THE SILENT PARTNER

The role of the environment in multi-stakeholder partnerships for urban and peri-urban water and sanitation supply

Tracey Keatman, BPD Water & Sanitation

March 2012

BUILDING PARTNERSHIPS FOR DEVELOPMENT IN WATER & SANITATION

With more than 13 years' experience, Building Partnerships for Development in Water & Sanitation (BPD) has become the sector leader in enabling partnerships to meet the water and sanitation needs of poor communities.

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- DIRECT SUPPORT – to water and sanitation organisations and partnerships, to build stronger relationships, through the application of BPD's tried and tested tools and frameworks.
- LEARNING EVENTS AND ACTIVITIES – for organisations across the water and sanitation sector, to promote dialogue around institutional relationships.

Further learning is generated through the interplay of the above three activities.

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COVER: Reservoir in Alta Guajira, Colombia and children collecting water in Cochabamba, Bolivia.
PHOTOS: Fabian Cordero, FCAG, Gustavo Heredia, IPES, Martin Rall, Nathalie Seguin.

EXECUTIVE SUMMARY

Current figures point to as many as 123 million people in Latin America living in urban areas without access to a sustainable, clean water supply and some 131 million requiring urban sanitation services. It is often the case that the poorest and most vulnerable communites find themselves marginalised from the delivery of basic services.

Alongside the existing challenges of providing services, poor sanitation practices by individuals and inadequate wastewater treatment by institutions coupled with the lack of integrated resource management are all increasingly damaging the environment. This is further compounded by the threats posed by climate change, particularly the increased variability of weather patterns and resulting stress on water supplies, which is expected to intensify considerably in the next few years.

The impacts and costs of upstream environmental degradation on the sustainability of water supply and sanitation services are beginning to be recognised downstream; it is therefore imperative to ensure that service delivery models factor in what is happening at source. Similarly, sustainable services need to ensure minimal damage to environmental resources required for others' ongoing supply downstream.

Achieving universal coverage in Latin America is, first and foremost, driven by public health and poverty alleviation imperatives for providers and authorities, and this focus prevails in sector policy and informs stakeholders' incentives. However, the environment is becoming increasingly 'vocal' in water and sanitation supply debates as its protection is critical for the sustainable delivery of services and the impacts of service delivery on the environment are increasingly recognised as significant; it can no longer be sidelined, neglected or de-prioritised.

In over a decade of working with water and sanitation partnerships, BPD noted that environmental considerations tended to take a backseat to service delivery issues related to finance, technology, equity and poverty alleviation. By and large, stakeholders promoting a clear emphasis on environmental aspects were few and far between in these relationships. This 3-year research programme, supported by IDRC, responded to a clear demand to better understand and articulate the needs, capacity and contribution of the 'environment' – the so-called 'silent partner'. The analysis therefore focuses on exploring how multi-stakeholder partnerships (MSPs) can provide a mechanism for encouraging the better integration of environmental perspectives and stakeholders into water and sanitation supply programmes. Such institutional arrangements can bring together public, private and non-profit stakeholders in order to develop supply systems, inform sector policy and reform, and provide a space for maximising synergies across different sectors (ie those of health, planning, environmental protection, etc.).

The research draws on knowledge generated from five examples of MSPs from Bolivia, Colombia, Mexico, Paraguay and Peru (presented as individual cases in section 4). The analysis focuses mainly on the specific contextual factors (socio-cultural, technical, economic and administrative (ie institutional, legislative, etc.)) that have enabled MSPs to flourish (or otherwise). Based on the case studies and conversations with a wide range of stakeholders, the assumptions in this paper revolve around the following:

- The environmental context within which supply projects operate is not fully understood or analysed.
- The incentives that drive decisions about policy, supply models and institutional arrangements are not always clear between partners.
- The different environmental organisations and stakeholders that have an increasing influence over service supply are usually not involved as effectively as they should be.

The research found that partnership function is already difficult to manage when partners have a shared definition of the project and agreed public health and service delivery incentives in mind; addressing environmental concerns as well complicates the practice further. In addition, partners in MSPs generally dedicate too little time to the internal functioning of their relationships and a more rigorous analysis and negotiation of the scope and structure governing the partnership is essential for success.

In response, this paper provides a summary of the impact on partnering practice of viewing the environment as a 'common good' that can be sustained through MSPs. The case is made for MSPs to be seen as a specific type of institutional arrangement for protecting environmental goods and services. This is followed by a discussion of impacts on partner incentives, roles and responsibilities and also on time frames and the sequencing of activities.

The final section, the Partnership Discussion Tool, offers MSPs a starting point to systematically and proactively question how the environment becomes a driver for their negotiations and decision-making. The tool synthesises learning from the research process and highlights where the inter-relationships between environmental protection and public health actually coincide in partnership practice. MSPs can use such insights generated by the tool to inform their governance structures and practices and, ultimately, improve the likelihood of their interventions being more sustainable in the long term.

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March 2012

ABBREVIATIONS

BPD	Building Partnerships for Development in Water and Sanitation.
CBO	Community-Based Organisation.
CCA	Climate change adaptation.
COP	Conference of (the) parties.
Ecosan	Ecological sanitation.
FCAG	Cerrejón Foundation for Water in La Guajira (Colombia).
HDR	Human Development Report.
IDRC	Canadian International Development Research Centre.
IPCC	Intergovernmental Panel on Climate Change.
IPES	Promoción del Desarrollo Sostenible (Peru).
(I)WRM	(Integrated) Water Resource Management.
MDG	Millennium Development Goals.
MSP	Multi-stakeholder partnership.
OGAPU	Optimising Water Management to Combat Urban Poverty (Peru).
UNDP	United Nations Development Programme.
WASH	Water, sanitation and hygiene.
WfA	Water for All (Bolivia).

1

INTRODUCTION

1.1 ADAPTING TO A 21ST CENTURY CHALLENGE

"In the past, and too frequently today, public water supplies have given rise to much illness and death caused by diseases such as typhoid, dysentery, diarrhoea, and cholera. A safe water supply is absolutely essential and should figure among the first permanent measures adopted by communities to protect their health." Hugh Cumming. [1]

The Human Development Report (UNDP, 2006) stated that "*overcoming the crisis in water and sanitation is one of the great human development challenges of the early 21st century*." However, it is not just public health that is at stake. The Report, alongside publications and statements from numerous water and sanitation experts, asserts that stress on water supplies and poor sanitation practices are increasingly damaging the environment. This is compounded by the threats posed by climate change, particularly the increased variability of weather patterns, which is expected to have a direct impact on natural resources. The IPCC has reported a number of alarming environmental trends, as illustrated in the box opposite.

Throughout Latin America, as in the rest of the world, an increasing and unchecked rise in urbanisation has complicated the demands for improved water and sanitation service delivery. Poverty, unemployment, ill-health and other social and environmental factors all impact on access to services, particularly a problem in low-income areas on the edge of networked-service boundaries.

To meet the Millennium Development Goals in Latin America, as many as 123 million people in urban areas alone still need access to a sustainable and clean water supply and some 131 million additional people require urban sanitation services (see www.wsp.org). However, local authorities in the region typically responsible for providing both water and sanitation services to urban citizens find themselves constrained by a lack of financial, technical and human resources. More fundamentally, with many poor urban settlements considered informal or even illegal, authorities often lack the political will, capacity and experience to engage with the poor as they would be able to with other city dwellers. The poorest and most vulnerable urban communities therefore find themselves marginalised from the existing delivery of urban services, whether water (utility supplies) or sanitation (sewerage or on-site options).

WATER SCARCITY: A GLOBAL CHALLENGE

Some 1.4 billion people live in river basins in which water use exceeds recharge rates. The symptoms of overuse are disturbingly clear: rivers are drying up, groundwater tables are falling and water-based ecosystems are being rapidly degraded. Put bluntly, the world is running down one of its most precious natural resources and running up an unsustainable ecological debt that will be inherited by future generations. (UNDP, 2006)

CLIMATE CHANGE IMPACT IN LATIN AMERICA

The Intergovernmental Panel on Climate Change concluded in its Fourth Assessment Report in 2007 that the effects of climate change on water in particular will be felt by all sectors and regions (IPCC, 2007). It concludes that the main impacts in Latin America will include the following:

- By mid-century, increases in temperature and associated decreases in groundwater are projected to lead to gradual replacement of tropical forest by savannah in eastern Amazonia. Semi-arid vegetation will tend to be replaced by arid-land vegetation.
- Productivity of some important crops is projected to decrease and livestock productivity to decline, with adverse consequences for food security. In temperate zones, soybean yields are projected to increase. Overall, the number of people at risk of hunger is projected to increase.
- There is a risk of significant biodiversity loss through species extinction in many areas of tropical Latin America.
- Changes in precipitation patterns and the disappearance of glaciers are projected to significantly affect water availability for human consumption, agriculture and energy generation.

The IPCC recognises that although communities have been managing resources and the impacts of weather and climate-related events for many years, further adaptation measures will be needed to deal with the additional adverse effects of increasing climate change and variability, especially for people who may be particularly at risk (ie the poor, young children and the elderly (ibid.)).

Another cause for concern in the region is the clear negative impact of the lack of sufficient sanitation in urban and peri-urban centres on both poor communities and the water resources they rely on.

Untreated wastewater poses one of the greatest challenges to be tackled by local and national authorities: according to some estimates[2] only 14% of wastewater collected by sewer systems in Latin America is treated before being disposed of in rivers, lakes and the ocean.

Upstream environmental considerations will ultimately impact on the sustainability of water and sanitation supplies and their infrastructure downstream; it is therefore imperative to ensure that service delivery models factor in what is happening upstream. **This research responds to a clear need to better understand and articulate the needs, capacity and contribution of the 'environment' – the so-called 'silent partner' of this report.**

Based on case studies and many conversations with a wide range of stakeholders, the assumptions in this paper revolve around the following:

- The **environmental context** within which supply projects operate is **not fully understood or analysed**.
- The **incentives that** drive decisions about policy, supply models and institutional arrangements are **not always clear between partners**.
- The different environmental **organisations and actors** that have an increasing influence over service supply **are usually not involved** as effectively as they should be.

1.2 MEETING THE CHALLENGE – THE ROLE OF MULTI-STAKEHOLDER PARTNERSHIPS

To cope with present and future demand, a broader view is required that assesses water, sanitation and wastewater treatment from a more holistic perspective connecting the environmental implications with the socio-cultural, appropriate technology and economic contexts from the start of service delivery to the end stages of disposal and treatment. Approaches such as Integrated Water Resource Management (IWRM) seek to create management frameworks for water, land and other resources by bringing together different upstream and downstream sectors and stakeholders.

However, putting integrated management into practice is not always straightforward in reality. Multi-stakeholder partnerships (MSPs) can provide a mechanism for encouraging better integration and are being widely promoted as a way of delivering water and sanitation services for the urban and peri-urban poor in Latin America. Such institutional arrangements can bring together public, private and non-profit stakeholders in order to develop water and sanitation supply systems and to inform sector policy and reform processes. Partnerships also provide a space for bringing in other stakeholders from different sectors (eg health, environment, planning, etc.) to manage common resources and to encourage synergy and create greater coherence.

Nevertheless, MSPs are complicated to manage and are prey to the competing demands and differing incentives of the partners involved.[3] In particular, public health improvements and poverty alleviation brought about by access to clean water and effective sanitation are clearly defined priorities of public authorities and operators (whether public or private). Addressing environmental imperatives (eg to manage untreated wastewater, reduce water use and pollution, manage scarce resources, etc.) is often relegated to a second tier of activity for service providers due to the costs involved, the challenge of regulating environmental impacts in many contexts, and the more immediate priority of getting services to the unserved. Whilst there is generally a recognition that protecting the environment and reducing pollution of resources will reap benefits for upstream and downstream users, the general approach is that this is something to tackle at a later stage.

This publication does not aim to solely re-state the arguments for, and approaches of, IWRM.[4] Rather it is about encouraging MSP practitioners (who may have different visions but a common goal) to **understand and negotiate these different incentives and priorities** when initiating a partnership, and to find mechanisms for better decision-making that **more effectively incorporate environmental considerations** throughout the lifetime of their relationship.

INTEGRATED WATER RESOURCE MANAGEMENT

Water resource protection needs to be addressed at three complementary levels:

(i) Environmental protection.
(ii) Water resource management (quantity and quality of available water resources, competing water uses).
(iii) Service management (demand, supply).

More specifically, in water and sanitation services, water resource protection has to:

- Consider the utilisation of all resources: water (withdrawal, quality and nutrients), chemicals, energy, materials and land.
- Assess the environmental impact of all decisions made on water, land (sludge reuse), air and biological diversity.
- Respect ecological needs in setting project priorities (eg no water without sanitation, repair of leakages, etc.).
- Apply the precautionary principle wherever direct ecological impact cannot be positively ascertained.

(Extract from BPD, 2011 – Water Resource Protection.)

1.3 THE SILENT PARTNER RESEARCH PROGRAMME

To explore the interface between varied institutional relationships, local natural resource management and the integrated management of water and sanitation in Latin America, BPD Water and Sanitation (BPD) and the Canadian International Development Research Centre (IDRC) developed a 3-year programme of research, starting in October 2008.[5]

After an initial wide-ranging literature review (available at www.bpdws.org) to identify MSPs in the water and sanitation sector in Latin America and the Caribbean, five examples were selected from across the region – Bolivia, Colombia, Mexico, Paraguay and Peru – as examples of different types of MSPs focusing on different stages of the water cycle.[6]

The methodology involved initial desk-based reviews for each case followed by extensive stakeholder interviews in-country. Local workshops sought to stimulate debate and to verify initial findings. Following on from the local case studies and data collection, a Regional Learning Workshop[7] was held in Lima[8] in early March 2011 to bring together 28 programme practitioners and policymakers from across the five cases with the research team and representatives from the local community. The aims of the workshop were to provide a platform with several objectives in mind: information exchange about the specific contextual circumstances presented by each case study; the opportunity for participants to learn from each other's experiences; and to develop a discussion framework (see Section 5) that partnership stakeholders can use to shape their negotiations and discussions either at the outset of a partnership or at any point in its lifetime. This document, alongside accompanying audio-visual files (available at www.bpdws.org), form the main outputs of this research programme.

Over the period of the research much was learned about the process of partnership and the practice of undertaking research with 'active' partnership projects. The initial hypothesis asserted that environmental stakeholders should be integrated (or their view institutionalised at least) into the partnership from the start of the relationship. It was found however, that effective, well-functioning partnerships can offer the flexibility required to deal with the shifting needs of the external context and that environmental 'voice' and perspectives can be incorporated as partnership relationships evolve.

THE SILENT PARTNER CASE STUDIES [9]

Water for All, Cochabamba, Bolivia
Water for All is an MSP focused on the construction of local distribution networks for supplying water to low-income communities through community mobilisation and with local water committee management. The non-profit foundation AGUATUYA leads the partnership, which also incorporates the public provider SEMAPA, Cochabamba Local Government, UNDP, local CBOs and AGUATUYA's parent private company, Plastiforte.

Sustainability of Water Reservoirs in Alta Guajira, Colombia
The Cerrejón Foundation for Water in La Guajira has been working in partnership with various private and governmental stakeholders, community groups and the World Bank. It aims to improve local water resource protection and to develop water supply initiatives for poor indigenous Wayúu communities living in municipalities surrounding the Cerrejón coal mine in northern Colombia. The reservoir programme is part of the ambitious La Guajira Departmental Water Plan (PDAG).

TepozEco, Tepoztlán, Mexico
The multi-stakeholder TepozEco pilot project (2004-2007) brought together NGO Sarar Transformación, local- and state-level public authorities, community groups, CBOs and international donors/research institutes to implement an urban ecological sanitation programme. The four components were: to supply ecological sanitation (dry toilets); develop solid waste management solutions through a municipal composting centre; experiment with household and event urine harvesting for nutrient re-use; and raise awareness of water and sanitation issues.

The *Aguateros* of Paraguay
The *aguateros* are small-scale private water providers who operate in peri-urban areas of large cities and in some smaller cities and towns. The *aguateros* respond to a demand for services which the state is unable to satisfy, due to the limited capacity of the public provider CORPOSANA. This case study reviews the process and ramifications of bringing the *aguateros* under state control and the formalisation of the relationships through a public-private partnership.

Optimising Water Management to Combat Urban Poverty, OGAPU project, Lima, Peru
OGAPU was implemented in the Municipality of Villa El Salvador in Lima by an MSP comprising the NGO IPES-Promoción del Desarrollo Sostenible, Villa El Salvador district council, several local CBOs, the Environment Office of the Ministry of Housing, Construction and Sanitation, CORDAID and the Peruvian electricity supplier, Red de Energía del Perú. OGAPU was also one of the study and learning projects of the international SWITCH research programme (www.switchurbanwater.eu). The aim of OGAPU was to develop a two-hectare multi-functional park in a poor neighbourhood, using partially treated wastewater from the city's sewerage system to irrigate recreational and productive spaces. Knowledge gained from the project helped define policy on wastewater recycling and re-use.

1.4 STRUCTURE OF THE DOCUMENT

The remainder of the document is split into four main parts.

Section 2 discusses whether the environment actually *is* silent in relation to MSPs or whether its demands are becoming increasingly vocal. It also introduces what is meant by the term multi-stakeholder partnership in this context and whether the environment itself is a partner.

Section 3 highlights two inter-related roles that the environment plays in regard to service delivery partnerships, namely:

1) **To reinforce the concept of the 'common good'.** This section provides an analysis of the competing perspectives and shifting incentives of different stakeholder groups when considering the environment in this way.

2) **To encourage sustainability.** This part considers what sustainability means in this context and proposes that well-managed MSPs can be effective mechanisms for managing the 'common good' whilst also addressing the sustainability concerns of service provision.

Section 4 provides a snapshot of each of the five case studies in regard to four contextual dimensions: the socio-cultural, the technical, the economic and the administrative/institutional. Partner 'maps' identify the different organisations involved in each case study and illustrate their inter-relationships. The cases also describe in more detail how and why the partnerships emerged – which ranges from community demand for water and sanitation services to piloting innovative environmental protection approaches.

Section 5 contains the partnership discussion tool. The aim of the tool is to encourage and facilitate dialogue between partners, to flag some of the pitfalls and to suggest opportunities for partnership adaptation. The tool synthesises learning from the research process and highlights where the inter-relationships between environmental protection and public health actually reside when it comes to partnership practice. It draws together key 'environmental' questions in relation to the four contextual dimensions mentioned above.

2 THE ENVIRONMENT AS A 'SILENT PARTNER'

2.1 IS THE ENVIRONMENT SILENT?

Pressure on water resources, brought about by urban population growth and competing demands from agriculture, industry and domestic use, leads to over-abstraction from aquifers, rivers and reservoirs. Pollution of both surface and groundwater is also increasing and is expensive to avoid and even more costly to resolve. Contamination of some sources in Latin America is at such levels that there are now few raw sources that do not require extensive pre-treatment for service supply (Moscoso, 2004).

However, whilst the impacts of environmental degradation have been studied across a range of sectors (agricultural yields and industrial production, for example), such central environmental concerns are often not well articulated either at the project level or in the sector as a whole in efforts to provide and manage sustainable basic water and sanitation services. These concerns are not new. Since the late 1990s, for example, IWRM has been promoted as an approach that aims to provide an overarching framework for policy and practice designed to consider both supply needs and environmental protection. Yet the complexity of the challenge is daunting and although great strides have been made in developing IWRM processes, more systematic analysis is required to understand shifting stakeholder incentives, roles and responsibilities, and to see how these shifts are impacting upon institutional arrangements between sectors.

In addition to existing environmental challenges, the threat of the effects of climate change looms large in (and must accelerate) debates on sustainable water and sanitation supplies and on approaches for adapting to such change. Determining the financial costs of climate change adaptation (CCA) in terms of programming remains a challenge, however there is a wide acknowledgement of the potential environmental costs if action is not taken now. For Central and South America, extreme 'natural' climate events (eg hurricanes, floods and droughts) already have significant negative impacts on water infrastructure. (GWP, 2012). Furthermore, although the South American continent boasts as much as 28% of the world's freshwater resources (ibid.), multiple human activities

directly contribute to their deterioration.

