

PREFEITURA MUNICIPAL
DE BELO HORIZONTE

SWITCH
Sustainable Water Management in the City of the Future

**Governance of urban environmental sanitation: a case from
Belo Horizonte, Brazil**

By: Stef Smits (IRC), Nilo de Oliveira Nascimento (UFMG), Janise Dias (UFMG),
Tarcísio Nunes (UFMG) and Sônia Knauer (PBH)
Belo Horizonte, Brazil
August 2008

Executive summary

Although many cities in Latin America have advanced in provision of water supply services, environmental sanitation services provision has lagged behind. These sanitation challenges need to be addressed within a framework of Integrated Urban Water Management (IUWM), given the fact that the different elements of environmental sanitation, such as sewerage and stormwater drainage, are inter-related, with potential externalities within the city, as well as at catchment level. It also means that there will be a range of stakeholders with different, often divergent, interest, who will try to articulate these within the existing governance framework. In the region, various governance modalities around environmental sanitation are emerging, as the cities are addressing sanitation issues. The SWITCH Project aims to strengthen IUWM, amongst others, by promoting improved governance through a so-called Learning Alliance approach. This paper aims to analyse the actual governance framework in one of the SWITCH cities: Belo Horizonte, Brazil.

The main challenge of the urban water complex lies in the drainage of stormwater and wastewater. The intense urban growth during the 1970s led to huge impacts on water quality in receiving bodies and an increase of flood risk. Since then, a change in paradigm to drainage has been occurring, making better use of natural drainage courses, by improving urban creeks, detention ponds, wetlands, and investments in wastewater interception and treatment.

This change in paradigm has been facilitated and reinforced through the democratization of decision-making processes on sanitation. The city of Belo Horizonte has seized the opportunities of decentralization, and tried to democratize its entire governance structure, including around sanitation. One of the clearest manifestations of that is the establishment of platforms and mechanism for participatory strategic planning of sanitation. These have allowed for more integrated investments, which are responsive to the priorities of citizens. In addition, it has increased transparency, and proved to be instrumental in raising external funds for investments in sanitation.

Governance over operational decision-making processes and O&M could still be improved. While some programmes and units have developed and piloted methodologies for participatory planning of interventions, others are lagging behind. One of the reasons for this lag is that traditional engineering approaches and skills are still common among staff.

Also, governance over sanitation issues that cross the city boundaries could be strengthened. The catchment committee, with its management instruments, has the potential to support municipalities in achieving more integrated water management. Yet, these instruments are not yet well-developed, nor applied. Also, at metropolitan level, mechanisms for cooperation and joint decision-making on sanitation issues, are not institutionalised.

Table of contents

EXECUTIVE SUMMARY	1
TABLE OF CONTENTS	2
1 INTRODUCTION.....	3
1.1 URBAN ENVIRONMENTAL SANITATION.....	3
1.2 AN INTEGRATED APPROACH.....	3
1.3 GOVERNANCE	4
1.4 OBJECTIVE AND STRUCTURE OF THE REPORT	4
2 METHODOLOGY	4
2.1 CONCEPTUAL FRAMEWORK.....	5
2.1.1 <i>Local water governance</i>	5
2.1.2 <i>Integrated Water Resources Management</i>	6
2.2 DATA COLLECTION AND ANALYSIS	7
3 URBAN ENVIRONMENTAL SANITATION IN BELO HORIZONTE	7
3.1 WATER SUPPLY	8
3.2 WASTEWATER COLLECTION AND TREATMENT	8
3.3 STORMWATER.....	9
3.4 CHALLENGES IN URBAN ENVIRONMENTAL SANITATION	9
4 FINDINGS.....	9
4.1 INSTITUTIONAL FRAMEWORK.....	9
4.1.1 <i>Federal and State level institutions</i>	10
4.1.2 <i>Water resources management institutions</i>	10
4.1.3 <i>Prefeitura de Belo Horizonte</i>	10
4.1.4 <i>COPASA</i>	11
4.1.5 <i>Organized civil society</i>	12
4.1.6 <i>Discussion: importance of political vision and culture</i>	13
4.2 DECISION-MAKING IN PLANNING PROCESSES AND MECHANISMS.....	13
4.2.1 <i>Strategic planning</i>	14
4.2.2 <i>Operational planning</i>	15
4.2.3 <i>Operation, maintenance and administration of sanitation works</i>	16
4.2.4 <i>Discussion: strategic participatory planning seen as beneficial</i>	17
4.3 INTEGRATION ACROSS THE MUNICIPAL BOUNDARIES	18
4.3.1 <i>Integration at catchment level</i>	19
4.3.2 <i>Inter-municipal cooperation</i>	19
4.3.3 <i>Discussion: missed opportunities at regional and catchment level</i>	20
4.4 CAPACITY	21
4.4.1 <i>Financial resources</i>	21
4.4.2 <i>Human resources</i>	21
4.4.3 <i>Discussion: continued efforts needed to strengthen capacity</i>	22
5 CONCLUSIONS AND RECOMMENDATIONS	22
ACKNOWLEDGEMENTS	24
REFERENCES	24
ANNEX A: LIST OF INTERVIEWS.....	26

1 Introduction

1.1 *Urban environmental sanitation*

Most cities in Latin America have shown important progress in providing access to basic water supply services, with a nearly universal coverage rate of 96% in urban areas in the region (WHO/UNICEF, 2007). Notwithstanding this progress, difficulties remain in the actual provision of basic water supply services in urban areas, including issues such as the quality of the service, operation and maintenance of infrastructure and affordability and payment for services. Those who remain without access are most likely to be the poorest and most vulnerable people.

With this progress in addressing water supply issues, there is a growing attention to addressing environmental sanitation services, understood to include the provision of basic sanitation (toilets), the collection, treatment and disposal of wastewater, as well as stormwater and solid waste management (DfID, 1998). At a regional coverage rate of 86% (WHO/UNICEF, 2007), access to basic sanitation services in urban areas lags behind water supply. As cities have put in a lot of effort in trying to keep up service delivery rates with population growth, the disposal of waste and wastewater are now becoming an increasingly important concern. Only, an estimated 15% of all wastewaters generated in the region are treated before final disposal in receiving water bodies (WSP, 2007). A similar story can be told for solid waste management. Whereas collection rates often reach a coverage of 80-90%, only a small percentage of solid waste is disposed of safely.

1.2 *An integrated approach*

Addressing the urban environmental sanitation raises a number of key challenges in decision-making. First of all, urban environmental sanitation problems are inter-related. For example, stormwater drains in many cities de facto act as places to dump solid waste. One cannot achieve improvements in stormwater drainage, without addressing solid waste collection. However, resources are often limited, and required investments are high. Hence, often difficult choices need to be made between different interrelated investment options and scenarios. Investments in new infrastructure, also lead to increased operation and maintenance costs, which then need to be passed on to the citizens. In many cases, there is not a single-best solution; but, rather solutions with advantages and disadvantages for different groups. Thirdly, it requires dealing with trade-offs and environmental externalities, often outside the city area. Investments, or the lack thereof, in environmental sanitation, will often have impacts on others, e.g providing access to basic sanitation in a certain area, may actually lead to increased pollution in a downstream neighbourhood. Given these, and other, complexities, urban environmental sanitation needs to be addressed within a framework of Integrated Urban Water Management (IUWM) (Mitchell, 2004), often within and outside the city.

1.3 Governance

Because of the integrated nature of urban environmental sanitation, a wide range of actors has, often divergent, stakes in this, ranging from different sector departments to various communities and their representatives, from utility companies to private sector entrepreneurs and downstream users. This poses a number of questions regarding governance of urban environmental sanitation. Governance is understood here, in the way as defined by Rogers and Hall (2003), i.e. as the range of political, social and economic and administrative systems that are in place to take decisions, around water resources management and water and sanitation services delivery.

