bolivian cases and more mature systems where wealth is not a particular problem all indicate a need for review of demand figures, most probably resulting in a downward adjustment and consequently less capital investment needed and possibilities for sweating existing assets. More controversially perhaps, there should be a pragmatic approach to quality improvement so that the desire to leapfrog stages of more mature systems sits realistically within the financing model.
- Targets need to be defined that match the business profile and do not have show-stopping externalities. Building a US\$600 million dam on the back of a gross US\$10 million annual turnover water supply business is not a concession with some capital works but a capital project with some operations. Understanding the shape of the business is important and failing to understand financial relationships, ratios, and covenants imposed on borrowing as well as the physical attributes of the services will generate an unachievable project.
- Finally, and returning to energy, the public promoting team needs to be sufficiently extensive, briefed, and supported to carry through the metamorphosis stage of the change exercise. The regulatory body needs to be set up and trained in what will likely be a new and much longer relationship between promoter (government agency or ministry), service provider, and customers.

References

El Saneamiento en el Área Metropolitana by Osvaldo Rey, 2000

Homero Carvalho Oliva – “*Countenances and Souls from Eastern Bolivia*” by Roger Ortiz Mercado, 1999

UNFPA, *The State of World Population*, 2001

Selected 1999 World Development Indicators from the World Development Report 2000/2001 *Attacking Poverty*

Reglamento Nacional de Prestación de Servicios de Agua Potable y Alcantarillado para Centros Urbanos - Bolivia

Water to Tyneside by R W Rennison, 1979

OFWAT report on “*Leakage and the efficient use of water, 2000-2002*”

SIRESE Report on “*La Regulación Sectorial en Bolivia, 1998*”, published in December 2000

International Water Association, water 21 report, June 2000

Report on the legal feasibility of private sector participation {PSP} in Servicios de Agua Potable y Alcantarillado, SEMAPA, Cochabamba by Ashurst Morris Crisp, March 1996

Water for People and Nature: A Forum on Conservation and Human Rights in Vancouver, July 5-8, 2001

SAGUAPAC Memoria Anual, 1999

Aguas del Illimani 1^{er} Quinquenio report, 2002

SAGUAPAC - opinion poll by independent marketing consultants MKT and PAT (Periodistas Asociados de Televisión) on the view of SAGUAPAC by its customers, November/December 2000

OFWAT/ONCC (England and Wales) document “*Understanding Customers’ Views*”, October 2001