Once services have been delivered (through piped network systems or otherwise), dealing with wastewater is another major challenge. In Latin America the discharge of untreated effluent into watercourses and natural habitats represents a major threat to drinking water sources and to the environment in general. Treatment, pumping systems, infrastructure renewal and maintenance costs add pressure to over-extended public authorities and water utilities. As the costs rise of this financial and environmental burden, providers and authorities alike are seeking ways to manage this dynamic and provide better integrated regulation. [10]

Overall, these factors indicate that the environment is becoming increasingly vocal in water and sanitation supply debates. However, within supply projects its protection is still often neglected or de-prioritised despite this being crucial for the sustainable delivery of services.

IPCC (2007) RECOMMENDATIONS IN RELATION TO WATER

SECTOR	ADAPTATION OPTION/STRATEGY	UNDERLYING POLICY FRAMEWORK	KEY CONSTRAINTS & OPPORTUNITIES TO IMPLEMENTATION
WATER	Expanded rainwater harvesting; water storage and conservation techniques; water re-use; desalination; water-use and irrigation efficiency.	National water policies and integrated water resources management; water-related hazards management.	Constraints: financial, human resources and physical barriers; Opportunities: **integrated water resources management; synergies with other sectors.**

2.2 IS THE ENVIRONMENT A PARTNER?

The word 'partnership' may imply some sort of harmonious, healthy relationship between stakeholders who have mutual interests, shared incentives and clear responsibilities. However, this is often far from reality and such relationships are often much harder to initiate and manage than anticipated. MSPs are confronted by many external economic, institutional, social and sometimes geographic or technical constraints. In addition, BPD's previous work has shown that partners in multi-stakeholder relationships generally dedicate too little time to the internal functioning of their relationships and that a more rigorous analysis and then negotiation of the scope and structure governing the partnership is an essential base for success.[11]

FLEXIBILITY BY DESIGN: KEY FINDINGS

BPD's early work (Caplan et al., 2001) found that project practitioners can sometimes become too focused on their own activities to step back and review the partnership as a whole. Drawn from extensive partnership analysis, BPD initially found six key thematic areas that influence and shape partnership practice:

- Understanding context is key.
- Building on existing assets and filling gaps.
- Understanding partner incentives and conflicts.
- Understanding time frames and time requirements.
- Differentiating between individuals and institutions.
- Allowing for transformation, modification and capacity building.

For this document (and indeed the research it is informed by) the term and concept of partnership includes the variety of relationships that are created between different stakeholders in order to leverage capacity, resources and ultimately, sustainable services. Often, there may be no overarching or defined 'partnership' but sets of bilateral institutional relationships; however, the process for managing these requires many of the same skills and approaches to governance.

Partnership function is already difficult to manage when partners have a shared definition of the project and agreed public health outcomes in mind. Addressing environmental concerns as well complicates the practice further. To marry such differences and incentives requires that stakeholders reflect ever more proactively on the process of partnership and use such insights to inform their decision-making processes and governance structures.

If partners can work together to understand the environmental context better, to articulate and act upon environmental drivers or incentives and/or to bring in stakeholders who 'represent' environmental perspectives, then they will be more prepared to anticipate obstacles throughout the process of partnering and achieve their goals.

TERMS AND TYPOLOGIES… TYPICAL WASH PARTNERSHIP

In its simplest form, an MSP could include: a) a private company with a delegated management contract to provide water services to a city; b) the municipal government agency; and (c) a local non-profit organisation (NGO/CBO) with community ties. The motivations and interests of the various partners could be as follows.

Some low-income communities are not connected to the formal water system, so the municipality may prioritise these communities to receive expanded services. The municipality works with the company to map the communities and with the regulatory agency to experiment with different types of technology for affordable and sustainable water and sanitation services. An NGO/CBO works with the company to document the profile of poor households; with the municipality to design education and awareness campaigns on hygiene, drainage and other issues; and with the community to form water committees that can deal directly with the company. Though primarily outputs-oriented, the work of this partnership has a number of policy implications.

MSPs therefore include the various forms of collaborative engagement possible among public (eg municipal agency), private (eg water company) and civil society organisations that exhibit some characteristics of shared information, mutual decision making, duty of loyalty and care, and transparency. These forms of partnerships are meant to be more flexible and responsive ways of approaching a problem than a typical contract among business organisations. (BPD, 2006a)

Lastly, when referring to the 'process of partnership' in terms of timing and sequencing of activities, this is not a step-by-step guide of how to partner (although clearly there is some order to events). Rather, this research confirms that what is true for partnerships in general, particularly applies in the context of environmental protection. Namely, that beyond the initial coming together to partner, many of the subsequent steps and stages need to be constantly reviewed, including the approach partners take to exiting a relationship.

2.3 CHALLENGES FOR TREATING THE ENVIRONMENT AS A PARTNER

If the environment is a partner – or is 'represented' at least – in MSPs, the question is whether it is an equal partner given other drivers of water and sanitation service supply.[12] In many instances, health and poverty alleviation concerns predominate and interventions are thereby designed accordingly.

In Latin America, the research team found that there are other higher priorities than safeguarding the environment (compared to Europe, for example, where universal access to services already exists and therefore environmental protection is higher on the political and service supply agenda). In many Latin American cities, first and foremost is the public health imperative to provide access to services – this focus prevails in sector policy and informs actors' incentives. On the ground, decision-making about water resource use (of an adequate quality and quantity) is also driven by economic rather than environmental concerns (ie the rationale for planning service expansion can be based on the relative costs of using ground or river water, transport and contamination/treatment costs).

This dynamic frames whether 'environmental stakeholders' are genuinely involved due to wider environmental protection issues or primarily for public health reasons and concerned only with immediate resource quantity and quality and economic considerations related to achieving that goal.

Another challenge relates to time frames: partners should not be seeking for 'partnerships' to last forever. Rather, partnerships are usually a complex means to an end – to address specific problems that no single actor can deal with on its own. Partners already struggle to deal with immediate 'gritty' partnership issues (of negotiating technology choice, engineering aspects, community mobilisation, etc.); environmental protection and climate change adaptation on the other hand are longer-term, ongoing goals. How can short-term partnerships develop ways of factoring in these longer-term issues? How can they learn to deal with *immediate* environmental concerns besides those that might arise beyond the time frame and scope of their relationship and influence?

3

GIVING THE ENVIRONMENT A VOICE

In the previous section, the focus was on **why** it is important that environmental considerations have a more prominent role to play in service delivery negotiations.

In this section, the focus is on **what** happens when the environmental perspective is considered and articulated in MSPs; by **which** means or mechanisms does it happen; **who** takes responsibility for the environment and **when** should such perspectives and partners be incorporated. Through this analysis, a better understanding of the consequences, including the impact on partnership relationships and negotiations on the ground, begins to emerge.

Amongst others, the environment plays two fundamental and inter-related roles that impact upon the *nature* of stakeholder relationships and subsequently *influence* partner negotiations. The two inter-related roles are:

- To reinforce the concept of water and the environment as **common goods** and the management thereof.
- To encourage partnerships to address **longer-term sustainability** issues in a more integrated way – by proactively bringing together social, technical, economic and institutional dimensions[13] with an environmental perspective.

Consideration of the two roles, although somewhat academic at first glance, provides a framework for partners to understand what happens to the practice of partnership on the ground when the environment becomes a driver for negotiations and decision-making. When partners are more able to understand the impact – the pushes and pulls on different stakeholder incentives, roles and responsibilities, for example – then they are better equipped to negotiate and navigate themselves through any specific or contradictory implications of either a predominantly public health or environmental protection focus.

3.1 ENVIRONMENTAL ROLE 1 – TO REINFORCE THE CONCEPT OF THE 'COMMON GOOD'

The notion of water as a 'common good' is prominent in sector debates and policy discourse.[14] In other words, it is 'non-excludable' and 'rivalrous': a limited resource. The environment is also a common good in the context of inadequate sanitation (see box below).

Increasingly, different institutions, interests and users compete for water. Pollution of water sources

CONCEPTUALISING GOODS

Typically water and sanitation service supply is perceived as both a private good for the convenience, security and comfort of the household tap and toilet owner and as a public good* for the public health benefits accrued from the culmination of individuals' access to a service. Water resources and the environment into which sanitation services (or lack thereof) are discharged represent the common good in this context.

COMMON TYPOLOGY OF GOODS IN ECONOMICS

	EXCLUDABLE	NON-EXCLUDABLE
RIVALROUS	PRIVATE GOODS	COMMON GOODS (common pool resources)
NON-RIVALROUS	CLUB GOODS	PUBLIC GOODS

Economists see common goods as 'rivalrous' whereby the consumption by one person precludes its consumption by another and non-excludable, ie it is not easily possible to exclude a person from consumption. In the case of the environment in this context, this means that for:

- **WATER** – no-one can easily be excluded from its use and benefits, however as competition for clean, drinking water supplies increases, consumption is rivalled. As there are limitless or unregulated demands made on its supply and if it is not recharged, the resource becomes depleted.
- **SANITATION** – the environment into which wastewater and solid waste are discharged can be used by all but the capacity to absorb such pollution decreases and degrades what is available for the future and for different parties (ie rivalry increases).

This short-term use (and overuse) of both water resources and the environment used to soak up the lack of comprehensive sanitation coverage without considering the longer-term impacts is sadly prevalent. As the resources are subtractable (ie used more and more over time) they are put under more pressure. However, the benefits can be consumed on an ongoing basis if the environment is sustainably protected and properly managed for continuous use.

**Water and sanitation supply may also be seen as a social good but this refers less to its characteristics and more to the types of service provision available.*

from inadequate sanitation, agriculture, industry or other urban uses further complicates the emerging competition between users.

If water and the environment are common goods, the key questions that emerge are:

- Who is responsible for protecting the common good?
- How can partners and stakeholders be incentivised to protect the common good, particularly in cases where the tangible benefits could take time to develop?
- How can upstream and downstream resource users come together effectively?
- How can more immediate public health and poverty alleviation goals be balanced with longer-term resource sustainability?

3.2 ENVIRONMENTAL ROLE 2 – ENCOURAGING MSPs TO TAKE SUSTAINABILITY SERIOUSLY

Protecting the common goods of water and the environment within MSPs implies that partners are required to take into account longer-term sustainability when designing, implementing and monitoring their supply projects and their institutional relationships.

However, delivering sustainable basic services and benefits requires an understanding of and response to multiple perceptions and dimensions of sustainability in different contexts – this ultimately determines which partners need to come to the table in an MSP.

SUSTAINABILITY MATTERS

Since the Brundtland Report (UNWCED, 1987), the concept of sustainable development as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*" (ibid.) has, with an added emphasis on equity, gained political ground and has served to inform how environmental issues are addressed within social and human development interventions.

The intention to achieve sustainability is not always reflected in practice despite the current sector focus on sustainable services. The WASH Sustainability Charter (http://washcharter.org/) seeks "*to align stakeholders around collaboratively developed sustainability principles, catalyse adoption of these principles worldwide, and provide a framework to facilitate ongoing learning.*" The Charter usefully captures current thinking in the sector and the intent to make sustainability a reality.

On the ground, achieving 'sustainability' in the water and sanitation sector remains a difficult and ongoing challenge; not only because of the multiple factors, actors and resources required, yet also because of the differing conceptualisations of what sustainability means and what different stakeholders are attempting to do to reach it. MSPs can provide a space for reaching a common understanding of what sustainability means. In a given context, partnerships can bring together the relevant stakeholders that can make sustainability more realistic and achievable.

SOCIO-CULTURAL SUSTAINABILITY

This context is determined by multiple factors, eg demographics, community homogeneity and the level of community engagement in social development, and cultural practices and behaviour. In terms of ensuring sustainability from this perspective, partners must fully understand the community profile and their current practices and beliefs around the environment, including who they believe is responsible for protecting it.

COMMUNITY MANAGEMENT MODELS

There has been a widely-held assumption in the water and sanitation sector that community engagement and management of system hardware will automatically lead to sustainable projects and programmes. However, increasingly, this view has been challenged by evidence from the ground. "*The community management model has sometimes been presented as a panacea for achievement of lasting services but in the absence of external support, there is extensive evidence of its weaknesses*" (WaterAid, 2011). Ongoing external support with 'software' such as training on hygiene education and system maintenance needs to be combined with policies and practices that ensure there is a market for and access to maintenance supplies – including access to supply chains, equipment, etc.

TECHNICAL/ENVIRONMENTAL SUSTAINABILITY

Here sustainability is about determining or endorsing specific 'climate-proof' technical approaches (eg types of ecosan latrine or innovative wastewater treatment options and their functionality) that are being used around the world. Partners must determine which technologies are suitable for both the environmental context and user preference. Sustainability of both resources and supply mechanisms are usually most easily understood in relation to choosing the 'right' type of technology that will continually work (if properly managed and maintained) in a specific environment with a defined set of resources. More broadly, partners also need to identify the key challenges that the partnership will face in relation to the impact of any supply side interventions on water resources (including at the local basin level). They also need to consider local water consumption practices and emerging multiple-user demands, levels of environmental contamination and other factors in order to undertake appropriate risk analysis and to determine what environmental focus the partnership will take.

ECONOMIC SUSTAINABILITY

To have economically viable projects, steady income flows are required to ensure financial sustainability. The difficulty here is to consider the degree to which environmental costs are factored into supply equations. Beyond the life-cycle costing approach (see box on WASHCost below), costs of environmental damage and clean-up may also be included. Cost-Benefit Analysis (CBA) can support partners to make investment decisions, yet, are the costs of doing a CBA actually too high for small-scale innovative partnerships to bear? How does this fit with the short-term timeframe and targets of many multi-stakeholder partnerships?

WASHCOST: FACTORING IN LIFE-CYCLE COSTS

The life-cycle costs approach seeks to raise awareness of the importance of all costs in achieving adequate, equitable and sustainable WASH services, to make reliable information readily available and to mainstream the use of life-cycle costs in WASH governance processes at every level. Since 2008, WASHCost has developed new methodologies to better understand the costs of providing water, sanitation and hygiene services to rural and peri-urban communities in Ghana, Burkina Faso, Mozambique and India (Andhra Pradesh). For further information see: www.washcost.info

ADMINISTRATIVE/INSTITUTIONAL SUSTAINABILITY

This requires that the institutional or administrative/legislative landscape is coherent, robust and capable of negotiating comprehensive policies and delivering services. For example, in Latin America, local government elections often see entire municipal staffing teams change as well as mayoral positions. This makes a longer-term perspective more difficult to engender.

COMPETING REGULATION: HARMONISING LEGISLATION IN MEXICO

It is crucial for forestry and environmental legislation to be coherent and complementary, and the same can be said of the laws governing water and sanitation management, healthcare and construction.
In Mexico, legislation is disjointed and the laws applicable to one sector complicate efforts to implement the laws of another. This lack of integration between town planning and ecological planning highlights the problem systematically engendered by Mexican legislation due to the lack of harmonisation of the various laws (Seguin, 2011).

In addition, the norms and laws governing the sector (both WASH services supply and environmental protection) must be aligned and implemented coherently.

In some contexts, regulatory frameworks for water and sanitation supply clash directly with those governing environmental regulation, notably over abstraction rights and pollution control (BPD, 2012).

Each dimension implies a certain set of approaches, resource allocations and activities. Perspectives on these aspects will often generate conflict between partners who may have different incentives around, or perceptions of, how to uphold the common good. However, the negotiations around these dimensions are vital to determining how projects and programmes seeking to deliver basic services to poor communities can be most effective and efficient.

3.3 SUSTAINABLE MANAGEMENT OF COMMON GOODS: THE IMPACT ON THE PRACTICE OF PARTNERSHIP

This section explores the consequences and impact on partnering practice of viewing the environment as a common good that can be sustained through MSPs. The case is made for MSPs to be seen as a specific type of institutional arrangement that can be used to protect common environmental goods, followed by a discussion of how this impacts on partner incentives, roles and responsibilities. The section concludes with a consideration of time frames and sequencing of activities.

In the economic conceptualisation of goods, water resources are also referred to as 'common-pool resources'; these are common goods that may be natural (eg the water cycle) or a man-made resource system (eg an irrigation or wastewater re-use system) that can be sustainably managed by using some sort of institutional arrangement – sometimes termed a 'common property regime' – to ensure that exploitation is restricted by regulation, maintenance and effective resource management.[15]

MSPs may provide the conditions necessary to co-ordinate the protection and management of common resources. Well-negotiated and effective partnerships are an institutional governance mechanism by which environmental protection practices can be hardwired into supply side programmes and projects. In effect, they operate as a space for innovation and piloting new policy and for partners to adapt to changing needs.

MANAGING ECOSYSTEMS SERVICES: PAYMENT FOR ENVIRONMENTAL SERVICES

One mechanism for managing common-pool resources is known as Payment for Environmental (or Ecosystem) Services (PES). The three types of 'environmental services' most commonly managed through this approach are: climate change mitigation, watershed/basin management and biodiversity conservation.

The idea behind PES is that different resource users (those with many demands) contribute financially or otherwise to the costs of maintaining the supply of the raw resource. This can be in the form of payments to landowners or local communities to manage the resource on an ongoing basis, or payments to farmers to change their farming practices for example. Water basins provide a useful catchment area (ie a geographic boundary) for bringing together related and interested stakeholders to manage a local common resource. Although there are few PES mechanisms related directly to water resource management, the majority of such cases emanate from Latin America.

In practice, challenges abound: practically linking upstream and downstream users is not an easy undertaking; one-off PES payments do not consider longer-term sustainability; complex power relations cannot be overcome without proactive relationship management; ongoing financing is not prevalent; willingness to pay is not common amongst downstream residents many of whom see land-use practices upstream as not their concern; and policy is often not conducive to such approaches.

Despite the many benefits and potential for scale-up, there is acknowledgement of the trade-offs between the achievement of different environmental goals and between environmental and social goals.

For further information, see accompanying BPD briefing note, *Payment for ecosystem services* (BPD, 2012)

ADAPTIVE GOVERNANCE

The concept of 'adaptive governance' is drawn from Elinor Ostrom's 2010 work *The Challenge of common-pool resources* in Environment: Science and Policy for Sustainable Development. Ostrom states that governance structures and approaches for managing common resources must be tailored to specific contexts and to the type of resource involved. In order to be 'adaptable' to different contextual needs, there are overarching requirements that must be addressed.

- Achieving accurate and relevant information, by focusing on the creation and use of timely scientific knowledge on the part of both the managers and the users of the resource.
- Enhancing rule compliance, through creating responsibility for the users of a resource to monitor usage.
- Dealing with conflict, acknowledging the fact that conflicts will occur, and having systems in place to discover and resolve them as quickly as possible.
- Providing infrastructure that is flexible over time, both to aid internal operations and create links to other regimes.
- Encouraging adaptation and change, to address errors and cope with new developments. (ibid.)

These requirements are also essential considerations for governance structures and procedures in MSPs. Adaptation measures are not undertaken in isolation but as an intrinsic feature of MSPs.

To encourage the development of well-negotiated and effective MSPs, partners must take a step back and focus on finding the right incentives for the different stakeholders involved. Reviewing different stakeholders' obligations and therefore their roles and responsibilities helps to determine what they will be willing to contribute and their motivations to partner (or not) with others. Table 1 highlights the expected activities that partners need to undertake within the context of their MSP across a typical project development cycle.