A range of governance arrangements for dealing with integrated urban environmental sanitation is emerging in cities in Latin America. Some of these have led to improved services provision and water resources management, while others are weak, and do not lead to more effective investments. Analysing these actual governance arrangements, helps identifying key aspects of good governance, and how these can be put into operational practice.

The Sustainable Water Management Improves Tomorrows Cities Health (SWITCH) project is a research partnership funded by the EC. It aims to carry out more demand-led, action-orientated research in a range of cities around the globe, with a view of effecting greater IUWM, and ultimately beneficial impacts. In order to do so, it works through so-called Learning Alliances (Smits et al., 2007; Butterworth and Morris, 2007). These are platforms which bring together the main stakeholders at city level, who jointly work together and learn about changes in IUWM and effectuate change.

1.4 Objective and structure of the report

As part of the SWITCH project, a study was carried out, to identify lessons learnt on what constitutes good urban water governance, by analysing actual governance of delivering integrated urban water infrastructure, with a focus on environmental sanitation, in 4 selected cities (Belo Horizonte, Cali, Lima and Tegucigalpa) in Latin America¹.

This report presents the findings from the study in Belo Horizonte.

The report starts by presenting the study methodology, including the conceptual framework used. This is followed by a brief introduction to the city of Belo Horizonte, with respect to its environmental sanitation situation. We then present the findings from the study. These consist of a description of the findings, followed by a discussion. The report ends with the overall conclusions and recommendations.

2 Methodology

The methodology used for the study in Belo Horizonte, follows closely the overall study methodology, which is described in more detail in Smits et al. (2008). Below, we highlight the key elements of the conceptual framework, as well as some specific details related to data collection and analysis in Belo Horizonte.

¹ For a full report across the 4 cases, see Smits et al. (2008).

2.1 Conceptual framework

The conceptual framework applied in this study uses the following elements:

- local water governance
- Integrated water resources management

This section will explain how both concepts are understood and applied in this study.

2.1.1 Local water governance

Governance has become more widely accepted in the water sector over the last decade as a root cause of limited progress to improve water services and environmental management. Various authors have tried to define what the governance concept implies in this sector. This study uses the definition by Rogers and Hall (2003) (see chapter 1). It is based on the premise that different actors in society, government, civil society and the private sector can influence decision making, both through formal and informal mechanisms and structures. Formalised mechanisms include for example the institutional framework, planning procedures and the legal and policy framework. These may even differ between spheres of planning, such as water resources, water services and broader urban development. In addition to these formalised structures, informal mechanisms (including corrupt relationships) may still be of main importance in decision-making processes. Analysing how these mechanisms function in reality is key to understanding governance.

More controversial is the concept of “good governance”. UNESCO (2006) states that “sound governance should be open and transparent, inclusive and communicative, coherent and integrative, and equitable and ethical, echoing similar principles as defined in Rogers and Hall (2003). These principles have led to debates on how the balance between different actors in society needs to lie to achieve good governance. As Heller (2007) argues there are different ways to analyse governance, stemming from different schools of social sciences, and perspectives of the role of the State. He shows that the outcomes of an analysis of governance of a water system will differ significantly, depending on the approach taken, illustrated by the case of Belo Horizonte.

Moreover, there are different governance “cultures” between countries and cities, which can influence on what is considered to be good governance. In many places, preference is given to mechanisms like multi-stakeholder platforms or coordination councils, while in others, more formal mechanisms of protest and social movements are common. Both are forms of channelling different voices and opinions, but in different forms. Finally, the culture of civil society participation may differ, depending both on the views and attitude of civil society itself, as well as of the government.

This paper will try and take a governance perspective which is not prescriptive, but is rooted in analysing actual practices, and identifying what works and what doesn't work.

Governance cannot be analysed without looking into capacities of the stakeholders. For stakeholders to participate in decision-making processes, they need capacity: skills, financial resources and access to information and knowledge.

Because SWITCH aims to strengthen water management at city level, this study will focus mainly on governance at local (i.e. city or part thereof) level. It is realized that the governance at local level is influenced by decision-making processes, including the political culture, at other institutional levels (departmental, State or national level). Where relevant this study will refer to these and analyse their relative importance.

2.1.2 Integrated Water Resources Management

Good water governance is not an end in itself, but a means to achieving sustainable water management and equitable water services delivery. Hence, we need to analyse water governance in relation to the performance and sustainability in water services and water resources management. We do that, using the concept of Integrated Water Resources Management (IWRM), which has been adopted as the main paradigm in water management for the last decade or so. We won't go into detail here on the origin and key premises of IWRM, as they have been discussed widely elsewhere (e.g. GWP, 2000).

For this study, the key question is how to analyse IWRM at a city level. The (sub)-catchment is understood to be the logical unit of planning and implementing water resources management interventions. City boundaries do not coincide with these hydrological boundaries. Yet, this doesn't mean that IWRM principles cannot be applied within a city. Moriarty et al (2004) propose two different approaches to IWRM, which have been adapted by Smits and Butterworth (2006) to application at local government level:

- Full (or institutional) IWRM. This refers to the establishment of the “conventional” IWRM package, of institutional reforms and policies, and the establishment of catchment-management bodies and instruments. Cities have a role in these reforms, as they are often a major water user and polluter; through their role in planning, they may also alter local hydrology. Their actions create externalities. Analysing IWRM from a city perspective implies analysing to what extent cities are considered in full IWRM, e.g. the extent of their participation in catchment bodies and the application of water resources management instruments to cities.
- Light IWRM. This refers to the application of IWRM principles within a sector or within an administrative boundary. It starts from the premise that many of the full IWRM measures have remained on paper only. Yet, there is a lot that can be done by sectors locally, without immediately seeking cross-sectoral integration. There is a range of actions that cities can take, independently of others, to achieve more integrated water management within their city areas, and improve their performance by applying IWRM principles to their work (see for example Smits and Butterworth, 2006; Cox et al., 2008).

For this study, we will follow both perspectives, studying the integration of the cities in their catchments and institutions, and the degree of integration within their cities and sectors.

Figure 1 below aims to bring together the key conceptual elements. At local level, there, different stakeholders try to participate, formally or informally in decision making, through various planning mechanisms (urban development, sanitation services and water

resources). They have more or less capacities to do so. The outcome of these decision-making processes has impact on the IWRM situation. Through formal and informal accountability mechanisms, this creates a feed-back to the stakeholders. In this study, we will analyse how these interactions function in reality.

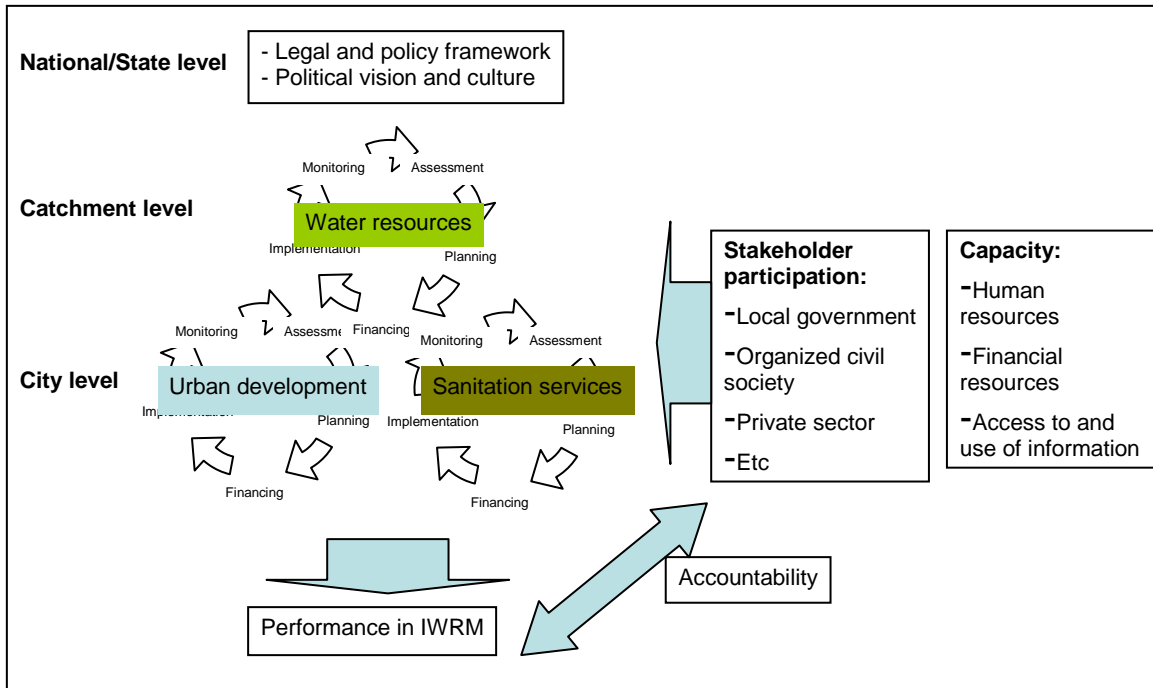


Figure 1: Conceptual framework

2.2 Data collection and analysis

In order to collect information required to answer the questions and issues outlined above, the study used a combination of:

- Review of global literature on governance and urban environmental sanitation
- Case studies in four cities in Latin America (for further details about the other cities, see Smits et al, 2008)
- Cross-case analysis

In Belo Horizonte, data was collected through:

- Review of secondary information
- Interviews and focus group discussions with key stakeholders. This formed the bulk of the data collection. The full list of interviewees can be found in Annex A.
- Analysis of results with the SWITCH team

3 Urban environmental sanitation in Belo Horizonte

This chapter introduces the case study city of Belo Horizonte (BH). It consists of a general introduction to the city. This is followed by the state of environmental sanitation in BH, and the main challenges therein².

² The data presented in this section come from Nascimento et al, 2007a, unless indicated otherwise.

Belo Horizonte is the capital of the State of Minas Gerais in Brazil (see Figure 2). The city lies in a mountainous region at an altitude of 750 to 1,300 metres. Tropical highland weather predominates in this area, with an average yearly rainfall of 1,500 mm and an average yearly temperature of 21°C. The rainy season lasts from October to March, when 90% of the total yearly rainfall occurs.



Figure 2: Location of Belo Horizonte (Nascimento *et al*, 2007a)

The city of BH has 2,227,400 inhabitants, while the overall metropolitan area (RMBH; Belo Horizonte Metropolitan Region) consists of 33 distinct municipalities with some 3,900,000 inhabitants.

BH is located in the Sao Francisco river basin, specifically in the Velhas sub-basin. It spreads out over two sub-catchments in that basin, namely Onça and Arrudas. Most of its abstractions and returns take place in the Velhas sub-basin.

3.1 Water supply

The water supply system (drinking water) connects to 99.7% of BH residents. Surface sources predominate in the BH water supply system. There are four main sources, namely, with a total capacity of 16.3 m³/s. These sources are interconnected and supply most of the municipalities in the RMBH, easily meeting the current total demand of 11.9 m³/s. The water supply system presents high standards in terms of operation as well as water quality.

3.2 Wastewater collection and treatment

About 92% of the population is connected to the sewerage system. In the neighbouring municipalities of the RMBH, this percentage is much lower. But there is a lack of interceptor pipelines – still 40% of interceptors need to be constructed. In addition, there are illegal interconnections to the separate stormwater drains, leading to contamination of groundwater and surface streams.

There are two relatively recent wastewater treatment plants (WWTP) in operation, with a total capacity to treat 4.0 m³/s. In the future, those WWTP will have their total treatment capacity increased to 8.1 m³/s and will then be able to treat almost 100% of the wastewater flow generated, including wastewater drained from the Contagem municipal area located upstream.

3.3 Stormwater

BH has a separate stormwater drainage system. There are some 700 km of perennial creeks in the municipal area. Parts of these creeks have been lined to the extent of nearly 200 km, most of them as culvert concrete channels.

3.4 Challenges in urban environmental sanitation

The main challenge of the urban water complex lies in the drainage of stormwater and wastewater. The intense urban growth during the 1970s led to huge impacts on water quality in receiving bodies and an increase of flood risk. Water pollution by wastewater discharges and diffuse pollution inputs, including solid waste and the products of erosion have caused the degradation of water quality in streams and the reduction of conveyance capacities of sewers and channels due to sediment deposits. At the same time, the need for a more integrated approach to stormwater drainage has been proposed, making better use of natural drainage courses, by improving urban creeks, detention ponds, wetlands, and investments in wastewater interception and treatment.

4 Findings

This chapter will present and discuss the findings of the analysis of the governance situation. Its structure closely follows the structure of the conceptual framework (see Figure 1). It will start with an introduction to the institutional framework, so as to know who-is-who. In the discussion, we will also go into the analysis of the political vision and culture. This is followed by an analysis of the decision-making procedures and mechanisms, and the participation of different stakeholders therein. Then we reflect upon the implications for achieving integration across the municipal boundaries. We end with a discussion on capacity for local governance. Each section consists of a presentation of findings on governance as such, followed by a discussion on the implications for achieving IUWM.

4.1 Institutional framework

A full mapping of the institutional framework for urban water management, including the relevant laws and policies, has been made by Nascimento et al. (2007b) and by Dias et al. (2007). This section provides a summary of the findings of these authors, by briefly introducing key stakeholders involved in environmental sanitation, particularly those at local level, so this is not meant to be an exhaustive overview. It merely aims to serve as background to the section on findings, where we analyse the functioning of these stakeholders and the relation between them in decision-making.

4.1.1 Federal and State level institutions

A range of Federal and State level institutions have a role in urban environmental sanitation. However, these roles are limited to setting overall policies and regulations, and not to any executive powers (see Nascimento et al., 2007). These lie largely at decentralised level. Even control functions, particularly environmental control, have been decentralised to municipal level. Therefore, for this study we will not go into detail in this level of governance.

4.1.2 Water resources management institutions

Brazil has a hierarchical structuring of its water resources institutions, with committees and agencies at different levels of scale: Federal, river basin and catchment. Committees are deliberative bodies, with a mandate in planning and conflict resolution around water management, while the agencies are their executive branches.

BH is located in the Velhas catchment, which does have a catchment committee. The Velhas catchment committee is made up of 28 persons, of which 7 representatives from Municipalities, 7 from State level entities, 7 users (such as utility companies and irrigators), and 7 from civil society, such as NGOs. It doesn't have an agency yet. In addition, voluntary sub-catchment committees have been established in the Arrudas and Onça. These only have advisory power.

4.1.3 Prefeitura de Belo Horizonte

The Municipality of Belo Horizonte (PBH or Prefeitura de Belo Horizonte) is the main planning and service provision body. Dias et al (2007), Costa and Costa (2007) and Nascimento et al (2007) provide an overview of the different bodies under the PBH that are somehow involved with urban environmental sanitation (see Figure 3). All these bodies fall under SMURBE (Municipal Secretary for Urban Policies), one out of several first-order secretaries. This is the main body for the articulation and implementation of urban development and environmental policies. It does so through a number of second-order secretaries, autonomous bodies (*autarquias* in Portuguese), and public or mixed companies. Also special projects, such as the DRENURBS programme (a programme for the improvement of drainage channels), fall directly under the SMURBE. The most relevant ones are indicated below, including their mandate.