TABLE 1: TYPICAL ROLES FOR WATER RESOURCE PROTECTION WITHIN AN MSP[16]

	PREPARATION	PLANNING	PROCUREMENT	OPERATION & MONITORING	
SUPPORT PROCESS	• Identify relevant stakeholders, especially vulnerable or marginalised groups. • Create a stakeholder committee and enable effective participation.	• Ensure stakeholders can review and comment on planning documents. • Build knowledge/ raise awareness around environmental protection and tariff issues.	• Engage community throughout implementation. • Include upstream users in project (eg review their needs, uses and incentives to engage).	• Set up a group within provider to address environmental issues. • Educate water users about conservation. • Monitor and fulfil community rights (eg Right to Water, abstraction rights, livelihoods).	TERMINATION – RENEWAL
MAIN PROCESS	• Define clear outcomes. • Tie in with municipal planning and water resources management plan. • Review environmental situation (sources, uses, wastewater discharges, and sanitation systems).	• Analyse technical options to meet demand: consider innovative solutions, and a 'no water without sanitation' approach. • Undertake EIA or CBA. • Define a local tariff policy that covers environmental costs. • Charge for untreated water to further protect the resource.	• Ensure operator model is financially and environmentally viable.	• Manage expectations of community engagement. • Promote water conservation measures. • Ongoing EIA/ CBA analyses.	
REGULATORY PROCESS	• Review environmental legislation relevant to WASH (eg abstraction rights, re-use, etc.). • Check existing regulatory functions.	• Establish water resource management standards for identified multiple users.	• Review provider contract obligations relating to the protection of water resources. • Manage competition between providers.	• Monitor operations (abstraction and pollution levels) from the beginning. • Publish outcome of regulatory process.	
	WATER RESOURCES PROTECTION				

TABLE 2: STAKEHOLDER COSTS AND BENEFITS

	COSTS/CHALLENGES	BENEFITS
PUBLIC AUTHORITIES	• Implementing IWRM policy to manage rivalry/competing uses. • Restrictive, fragmented or competing policy framework. • Lack of cohesion between public bodies (eg Ministry of Environment, Public Works, WASH, Public Health, Housing) responsible for environmental protection and supply. • Lack of continuity of municipal/local government and short-term time frames.	• Sustainable, less expensive coverage for the population. • Greater institutional synergy and sector coherence. • Fulfilling duty as duty bearer (of community rights). • Better communication between upstream and downstream authorities. • Cleaner, more attractive environment and potential for protected biodiversity.
PROVIDERS (PUBLIC OR PRIVATE, LARGE OR SMALL)	• Investment costs rise due to greater treatment needs. • Business models/operations depend on sustainable access to resources. • Skills required to negotiate shared, and ongoing, resource access. • Expectations rise in terms of investment, resource protection, more efficient technology, less non-revenue water, etc. • Greater competition – 'survival of the greenest' and reputational risk.	• Providers understand state of water resources and develop sustainable and more cost-effective service, delivery models accordingly. • Revenue can be generated to cover costs including environmental costs through supporting policy environment. • Clean-up standards agreed for sector and all users. • Reputation and scope for adding 'social value' through more environmentally aware practices.
COMMUNITY /CSOs	• Supply is compromised and costs for access to water (and sanitation) supply may rise and become unaffordable. • The poor/most vulnerable may have an unequal share of the cost burden. • Unwillingness to pay for environmental clean-up costs as well as supply. • Lack of awareness of environmental protection benefits or connections not adequately made to water cycle. • High expectations of community engagement in supply-side as well as environmental protection activities.	• Ongoing, sustainable access to supply (at reasonable cost). • Cleaner environment and potential for better livelihoods. • Potential for economic remuneration for environmental protection (through PES/ watershed management practices). • Raising awareness more widely among communities. • Able to participate in decision-making and responsible for protection.

Once stakeholder obligations have been considered, as per Table 1, partners should also take time to review the related costs and benefits for each stakeholder group present in their MSP. Table 2 provides example costs (challenges) and benefits of bringing a more environmentally-focused element to partnership projects.

UNDERSTANDING TIME FRAMES AND TIME REQUIREMENTS

Different stakeholder groups work within the bounds of different time frames. Public sector officials are usually driven by election cycles (or if not directly then influenced by politicians who are), private sector firms by predetermined contract duration and their internal financial/reporting cycles, and NGOs by donor and community (including seasonal) cycles. Ideally a partnership process will allow the different stakeholder groups to strive for modest milestones that coincide with their individual cycles. This will not occur without negotiation and understanding. Along with time cycles within the project, partnership building itself takes time. Too often the pressure is on to produce the results, even though partners have not been given or made the time to get to know each other. Investing time at the beginning will save time and money in the long term as each partner becomes more familiar. (BPD, 2001)

As noted above, environmental sustainability is an ongoing long-term challenge whereas an MSP is usually a short-term mechanism used for achieving specific outputs and outcomes. Partners have to prioritise, make decisions, invest resources and take action based on already differing perceptions of time frames (see box). To deal with some of the shorter-term environmental aspects on a practical, tangible basis, partners must either:

- Include a partner with a direct environmental stake.
- Find a way to make the environment a more immediate consideration in partnership negotiations.

The case studies present diverse examples of how and why environmental perspectives (and in some cases, stakeholders) were brought into the MSPs.

TABLE 3: MAPPING THE CASE STUDIES ACROSS A SPECTRUM OF ENGAGEMENT

PARTNER WITH ENVIRONMENTAL STAKE → → ENVIRONMENTAL CONCERNS SHIFT NEGOTIATIONS

TEPOZECO, MEXICO	OGAPU, PERU	LA GUAJIRA, COLOMBIA	*AGUATEROS*, PARAGUAY	WATER FOR ALL, BOLIVIA
• NGO (SararT) was already working on other environmental and food security projects. • Environmentally aware local government. • The need to deal with grey-/wastewater was a key driver for the project and the focus of local policy influencing.	• NGO (IPES) already working on other environmental and urban agriculture projects. • Government interested to renew policies on wastewater treatment and re-use due to arid/water-scarce context.	• FCAG working on water supply through maintenance of resource capture infrastructure in arid region, supply mechanisms and water treatment. • Influenced by policy imperative to increase coverage to indigenous communities while effectively using scarce resources available.	• *Aguateros* focused on water supply not sanitation. • Over-abstraction and pollution of aquifers (*aguateros'* main supply) leading to increased treatment costs. • *Aguateros'* business model is more expensive and unsustainable without sanitation services/greater environmental protection being put into place.	• Water for All focuses on delivering demand-led water services in low-income, peri-urban areas through small networks. • Little focus on sanitation at start as partners less concerned about environmental issues. • Wastewater problem leading to demand and plans for treatment/sanitation services.

As the case studies found, simply incorporating environmental stakeholders into projects from the outset does not of course necessarily lead to the provision of more sustainable services. Rather, throughout the lifetime of the partnership, stakeholders need to be more strategic and systematic in their approach to dealing with environmental incentives. The tool in Section 5 helps to frame this more systematic thinking.

4

THE CASE STUDIES

Each case study provides an example of an MSP that seeks to influence water, sanitation and/or environmental policy – whether to demonstrate how to shift existing laws and norms or to influence and create new ones. The five cases were at different stages of forming, maintaining or replicating their relationships throughout the duration of the research programme. In each case the aim was to identify how these relationships actually work on the ground and to illustrate how the environment had an impact in terms of the **context** within which the partnership operated, the sets of **incentives** driving the relationships or the types of **actors** involved in the partnership.

The knowledge generated by these cases focused mainly on analysing the specific **contextual** factors (socio-cultural, technical, economic and administrative (ie institutional, legislative, etc.)) that have enabled multi-stakeholder arrangements to flourish (or otherwise).

ECONOMIC CONTEXT: THE *AGUATEROS* – A SUSTAINABLE BUSINESS MODEL?

A key factor favouring the advent and continuing feasibility of the *aguateros* in Paraguay has been the availability of good quality, reasonably accessible groundwater extracted through perforated wells. However, there are over-abstraction and contamination problems in both Asunción and Ciudad del Este affecting the quality and quantity of water now available.

The consequences for the *aguateros* are huge. In the short term, they will be increasingly forced to purify their groundwaters. Most *aguateros* who do this use a simple, chlorine-based in-line purification system or more feasible manual techniques at the reservoirs. Some have investigated purification techniques to treat nitrate pollution, but have ruled out the idea in light of the cost. Due to much higher costs, and obstacles hindering investment in new infrastructure, only two *aguateros* in Asunción use river water and a purification plant.

The need to protect water resources will increase the *aguateros*' costs and put greater pressure on them to consolidate in the market through mergers or absorptions so as to achieve greater economies of scale, which is the only way to minimise costs.

BOLIVIA

4.1

Report: Rossina Alba and René Terán

The Water for All project

CONTEXT

In Cochabamba, Bolivia's third largest city, the supply of a water and sanitation service is a complex process. The principal factors behind this are the structural water shortage; a weak centralised operator – Cochabamba Municipal Water and Sanitation Service (SEMAPA) – hampered since the 1970s by the chronic shortcomings of a service that reaches less than 50% of the population; and extensive growth in peri-urban areas.

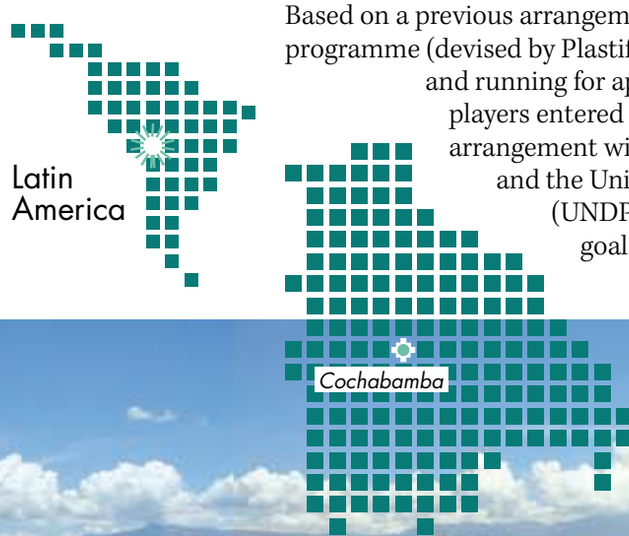
The need for an efficient water service has prompted the construction and management of independent water systems, with around 300 small-scale operators emerging to provide this facility in peri-urban areas of the city.

After years in the background, these operators came to the forefront in the wake of the Cochabamba protests in 2000 (known as the Water War). Faced with the prospect of being absorbed or wiped out by the new centralised private operator (Aguas del Tunari) and of no longer being able to provide the water service, small-scale operators joined forces with the population they served to 'fight' for control of the water supply service. Eventually, they achieved their goal and the service was reverted to SEMAPA. At the same time, the independent systems gained recognition and respect and the outcome of these uprisings had a profound impact on subsequent legislative and regulatory policy changes.

The advent of independent systems, coupled with the reality of a severe shortfall in the supply of water and sanitation services in peri-urban areas, changed the stance of public and private players and donor agencies. These actors sought ways to relate more effectively and in a more structured and organised manner with water-deprived neighbourhoods and small-scale operators.

This paved the way for cross-institutional co-operation arrangements, which by pooling their knowledge and skills, are able to generate more effective and sustainable approaches for delivering water and sanitation services for communities. This was the context for the Water for All (WfA) partnership in 2005.

Based on a previous arrangement between the AGUATUYA programme (devised by Plastiforte) and SEMAPA, which had been up and running for approximately a year at that time, these players entered into a cross-institutional co-operation arrangement with Cochabamba local government and the United Nations Development Programme (UNDP). The new partnership's principal goal was to extend the supply of drinking



Peri-urban inhabitants have called upon their organisational experience and social capital to satisfy their need for a water service

water to the low-income peri-urban communities that lacked these services.

This multi-stakeholder partnership (MSP) serves as a platform for the interests of public entities working to mitigate the supply shortage. It also enables comprehensive solutions (from project design to construction of the system and formation of a water committee to operate the facilities), and technological innovations developed by the private provider, to benefit the partnership's social stakeholders: peri-urban communities.

The partnership's work has spanned five years, facilitating better public-sector relationships with the community and creating a more effective response and recourse mechanism.

THE SOCIO-CULTURAL DIMENSION

The partnership's social stakeholders, and the beneficiaries of its work, are community-based organisations (CBOs) – neighbourhood committees or agricultural unions – and the small-scale operators from the peri-urban areas of Cochabamba. All these areas of the city have similar characteristics and emerged as a result of unplanned settlements of migrating populations. Cochabamba is comprised of 14 districts, four of which have benefited from the partnership's involvement to the greatest extent. These are the largest and most densely populated areas – with a growth rate of almost 10% between 1992 and 2001. Poverty is widespread in these neighbourhoods; there is a lack of basic services and overcrowding is prevalent, while the infant mortality rate is almost double that of the city's central zone.

The peri-urban population shares a common trait: the organisational skills developed in their place of origin. Coming from a rural or mining background or from peri-urban areas of other cities, where they have also been faced with a lack of basic services, they have developed various family and community strategies to mitigate the impact of the water and sanitation deficit, sometimes employing pioneering initiatives, but in other cases generating additional problems.

Faced with this absence of services, and receiving no assistance from any government entity, peri-urban inhabitants have therefore called upon their organisational experience and previously devised strategies, deploying their social capital to satisfy their need for a water service. They have worked in solidarity using their own resources. The community as a whole has thus sought to resolve the water issue by constructing independent systems, whilst also implementing individual sanitation solutions (latrines and septic tanks). Nevertheless, this has left little room for the consideration of environmental matters which are beyond their current capacities.

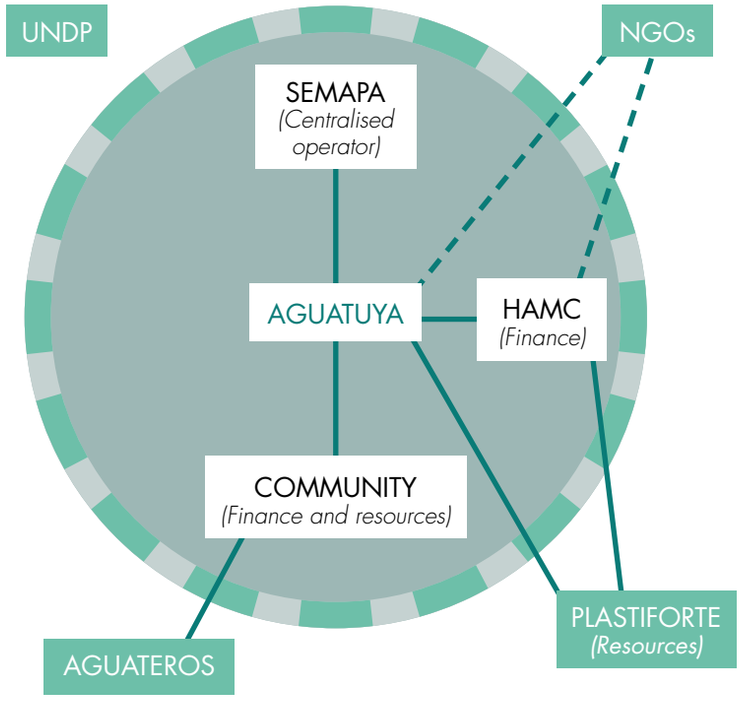
The involvement of the the CBOs and small-scale operators in the partnership is two-tier: 1) within the MSP, and 2) in the construction of the systems. The social stakeholders do not formally become members of WfA, nor do they participate in all of WfA's activities; they are effectively the recipients of the project. However, their participation in the second tier of activity is significant, from the outset of the project to implementation and systems operation, they dedicate their motivation, time, labour and, above all, their financial resources.

The partnership's five-year intervention has a marked 'before' and 'after' point. Previously, no institutional support or technical advice was received when constructing water systems, a situation that gave rise to poor and non-compliant infrastructure. Under the partnership framework, works are carried out with the technical backing of the centralised operator and sustainability is ensured by forming water committees, which function independently from the partnership, to operate, manage and maintain the systems. Meanwhile, connection to the centralised operator's system is guaranteed, as long as water resources are sufficient. The result is not faultless since technical, administrative or operating issues could arise, meaning that not all the systems may be operating at full capacity. However, it is without doubt an improvement on the former arrangement of self-management.

The sustainability of the partnership's activities is linked to the demand for water from the population. In this respect, projections for the possible roll-out and/or extension of the partnership's initiatives are feasible at this time, since the demand for water and a sewage or sanitation system is still very high, not only in Cochabamba and the surrounding towns, but also in other medium-sized cities in Bolivia.

THE TECHNICAL/ ENVIRONMENTAL DIMENSION

The partnership's initiatives have centred on supplying a water service and there are several reasons for this. Firstly, community demand focused mainly on water systems – given that individual sanitation solutions were already in place – with a low cost but a high environmental impact (80% of the population put a water



system at the top of their list of priorities, compared with 9% for a sewerage system). These individual solutions have ultimately played their part in delaying the inclusion of environmental considerations to any definable extent. Secondly, the project concentrated primarily on water systems. Last, but by no means least, the lack of an environmental stakeholder can be attributed to the generally poor handling of environmental issues.

Specific measures to address the consequences of polluted aquifers, the water shortage, or for the treatment of sewage, are few and far between and even fewer with regard to managing the risks associated with providing a water service when adapting to climate change. This is illustrated by the fact that wastewater treatment barely reaches 24% nationwide, while the sewerage system itself has an equally low coverage rate of just 27%. This is in turn due to difficulties in leveraging financial resources. Everybody is aware that intervention in these matters is extremely costly, hence the continuous delays.

Nevertheless, five years have elapsed and considerable progress has been made by the project in extending the water supply through independent network systems. At a time of heightened awareness of environmental matters, wastewater treatment is becoming an

The investment from the beneficiaries is remarkable and it firmly demonstrates their sacrifice and commitment to the project

increasingly pressing issue, particularly when the effects of aquifer pollution are more and more apparent, as is the impact of depleting water resources due to over-abstraction. Tending to the population's demand for sanitation can therefore not be deferred. In fact, the raised environmental awareness of the CBOs from their direct connection with the provision of the water service has served to support a second phase of the partnership.

THE ECONOMIC DIMENSION

As highlighted, the partnership has devised viable solutions for the provision of a water service by constructing independent systems, with a view to these being connected to the centralised system and thus to a secure supply of water.

The CBOs committed their own resources amounting to 43% of the total cost of the water systems. The town council financed 57% of the total cost through 'Participación Popular' funds. SEMAPA, as the centralised operator, provided the technical oversight for the projects at both the preparation and implementation stages, albeit somewhat intermittently.

AGUATUYA's considerable input consisted of co-ordinating all the stakeholders and finding synergies amongst them, as well as developing the projects and ensuring their correct implementation through Plastiforte. Moreover, AGUATUYA was able to manage and channel the resources donated to finance the systems, a task it has carried out since becoming a non-profit foundation in the last three years. Most of the projects, however, have continued to operate under the traditional structure with investments primarily from the community and 'Participación Popular' funding.

This framework has achieved significant results, moving over US$1.2m, of which US$521,972 was contributed by the beneficiaries (US$105 per family on average). The investment from the beneficiaries is remarkable when considering that monthly household income in peri-urban areas is US$126, and it firmly demonstrates their sacrifice and commitment to the project. The total investment has enabled the construction of 34 independent systems for almost 25,000 users.

This highlights the positive regard for the independent systems and the very real demand for such structures; even more so when they are the result of an initiative implemented by CBOs, residents and members of the community who are committed to their construction.

The partnership model has not factored in environmental costs generated by over-abstraction of water resources or the pollution of aquifers

The partnership's intervention encompasses training to form and develop water committees that are specifically responsible for operating the systems. However, this aspect is not always sufficient to ensure that the systems are financially sustainable. Another decisive factor is the tariff to be charged for the service, which must also cover the various costs and, ideally, generate a surplus to be set aside as replacement reserves.

Calculating the fixed and variable tariffs per m^3 is relatively straightforward. However, acceptance of these tariffs by a low-income population can be a challenge. Recipients will normally commit to paying the minimum tariff, but the minimum is not enough to cover all maintenance costs.

Bearing in mind the importance of the economic dimension, thought should be given to the need to follow up on completed projects, as well as to work on mechanisms devised to reduce costs and increase revenue from the systems, so as to ensure their sustainability. In this respect, those running the individual systems may benefit from joining forces as an association. This would enable them to share service costs that they would have difficulty in settling individually (a laboratory for analysing water quality, hiring one or more technicians specialised in systems operation and maintenance, etc.), or to manage funding awarded by public entities or international donor agencies.

From an environmental perspective, the partnership model and the systems built have not factored in environmental costs or negative externalities generated by over-abstraction of water resources or the pollution of aquifers due to the lack of sanitation systems. This is understandable with respect to the aforementioned minimum tariffs, which are unable to internalise these costs. Environmental matters such as these can therefore only be handled and addressed through a cross-institutional co-operation approach involving government and international donor agencies, which are able to leverage sufficient resources to deal with these issues.

This does not, however, mean that the CBOs are not able to implement or conduct certain initiatives directly. The CBOs' current agenda includes the provision of sanitation services; a need that has generated considerable expectation, especially taking into account the two pilot solutions implemented by AGUATUYA (outside the partnership framework), namely: a decentralised sewerage system with its own purification plant and the construction of ecological toilets.

THE ADMINISTRATIVE/ INSTITUTIONAL DIMENSION

The principal milestone marking the creation of the WfA partnership was the Cochabamba Water War. In 1999, central government opted to privatise the water service, increasing water and sewage system tariffs and basically prohibiting the independent systems. This gave rise to heated protests that culminated in the Water War in 2000. As a result of these uprisings, the service was reverted to SEMAPA; independent systems came to the forefront, as did the importance of their role in providing a water service (these systems represent around 50% of the residential network supply); and public, private and social actors adopted a new perspective on working together.

The changing context was a key factor that opened the doors for potential cross-institutional co-operation arrangements, which were able to generate more effective results by pooling their skills and capabilities. This backdrop, in turn, laid the foundations for WfA.

The mere constitution of the partnership was in itself an institutional challenge – initially the different stakeholders did not share the same interests and objectives and there were no guarantees that they would work well together. However, each stakeholder adapted its own particular rules and regulations to achieve the common goals, making this collaboration an outstanding example of a cross-sector partnership. The partnership was made official on 20 May 2005 when the main stakeholders entered into a cross-institutional agreement.

The roles and responsibilities specified in the agreement for each member of the partnership were defined according to their experience and skills. AGUATUYA's mission was to co-ordinate the work of the other stakeholders and liaise directly with the CBOs, as well as to design the technological tools and, through Plastiforte, carry out the projects. Local government's task was to finance approximately 50% of the project through 'Participación Popular' funding. SEMAPA was to endorse the technical features of the systems design and oversee the works. The CBOs, meanwhile, were given the role of co-ordinating the contribution of their own resources and committing their time and labour to enable completion of the works.

In practice, the partnership has required a work methodology that, while not being formally established through operating regulations

BEFORE THE WATER WAR	AFTER THE WATER WAR
COCHABAMBA LOCAL GOVERNMENT	
• Initial and somewhat weak application of participatory planning.	• Greater involvement with CBOs to finance priority works.
SEMAPA	
• Weak relations with the unserviced CBOs and with the independent systems built.	• Self-help programme from 2001 onwards through an agreement between the town council, SEMAPA and CBOs.
AGUATUYA/PLASTIFORTE	
• Company with a track record of 30+ years in manufacturing pipes for industrial, agricultural and residential use. • Identified growing demand for construction of independent drinking water systems.	• AGUATUYA devised comprehensive solutions for the construction of independent water systems. • Created partnerships with entities involved in the sector. • These initiatives led to the construction of over 150 water systems in different towns in the Valle Central region of Cochabamba up to 2005.
COMMUNITY BASED ORGANISATIONS	
• Invisible. • Organisational capacity. • Lacking technical advice and assistance, and comprehensive solutions for systems construction.	• Gained organisational power and strength. • Greater organisational skills and ability to exert pressure to meet the demand for services (water, funding, training, etc.).

AGUATUYA brought about technological innovations and is effective in terms of deadlines and quality, and this is widely acknowledged by the beneficiaries

or a procedures manual, has nonetheless been particularly effective, even when not all the stakeholders have participated or been involved to the same extent. Based on the positive results obtained during the partnership's five years of activity, the extent to which formal procedures and institutionalisation have been achieved has proven both effective and sustainable.

The partnership has been led by AGUATUYA/Plastiforte, with moderate participation from local government and variable input from SEMAPA. This invites reflection on the important role of AGUATUYA, which has been the mainstay of the partnership's activities. Plastiforte has been operating in the sector for over three decades and has thus become the primary supplier of materials, and has also built the water systems implemented by the partnership. These activities are permitted under the cross-institutional agreement and are supported by the technological innovations developed by the company to meet its own institutional objectives.

AGUATUYA is a programme devised by Plastiforte to offer comprehensive solutions to the demand for the construction of independent water systems. As part of Plastiforte, it is also a member of the partnership. This has enabled AGUATUYA to channel donated resources to construct additional systems and develop basic sanitation alternatives, which have been implemented with different CBOs in peri-urban areas.

Plastiforte's participation has the potential to generate a certain degree of criticism primarily because of its links with AGUATUYA. This situation intensifies when AGUATUYA promotes and manages the projects and Plastiforte more or less has exclusivity in constructing the systems, and in providing materials. However, it cannot be denied that this private-sector player has been a key factor in enabling the partnership to achieve its objectives. Not only has it brought about technological innovations, it has also been extremely effective in terms of deadlines and quality, and this has been widely acknowledged by the beneficiaries.

Finally, mention should be made of the impact on public policy. The Water War and the new government, which is primarily founded on social organisations, have brought about significant legislative and regulatory changes that recognise and protect the independent systems. The basic sanitation plan in force also considers these players and allows for different intervention programmes in their favour. This

By bringing in partners that are more focused on environmental management, WfA's approach may be more socially and technically sustainable

demonstrates their importance when drawing up public policy for the provision of a water and sanitation service to peri-urban areas.

The impact of the cross-institutional arrangement model on public policy was not one of the partnership's objectives, and therefore no specific initiatives have been carried out in this respect. Nevertheless, conditions that are conducive to the development of cross-institutional arrangements such as the WfA partnership should be assessed further and their replication and scale-up promoted.

CONCLUSIONS

Since the Water War, more small-scale local water operators have emerged and are providing services to a major proportion of the population. These providers are now legally recognised and are taken into consideration in sector planning and policies. This has also drawn attention to the possibilities of MSPs between public, private, social stakeholders and donors. It is within this context that the WfA partnership emerged; bringing together the skills, experience and capacity of its members to develop an effective cross-institutional platform for providing better water services for peri-urban residents.

Although this partnership has greatly extended coverage of the water supply, its benefits could now be scaled up further by institutionalising and promoting the approach they have taken and by raising awareness of its successes. In this way, WfA may be able to achieve more influence on public policy and a wider reach.

Environmental issues are rising on the agenda in Cochabamba – with the population, government entities and donor agencies becoming increasingly aware of the needs to address such concerns.

There is a common interest in working towards effective solutions and initiatives to address the treatment of sewage, polluted aquifers, the water shortage, and managing risks associated with providing a water service when adapting to climate change.

The WfA partnership is beginning to respond to the demand for sewerage and wastewater treatment. It has the scope to expand its initiatives and to leverage the support of existing partners as well as engaging with new ones. By proactively bringing in partners that are more focused on environmental management, WfA's approach may be more socially and technically sustainable. Harnessing the willingness of CBOs to engage in environmental protection activities may be one way to take this forward.

COLOMBIA

4.2

Report: MARLENE GARCÍA

Sustainability of Water Reservoirs in Alta Guajira

CONTEXT

The region of La Guajira is located in the northeast of Colombia, the northernmost part of South America. Geographically, this area is divided into three large subregions: Baja Guajira, Media Guajira and Alta Guajira – the latter being home to the beneficiaries of the multi-stakeholder partnership (MSP) discussed in this case study.

Alta Guajira is an arid sub-region that sees short spells of torrential rainfall in the rainy season, with limited rainfall the rest of the year. Owing to climatic conditions and limited access to surface water, rural communities (mostly of the Wayúu ethnic group), have resorted to alternative water supply and storage systems such as windmills, tanks, *jagüeyes* (earthen dams) and reservoirs.

Despite these alternative supply systems, and even after substantial investment from the public and private sectors, a solution has yet to be found that not only redresses the issue of access to good quality water, but also takes into account the specific environmental, social and cultural characteristics of the inhabitants of Alta Guajira.

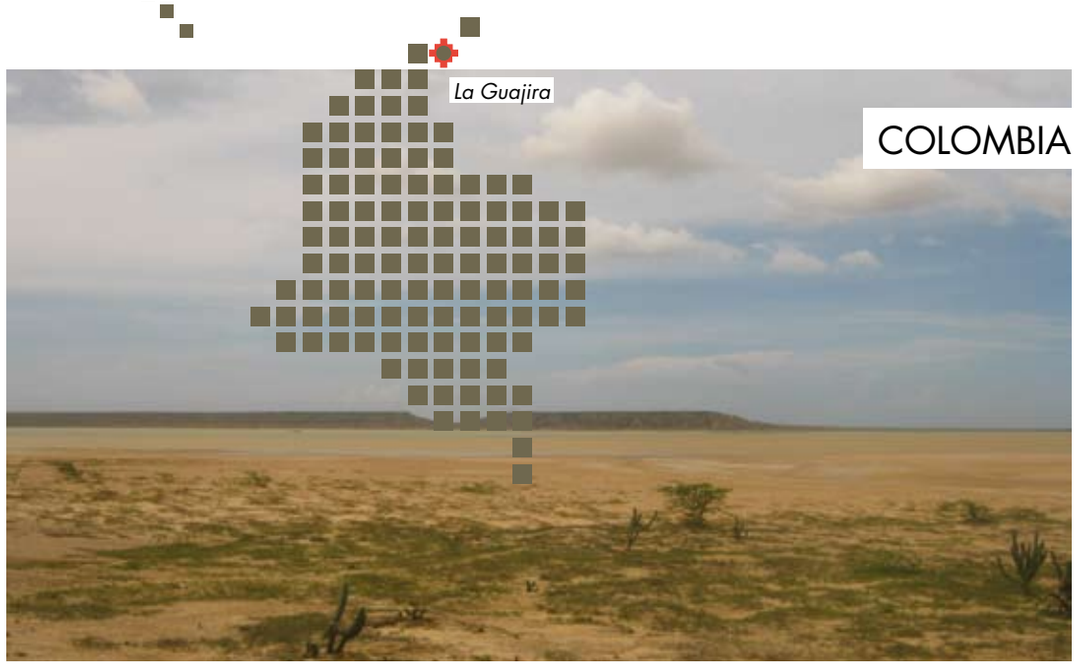
This quest for a solution led to the creation of an MSP with the task of building five reservoirs. This partnership also enabled state players involved in the administration of public resources for the water and sanitation sector to join forces with influential private players in Alta Guajira.

The partnership was formed in order to design, structure and implement social, institutional and financial frameworks to enable the sustainability of five water supply systems (reservoirs and the associated purification plants). These were constructed using resources provided under the La Guajira Departmental Water Plan (PDAG) for the business management of water and sanitation services.

The reservoirs are located in Alta Guajira in the areas known as La Gran Vía-Turiiain, Ukaitalamana, Kaleruwoua-Mauraru and Kaiwa, with plans to build an additional reservoir in Cabo de la Vela, pending consultation with the community.

The partnership incorporates a number of institutions at national, departmental and local government level, whose objectives range from devising and adopting national policies for water and sanitation (DNP – National Planning Department and the Vice-Ministry of Water and Sanitation) to designing and implementing plans and projects at a local level (local government, La Guajira Autonomous Regional Corporation (Corpoguajira) and Uribia town council). These institutions converge in the PDAG steering committee, which is responsible for defining the PDAG structuring and implementation strategy and determining the guidelines that must be followed to achieve public policy objectives for the water and sanitation sector in La Guajira.

In terms of specific roles and responsibilities, the DNP is responsible for designing public policies through decentralised environmental management and natural resource administration. The Vice-Ministry of Water and Sanitation draws up and implements policies and programmes for comprehensive water resource management and administration, as well as defining procedures for those implementing activities under the departmental water plans (PDAs). The region's local government co-ordinates and promotes nationwide public policy on a regional and local scale. Corpoguajira, as the highest authority for the environment in La Guajira, is responsible for granting permits



The community has become increasingly involved as the FCAG has advanced in its initiatives to design the reservoir sustainability framework

and concessions for forestry exploitation and the use of surface waters and groundwaters. Uribia town council provides the water service and ensures that this is rendered efficiently within its jurisdiction.

The private component of the partnership is the Cerrejón Foundation for Water in La Guajira (FCAG), which forms part of a network of four foundations created by the company Carbones del Cerrejón (CC) as a vehicle for its corporate social responsibility strategy in La Guajira.

THE SOCIO-CULTURAL DIMENSION

The communities benefiting from the partnership are from the Wayúu ethnic group, which still observes many of its long-standing traditions, beliefs and customs. Owing to the region's climate, the Wayúus are forced to cover great distances in search of drinking water, or for use in agricultural activities and subsistence farming.

For these communities, the *jagüeyes* and reservoirs are a key focal point for the creation and consolidation of social relationships and kinship between families and clans. The families living furthest away request permission to access the water sources, and in most cases exchange water for livestock or agricultural produce.

Water shortages in drier periods of the year have historically given rise to intergroup conflict, with family clans or groups other than those in control of the water sources being denied access. This has resulted in considerable displacement of the community and livestock from Alta Guajira to Media and Baja Guajira, as well as into Venezuelan territory.

In the past, the native ethnic groups that have settled in Alta Guajira have been marginalised communities with a minimal background of direct contact with public authorities, limited access to information that would assist them in making decisions affecting their living conditions, and little experience of participatory processes. Public authorities are low profile and they do not meet the deep-rooted needs of the communities, who are largely unfamiliar with the workings of these institutions and do not know what communication channels are available to them to voice their needs.

In contrast, CC has been operating a policy of direct relations with local communities that goes beyond merely fulfilling legal obligations and social responsibilities. This policy has built trust between the company and local stakeholders, to a point where traditional indigenous authorities and leaders the FCAG has worked with have acknowledged and value the fact that they were duly consulted and involved in the design and implementation of the programmes piloted in their territory. The community has become increasingly involved as the FCAG has advanced in its initiatives to design the reservoir sustainability framework and reinforce local capacity, and as construction of the reservoirs has progressed.

From 2009 to 2010, the Vice-Presidency of the Republic, the Ministry of the Interior and the communities involved in the project jointly defined the four cornerstones behind the use and management of the reservoirs as the following: 1) the reservoirs are for public use; 2) anyone who obtains a financial profit must pay for the water used in accordance with the agreements reached by the community under its sustainability framework; 3) all funds raised from use of the reservoir are to be reinvested in maintenance; 4) use of the reservoir by communities outside the recipient area could be restricted in times of drought.

With this in mind, the FCAG is devising a sustainability framework that incorporates the traditional organisational practices of the indigenous community into the proposed operations and maintenance structures for the reservoirs. They are also taking these factors into consideration when defining innovative capacity-building activities with the communities for the management of the facilities. On a consensus basis, the FCAG is also defining the access procedure for the reservoir facilities, the water itself and the distribution systems, to mitigate any tension that could arise amongst community members.

THE TECHNICAL/ ENVIRONMENTAL DIMENSION

In recent years, normal rainfall, temperature and relative humidity conditions in La Guajira have been affected by drastic climate changes in Colombia, which has led to an imbalance in the water cycle. This has resulted in a decrease in water supply during periods of low rainfall - causing periods of drought - while the rainy season brings floods and mud-slides.

Specifically in Alta Guajira, where the water supply comes from underground wells and/or artificially stored rainwater, these longer periods of drought have reduced the amount of water available. This situation is exacerbated in certain areas where water extracted from underground wells is turbid and saline, making it unsuitable for human consumption.

In times of drought the demand for water from the communities is met by purchasing water directly from water tankers. These initiatives

For communities living in more remote areas of Alta Guajira, the reservoirs have become a good source of fresh water in periods of drought

have provided a temporary solution to a structural problem, but are nonetheless onerous for those involved.

Studies conducted during the PDAG structuring process identified rainwater reservoirs as one of the most viable alternatives, from a social, cultural and environmental perspective, to increase water availability in Alta Guajira. These reservoirs are very deep artificial dams built to trap and store water during the rainy season, to be later used in dry periods throughout the year. For communities living in more remote areas of Alta Guajira, the reservoirs have become a good source of fresh water in prolonged periods of drought and even in winter.

The reservoirs are the most feasible option for two reasons: 1) they are the traditional method used by the Wayúu to store water in their settlements; and 2) they are effective in managing surplus water in periods of heavy rain and shortages in times of drought. The purification plants adjoining the reservoirs will reduce turbidity in the water and eliminate bacterial pollution.

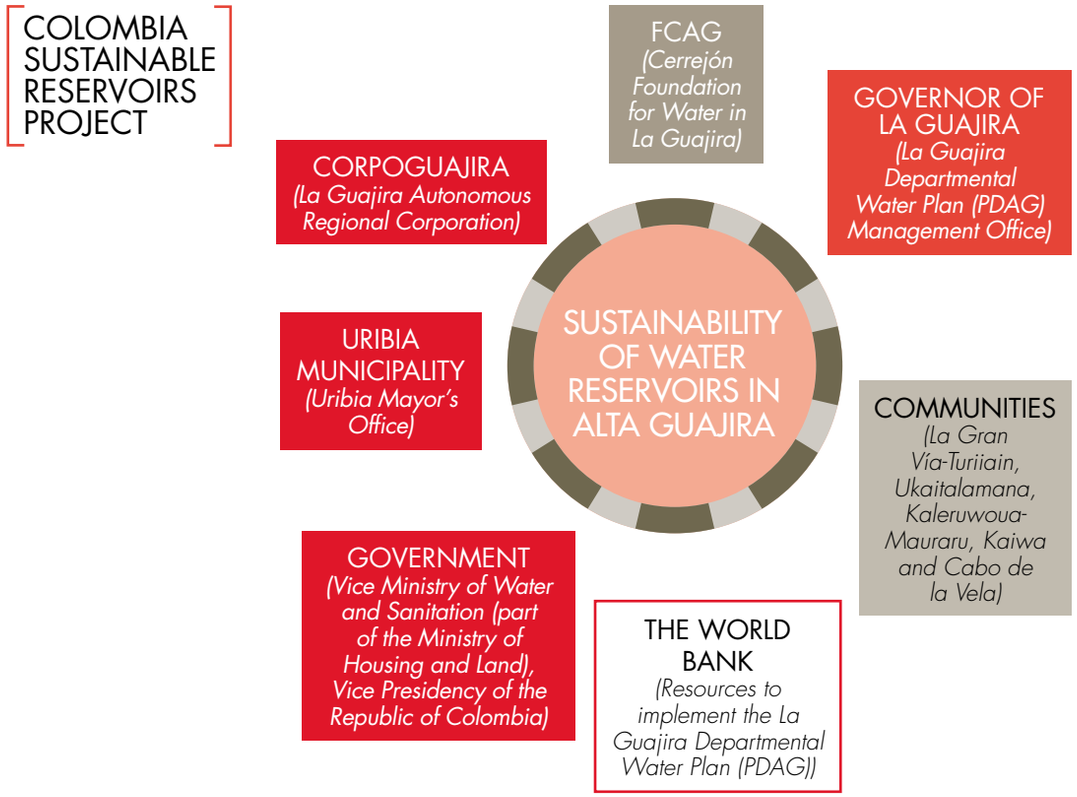
The partnership has appointed a technical committee comprising La Guajira local government, the PDAG manager, the FCAG and the Vice-Ministry of Water to oversee the sustainability of the five reservoirs. This committee will ensure that the framework of the Indigenous Peoples Plan is observed, guaranteeing respect for local culture and traditions.

THE ECONOMIC DIMENSION

The partnership's activities are estimated to cost US$772,000, of which 54% will be borne by the region through funding provided under the PDAG, with the FCAG settling the remaining 46%. Besides these financial inputs, the parties have also undertaken to make contributions in kind, in the form of human, technical and administrative resources.

The partnership's resources are managed by the FCAG through independent bank accounts into which the financial contributions agreed by the parties are deposited. The FCAG made the first contributions, totalling US$101,385, in 2010: these funds were to cover the start-up expenses for the Gran Vía reservoir. The region made its first contribution to the FCAG, amounting to US$199,316, on 15 June 2011.

The partnership has created a 'resource bank' that should cover most of the costs incurred in designing the sustainability framework for the five reservoirs. However, who will assume the reservoir operating and maintenance costs has yet to be decided.



The reservoirs have deep-seated social and cultural connotations for the indigenous communities in Alta Guajira. For this reason, they cannot be deemed purely an economic service for which a tariff is applied. The partnership must take these social considerations into account when resolving issues such as affordability, distribution and recovery of costs so as to render an efficient, fair and sustainable service. These issues have been addressed through participatory processes conducted amongst the communities.

The sustainability framework being designed by the FCAG encompasses a combination of economic and financial instruments, such as: awarding direct subsidies or subsidies aimed at certain segments of the population; setting tariffs for the distribution of water from the reservoir to the different locations it is consumed; government grants in the form of transfers from national government to regional and/or local government, or local government contributions; direct financing through funds provided under the PDAG; private sector contributions, for example from CC or other companies engaged in oil and natural gas extraction in the region; external grants awarded by an international development donor agency; and co-financing of investment projects through partnerships with NGOs and non-profit CBOs.