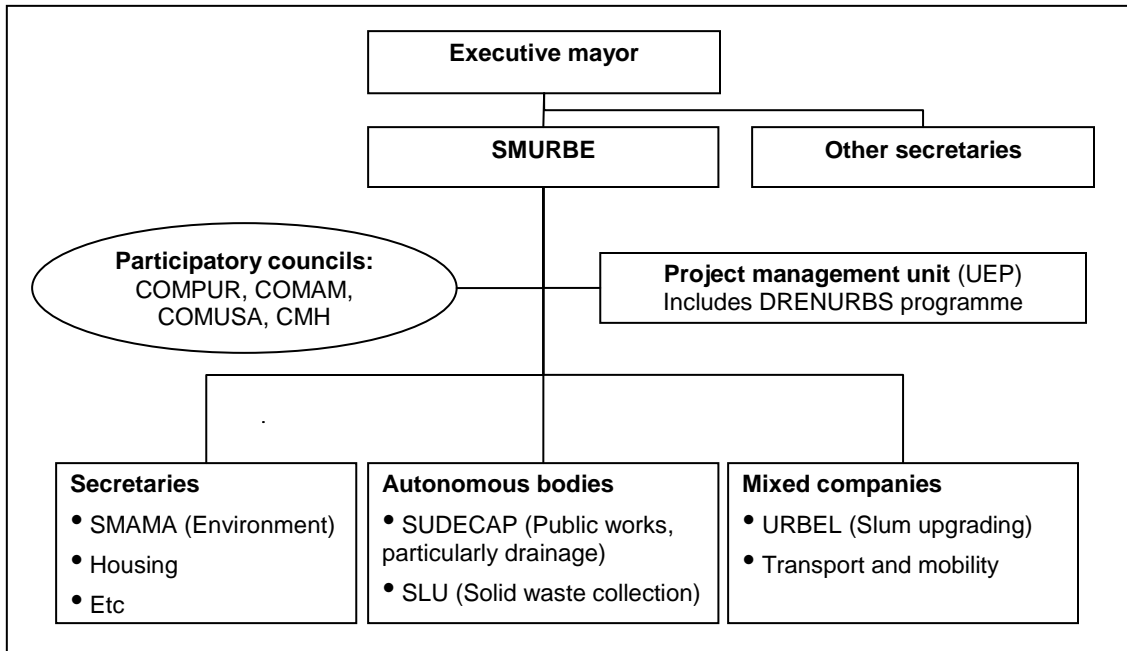


Figure 3: main municipal entities involved in environmental sanitation (based on Costa and Costa, 2007)

In addition to the secretaries, autonomous bodies and mixed companies, there is a number of participatory councils. These are councils, with a deliberative mandate, in which representatives of local government and civil society participate. They have been set up around a number of key urban and environmental issues. The most relevant ones for this study include COMAM (Municipal Environmental Council) and particularly COMUSA (Municipal Environmental Sanitation Council). COMUSA is made up of 16 members, 8 of which from PBH, while 8 come from organised civil society.

4.1.4 COPASA

Water supply, sewage and wastewater treatment services are provided by a concessionary called COPASA. COPASA is the service provider in most municipalities in the State of Minas Gerais. The relation between COPASA and the PBH, dating back to the military dictatorship in the 1970s, has changed over time, as explained in detail by Heller (2007) and Barbosa et al. (2007).

At the moment, COPASA is a mixed company, with part of its shares owned by PBH³, part by the private sector (through listing on the stock exchange), and the majority by the State government. In addition, COPASA has a cooperation agreement with PBH for the shared management in the provision of water supply, sewage and wastewater treatment services in the BH Municipality. It is a shared management model, as PBH and civil society participate in setting the policies around sanitation, through the COMUSA, whereas COPASA directly provides the service.

³ At the moment of writing, PBH was in the process of selling its shares in COPASA.

The terms of the cooperation agreement are subject to wide debate (see for example Heller, 2007 and Barbosa et al, 2007). Particularly, issues of accountability and tariff setting are of concern. COPASA only provides financial accountability to the State Accountants (*Tribunal de Contas do Estado*), but not to the Municipality. The diagramme below provides a schematic representation of the relation between PBH and COPASA.

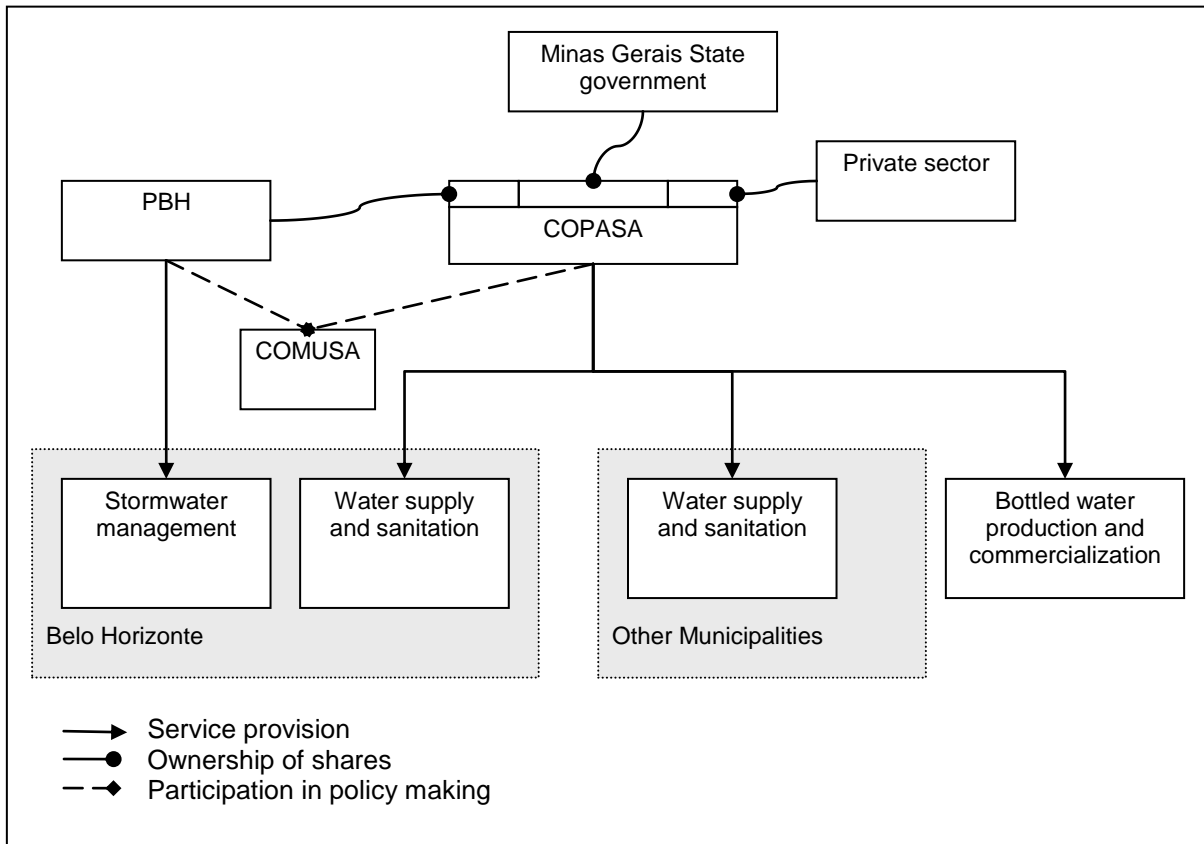


Figure 4: relation between COPASA and PBH (based on Heller, 2007)

4.1.5 Organized civil society

A number of civil society organisations play a role around urban environmental sanitation. The list below includes some of the most active and relevant ones. These are also represented in participatory platforms such as the municipal councils (see above).