It is widely perceived that this institutional arrangement will reap long-term benefits beyond the reservoir project

THE ADMINISTRATIVE/ INSTITUTIONAL DIMENSION

Applying the border policy devised by national government to reinforce and increase the visibility of state presence at the border with Venezuela, the Vice-Presidency of the Republic called on all players – public and private – with social investments in the water and sanitation, healthcare, education and electricity sectors in Alta Guajira to join forces to carry out initiatives to develop human and social capital.

In 2008, bringing into play one of the fundamental instruments of its CSR strategy, CC created a system of foundations specialised in four key areas identified as strategic for the sustainable development of La Guajira (water, indigenous communities, institutional capacity building and entrepreneurship). The FCAG was specifically created with the mission of becoming a trustworthy, efficient and transparent actor in the water and sanitation sector in La Guajira.

The PDAG was issued in 2008 and is part of government policy under the regional plans for drinking water and basic sanitation promoted by the Vice-Ministry of Water and Sanitation. The PDAG seeks to improve the quality of drinking water and basic sanitation services in urban areas by investing in infrastructure in the form of aqueducts and sewage systems, as well as increasing access to water in rural areas by implementing pilot projects.

The public-private partnership between La Guajira and the FCAG began on 10 December 2010 when the two entities signed an association agreement to design, structure and implement social, institutional, and financial frameworks for five reservoirs and purification plant annexes.

Since its creation the FCAG has conducted pilot projects and baseline studies in co-operation with other public and private stakeholders, thereby positioning itself as a technical benchmark for other institutions, beneficiaries and stakeholders associated with the water and sanitation sector in La Guajira. In light of the positive results of its interventions and its active participation in the PDAG, the FCAG has become a permanent guest at specialised forums and has considerable sway with regard to sector-specific technical and political decisions in La Guajira.

The FCAG is a particularly attractive institutional partner for La Guajira because it knows the sector and is in permanent contact with the communities, especially those in its area of influence. The regional government is aware that the FCAG has a level of technical and operating capacity that allows it to be present in isolated rural areas and to leverage its rallying power.

The partnership between La Guajira and the FCAG was made possible by the mediation of the Vice-Presidency of the Republic, which brought the stakeholders together. The partnership's success lies in allowing for co-operation between government entities (national, departmental and local) and the private sector (CC), as well as facilitating legal, institutional and political conditions to resolve water issues that have historically affected communities in Alta Guajira.

The MSP enables both the FCAG and all the other members to gain experience and recognition. This in turn positions thes partnership, with respect to the international development donor agencies, as an active and efficient associate for implementing projects in the water and sanitation sector. It is widely perceived that this institutional arrangement will reap long-term benefits beyond the reservoir project.

COMMUNITY PROJECT
The Alta Guajira community has played an important role in the MSP and has gained significant advantages. At the same time, a committee was put in place to ensure local culture and traditions were respected throughout.

CONCLUSIONS

Although it is still early days to evaluate the results of this intstitutional arrangement and the possible impact of investments in infrastructure and building up social capital, the partnership is reaching its objectives to address the problem that affected sustainability of reservoirs constructed in the past, and to extend access to water to the communities of Alta Guajira.

The reservoir and purification plant model has not yet been tested and it is therefore not possible to guarantee community expectations of having constant access to drinking water will be met. The blend of tradition and technology requires innovative social organisation and knowledge transfer schemes, which should take into account the individual social and cultural characteristics of the indigenous communities, the impact of climate change and new techniques for improving the quality of water.

The sustainability framework, currently at the design stage, includes community organisation aspects and a system of charges for distributing water from the purification plant to where it is consumed. The communities in question have deep-rooted traditions in land management and water usage, relying on rainfall and underground sources. Consequently, paying for water distribution is not customary. If this component was implemented as standard practice, sustainability of the five reservoirs could become a challenge.

As these are public works, state intervention is to be expected, but there is still some doubt as to who will bear the recurrent expenses and capital costs of the reservoirs and purification plants over time if the proposed economic and financial sustainability framework fails.

Management of resources by the FCAG has meant the partnership has benefited from CC's frameworks for investments and subcontracting, which have rendered resource management efficient and transparent.

If the innovative model of reservoirs with a purification plant annex proves sustainable, it could be replicated and extended to the seven remaining communities encompassed under the PDAG, bringing a promising solution to the pressing need for access to drinking water in Alta Guajira.

The MSP has replaced the former system where CC and the FCAG worked on their own, the community addressed its concerns to CC and the public sector played no part. La Guajira local government and the FCAG have entered into an association agreement (No.138 of 2010), which aims to provide for eventualities such as a lack of synchronisation between the timing and needs of the MSP and those of CC, or if the department of La Guajira were to postpone or suspend ongoing tenders for construction of the reservoirs. Indeed, a key benefit of this partnership is precisely its ability to withstand changes in staffing within the government or CC.

MEXICO

4.3

Report: NATHALIE SEGUIN

The TepozEco project

CONTEXT

The initial objectives of the TepozEco pilot project carried out in Tepoztlán, in Morelos, Mexico, were the following:

- To set up, over a four-year period, a functional example of urban ecological sanitation (ecosan) within a community of Tepoztlán. The programme encompassed dry toilets for homes, a secondary purification plant for dry toilet waste, an organic waste collection system with a communal composting centre, management of greywater, and agricultural nutrient recycling.

- To provide an example of the implementation of an integrated ecosan system in an urban context in Latin America.

More than one partnership was needed to carry out this project. To this end, a combination of partnerships made up of different stakeholders worked in collaboration. The community, the local and state authorities, national NGOs and international research institutes joined forces to carry out the pilot project.

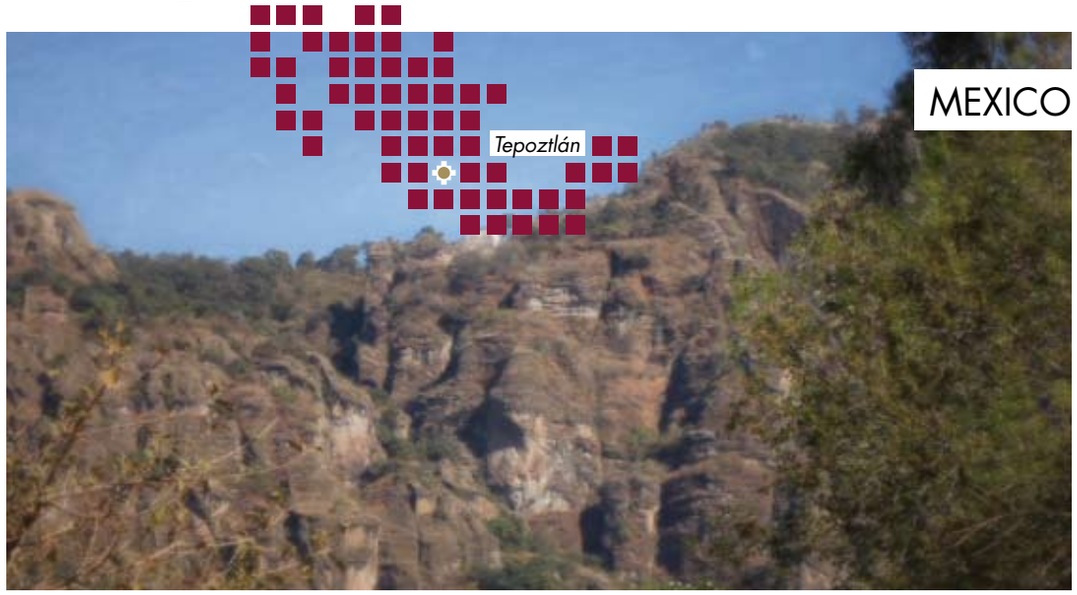
The socio-economic context in Tepoztlán is one of complexity and contrast, ranging from marginalised indigenous communities to luxury weekend residences. However, the town as a whole lacks a wastewater collection and treatment system. The sole infrastructure for collecting sewage from the town's 'first block' was only partially installed and does not yet have the purification plant necessary for this to be a complete system that could be considered adequate sanitation.

As a tourist destination included in the nationwide 'magic towns' programme, Tepoztlán is politically and environmentally strategic, making TepozEco a melting pot for a variety of interests and players aimed at achieving the different goals of the project. This 'constellation' of partnerships is the focal point of this case study.

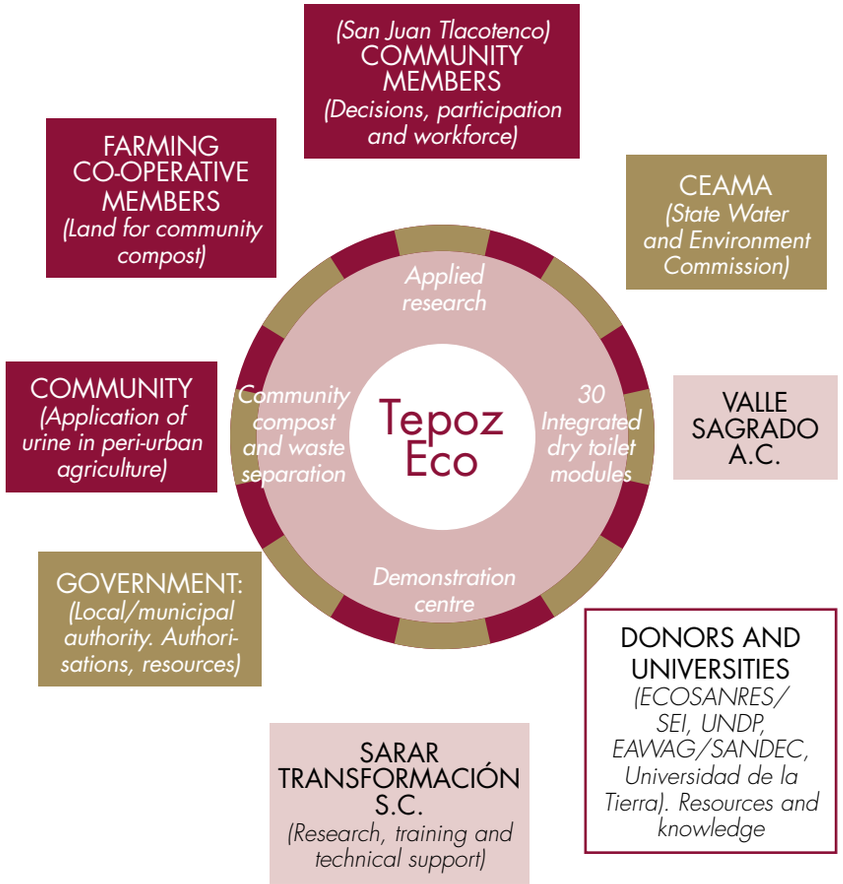
THE SOCIO-CULTURAL DIMENSION

Tepoztlán is somewhat of a microcosm as regards the conditions of inequality and the lack of suitable water planning prevalent nationwide. This small urban centre located 70km south of Mexico City has a history of environmental activism, firm leadership and local commitment. Between 1995 and 1999 it was governed under the 'customs and traditions' of the population. During this four-year period, Tepoztlán declared itself an 'autonomous municipality', after corrupt authorities joined with real estate companies with the intention of building a golf club there. Nevertheless, although the town won its battle against the golf club, in the last 20 years it has gone from being a town of farmers, living off the land and the sale of their produce, to one that thrives mainly on tourism services (hotels and restaurants). Urban demand for drinking water has therefore increased considerably, as has the need for sewage management systems. However, the local authorities have not supported any integrated plan for drinking water and sanitation beyond the initial period of this pilot project.

The NGO Sarar Transformación (SararT) acted as co-ordinator of the whole TepozEco project, in collaboration with the organisation Taller Artes y Oficios A.C. Together, they conducted a study on dry toilets in Tepoztlán to ascertain which population would be the most receptive to having them installed as a sanitation option. The deciding factor in selecting the beneficiaries was identifying a genuine interest amongst the population in trying out these systems, since the authorities would not be proposing any alternative drainage system in the near future or any system using septic



MEXICO
TEPOZECO
PROJECT



tanks, due to the lack of water. Another determining factor was the presence of a group of enthusiastic young people trained under the project, who were pivotal in organising community training and in identifying and supporting motivated families.

After conducting this research, the location chosen for the pilot project was San Juan Tlacotenco, an indigenous community that forms part of Tepoztlán. Like many indigenous communities in Mexico, it does not have access to drinking water or a basic sanitation system. San Juan is located upstream, making it difficult to pump drinking water from the supply sources (wells) in Tepoztlán.

The families in San Juan took part in awareness-raising and training workshops on sanitation, health, and the operations and maintenance of the dry toilet units. Once the families were satisfied with these systems, and with a view to testing a sample unit, they formed an association that was in turn responsible for seeking out and securing the support of the state authorities in the project,

The community's responsibility was to train one person per household to use the sustainable sanitation system

offering manual labour in return. The community's responsibility was to train one person per household to use the sustainable sanitation system, contribute manual labour and learn to design, construct, operate and carry out maintenance on the system.

Developing these skills has been crucial from the outset of the TepozEco project. Being based on a new paradigm, it is difficult for the concept of sustainable ecological sanitation to take root in the residents' traditional ways. Moreover, certain taboos exist relating to human excreta and to the use of urine in organic agriculture. For this reason, it was imperative for a process to be adopted to guide and inform users and develop the necessary skills so that the benefits became apparent, and the system could be designed according to the needs and understanding of the beneficiaries. SararT paid particular attention to this aspect, which was clearly stipulated in the agreements and adhered to by the different partners. The importance of this facet is exemplified by the State Water and Environment Commission's (CEAMA) subsequent attempt to replicate the model without prior community training and preparation, where 80% of users abandoned the facilities and the CEAMA project ultimately failed. This situation, albeit with variations, is seen time and again throughout Mexico.

THE TECHNICAL/ ENVIRONMENTAL DIMENSION

Tepoztlán is located in the region of Los Altos de Morelos, within the Tepozteco national park and protected natural area, and the major biological corridor of Chichinautzin. This is especially significant as certain conservation regulations exist for neighbouring towns including the community of San Juan Tlacotenco. Tepoztlán does not receive water from up-river sources via gravity owing to its location in the upper Balsas river basin and with the exception of a few springs in the upper neighbourhoods, the town's water supply is mainly pumped from wells, with the ensuing over-abstraction of the small perched aquifer in the Tepoztlán valley.

Outdoor defecation, badly constructed latrines and poorly managed septic tanks are some of the problems caused by the lack of sanitation services in the town. However, the problem is more widespread, since an estimated 70% of the urban population use flushing toilets that are emptied into septic tanks, which rarely meet the standards for acceptable sanitation. Emptying and maintenance are sporadic and the poorly treated sewage therefore filters through the earth and fissures in the region's cavernous subsoil, polluting the over-abstracted aquifer.

The main driver for setting up this project was the lack of any plans at local authority level to develop a water and drainage system in San Juan

In addition, due to the lack of greywater and blackwater recovery services, in 'downstream' Tepoztlán the residents empty sewage directly into the rivers and ravines, or even onto the streets. There is no management of solid waste, which is also emptied into the rivers. As a result, all the fresh water flowing down from the mountains is immediately polluted as it passes through the town.

All of these factors were key to forming the TepozEco project and raising environmental awareness in general. Nevertheless, the main driver for setting up this project was the lack of any plans at local-authority level to develop a water and drainage system in San Juan Tlacotenco. This pushed the community to seek alternatives to resolve the shortfall in sanitation services.

This need for sustainable sanitation systems prompted SararT director Ron Sawyer, a local expert in water, sanitation, education and health issues to propose a pilot project in Tepoztlán. The project in question was to have an ecosan focus that the Stockholm Environment Institute (SEI) was seeking to support in Latin America, thereby promoting a holistic approach to water and sanitation management based on the systemic closure of cycles or flows of local organic material.

Research was another aspect of this project, which was made possible through the interest of donors as well as SararT and the community of young people and farmers. Ongoing research into the best way to sanitise faeces and into the correct use of urine in cultivation has contributed to the knowledge-building process in this field, as well as to the improvement of systems design.

In this particular case, as is apparent, partners and institutions were incorporated for environmental reasons from the outset. The initial motivating factors expressly (or otherwise, in the case of authorities) encompassed the environment for all the original stakeholders, including the community. However, while several partners were aware of the importance of the environmental dimension, the challenge lay in securing the collaboration of the federal and state authorities responsible for water, sanitation and environmental services, so as to work in co-ordination with the municipal authorities.

THE ECONOMIC DIMENSION

The main group concurring on the importance of the environmental dimension was SararT with the SEI, along with other partial donors such as the Mexican arm of the UNDP, WASTE (Holland) and EAWAG-SANDEC (Switzerland). These entities formed the financial driver that enabled many of the offshoots of this project to come to life, such as research into sanitisation processes and the use of urine, and management of greywater. Above all, though, their actions raised awareness and enhanced education with regard to ecosan through courses and workshops.

The involvement of the state and municipal authorities was significant in enabling construction of the infrastructure for both the dry toilets and the Municipal Composting Centre. They participated by providing organic waste collection trucks, fuel, water for composting and two workers. The farming co-operative provided the crushing machine and the land for the composting process; the Valle Sagrado A.C. association gave tools and timely support; and SararT contributed technical support and training. The community played an active role, undertaking to raise awareness, while also being involved in the design, construction and maintenance of the dry toilets.

Although the various contributions and benefits were never quantified in economic terms, a cost-benefit study was conducted in relation to the sanitation systems in San Juan. This served to show both the community and authorities the benefits of an integrated concept and, in particular, of the systems. The difference in construction costs (materials and labour) is substantial. An ecological system, including labour, costs around US$1,200 (14,000 Mexican Pesos), while a conventional system with WC can cost up to US$3,000, as this system requires a septic tank with an absorption well, in addition to construction of the toilet. The cost-benefit study also compared the components of the drainage system, extrapolating all manner of costs to these systems (water usage, environmental impact, product re-use, health, investment, maintenance costs).

The project aimed to promote the creation of new businesses by exploring the niche offered by an ecosan approach. The focal point was the re-use of bioproducts which, when managed collectively to ensure sanitisation, can generate not only jobs but also products with an economic value, in view of their agricultural uses. An example of a business of this kind is the micro-company 'Impetu Joven' (a name alluding to the motivation of young people), which carried out maintenance on ecosan toilets. The community paid Impetu Joven for the excreta to be taken away and treated and the company initially used the urine as a fertiliser for cultivating vegetables, fruit trees and cactus plants in vegetable gardens and greenhouses. Unfortunately, this promising initiative failed to prosper, as it did not have the

The lack of project continuity due to changes in the government continues to be a complex issue that is difficult to resolve

necessary support for the founders to draw up a business plan. As a result, the families, mostly producers of cactus and agapanthus (a commercial flower), preferred to use the bioproducts for their own cultivation activities. Nonetheless, at present, one commercial nursery in the community continues to collect, process and use the products to cultivate its plants which are available for purchase.

Swiss finance (NCCR-NS/EAWAG-SANDEC) was used for a urine re-use project, leading to the creation of 'Oro Liquido' (Liquid Gold), another micro-company which generated resources by renting out ecological dry urinals for town festivals and events. This company is now known as EcoSencia and works in partnership with SararT.

THE ADMINISTRATIVE/ INSTITUTIONAL DIMENSION

While the project was at the development stage, Tepoztlán was independent in socio-political terms, federal financing had been cut and the autonomous local authorities were keen to resolve the escalating issue of the lack of a management system for greywater and blackwater, and refuse. In 2002 SararT presented the pilot project to the local authorities and the opportunity arose to visit an eco-sanitation programme in southern China. The Environment Councillor and the Municipal President were invited for this visit, and this convinced them of the benefits of such a programme, prompting them to enter into an agreement with SEI and the municipal authorities, with SararT as project co-ordinator. The project got underway in 2003.

The main agreement signed by the municipal authorities, SEI and SararT was high level, involving the Municipal President in office at that time, the director of SEI and the director of SararT. However, there were two changeovers in the municipal authorities over the duration of the project. Lack of continuity is a systemic risk that can always arise when working with the government, even more so in the case of municipal authorities, as the term of office in Mexico is just three years and re-election is not possible. Moreover, there is no law requiring incoming administrations to continue projects started by the outgoing government.

The next agreement, between Valle Sagrado A.C., SararT, the farming co-operative and the town council, concerned the municipal Composting Centre. Under this arrangement each party considered that it had honoured its responsibilities and although this is true to an extent, the exception were the farming co-operative representatives, who started to use the fertiliser that had been earmarked for sale, which would have made the composting centre financially sustainable and resilient to political changes.