- Projeto Manuelzão. This organisation started of as a project. Its main objective is to restore water quality in the Velhas river and reduce water-related diseases. It aims to do so through environmental education, community mobilization and advocacy.
- Frente Estadual de Saneamento. This is a network of civil society organizations, such as resident associations, representatives from favelas and vilas, academics, the Engineering Council, NGOs and professional associations. Its objective is to educate people on citizenship and sanitation, and to explain people’s right and responsibilities with respect to sanitation. It does so through training, seminars, and advocacy.
- The “technical” and academic community, such as the University, and the Engineering Council.

4.1.6 Discussion: importance of political vision and culture

The institutional framework can be characterised as one of strong decentralisation of decision-making and executive tasks to the Municipal level. Federal and State levels merely set the overall policy framework.

Internally, BH has seized the opportunity of decentralisation to democratize its structures for decision-making through the participatory Municipal councils. This finds its roots in several factors:

- History of democratization. After the end of the military dictatorship and inflation crisis, the BH Municipality has put in a lot of effort into establishing mechanisms for participatory democracy. In the political vision of the local government, democratization should extend to participation in decision-making about local planning and services provision. Examples of that are the establishment of participatory budgeting and the various Municipal Councils, in which organised civil society participates. In addition, communities can participate around the development of specific works in their neighbourhoods.
- Focus on social services delivery. Because of the large influx of population into the city since the 1970s, and the associated inequities in terms of welfare between different population groups, a lot of effort has been put into the provision of basic services and improvement of conditions in the *vilas* and *favelas*.
- Continuity in municipal administration. The establishment of these spaces for participation and prioritization of social services delivery has taken a long time. As BH has had municipal administrations from the same political colour, this has allowed the Municipality to provide continuity in the establishment of these structures.

Decentralization has also allowed PBH to change its relation with COPASA. This has changed from a “technical” relation through a service delivery contract to one of “shared management”, and even ownership of shares of COPASA by PBH. This, at least on paper, gives a shared responsibility in decision-making.

Alongside the decentralization and democratization of the institutional framework for stormwater and sanitation, internally coordination functions are centralized through the PBH. This, in theory, allows for integration and coordination between the different bodies that somehow deal with urban development and environment.

Apart from the policy development role, the only important role at higher level of scale, is the one of environmental planning and control. For water resources, these roles lie with the catchment committee and agencies. At least on paper, these have an important role in setting and enforcing water quality and quantity standards.

4.2 Decision-making in planning processes and mechanisms

In analysing the actual functioning of planning processes and mechanisms, a distinction is made between strategic and operational planning. Strategic planning refers to long-term planning and priority setting for investments for the entire municipality, whereas operational planning refers to the process of planning of specific local interventions, such

as the rehabilitation of a creek or slum upgrading activity. In addition, this section will look into the final steps of intervention processes: their operation and maintenance.

4.2.1 Strategic planning

The main instrument that sets out the framework for decision-making on sanitation is the Municipal Sanitation Policy (2001). This policy covers water supply, sewage and garbage collection and treatment, drainage and vector control. It articulates four particular instruments (Dias et al., 2007):

- A four year Municipal Environmental Sanitation Plan (PMS) reviewed every two years, which articulates, integrates and coordinates technological, human, economic and financial resources. It defines how the resources of the FMS are to be invested, and includes a geographical prioritization of these.
- A Municipal Environmental Sanitation Fund (FMS) which finances the propositions contained in the plan (PMS) after approval by COMUSA. The fund has administrative and financial autonomy.
- The Municipal Environmental Sanitation Council (COMUSA), a consultative and deliberative body, responsible for the implementation of the sanitation policy, including the approval of the plan.
- The Municipal Environmental Conference (COMUS) which happens every two years with the representation of various social segments, to assess the situation of sanitation in the city and propose guidelines for the formulation of policy Municipal Sanitation.

The functioning of the planning and decision-making process, is best illustrated by the steps followed in this:

Participatory assessment

The development of the PMS starts with an assessment of the actual state of sanitation, water supply, stormwater drainage, solid waste management and vector control in the entire municipal area. Information on these indicators are collected and processed on the basis of urban catchments, not of neighbourhood boundaries. URBEL carries out part of the assessment in *vilas* and *favelas* (formal and informal low-income neighbourhoods respectively), as they do these assessment for broader slum upgrading anyway. URBEL has developed a full methodology for doing such participatory assessments, and corresponding community mobilization.

Priority setting

Priority setting for the strategic plan happens in the COMUSA. On the basis of criteria of access to services, priority areas for investments are identified. Other criteria such as poverty, or environmental impacts are not explicitly part of this, but areas with least access to services are often the poorest neighbourhoods anyway.

Final decision-making happens in the municipal council. Here, other political criteria are brought forward for priority in investments. Having the indicators, provides a technical basis for political decision-making. However, recently, the discrepancy between priorities set in the PMS and the decisions by the municipalities have increased, raising questions on the role of the COMUSA.

Mobilizing funds

As mentioned above, the PMS is funded out of several sources, some of which are committed, while others are not. COPASA re-invests part (4%) of its income from tariffs into the FMS. Sanitation-related works, identified through the Participatory Budgeting process, get funded through the FMS. In this process citizens can participate in decision-making prioritizing the allocation of a part of the municipal budget to a range public works (not only environmental sanitation). However, only works that have been identified in the PMS are eligible for funds out of the participatory budget. Over the past years, citizens have prioritized investments in sanitation, as it is apparently one of the main priorities for them. Finally, the funds come from external resources, from State, Federal or even international level. These may be linked to specific programmes, such as DRENURBS. As was commented by one of the respondents, by having a strong PMS, the Municipality has been able to formulate such programmes and mobilize resources more easily, as these funders do require all the assessments and prioritization done. Or, to put it the other way round, as done by the Secretary of Urban Policies “growth without planning costs the city”.

After fund mobilization, the implementation cycle starts, which will be discussed in the section on operational planning.

In addition, to the PMS, there is the PDD (Drainage Master Plan). It is the sectoral plan for urban drainage. Although the PDD was first developed in 1999, well before the PMS, it now falls under the PMS.

4.2.2 Operational planning

Once priority neighbourhoods have been selected in the strategic planning process, specific intervention programmes can start. The responsibility for operational planning and implementation of these depends on the type of works involved, and the corresponding entity:

- SUDECAP is responsible for stormwater drainage works
- COPASA for sewerage systems and wastewater treatment
- URBEL for overall slum upgrading (only in *vilas* and *favelas*)

The intervention methodologies differ a lot across these agencies. Particularly the DRENURBS programme and URBEL have piloted more integrated intervention and participation models. See Box 1 for an example of the intervention model of DRENURBS.

Box 1: Intervention cycle of the DRENURBS programme

The DRENURBS programme follows a participatory approach to planning and implementing urban drainage works. It follows the following steps:

1. Informal contact with community leaders. Sometimes the initiative for this first contact comes from the community, or the programme contacts the community because of known problems from the PMS.