Amongst other problems identified, even though the objective was made clear and the responsibilities of all the local players were detailed explicitly and signed in acceptance (town council: fuel and water; Valle Sagrado: uniforms and tools; SararT: workshops and technical support; farming cooperative: land), the follow-up and co-ordination meetings stipulated in the agreement never took place.

A third agreement was signed by CEAMA, SararT and the association of beneficiary families in San Juan. This was reinforced by another individual arrangement between each beneficiary family and CEAMA, whereby the families pledged to meet project deadlines and use only the materials provided by CEAMA to construct the dry toilet units.

The absence of an environmental mandate under water management and supply policies, and the segregation of duties between those that provide water, those that gather water for subsequent treatment and those entrusted with environmental issues, prevents any attempt at integrated and sustainable management of water and sanitation. Moreover, the lack of collaboration or co-ordination amongst the institutions supposedly involved hinders the implementation of these types of projects.

This non-co-operation not only exists amongst institutions, but also between different levels of government, as in this particular case in which the municipal environment office was one of the original players, whereas the Mexican National Commission for Protected Areas (CONANP) and the Secretary of Environment and Natural Resources (SEMARNAT) were practically absent, despite the impact of polluting an environmentally protected area.

Another setback that projects such as this come up against is the absence of rules and regulations supporting these innovative, decentralised systems, which can block progress. Greater emphasis needs to be placed on drawing up public policies that recognise the benefits of these alternatives. Furthermore, the lack of project continuity due to changes in the government continues to be a complex issue that is difficult to resolve. This is the main reason why replication or scale-up of the pilot project was ineffective, despite the initial positive results.

CONCLUSIONS

The TepozEco project is a rare example of an MSP founded from a health and environmental perspective to provide water and sanitation services. The success factor is a chain of alliances spanning from state to community level, with the active involvement of the public sector (municipal and national), NGOs, the local community, and international partners and donors. The success of the partnerships in this project was largely due to the commitment and skills of the individuals, the personal trust-based relationships formed between the representatives of each stakeholder, and the ability to clearly demonstrate the benefits of decentralised water and waste management systems.

The incorporation of environmental players from the outset does not necessarily lead to the provision of more sustainable services. Based on this case, it could be said that understanding the resource itself as a partner that merits the respect of all stakeholders and users is the path to providing more sustainable services. Multi-stakeholder arrangements enable the integration and ownership required for this by providing a communication platform through which the needs and limitations of each partner can be shared, so as to then jointly agree upon objectives and responsibilities. The process might appear slower in the first instance as a good deal of communication and consensus work is required. However, this enables the environmental partners to express their concerns and explain the need to integrate the environmental dimension with regard to existing climate and pollution issues, while water and sanitation stakeholders can grasp these arguments and reflect upon how to improve water and sanitation management by integrating environmental concerns. This consensus also brings the beneficiaries into the discussion platform and, in the long run, makes for a more robust and lasting outcome.

Besides cross-sector collaborations, having multidisciplinary teams that can tackle the water and sanitation challenge from many different angles is also valuable, enabling solutions that encompass health, cultural, social, technical, scientific and political concerns. The SararT team could perhaps have a greater impact if there was a person specifically engaged in building relationships with the local authorities, so as to have a voice when water-related plans and policies are drawn up for the locations where they work and to encourage project continuity in the longer term. That said, the work of SararT, based on the SARAR participatory method, has been pivotal in achieving the community's full understanding and participation.

Although in this case most of the stakeholders considered the partnership to be sufficiently robust, in reality they were not able to withstand the changes of government and maintain their vision. However, the project did manage to satisfy the interests of those involved and achieve a number of results, some of which are still in place at the moment.

PARAGUAY

4.4

Report: MARTIN RALL

The 'aguateros' of Paraguay

CONTEXT

The *aguateros* are small-scale private water distributors operating in the peri-urban areas of large cities and the peri-urban and urban areas of small cities and towns in Paraguay. They first emerged in significant numbers in the early 1980s in a fast developing peri-urban area of the capital Asunción, and in Ciudad del Este, the country's second-largest city. While most *aguateros* used trucks to distribute water, the presence of relatively abundant underground aquifers facilitated the development of network systems served by deep wells. The *aguateros* were satisfying a demand (as indeed they still do) that the state was unable to meet due to the limited capacity of the public supplier, CORPOSANA, which was created in 1955. In 2002 CORPOSANA was divided into two different entities: the state-owned Paraguay Sanitation Services Company (ESSAP), and the National Environmental Sanitation Service (SENASA), created by the Ministry of Health to construct water systems and set up 'sanitation boards' (comprising, and managed by, community members) to administer them.

ESSAP is responsible for the large-scale systems (in excess of 10,000 connections), of which there are 27, while SENASA covers the smaller-scale systems, of which there are over 1,300, managed by the users and organised into sanitation boards. The approximately 960 remaining systems were constructed and are managed by government entities, state-owned companies, NGOs, community organisations (Neighbourhood Committees) and private distributors. In the year 2000 there were more than 600 private distributors (ie the *aguateros*). However, a spontaneous consolidation process reduced this figure to the 276 officially registered today (there could be a further 100 unregistered *aguateros*). Together, they serve nearly 10% of Paraguay's population; or rather, almost 17% of those who receive piped water. Their systems encompass 300 connections on average, although some have up to 3,000 and 88% have fewer than 300. Over 60% have fewer than 100 connections and, as a result, most are economically unviable.

An estimated 15% of the country's urban population does not yet have access to piped water and the *aguateros* could therefore still invest in this market. However, this percentage primarily comprises poorer families. Less than 50% of the rural population receives a satisfactory service, yet rural settlements have not attracted significant private investment.

The institutional panorama in the water and sanitation sector is complex, as described in greater detail in the final section of this case study. For the most part, it is governed by General Law 1614/00 of 2000 (enacted in 2002, together with its respective regulations), entitled *Regulatory and Tariff Framework for Drinking Water and Sanitation Services*. This law appointed the state as the general authority in charge of these services, and in turn created the Sanitary Services Regulation Agency (ERSSAN). It provided a legal framework enabling the *aguateros* and sanitation boards to operate. The sanitation boards are also governed by their own specific legislation – Decree 1890/74 of 1974.

Under the terms of Law 1614, the state can transfer to independent distributors – including the *aguateros* and sanitation boards – the function (although not the authority) of supplying water and sanitation services, through 30-year concessions or 10-year permits issued through public tender. The sanitation boards and state-owned entities are not required to submit a tender. All *aguateros* existing when the law was enacted in 2002 (the vast majority of those currently registered) automatically received 10-year permits, which are renewable at the discretion of the state-based regulator ERSSAN's recommendations.

The aguateros *emerged spontaneously, as entrepreneurs, in response to the demand not met by the state*

The law requires that on expiry of an *aguatero*'s permit, all their assets should be handed over to the state (without compensation). This has given rise to considerable uncertainty and resentment amongst the *aguateros*. In the meantime, no asset forming part of the *aguateros*' systems may be mortgaged. In most cases, this includes the land on which their own homes are built, as well as the homes themselves.

In January 2009 the government created the Drinking Water and Sanitation Unit (USAPAS) within the Ministry of Public Works, bridging a gap in the institutional system nationwide. The lack of a specialised unit such as this was the root of many problems in the sector. USAPAS, now known as the Water and Sanitation Directorate (DAPSAN) is responsible for drawing up policies, strategies and plans for the sector, as well as sector restructuring. It has already begun to undertake these tasks by entering into talks with the *aguateros*, amongst other players.

As mentioned above, the *aguateros* emerged spontaneously, as entrepreneurs, in response to the demand not met by the state, investing their own capital and with no government assistance. They subsequently came under state supervision and the public-private relationship was formally provided for by a law. However, rather than a partnership, it has been a relationship of mutual distrust, for various reasons. Nonetheless, with the creation of DAPSAN and in light of ongoing sector restructuring, a public-private partnership is now being formed, and this is the focal point of this case study.

THE SOCIO-CULTURAL DIMENSION

Around 500,000 people, possibly as many as 700,000, are currently estimated to receive water through a network supplied by *aguateros* in the peri-urban areas of Paraguay, primarily in Asunción and Ciudad del Este. Most of these recipients live in developed neighbourhoods, which exclude the poorest segments of the population.

The government in Paraguay has not traditionally played a very active role in the direct supply of water and sanitation services, and much less so in peri-urban areas. It has intervened to a far lesser extent than most other governments in regulating the private sector, which is renowned for its dynamic nature and creativity. As a result, most Paraguayans are used to seeking out a wide range of services in this sector and have little faith in the government's ability to meet their demand. Those not residing within ESSAP's catchment area turn to any supplier able to provide them with access to a networked water supply, whether this is through a sanitation board or an *aguatero*, and they do not generally consider the level of service received from the latter to be inferior. A survey conducted in 2002 amongst 1,000 homes supplied by *aguateros* reveals that 90% of users were satisfied with the service received and 75% would not be prepared to pay more for a better service.

Despite ERSSAN's presence, in practice *aguatero* customers are neither more nor less likely to have their rights protected than the customers of any other company in Paraguay (where legislation in this respect is notably weak), with the one significant exception of tariffs. *Aguateros* are disinclined to charge more than the tariff approved by ERSSAN, as this would give consumers grounds to withhold payment. Adherence to the approved tariff also guarantees legal protection in the event that action is taken against defaulters, which generally entails disconnection from the supply network, as stipulated in the contract that most well-managed companies require their customers to sign. The law does not require any alternative supply to be provided, nor are subsidies given to those unable to pay. Nonetheless, for relatively well-managed *aguateros* and sanitation boards, default levels are particularly low and large debts are few, especially where no cheaper alternative water supply is available nearby.

Users are not organised into any representative body and depend on a regulator with little capacity to protect their rights. Very few neighbourhoods receiving their water from traditional *aguateros* have any kind of consumer organisation to represent their interests, and only in exceptional cases have consumers joined forces to request the intervention of ERSSAN. However, this lack of organisation highlights the superfluous nature of such a body, as dependence on firmly rooted personal relationships appears to work well– considering the limited number of connections in each system (more than 60% of all supply networks have fewer than 100 connections and 88% have fewer than 300) – especially when combined with regulator protection, which prevents arbitrary tariff increases (there has not been a general tariff increase since 2002). This also demonstrates the consumers' ability to resolve other issues directly with their *aguatero*.

Moreover, the country's political and social history has curbed the development of a culture founded on autonomous community organisation. Before the present government came into office, the country was controlled for more than 60 years by authoritarian governments, including a 35-year military dictatorship, which repressed social organisation and protest. The current political agenda aims to promote autonomous community organisation, the

Long-term solutions for Asunción and Ciudad del Este need to combine the extension of the sewerage network to most, if not all, homes

first step being to create a legal framework for neighbourhood committees and their relationship with the state. Society is starting to evolve and social organisations are now constantly lodging claims with DAPSAN, which was not the case previously.

THE TECHNICAL/ ENVIRONMENTAL DIMENSION

As highlighted in the introduction, a key factor favouring the advent and continuing feasibility of the *aguateros* has been the availability of good quality, reasonably accessible groundwater, which is extracted through perforated wells. Except in a handful of cases, *aguateros* are only to be found where groundwater is available.

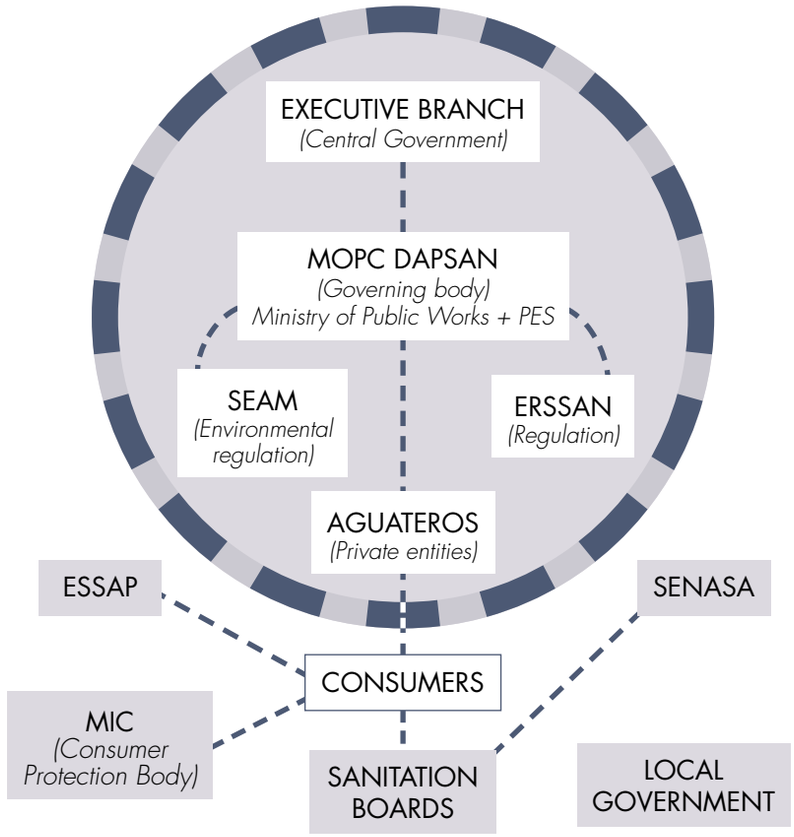
The highest concentration of *aguateros* is in the outskirts of Asunción, on the Patiño aquifer, which has a depth of between 150 and 200 metres. The remainder are mostly in Ciudad del Este, located on one of the world's most extensive aquifer systems: the Guaraní.

However, the problems in both cities relate to the quality and quantity of water available. Asunción faces three different types of issues. To the north and west of the city along the Paraguay River, brackish water is filtering through from a nearby aquifer as a result of over-abstraction from the Patiño aquifer. The rest of the city is plagued by proliferating fecal coliform bacteria, and in a few heavily populated areas near the city centre nitrate levels are high.

Pollution stemming from coliforms and nitrates is due to the lack of an adequate sanitation system able to cope with the dense population in the urban settlements. Only the old city centre has a sewerage system with a wastewater treatment process. In the outskirts of Asunción, making up most of the city, septic tanks are used in situ. This situation is aggravated by the fact that most of these septic tanks are actually the wells that were dug manually and used prior to piped water facilities being installed. These have now become infiltration wells and, as a result, aquifer pollution is even worse than with conventional septic tanks, as the wells allow direct access to the aquifers.

In Ciudad del Este, the problem is more one of quantity than quality. The Guaraní aquifer is located at a depth of around 500 metres and the groundwater used to supply most of the city (a small quantity comes from the Paraná River) is extracted from a less productive aquifer at a depth of between 100 and 150 metres. While most of the *aguateros* in this city struggle to meet demand with an insufficient water supply, they are reluctant to invest in further digging, for the reasons

PARAGUAY'S AGUATEROS



mentioned previously. Water quality has not yet become a significant issue, but the growing population is expected to have an impact in this respect unless the extension of the sewerage system is treated as an urgent matter.

There are both short- and long-term solutions to these problems. Long-term solutions for both cities need to combine the extension of the sewerage network to most – if not all – homes, with greater use of purified river water. The Paraguay and Paraná rivers have sufficient capacity to comfortably supply both cities. Pollution and over-abstraction from the aquifers can therefore be managed, keeping water quality within economically viable purification limits, and restricted to the more remote peri-urban areas.

This measure will have huge consequences for the *aguateros*. In the short term, they will be increasingly forced to purify their groundwaters. Most *aguateros* who do this use a simple, chlorine-based in-line purification system, or more feasible manual techniques at the reservoirs. Some have

While many systems are high quality, most do not meet the standard criteria for infrastructure, water quality or reliability of supply

investigated purification techniques to treat nitrate pollution, but have abandoned the idea in light of the cost. Due to much higher costs, and obstacles hindering investment in new infrastructure, only two *aguateros* in Asunción (on the other side of the river in the Presidente Hayes district, located over a brackish aquifer) use river water and a purification plant.

In the long term, *aguateros* will need to consider measures with greater outreach. However, the primary responsibility lies with the government, which will have to invest or promote investment in river water purification and sewerage systems for the two cities, which are now beyond the capability and means of the *aguateros*, the sanitation boards and even ESSAP. A water purification plant is already under construction in Ciudad del Este, with government funding, and is expected to start supplying purified river water by 2013.

The changeover to river water purification programmes does not necessarily mean the disappearance of the *aguateros*. They will be able to continue providing water on a retail basis, purchasing purified water in bulk from ESSAP or any other wholesale supplier, and managing part of the sewerage network, although they will have to pay the wholesale operator for this service under the terms of the management or concession contracts. The government's ideas currently include this option, and this system is in fact already in place on an informal basis. However, ESSAP has complained that some *aguateros* have set up an illegal connection point with ESSAP's wholesale piped water system, as their wells are collapsed or in decline, and that they are supplying their customers with ESSAP water at the same rates, but without paying for this service.

In areas where wholesale supply is not viable, *aguateros* will be reliant on subsidies to invest in their own river water and sewerage systems.

Clearly, it is not possible at this stage to predict the specific impact of these changes on the feasibility of the *aguateros*' business model. However, the need to protect water resources will increase their costs and put greater pressure on them to consolidate in the market through mergers or absorptions so as to achieve greater economies of scale, which is the only way to minimise costs.

THE ECONOMIC DIMENSION

For most *aguateros*, their water business is their livelihood, and despite uncertainty generated by the law and the lack of state support, many have reinvested their earnings and even raised capital in the market to improve and expand their systems. In fact, the *aguateros* have invested an estimated US$50-80m in the country according to the Cámara de Agua de Paraguay (CAPA), the association representing the interests of the majority of *aguateros*.

However, due to frozen tariffs and legal insecurity, many have not reinvested and are not profitable. The quality of the infrastructure built by the *aguateros* is also inconsistent. While many systems are high quality (ERSSAN considers that around 40 are 'acceptable'), most do not meet the standard criteria in terms of infrastructure, water quality, reliability of the supply or management efficiency. In a more favourable environment (eg legal security, rise in tariffs) and with state support in the form of soft loans and skills development for example, the increased earnings would be sufficient to enable the majority of systems to reach adecuate standards and to allow most *aguateros* to stay in business.

An improved commercial environment would also facilitate consolidation, which is necessary to make this market segment sustainable. Estimates and opinions vary, but the minimum size necessary to be able to manage the system and make a profit while complying with the law is around 300 connections. Smaller-scale systems therefore need to join forces with others, merge, or be incorporated into the larger systems. A similar process is required for the hundreds of small unviable sanitation boards. Each *aguatero* has upheld the differential tariff prevailing when rates were frozen in 2002, which ranges between 30-50 cents (US) per m^3.

As regards compliance with requisite criteria (not related with the quality of the service rendered), according to CAPA an estimated 60-70% of water providers are managed under formal business parameters. Incentives are not financial. On the contrary, formally setting up a company entails payment of taxes and the cost of complicated bureaucratic procedures. The *aguateros* are motivated by dignity and the desire to be 'authentic' entrepreneurs. They do not engage in irregular or 'irresponsible' operations, referred to disparagingly as 'under-the-table' activities.

For the most part, the relationship between *aguateros* and their customers is the same as in the consumer market in general. The main exception is that *aguateros* operate as a monopoly, while the regulator has to make the necessary checks specific to a provider of customer services. At present, this only entails enforcing the

The protection offered by ERSSAN is welcome as it prevents one operator intruding on what has been demarcated the exclusive territory of another

approved tariffs (which most *aguateros*, and many other sector players, consider too low). Most of the *aguateros* require their customers to sign a standard contract, similar to that signed by customers of the state-owned company, ESSAP. After the law has been amended to protect the interests of the *aguateros* and they have entered into contracts with ERSSAN, as required under the terms of their permits, their customers (and ERSSAN) will be equipped with an additional tool to make the *aguateros* accountable.

THE ADMINISTRATIVE/ INSTITUTIONAL DIMENSION

Bringing the role of the *aguateros* into compliance was part of the restructuring process implemented from 1997 to 2000. The main incentive in this process was the desire of the then government, firmly backed – or perhaps pressurised – by the international donor community led by the World Bank, to privatise CORPOSANA, believing this to be the best way to improve performance and extend coverage of the service to all urban areas. In preparation for the privatisation, CORPOSANA was converted into the state-owned company ESSAP, and the *aguateros* were formally acknowledged and granted 10-year permits in 2002, after which time their assets would revert to the state. This would enable ESSAP to be replaced by private concessions, into which the *aguateros* would be incorporated 10 years later, at the discretion of the concession holder and ERSSAN. While this interpretation could be questionable, it is nonetheless firmly upheld by the majority of the *aguateros*, including its association CAPA, which until recently had little faith in the government's assertions to the contrary. However, the privatisation trend did not secure the necessary political support from subsequent governments after 2002.