2. Rapid assessment. A rapid assessment is done of both the physical situation in an area but also the status of knowledge and awareness of environmental issues among the population.
3. Establishing and/or strengthening the capacity of the resident committee. The committee is open for anyone to participate and typically consist of some 30 persons. Its main tasks are: act as communication channel between the community and the PBH, mobilize the community further, and monitoring and control of the implementation. Capacity building activities included training, exchange visits and skills development.
4. Defining general directions for water course improvement interventions. In this community members start to participate.
5. Proposal development for specific interventions. This is done with community participation. This may include proposals for physical interventions and environmental education activities.
6. Detailed design of physical interventions. The community reviews the detailed design of physical interventions and checks whether the design meets their criteria.
7. Implementation of the interventions. These included: 1) physical drainage works, 2) land appropriation and resettlement and 3) environmental education activities.
8. Monitoring and control of implementation. The committee checks the day-to-day implementation of the physical works (*fiscalização*). Monthly control visits are carried out (*vistoria*), in which quality of the works is checked and where explanations are given of the maintenance of the works.
9. Handing over responsibility for maintenance. Depending on the type of intervention the works are handed over to PBH or COPASA for maintenance.

These participatory approaches are less utilized among other entities, partially because most staff is less familiar with these methods (see also the section on capacities). Particularly COPASA is not used to working in this manner. As a result, one of the big problems for COPASA is that, even though statistics show that sewers are laid, not the entire population connects to the sewers, or makes unauthorised connections to stormwater sewers. One of the main reasons for this situation is the little communication with users around sewerage works, and the process of getting connected.

4.2.3 Operation, maintenance and administration of sanitation works

Responsibility for operation, maintenance and administration of sanitation and drainage works are clearly defined:

- stormwater drainage works are maintained by SUDECAP (in case these include also green areas around natural courses, also the Municipal Parks Foundation is involved)
- sewerage and wastewater treatment operation, maintenance and administration all falls under the mandate of COPASA (see also section in the institutional framework)

Both have different systems for operation, maintenance and administration.

Stormwater

Day-to-day maintenance is considered to happen adequately, through a contracted private company. Citizens can directly contact this company in case of minor problems (e.g. a blocked intake). Preventive maintenance is considered inadequate by the interviewees.

There is not a good management plan for that, even though the activities and costs for that are expected to be part of the PDD, and budgeted as such. Monitoring of stormwater drainage systems (including early warning systems for floods) is also an incipient activity.

Sewerage and wastewater treatment

COPASA raises a tariff for sewerage and wastewater treatment, alongside the water bill to be paid for citizens. Sewerage has always been less important to COPASA, as it is difficult to raise a fee for sewerage. So, COPASA raises a higher water supply tariff, so as to keep the sewerage tariff low. Besides, there are cross-subsidy mechanisms within BH between richer and poorer households, as well as within the State between richer and poorer municipalities. The exact way in which tariffs are set, cannot be controlled by the PBH, as it falls outside the service contract. Further details on this topic fall outside this study, and are discussed further in Barbosa et al (2007) and Lobina (forthcoming).

The funds raised in this way, are spent both on operation and maintenance of the service. No financial accounts exist which break down COPASA's spending on O&M activities per Municipality, making it difficult to have a good control over COPASA's financial management within the city.

4.2.4 Discussion: strategic participatory planning seen as beneficial

Over the last decades, BH has established a range of mechanisms, through which both local government entities, civil society and the utility jointly plan for sanitation. These are widely regarded as useful and beneficial by the interviewed stakeholders.

The fact that long-term planning exists is already considered a big gain by them. Having long-term strategic plans, based on a participatory assessment of needs, technical criteria and a priority-setting process, provides a strong tool in various ways:

- It helps creating transparency, and reducing political expediency in decision-making processes. The PMS contains a technical basis for decision-making. If other priorities are set in political processes than the ones contained in the PMS, strong arguments are needed.
- It is often a pre-requisite for raising external funds from State, National or international level. These do require strong plans, backed by information. The PMS provides that.
- It helps moving away from “fire-fighting” to long-term pre-emptive investments.

One of the concerns raised in the COMUSA on the current planning methodology is the use of urban catchments as planning units. Whereas that makes sense from a hydrological perspective, it doesn't from the viewpoint of a community, as neighbourhoods may straddle various hydrological units. On the other hand, the focus on urban catchments has allowed for strengthening the new paradigm of restoring natural drainage channels, rather than canalizing them.

The COMUSA as a space for participation is also considered useful, and a gain in itself. Again it is seen to bring benefits such as:

- Increased transparency, as priorities need to be made explicit in the planning process.
- Social control over priority setting in investments
- Providing a space for dialogue, not for conflict

Even agencies like COPASA, which have no tradition in participation, see an added-value in it, as it can improve the relation between COPASA and other stakeholders, as it is a space for dialogue, not for conflict.

Yet, these are also questions on the composition of the COMUSA, particularly the civil society representatives. These now come from the popular sector of another two councils (Health and City), NGOs and the technical and academic sectors. The question is to what extent these represent the community at large. At the same time, it is not clear how groups like resident associations could be represented without making the COMUSA too big. That is a topic of ongoing discussion, particularly within civil society. During a municipal environmental sanitation conference held last year, a proposal was launched to democratize COMUSA, and have some elected community representatives taking a seat on COMUSA for a specific period.

Civil society organisations also use other methods to influence long-term strategic decision making processes. Social movements, such as the Frente Estadual de Saneamento, have organised seminars, conferences, etc, through which it tries to mobilize and influence actors who have a formal representative position, such as Projeto Manuelzão.

While progress has been made in institutionalising participation into long-term strategic planning of sanitation, this is less the case for planning specific interventions. The experiences from URBEL and DRENURBS have shown important benefits of participation at this level:

- Increases acceptance of sometimes hard decisions, particularly when re-settlement is required of houses from risk-prone areas
- Community monitoring and control over works has increased transparency and reduced suspicions over corruption.

Yet, these methods are far from mainstreamed within PBH. This may result sometimes in unsustainable infrastructure.

For O&M of the services, the main entity, COPASA, operates quite independently. Of particular concern is the lack of control and accountability mechanisms between the Municipality and COPASA. The Municipality cannot see how the fees, paid for by users, are invested within and outside the Municipality, or how the expenditure by COPASA is broken down between investments and ongoing operations, or between water, sewerage and wastewater treatment.

4.3 Integration across the municipal boundaries

This section analyses the mechanisms for decision-making on sanitation issues that cross municipal boundaries. Two perspectives are used for that: integration at catchment level and inter-municipal cooperation.

4.3.1 Integration at catchment level

Although the Velhas catchment committee has been functioning for a number of years already, and a number of instruments have been developed, such as a cadastre of users, a catchment master plan, and the establishment of water quantity and quality objectives (so-called *Meta 2010*). However, scepticism exists about the latter objectives among some of the stakeholders. These were established after the PMS was developed, and took these as basis for the *Meta 2010*.

The main instrument lacking is the establishment of an executive agency. This is expected to start functioning from January 2009 onwards. But, there are still discussions going on about the executive powers to be awarded to the agency, the way it will be governed and its finance basis.

For now, the catchment committee is seen above all as a space for negotiation between different users, including municipalities, but not as a body which can force municipalities or utility companies to comply with water quality standards, as it lacks the instruments to do so. Rather, its added value is seen to lie in the facilitation of a dialogue with municipalities that are struggling to mobilize technical assistance and financial resources to meet standards.

The role of the sub-committees is less clear. This is seen as an initiative, by civil society, to decentralize the catchment committees, and bring these closer to the communities, and mobilize these around water issues. Yet, these sub-committees do not have clear mandates or functions, apart from deliberative ones.

4.3.2 Inter-municipal cooperation

In the absence of application and enforcement of strong water resources management instruments by catchment committees, some initiatives have been taken by PBH and neighbouring municipalities to address sanitation problems that cross the municipal boundaries. The clearest example is the PROPAM programme (see below).

Box 2: PROPAM: an example of inter-municipal cooperation

PROPAM stands for the Programa de Recuperação e Desenvolvimento Ambiental da Bacia da Pampulha (Programme for the recovery and environmental development of the Pampulha catchment), a joint programme between the BH and Contagem municipalities to restore the catchment area of the Pampulha lake, and improve the environmental conditions of the inhabitants of the area. This catchment got seriously degraded, due to increased population growth (some 450.000 people living in this catchment with an area of 96 km²), leading to reduced run-off from streams, larger built-up area, pollution, and poor sanitation conditions, all leading to serious water quality degradation of Pampulha lake.

PBH had strong interest in restoring the lake and improving the conditions in the catchment. In 1997 it contacted Contagem to jointly address the situation. Initially, Contagem, located in the upper catchment, showed little interest in this. But, after

Contagem realized that by teaming up, they could jointly mobilize external funds, it decided to cooperate.

The establishment of a governance structure for such an inter-municipal programme proved difficult, particularly in terms of joint management of funds. Current regulations and legal frameworks do not facilitate such cooperation agreements. So, formalization of the cooperation had to go through a number of administrative steps.

Whereas the cooperation agreement provided general guidelines, the operationalisation, and detailed planning had to go through lots of negotiation and consensus building between both municipalities. Activities ranged from slum upgrading and wastewater treatment, to environmental education and the production of regular newsletters. Through all these activities, the water quality degradation of Pampulha lake has stopped, and flooding has been reduced.

The main lesson learnt was that these kinds of initiatives require joint-up planning between two municipalities, but above all negotiation and consensus building.

For a detailed overview of PROPAM, see PBH (2007)

The only institutionalised form for inter-municipal cooperation that is being established is the Council of the RMBH, which would act as a decision-making body, alongside an executive agency. It would treat topics that concern the entire metropolitan area. Yet, the interviewees consider that so far environmental or sanitation problems haven't received a high priority on its agenda. Neither is it clear whether it would be able to enforce its decisions and really lead to major integration at metropolitan level.

4.3.3 Discussion: missed opportunities at regional and catchment level

Actual decision-making processes on sanitation that go beyond the municipal boundaries are much weaker than the ones within the municipal boundaries.

At catchment level, the catchment committee should play a leading role. Whereas a range of stakeholders can participate in discussions on water resources management at catchment scale, and effectively do so, instruments to enforce decisions are still in development, and the ones that are there (such as Meta 2010) lack ambition. Whereas the collaborative and consensual approach of the committee is appreciated, particularly in supporting poorly capacitated municipalities, these could be supported by stronger enforcement instruments.

For inter-municipal cooperation, the instruments are even less well-developed. The ad-hoc approach around specific issues, such as Pampulha lake has proved to work, and the two municipalities have worked their way around institutional hurdles through an approach of consensus and negotiation. Yet, without institutionalised forms of collaboration and decision-making at metropolitan level on sanitation, opportunities may be missed. Some of BH's neighbouring municipalities (like Ribeirão das Neves) are

much poorer and access to sanitation services is low. Yet, the population makes use of BH's health services, and provides part of its labour force. Sanitation problems there, will ultimately also affect BH. Yet, it cannot invest and provide services in a neighbouring municipality. These cross-municipal issues need decision-making at metropolitan level.

4.4 Capacity

This section analyses to what extent the capacity (financial, human resources, access to information, etc) of the various stakeholders facilitates or limits their participation in decision-making, or otherwise the governance of environmental sanitation.

4.4.1 Financial resources

In general terms, financial resources are not considered a limitation to effective governance. Obviously, there may not be enough financial resources to meet all investment needs at once, but funds like FMS and DRENURBS have annual budgets of around R\$ 50m and R\$ 26m per year (equivalent to €19 million and €10 million per year for both respective programmes). In addition, there are funds from entities particularly COPASA and URBEL, which also cover investments costs in sanitation and drainage. These budgets allow for the execution of plans, as well as the functioning of the governance structures as such.

4.4.2 Human resources

The different municipal entities working on sanitation tend to be well-staffed. SUDECAP has over 1000 staff members, while over 250 engineers and technicians are working for the PBH. In addition, quite a large number of activities and functions is outsourced to contractors and consultants. So, in terms of manpower, the institutions are not feeling limited in fulfilling their governance functions.

The interviewees expressed concerns though about the skills profile. As indicated above, more participatory approaches, such as those employed in DRENURBS and URBEL are not fully known among all staff. Traditional engineering approaches are predominant. Senior officials expect that programmes such as DRENURBS in fact contribute to a change in culture and paradigm among staff of the PBH. These skills are also difficult to outsource. URBEL, for example, is finding it hard to contract social consultants, who support participatory planning processes and capacity building of communities.

Both organised civil society and community organisations have gained space in various participatory bodies. Organized civil society can count on high level skills, for example through the university and council of engineers. But, also at community level, efforts and attention have gone into strengthening skills of community organisations to participate in decision-making processes. Also, other spaces for participation outside the sanitation sector, such as the participatory budgeting process, have contributed to this. Despite these efforts, this remains an area of continued attention.

4.4.3 Discussion: continued efforts needed to strengthen capacity

The interviewees indicate that neither financial, nor human resources are the main limitation to local governance of urban environmental sanitation; yet continued efforts need to go into strengthening capacity.

Financial resources are available to support the planning processes and mechanisms that we saw above, as well as for the implementation of the plans that have been identified.

For human resources, the picture is somewhat mixed. Over the last years, skills have been developed among staff of the PBH and related entities to lead participatory processes. Yet, these skills are not mainstreamed among all officials. Likewise, efforts have gone into strengthening skills for effective participation in decision-making, but need continued efforts.

5 Conclusions and recommendations

The institutional framework in Brazil can be characterised as one of strong decentralisation of decision-making and executive tasks to the Municipal level. Over the last 16 years or so, the city of BH has seized the opportunities of decentralization, and tried to democratize its entire governance structure, by putting emphasis on establishing mechanisms for participatory democracy. A good example of that is the participatory budgeting. Democratization has also happened in the structures and procedures for decision-making on environmental sanitation. One of the clearest manifestations of that is the establishment of participatory strategic planning platforms and mechanism for sanitation, being the COMUSA, the PMS and FMS. These spaces provide both for participation of civil society, even though interviewees felt that these spaces are sub-utilized and that civil society is not well represented. It also provides for coordination between different sectoral entities, such as COPASA and SUDECAP. Such coordination is further supported by SMURBE as centralised coordination body.

Through these spaces, long-term planning has improved, resulting in more integrated investments, which are responsive to the priorities of citizens. In addition, it has increased transparency, and proved to be instrumental in raising external funds for investments in sanitation. However, governance over operational decision-making processes and O&M could still be improved. While some programmes and units within the PBH have developed and piloted methodologies for participatory planning of interventions, others are lagging behind. One of the reasons for this lag, is that traditional engineering approaches and skills are still common among staff. It takes time before these change. This situation may un-do some of the gains made in strategic planning, as infrastructure may become unsustainable, e.g. when unauthorised connections are made to sewers.

Despite these advances in more integrated water management in the city, integration across the boundaries of the city lags behind. The catchment committee, with its management instruments, has the potential to support municipalities in achieving more integrated water management, and to enforce these. Yet, these instruments are not yet well-developed, nor applied.