AGUATEROS
The Ruiz Benitez Company team, in San Lorenzo, Asunción. This is one of the larger *aguaterias*, with 1,450 clients (connections). Pictured on the right is General Manager Pedro Ruso.

In light of this provision in the law whereby in 2012 the *aguateros*' assets were to be 'confiscated' without compensation (as they see it), none of the *aguateros* have entered into a contract with the government as the law requires. In this somewhat weak public-private partnership, the relationship between the *aguateros* and the state is merely based on the requirement that the *aguateros* (or at least the majority) register with ERSSAN and pay their licence fee (2% of their revenues), in exchange for protection against the entry of competitors into their catchment areas. ERSSAN plays a key role and is the main motivating factor encouraging the *aguateros* to register.

Before Law 1614 and the associated regulation were enacted in 2002, the *aguateros* had no relationship with the state. Since then, this legal and regulatory framework has been the primary deciding factor in their relationship, both internally and externally. The *aguateros* might have voiced most of the criticism against this legislation, but they are not the only ones to do so; there is a general consensus that the law should be amended. ERSSAN has, of course, been obliged to enforce the law to the best of its ability, and the resulting resentment now dominates its relationship with the *aguateros*. However, ERSSAN's enforcement of the legislation has not been entirely negative and not all aspects have upset the *aguateros*. The protection provided by ERSSAN, wherever it can, is welcome as it prevents one operator intruding on what has been demarcated as the exclusive territory of another.

The main criticism of the law revolves around certain clauses that have hampered the *aguateros*' attempts to invest in improving and expanding their systems, to start up new systems, buy out others to consolidate and create economies of scale, or invest in sewerage systems, as well as other issues that have led to tariffs being practically frozen since 2002. ERSSAN does not have the power to amend the law itself, and the lack of a national water department, with the power to develop its own regulations, has virtually resulted in paralysis. However, with the creation of DAPSAN, whose mandate it is to change this situation, it appears more than likely that within one or two years the favourable setting that is crucial to the *aguateros* will have been created. The government intends to create a positive environment so that the *aguateros* can play an active role in the renovation, consolidation and

The Environmental Secretary's Office will play a key role in protecting the aquifers and rivers against fecal pollution and over-abstraction

restructuring of the small-scale water supply systems not owned by the state, by investing private capital. This includes expanding the coverage of sanitation services in urban and peri-urban areas by constructing sewerage systems. The *aguateros* are not expected to participate substantially in extending the water supply network to areas not currently serviced, as these are markedly rural communities with little to offer the private sector in financial terms.

The partnership currently being formed also incorporates new players, the most important being SEAM (the Environmental Secretary's Office), which approves the environmental licences required by all providers of water and sanitation services. This office will play a key role in protecting the aquifers and rivers against fecal pollution and over-abstraction.

Meanwhile, the Ministry of Health has yet to put into practice its responsibilities as defined by the law and will need to play a more active role in the future, particularly in terms of healthcare supervision. ERSSAN's task of requiring regular water analysis is not sufficient to protect users' health, therefore DAPSAN is working to reinforce the Ministry of Health's role.

CONCLUSIONS

The creation of DAPSAN and the restructuring of the water and sanitation sector in Paraguay, underway since 2008, have given rise to a new multi-stakeholder partnership, bringing together the state, the private sector *aguateros* and the community. This process has managed to overcome almost a decade of tension and antagonism between the *aguateros* and the state. It is now involving the users for the first time and appears to be on the right track to generate the institutional, social and economic conditions that will make the partnership robust and sustainable.

Nonetheless, the problems that have emerged in relation to the accessibility and quality of groundwater, coupled with the lack of investment in sanitation systems, mean that certain environmental issues, specifically water source security, continue to threaten the sustainability of both the partnership and the *aguateros*.

PERU

4.5

Report: MARTIN RALL

The OGAPU-SWITCH project

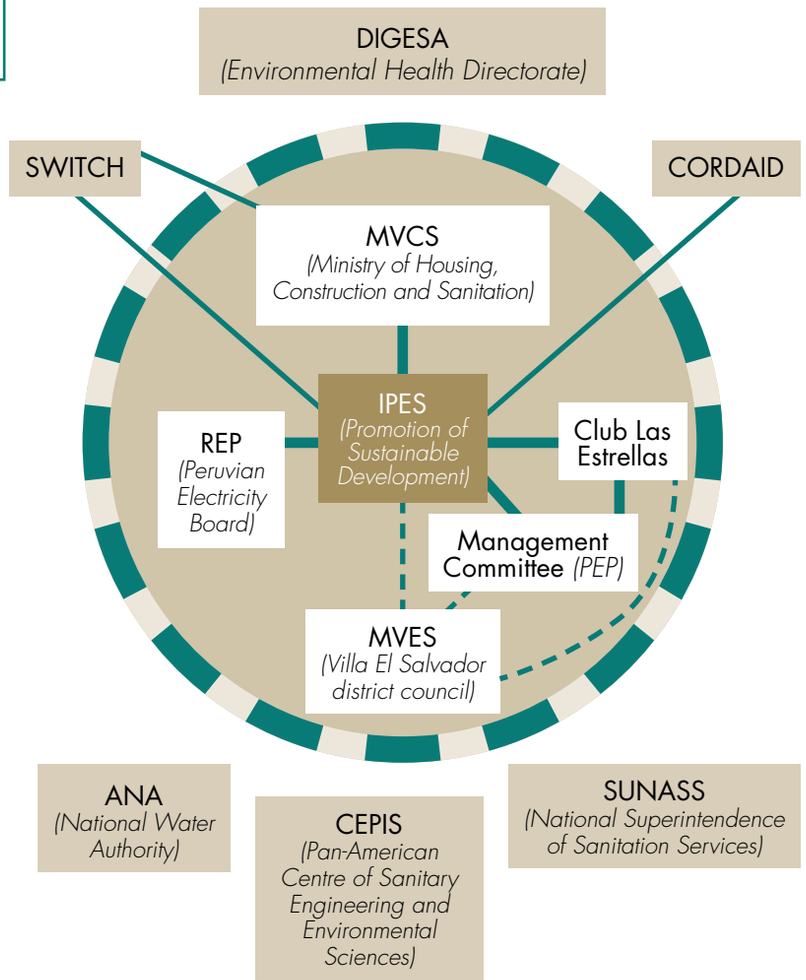
CONTEXT

The project known as OGAPU (Optimising Water Management to Combat Urban Poverty) was developed in the district of Villa El Salvador, in the Peruvian capital of Lima. It is also one of the study and learning projects under the international programme, SWITCH (Sustainable Water Management Improves Tomorrow's Cities' Health). The OGAPU project set up a two-hectare multi-functional park in an impoverished neighbourhood, where it made use of the city's sewage treated by the Lima Water and Sewage Company (SEDAPAL). SWITCH is an action research programme that aims to shift existing urban water management concepts from the current improvised solutions towards a more reliable, integrated approach. SWITCH supported the implementation of this programme and used it as a demonstration experiment for the Ministry of Housing, Construction and Sanitation (MVCS) to draw up a national law that promotes the use of treated sewage for watering green areas and urban parks.

The OGAPU project was implemented by a cross-institutional partnership led by IPES-Promoción del Desarrollo Sostenible, a local NGO that promotes sustainable development. The main partners were Villa El Salvador district council (MVES), the neighbourhood organisations representing the community of approximately 2,600 residents that use the park, and the Environmental Office (OMA) of the MVCS. Funding was primarily provided by CORDAID in the Netherlands and the SWITCH project, as well as to a lesser extent the Peruvian electricity supplier, Red de Energía del Perú (REP).

OGAPU has achieved its four objectives, namely: 1) to demonstrate the recycling of domestic sewage in an urban setting; 2) to develop a multi-functional green area; 3) to increase the household income of 40 families through urban agricultural activities; and 4) to train the community to use a water treatment system and to manage the park so as to make it sustainable. The park, which the community has named the Villa El Salvador Eco-productive Park, has several roles. These comprise social aspects (reinforcing social unity, recreation, inclusion and impartiality), economic functions (household savings, job creation, increasing income), and environmental features (making use of empty spaces, recycling solid waste and wastewater, improving air quality and reducing global warming).

The SWITCH project includes several demonstration activities, or sub-projects, implemented in 10 SWITCH demonstration cities, one of which is Lima. The Lima sub-project is connected with OGAPU. This is another cross-institutional partnership, jointly led by IPES



and the MVCS with the support of the recently created National Water Authority (ANA), the National Superintendence of Sanitation Services (SUNASS) and the Pan-American Centre of Sanitary Engineering and Environmental Sciences (CEPIS), under the WHO/PAHO.

The objectives of SWITCH in Lima are to increase the capacity of national government and district council administrators, town planners and water administrators to design wastewater recycling systems for urban agriculture and public green areas, and to put these into practice. The specific results expected to emerge from the project include enhanced stakeholder awareness of the potential for recycling wastewater, new public policy on wastewater recycling for the sanitation sector, and the training of local and provincial governments and state-owned water and sanitation companies to be competent in the development and design of treatment and recycling systems.

Lima has already produced examples of private and district council initiatives for wastewater recycling

Wastewater recycling in Peru, particularly in Lima and other cities in the arid coastal plain region, is increasingly drawing interest. These cities are entirely dependent on water from rivers with their source in the Andes, which are supplied by rainwater in the rainy season and glacial meltwaters. Both of these sources have suffered the negative effect of climate change. Demand for water in Lima (and other cities) has risen sharply as a result of urban development, which accelerated dramatically from 1980 to 2000 in light of the internal armed conflict. Lima's population currently totals around 8 million inhabitants, which is almost one third of the country's entire population. These supply and demand factors have greatly raised the level of awareness, both amongst the general public and the government, of the need to conserve and make efficient use of water.

Lima had already produced examples of private and district council initiatives for wastewater recycling, both for watering public spaces and for agricultural irrigation. However, there was no clearly defined policy to promote this approach on a nationwide scale and facilitate replication of existing projects to a much wider extent. The OGAPU-SWITCH initiative supports the creation of such a policy through guidelines drawn up to promote treatment enabling domestic and community wastewater to be reclaimed for watering urban and peri-urban green areas. These guidelines were approved by the Peruvian government through ministerial resolution 176-2010-VIVIENDA of 5 November 2010.

THE SOCIO-CULTURAL DIMENSION

The Villa El Salvador Eco-productive Park is located in District 1, Sector 1 of the MVES Pachacámac housing development. The available social and economic data are not broken down by neighbourhood, but refer to the district as a whole, which is not classed amongst the poorest. However, based on an IPES assessment, the level of income in Sector 1 is below the average for the district; ie in the second and third fifths in the national classification system (1=poorest, 5=richest). The rates of unemployment and underemployment, juvenile delinquency and substance abuse are above average.

Due to Lima's climate, its inhabitants are well aware of and sensitive to environmental matters, especially those relating to the management of water resources. For the community benefitting

from the project, their main reason for wanting to renovate the park is environmental, in the broadest sense; meaning, they wanted to transform an unsightly area, used primarily by gangs and delinquents, into a visually attractive park to be enjoyed by the entire community. They intended it to be used for both recreational and cultivation purposes. This required an irrigation system and the option of using treated sewage found support amongst the community for both ecological and financial reasons.

The community is well organised and many of its members belong to neighbourhood groups, of which there are nine, including three focused specifically on the environment. The most active of these organisations is Club Las Estrellas, a football club that was one of the main driving forces behind the request for support addressed to MVES. The club wanted a grass pitch, which in Lima is a luxury. Other plans, such as growing plants for sale and setting up a cycle path and children's play area, have also come to fruition.

The community, young people in particular, played an active role in designing the park and also participated in its construction. They made a notable contribution in the form of voluntary labour; for example, by digging channels to lay pipes. Their participation was facilitated by IPES, which worked in close collaboration with the neighbourhood organisations, three in particular, led by Club Las Estrellas. Since completion of the project, administration of the park and of the treatment and watering system has been carried out by a management committee comprising community leaders. This committee has now been formally recognised as a legal association and works in partnership with the district council.

The community remains committed despite the problems encountered in maintaining the water supply to the park. There have been long periods during which the water supply has been cut off as a result of technical failures in the pumps and other equipment operated by MVES, located near the PTAR, SEDAPAL's treatment plant and due to a lack of funding from the district council. The delay in repairing these technical problems was caused by lengthy bureaucratic procedures in MVES for tenders and purchasing new equipment. The lack of funds (to pay for the electricity required to operate the pump) was owing to a change in mayor following the local elections. The community leaders have entered into contact with the new local government authorities and are confident that the park can once again become fully operational.

Rainfall in Lima is practically non-existent (around 25mm per year). As a result, the city's main sources of water are surface water and groundwater

Despite these interruptions, which have resulted in many of the plants dying and part of the grass on the Club Las Estrellas pitch drying up, the community is persevering. The project has received sporadic support in the form of water tankers from MVES, water from the drinking water system connected to homes, and new plants and seeds from MVES, REP (Red de Energía del Perú) and the MVCS Environmental Office, facilitated by IPES. As a result, almost half of the 40 families involved in the project at the outset are still active, producing decorative and medicinal plants. Club Las Estrellas has also managed to keep its pitch in working condition and the park's management committee is still going strong.

THE TECNICAL/ ENVIRONMENTAL DIMENSION

The Andes mountain range divides Peruvian territory into the abundant Amazon and the coastal region, which is 95% desert. Only 8% of the country's land is suitable for agriculture and 50% of the coast's agricultural potential is not exploited due to a lack of water. Given this water shortage, 4,300 hectares of agricultural land are irrigated using wastewater, 86% of which is untreated.

Rainfall in Lima is practically non-existent (around 25mm per year). As a result, the city's main sources of water are surface water and groundwater. Treated and untreated sewage is therefore considered a key alternative for irrigation purposes. Although more than 40 wastewater treatment and recycling projects are underway in the city, the volume of water treated (1.6 m^3/s) is only 9.2% of the total amount. Consequently, most sewage (90.8%) is flushed into the Rímac River or into the sea, causing pollution in both irrigated produce and sea foodstuffs for direct consumption. This in turn heightens the risk of endemic diseases spreading and impacts the environmental equilibrium.

Experiments in the recycling of sewage in Latin America and worldwide have permitted the development of a management model that integrates wastewater treatment and usage. The model aims to adapt the treatment process so that domestic sewage can be recycled to water farming land and recreational areas. This means that removing pathogens must be a priority to protect public health, rather than removing the organic material and nutrients that can be exploited for agriculture, aquaculture and green areas. The model includes the use of sewage as part of the efficient management of basin water resources, particularly in arid areas.

The treatment and recycling of sewage began in Peru in the 1960s with the implementation of the San Juan stabilisation lagoons in

The project served to validate a domestic sewage recycling model in an urban context with the final stage of treatment through a stabilisation lagoon

Lima. This system is considered the most viable technical alternative to eradicate pathogens and has been applied to 78% of the country's plant life. Only 17.6% of the sewage generated is treated, however, since the financial crisis has curbed investment in this activity.

Peru is the headquarters of CEPIS, which since 1977 has been studying the stabilisation lagoon system, in conjunction with certain national institutions, with a view to recycling water for various agricultural and livestock activities.

Some of the key results of this study are as follows.

- The stabilisation lagoon system has considerable capacity for removing pathogens, which ensures that the sewage can be used in agriculture while guaranteeing the quality of the produce from a health perspective.

- Sewage treated at levels of 10,000 fecal coliforms/100ml enables pathogen-free agricultural and fish produce to be obtained.

- Treated sewage provides the necessary nutrients for agricultural cultivation, while avoiding fertilisation costs.

The use of treated sewage in activities such as agriculture creates a platform for consensus between the city, which would gain satisfactory low-cost treatment systems, and the potential users of the reclaimed water, who could assume part of the treatment cost in exchange for having access to water containing dissolved nutrients for their cultivation activities. These integrated systems would therefore keep significant tariff increases in check where the tariff includes the cost of treatment, thereby guaranteeing the sustainability of the service. Acceptance of this model requires the community to assume responsibility for treating its sewage with appropriate technology, and to evaluate benefits such as safeguarding health and the environment, creating jobs and producing quality foodstuffs.

The OGAPU project served to validate a domestic sewage recycling model in an urban context, with the final stage of treatment through a stabilisation lagoon, and a decentralised management system shared by the community and the local authority. Based on this experiment, the conclusions drawn from an analysis of a selection of case studies, the results of two additional studies conducted and the forming of a learning partnership, the SWITCH project drew up the policy guidelines to promote the treatment and recycling of domestic sewage for watering urban and peri-urban green areas, amongst other uses.

The policy guidelines aim to incorporate the idea of using treated sewage in centralised treatment systems, and to promote and regulate decentralised treatment systems. This would provide the country with an alternative source of irrigation water for farming and recreational activities, thereby enabling appropriate water management and counteracting the increasing water stress in the city of Lima and in Peru as a whole.

THE ECONOMIC DIMENSION

Funding for the execution stage of the project was provided by several organisations. Most of the funding for OGAPU came from the international NGO CORDAID, while the main contributor to SWITCH was the European Union. OGAPU also received contributions in kind from MVES for the construction works, in the form of technical staff, security guards, transport, storage space and construction materials. The community contributed through voluntary work. The contributions of the district council and the community surpassed their initial commitment by far. REP, a member of the partnership, made a financial contribution, while the MVCS assumed part of the cost of replacing plants after the first interruption to the water supply.

The simple, low-cost technology used in the project, coupled with the voluntary contributions from the community (labour, organisation, mobilisation), facilitated by IPES, an NGO with considerable experience and knowhow in community work, means that the total cost of the project was much lower than if it had been carried out by MVES without IPES' intervention and community participation.

In the post-construction phase, and at present, the park's operating expenses are financed by MVES and the community. The district council covers the cost of electricity to operate the pump and equipment maintenance expenses, although the new government authorities took several months to approve a new budget. The community primarily contributes through manual labour, but also pays the extra cost for using domestic water in times of water shortage. The members of Club Las Estrellas pay a fee to use the grass pitch, which also contributes to its upkeep.

Due to the interruptions in the water supply, the park has not been fully operational for long enough to enable a cost-benefit analysis. The costs are essentially those incurred by pumping water from the PTAR, SEDAPAL's nearby sewage treatment plant, to the park, ie electricity and equipment maintenance. The water itself is free of charge. In theory, once the park is fully operational, revenues from the cultivation activities should be more than sufficient to cover local park maintenance costs.

THE ADMINISTRATIVE/ INSTITUTIONAL DIMENSION

The process of forming the OGAPU and SWITCH project partnerships began with IPES, which is an NGO focused on urban development and has been active in environmental matters for over 10 years. It is the most important NGO in Peru, and is also present in 18 countries across Latin America and the Caribbean. Besides its environmental expertise and its focus on community development, IPES maintains certain core content in all its activities, including involvement in public policy and working in cross-institutional partnerships. Through its work relating to the urban environment, particularly in the field of water and sanitation, IPES has gained vast experience and competence in sewage recycling and has formed close relations with the MVCS and other environmental players. When IPES devised the OGAPU project, the first potential partner identified was the MVCS, which had also been working on sewage recycling. The Ministry of the Environment (MA) and ANA had not yet been set up at that time, but they have actively supported OGAPU and SWITCH since their inception.

PERSEVERING
Growing plants for sale is another of the project's achievements, although there have been long periods where the water supply has been cut off. Despite this, and thanks to support from partnership members, the community is determined to make it work and continues to invest time and effort in the park.

In theory, once the park is fully operational, revenues from cultivation activities should be more than sufficient to cover local park maintenance costs

At the outset, the OGAPU project had intended to work with another local authority in a different location. Various factors, including a lack of support for the initiative from new district council chiefs and poor administration, giving rise to constant changes in the authorities responsible for backing the initiative, led to the decision to select a different local authority. MVES was chosen because of its policy favouring sewage recycling for watering green areas, the fact that it had received a request for support from the park area residents, and an existing collaboration agreement in force between IPES and MVES.