The other level, at which more integration could be sought, is the metropolitan region. Yet, mechanisms for cooperation and joint decision-making on sanitation issues that cross municipal-boundaries, are not institutionalised. The only examples of inter-municipal integration are bilateral ones, where there is an immediate shared need.

Although the overall governance situation over environmental sanitation in BH is considered strong, a number of recommendations has been formulated. These recommendations aim to be pragmatic, trying to work within the existing framework, building upon existing strengths and opportunities where these exist. Besides, we have tried to highlight those recommendations that can be easily given attention from within SWITCH.

- Continued discussions on the composition and functioning of COMUSA. To maintain and strengthen this valued space, continued discussion and reflection on its composition and functioning is needed, addressing for example issues on the most appropriate form of civil society participation.
- Strengthening skills and methods for participation in operational planning. Programmes like DRENURBS and URBEL's slum upgrading programme (called Vila Viva), are obtaining valuable experiences on methodologies and approaches for participation. These need to be documented and analysed well, and shared among other staff. The SWITCH project provides an opportunity for in-depth research and analysis, as well as for training. Changing the skills profile of staff, however, is a long term process, well beyond the duration of the project.
- Supporting the catchment committee in operationalising its instruments. Particularly, the catchment agency has a potentially important role.
- Seeking improved integration at metropolitan level, through participation of neighbouring municipalities in the BH learning alliance. It is realised that without institutionalised structures for decision-making, metropolitan integration may still be far away. Yet, the learning alliance approach allows at least raising awareness and starting discussions.
- Structured forms of exchange of experience with other Brazilian State capitals. Unlike many other countries, Brazil has a number of cities with similar characteristics of similar size as BH. Some of these, such as Curitiba and Fortaleza have worked on addressing similar water and sanitation issues. Although there are ad hoc contacts with these cities, it is recommended to make these more structural for exchange of experiences. SWITCH may be instrumental in developing such networks, alongside existing networks for inter-city cooperation such as PROSAB.
- Last but not least, it is recommended to further document and disseminate the experiences from BH internationally. Despite some of the weaknesses that have been identified, the mechanisms and structures for participatory planning and decision-making on environmental sanitation, put in place in BH can be considered quite well advanced, and hold important lessons for other cities across Latin America and elsewhere as well. Again, SWITCH offers the possibility to further analyse, document and disseminate such lessons.

Acknowledgements

This study was carried out within the SWITCH project. The authors kindly acknowledge the financial support of the EC FP6 programme for this project.

We would also like to thank all the persons we interviewed for sharing their perspectives and experiences.

References

- Barbosa, A.P., de Oliveira, V. And L. Heller (2007) *Governance of water supply and sanitation in Belo Horizonte, Brazil: an assessment of the relationship between the municipality and the service provider*. Paper presented at the 2nd SWITCH Scientific Meeting, 25-29 Nov 2007, Tel Aviv, Israel
- Butterworth, J.A. and M. Morris (2007) *Developing processes for delivering demand-led research in urban water management*. SWITCH Working Paper.
<http://www.switchurbanwater.eu/page/1789>
- Cox, D., Van Nierkerk, K., Govender, V., Anton, B., Smits, S., Sullivan, C.A., Chonguiça, E., Monggae, F., Nyagwambo, L., Pule, R., Berraondo López, M. (2008) *Local Government and Integrated Water Resources Management (IWRM); Part I: Reaping the Benefits – How Local Governments Gain from IWRM*. ICLEI, Germany
http://www.iclei-europe.org/index.php?id=1587&project_id=CCP
- Costa G.M. and H.S.M. COSTA (2007) *Urban policy and institutional change in Belo Horizonte*. Paper presented at SWITCH First Scientific Meeting, Birmingham.
- DFID (1998) *DFID Guidance manual on water supply and sanitation programmes*. London, UK, DFID
- Dias, J., Costa, H., Costa, G., Welter, M., Nunes, T., Bontempo, V. and S. Knauer (2007) *Urban water management in Belo Horizonte: institutional mapping*. Paper presented at the 2nd SWITCH Scientific Meeting, 25-29 Nov 2007, Tel Aviv, Israel
- GWP (2000) *Integrated Water Resources Management*. TAC Background Paper No. 4.
www.gwpforum.org/gwp/library/Tacno4.pdf
- Heller, L. (2007) *Different approaches in analyzing water governance; implications to the case of Belo Horizonte, Brazil*. Paper presented at the SWITCH Scientific Meeting, University of Birmingham, 9-10 January 2007
- Mitchell V.G. (2004) *Integrated Urban Water Management. A review of Australian practice*. CSIRO and AWA report CMIT-2004-075
- Moriarty, P., Butterworth, J. and C. Batchelor (2004) *Integrated Water Resources*

Management and the domestic water and sanitation sub-sector. IRC Thematic Overview Paper, Delft, the Netherlands. www.irc.nl/page/10431

Nascimento, N.O, Heller, L, Baptista, M, Heller, P., Chernicharo, C, Knauer, S. and J.R. Champs (2007a) *Long-term uncertainties and potential risks to urban waters in Belo Horizonte*. Paper presented at SWITCH Scientific Meeting, 9-10 Jan 2007, Birmingham, UK

Nascimento, N.O., Knauer, S., and J.R. Champs (2007b) *Urban Storm Water Management in the Belo Horizonte area; legislative and strategic structures*.

PBH (2007) *Programa de Recuperação e Desenvolvimento Ambiental da Bacia da Pampulha – PROPAM*. Secretaria Municipal de Políticas Urbanas, Secretaria Municipal Adjunta de Meio Ambiente, Gerencia de Planejamento e Monitoramento Ambiental. Prefeitura Municipal de Belo Horizonte, Brazil

Rogers, P., and Hall, A.W., (2003) *Effective Water Governance*, TEC Background Papers No. 7, Global Water Partnership, Technical Committee, Stockholm, Sweden. Available at: www.gwpforum.org/servlet/PSP?iNodeID=215&itemId=197

Smits, S.J. et al (2008) *Governance and integrated urban water management: cases from 4 cities in Latin America*. SWITCH Working Paper

Smits, S.J. and J. Butterworth (2006) *Literature review: Local Government and Integrated Water Resources Management*. LoGo Water Project

Smits, S., Moriarty, P., and Sijbesma, C., (eds). 2007. *Learning alliances: scaling up innovations in water, sanitation and hygiene*. Technical paper series; no. 47. Delft, The Netherlands, IRC International Water and Sanitation Centre.

UNESCO (2006) *Water: a shared responsibility*. The United Nations World Water Development Report 2. Barcelona, UNESCO & Berghahn Books

WHO/UNICEF (2007) *Joint Monitoring Programme*. http://www.wssinfo.org/en/238_wat_latino.html

WSP (2007) *Saneamiento para el desarrollo ¿Cómo estamos en 21 países de América Latina y el Caribe?* Water and Sanitation Programme Latin America and Caribbean, Lima, Peru

Annex A: List of interviewees

- Community of 1o de Maio
- Denise: FEAM
- Claudius: URBEL
- Cristina: URBEL
- Valdete Bontempo: DRENURBS
- José Roberto Champs: SUDECAP
- Weber Coutinho – PBH/PROPAM
- Solange Fonseca: DRENURBS
- Léo Heller: UFMG
- Claudia Julio: Frente Estadual de Saneamento
- Sonia Knauer: PBH
- Benerval Laranjeiras: FEAM
- Antonio Leite: Projeto Manuelzao and sub-committee of the Arrudas sub-catchment
- Flavia Mourao: SMAMA
- Romulo Thomasz Perilli: COPASA
- Rogério Sepúlveda: Velhas catchment committee
- Murilo Valadares: SMURBE