The location of MVES and the community requesting support gave the OGAPU project a special advantage. Being located near the PTAR reduced the amount of sewage treatment required. SEDAPAL thus joined the partnership as a supplier of treated sewage.

MVES contributed to the project in various ways. The Deputy Director for Green Areas took part in the co-ordination meetings, and also liaised with SEDAPAL for the installation of pumping stations to the PTAR and to renew the agreement between MVES and SEDAPAL for the use of reclaimed water. This person also channelled the request submitted to the MVCS for the environmental permit to construct the stabilisation lagoon in the park and use the reclaimed water for irrigation.

The change in district council and location – with certain work having already been undertaken on the original site – created budgetary issues that forced IPES to seek additional funding. The Peruvian electricity supplier REP responded positively to IPES' request, through its social responsibility foundation. REP has backed initiatives to create urban green areas in several cities, particularly in the right of way land beneath its high-voltage transmission lines, to discourage unauthorised construction in these spaces.

The partnership for the SWITCH project was built on the existing partnership between IPES and the MVCS environmental office (OMA) – who had been in collaboration for several years. Through SWITCH, IPES supported the OMA in drawing up a sewage recycling policy entitled *Policy guidelines to promote the treatment and recycling of domestic sewage for watering urban and peri-urban green areas*. The

The MVCS was able to appreciate the value of combining the resources of various players rather than being limited to what the government could provide

OMA considers the OGAPU project as a demonstration experiment that endorses the guidelines.

The project had a substantial impact on the partners, both in the public and private sector. Although MVES had prior experience of working with NGOs and neighbourhood organisations, this was the first venture as partners in a project of this nature for the MVCS and REP. Previously, they would transfer funds and other resources to the projects without having any direct involvement. The MVCS was able to appreciate the value of combining the resources of various key players rather than being limited to what the government might be able to provide.

The OGAPU-SWITCH project also played a part in developing the relationship between the MVCS and the new government environmental agencies, namely the Ministry of the Environment and ANA, and assisted in clarifying their respective fields and functions. The project served to strengthen relations between IPES and these national government entities, and they continue to collaborate in raising awareness of the policy guidelines and replicating the Villa El Salvador Eco-productive Park experiment in other cities. The partnerships also remain in force at community level.

CONCLUSIONS

The OGAPU-SWITCH project is a rare example of a cross-institutional partnership that includes a chain of alliances spanning from community to nationwide level, with the active involvement of the public sector (local and national), private sector, NGOs, the community and international donors. This diversity was achieved by designing a pilot project that acknowledged the interests of all of these players.

This partnership was particularly robust since all the stakeholders shared a common concern for the environment, albeit each with their own specific interests and approach. The project managed to satisfy all of these interests. Moreover, the partnerships were facilitated by the presence and efficiency of the non-governmental organisation IPES.

5 PARTNERSHIP DISCUSSION TOOL

5.1 HOW TO USE THE TOOL

The following discussion tool poses some of the key questions for encouraging interactive negotiations amongst partnership practitioners. It draws together the principal concerns in relation to the four inter-related contextual dimensions – the socio-cultural, the technical/environmental, the economic and the administrative/institutional – that emerged from the research process.

The tool is presented as a form of non-numeric Likert scale. The scales one to four represent a progression in thinking and practice; implicit in the text of each level are the kinds of activities that partners should consider for increasing the likelihood of incorporating environmental perspectives in a practical and pragmatic way – and thereby increasing the chances for their projects to be sustainable. Level 4 is not presented as an ultimate wish-list but is based on actual partnership practice drawn from the case studies.

The idea is to read through the question and the grades to determine which is the potential best fit in a given partnership. There is no 'right or wrong' in terms of 'answering' the questions and the levels do not represent an indicator of performance; the idea is that partners use the questions and the levels to negotiate where they are and stimulate debate as to what improvements could be made.

Once potential changes have been identified, partners can then use the information to assess further capacity needs and to prioritise action plans based on what is feasible and achievable in their context given available resources and partners.

1 SOCIO-CULTURAL DIMENSION	1 NO/LOW LEVEL	2 BASIC LEVEL	3 MODERATE LEVEL	4 HIGH LEVEL	What grade is chosen? What is the evidence?	What actions are required by whom and when to reach a higher grade?
1.1 UNDERSTANDING THE SOCIO-CULTURAL CONTEXT	This refers both to understanding the context at the wider level (ie the legacy of past social input into resource management/WASH supply interventions and their reputation, participatory approaches to development, state openness to customer/community engagement and feedback, etc.) and at the specific or local level (ie to understand the profile and cultural diversity of the community, indigenous rights and local power relations). Within the scope of their collaboration, partners may not be able to control this and/or may not have wide influence beyond incorporating an understanding of attitudes towards environmental protection and undertaking environmental advocacy activities.					
To what extent have partners analysed the socio-cultural context?	No/limited baseline, situational or stakeholder analysis done. Some awareness of past environmental protection interventions and general trends in relation to the environment (eg economic crises usurping environmental concerns).	Basic analysis done. Focused more at general trend level rather than community-specific. Some acknowledgement of cultural make-up/indigenous rights/issues.	Adequate analysis undertaken. Focusing on specific community and needs identified with specific cultural/local rights issues discussed and considered for partnership planning purposes.	Comprehensive and regular analysis used to inform partnership/project/activities (both at wider trend level and local level). Approaches tailored to community demands and needs with indigenous/local rights recognised and respected.		
What are the existing perceptions of society/community* with respect to the value of the environment? **Question asked to, and responses disaggregated across, different socio-economic, geographic, etc. groups if required.*	Little real or expressed understanding of environmental issues and value of environmental protection.	Some expression of values through news media, public campaigns on water conservation, water rights, local government initiatives advertised widely (if not actively supported).	Demand-side conservation and resource protection promoted. Known and recognised actors play an active role in highlighting value and contribution of environment and use it to inform policy. Some recognition of the value of the environment from a livelihood perspective – from an employment, food security, ecosystem service perspective, etc.	Coherent local voice articulated/co-ordinated by societal actors (media, government, community groups, NGOs) which influences local policy and individual actions through awareness-raising and resource protection or conservation campaigns (which may be linked to economic incentives). Recognition of environment (and its protection) as valuable for improving livelihoods and well-being.		

To what extent do local/ indigenous beliefs and practices impact on integrated resource management and the actions of partners*? **Question asked to, and responses disaggregated across, different partners' organisations/sectors to map specific partner's responsiveness.*	Indigenous/local beliefs and practices are marginalised or barely recognised and are not actively considered by the partnership as relevant.	Some recognition and understanding by partners of indigenous/local practices for resource management (ie water conservation techniques, clan/traditional resource sharing mechanisms, etc.) and initial contextual analysis supports culturally appropriate approaches.		Recognition of indigenous/ local practices for resource management and approaches partially incorporated into project/partnership aims and activities. Some consultation with, or representation of, indigenous/ local partners within partnership.	Indigenous/local beliefs and practices highly regarded and used to inform partnership planning and approach to resource management. Indigenous staff or community representatives active within the partnership.		
1.2 COMMUNITY ENGAGEMENT	Ensuring the active engagement of community members in sustainable development projects and multi-stakeholder partnerships is not straightforward. 'Engagement' means different things to different actors; ranging from public consultation to active participation in the design and delivery of projects. 'Community' rarely refers to a cohesive or homogenous unit; rather, it can represent a diverse set of people with a diverse set of interests. Partners must identify which stakeholders are speaking up for environmental issues, their motivations, and the level of their influence. With communities, it is vital for other partners to identify how much influence community groups have at the local level and whether the environment is a priority for them (as compared with other, competing priorities).						
To what extent is the community involved in (the supply-side and environmental protection activities of) the partnership?	Little engagement at any level. Community is regarded as recipient of partnership actions. Little or no clear understanding of the risks or impact on sustainability of not engaging the community. Community groups are seen – or presumed – to be opposed to environmental protection due to vested interests (eg political or economic ties, corruption, etc.) hence their views are ignored.	Benefits of engagement are understood as are risks/costs of non-engagement (yet risks might not be quantified). Community is involved at some level (eg their know-how is used for consultation on design/ delivery, infrastructure building, some maintenance, etc.) but partners' implementing or funding timeframes and needs predominate. Some attempt to integrate opposing community perspectives.		Community is involved in design, delivery, some management/ monitoring as they are regarded as key stakeholders for reducing costs and improving sustainability. Some but maybe not all community stakeholder groups are engaged (ie some groups are excluded eg women, elderly, youth, etc.). Timing is synchronised with other community development processes and opposing interests are raised if not addressed.	Heading towards more representative and equitable engagement is seen as an objective of the partnership/ project to support empowerment or local ownership and therefore the likelihood of sustainability. Local social capital is highly valued and rights of access to services are safeguarded. Community is partner throughout and their timeframes inform overall process. Opposing interest groups are brought into debates and their incentives/needs considered to some degree (if not resolved).		
How much influence (ie impact on) does the community have over local environmental issues? Do they 'speak up' for the environment?	Community role is not well understood (little more than perfunctory or external requirement) in planning, projects, policy influencing. Expectations of their engagement are overly ambitious but not clarified or embedded into partner-ship or policy influencing process.	Some clarity over roles, responsibilities and influencing power of community. Expectations are high (to be resource protectors as well as supply-side managers) but are not fully defined or managed.		Community roles and responsibilities are defined (as for other partners) and community representatives contribute to decision-making about environmental issues. Information exchange and opportunities for recourse/ feedback may be lacking. Some confusion over expectations of community input and their role in the longer term.	Process for engagement and roles are clear and regularly revisited. Decision-making instruments about environmental issues involve the community. Regular and informed interactions between community and other stakeholders with recourse/ feedback mechanisms in place.		

2 TECHNICAL DIMENSION	1 NO/LOW LEVEL	2 BASIC LEVEL	3 MODERATE LEVEL	4 HIGH LEVEL	What grade is chosen? What is the evidence?	What actions are required by whom and when to reach a higher grade?
2.1 COLLECTING AND USING THE RIGHT INFORMATION	Sustainability is usually most easily understood in relation to choosing the 'right' or appropriate type of technology that will continually work (if properly managed and maintained) in a specific environment with a defined and limited set of resources and appropriate support mechanisms. Partners require information that informs longer-term sustainability considerations as well as how best to deliver immediate results. In turn, this frames and supports the 'business' or operating model of the partners/partnership as well as their approach to policy influencing or policy formulation.					
What level of environmental information/data is collected and used by partners to inform their activities and objectives?	Limited analysis undertaken (or used) of impact of supply-side interventions on the wider environment. Insufficient cost- benefit analysis (CBA) undertaken and/or no Environmental Impact Assessment (EIA). Little connection or shared information between upstream and downstream stakeholders. Data is used only to inform short-term technical choice and not widely considered despite concerns.	Some analysis and data collected on wider environmental risks of supply-side interventions and basic connections made between upstream and downstream partners. Data gathered may be limited and focuses more on immediate resource availability or technical choice rather than other longer-term issues (eg wider biodiversity issues). Data gathered represents more of a pro forma EIA checklist or partial CBA which has limited influence on partner actions and activities (or may represent merely a political box-ticking exercise).	The costs and benefits of partner interventions at the local level are considered and interventions are linked, in theory if not in full practice, to upstream stakeholders. Practice is informed by clear and neutral CBA and/or EIA data on the impact on local resources, consumption patterns, risks of over-abstraction, both from an engineering choice as well as biodiversity perspective. The impact of environmental risks is considered for the short-, medium- and longer-term activities of the partnership and beyond.	Partners understand the local environment, regularly reviewing environmental risks, costs, benefits and impacts at both a resource management and biodiversity protection level through active use of neutral EIA or CBA data with associated clear management strategies and longer-term mitigation plans. Information gathered on basin/resource-wide issues, local water consumption practices, multiple-user demands and levels of environmental contamination, etc. and then used to develop environmental sustainability risk indicators.		

SOCIO-CULTURAL CONTEXT: MEXICO

Tepoztlán is complex in terms of cultural diversity. There is a perception that the town is comprised of three different sets of people: indigenous communities that are marginalised and poor; those born in the town – the tepozteco – and those of mixed identity – the tepoztizo. When forming the partnership team, it was vital to ensure that local sensitivities were observed and that tepoztecos were represented.

ADMINISTRATIVE CONTEXT: COMMUNITY CONTRIBUTIONS TO SUSTAINABILITY

Community support for environmental projects can help mitigate the effects of local government (ie municipal) transition. In the cases used for this research, all cited local government transition as a key hindrance to ensuring continuity – in addition, there is a commonly held feeling that nothing can be done about it.

In Mexico, the NGO SararT and the TepozEco project invested in in-depth community training, capacity building in ecosan implementation and management and awareness-raising of water usage. This helped to manage and structure community demand for services which extended beyond the lifetime of one municipal term. Ongoing community demand is influencing the new municipal staff to continue to address wastewater and pollution concerns.

3 ECONOMIC AND FINANCIAL DIMENSION	1 NO/LOW LEVEL	2 BASIC LEVEL	3 MODERATE LEVEL	4 HIGH LEVEL	What grade is chosen? What is the evidence?	What actions are required by whom and when to reach a higher grade?
3.1 INVESTING IN THE FUTURE	Financial sustainability is about ensuring there will be sufficient investment in the process and 'products' of a multi-stakeholder partnership that seeks to protect the environment while serving the poor and that the community/beneficiaries will be willing and able to pay for such services.					
To what extent are supply-side investment priorities influenced by environmental considerations?	No/few environmental aspects are considered when planning partnership investments.	Environmental aspects are only considered when demanded from outside the partnership (eg political pressure, regulation, by civil society advocacy efforts, donor requirements, etc.).	Environmental aspects are considered but predominantly only for determining hardware costs (eg leakage reduction over new water abstraction) and forecasts only relate to the short- to medium-term. Some consideration of the supply-side as well as demand-side considerations for sustainable resource management.	Investments, in infrastructure, technology, software/awareness raising, are informed by environmental considerations balancing supply-side with demand-side considerations for sustainable resource management (and recognising other services provided by shared environmental resources). Investment plans consider longer-term costs to the environment as well as the 'business' model adopted/promoted by the partnership.		
Are the contributions of each partner ('environmental' stakeholder or otherwise) valued equally and are they managed well within the partnership?	Environmental/all partner contributions to the partnership are not defined, discussed or understood; silo mentality.	Partners only value the tangible and direct environmental contributions (goods or services) of partners (eg access to bulk water resources, water treatment facilities).	Partners value the tangible and intangible contributions (eg local beliefs, access to communities, 'green' reputation, etc.) of partners but may not maximise their utility or ensure they can be used in the long term or recognise them equally. Lack of clarity over who is responsible for administering (monitoring commitments, sharing and replacing) partner contributions.	Cost and/or benefit values of each partners' contributions are recognised by all, whether tangible or intangible and seen as vital contributions to effectively reaching the objectives/outcomes of the partnership. Clear structures in place for ensuring ongoing use, provision and/or replacement of partner contributions and for determining which partner administers and manages which contribution.		
Do partners value and/or measure the sustainability of the partnership or its impacts?	The partners do not consider longer-term relationships or institutionalisation of approaches as a measure of success and do not invest (financially or otherwise) in making this happen.	Partners see the opportunity costs of not being in the partnership and are willing to invest in replication and/or scale-up of the relationships or approach but are unable to do this within the context (either due to project timeframes/ end dates, lack of funds, lack of political support/will, etc.).	Partners recognise the benefits of institutionalising their relationship and actively fundraise to replicate or expand their relationships/ approaches to ensure there is longer-term impact (on access to services and on the environment).	Partners start their partnership with the 'end' in mind, actively considering how their relation-ships will lead to wider efficiencies and scale-up in the future (eg through tactical involvement of policy-makers, considering access to ongoing resources/funds, developing ongoing relationships with communities, etc.).		

How do partners review the financial sustainability of their approaches?	Partners only review the financial viability of their intervention in the short term in relation to project/programme availability needs and do not value or price the longer-term impact on the environment.	Partners review financial viability in a more holistic way assessing environmental costs and using them to inform their approaches (in the short- to medium-term).	The financial viability of projects/programmes is based on financial cost and benefit analysis which informs short-, medium- and longer-term approaches. Preliminary analysis of other income streams for sustainability (eg consumer contributions) is taken into account for programming.	Partners proactively use financial cost and benefit analysis to ensure their approach or outputs will be sustained into the future. This includes analysis of willingness and ability to pay, potential use of tariffs or cross-subsidies to supplement payment for environmental services and resource protection.		
4 ADMINISTRATIVE AND INSTITUTIONAL DIMENSION	**1 NO/LOW LEVEL**	**2 BASIC LEVEL**	**3 MODERATE LEVEL**	**4 HIGH LEVEL**	What grade is chosen? What is the evidence?	What actions are required by whom and when to reach a higher grade?
4.1 ENSURING CONTINUITY AND PREDICTABILITY	Continuous and stable administration – both for public health and environmental protection – is required to provide the institutional, legal and regulatory landscape within which MSPs delivering water and sanitation can thrive. Understanding the dynamic between different levels of administration, ranging from local government, regional and national and the linkages (or not) between them is vital. Internal institutional relationships are important also.					
To what extent does the partnership proactively review the external political and administrative context in relation to WASH and environmental protection?	Little analysis or mapping of external political and administrative context and standards. Lack of understanding of the impact of the interrelationship between laws, policies, levels of government, etc.	Some analysis undertaken which frames partners' interventions and interactions. But partners have not developed methods/tools for mitigating the impact of national, local/municipal government changes.	Partners understand the political and institutional landscape and have designed their interventions accordingly in line with agreed standards but may not be able to deal with clashing or overlapping policies or laws without bringing in new partners. Or this is beyond the scope of their shorter-term partnership.	Partners are fully aware of the political and institutional landscape and proactively seek to influence policy (at any government level required) to be more aligned across WASH and environmental protection arenas. Partners frequently review the context and negotiate strategies to optimise their influence within the evolving context.		
To what extent is the partnership able and willing to bring in new partners that may have the skills required to more effectively incorporate environmental issues?	The partnership is not robust or able to negotiate internal change very well. Internal competition (spoken or tacit) precludes partners from working with and bringing in others with the requisite expertise.	Partners can see the benefits of bringing in new partners with multi-disciplinary, multi-sector knowledge and experience but may be constrained by scope of intervention, external context, donor funding, political cycles, etc.	Partners are relatively flexible in their approach to partnership and recognise they cannot do everything alone. Partner roles and responsibilities are clear and gaps are filled by willing new partners. Governance structures may need further strengthening to be fully accountable, responsive and transparent to meet the needs of all partners.	Partners negotiate and agree from the start the aim and spirit of the partnership. Clear partner roles and responsibilities ensure synergy and enable the incorporation of new partners. Core business aims (of each partner) are met including CSR aims. Strong governance and accountability structures with clear decision-making and recourse mechanisms are in place. Self-evaluation, success indicators and exit strategies are agreed.		

NOTES

1 Hugh Smith Cumming (1869–1948) – Surgeon General of the United States from 1920 to 1936. This quote, from 1933, is still relevant to today's water and sanitation supply challenges.

2 Moscoso (2004) (http://web.idrc.ca/en/ev-6326-201-1-DO_TOPIC.html) In addition, "only 6% has been treated at a satisfactory sanitary level, which means that almost every water body near to urban areas has been polluted with parasites and bacteria." (ibid.) Chile is a notable exception, where figures from 2011 suggest that 86.9% of urban areas have adequate wastewater treatment.

3 BPD has published a range of different frameworks, case studies and think pieces further elaborating on the challenges of developing, managing and assessing such partnerships.

4 See Global Water Partnership (2004) Education curricula for water management. Toolbox: www.gwptoolbox.org for comprehensive information on IWRM/WRM.

5 The initial research objectives were:

- To identify which contextual circumstances have allowed multi-stakeholder partnership approaches to address technical/environmental, social, economic, institutional and legal aspects of service delivery for the poor.
- To enhance institutional collaboration through learning and sharing of experiences within the region.
- To develop guidelines and principles for multi-stakeholder partnerships for integrated management of water and sanitation systems in urban and peri-urban areas to enhance institutionalisation of such approaches.

6 Some focus more on water supply, some on resource protection, others focus on ecological sanitation and resource re-use. Clearly five is not a wide or exhaustive sample; however, the idea was to learn about the contextual specifics of a small number of cases and to follow their partnership practice over the duration of the research programme.

7 Alongside the analytical content, the Regional Learning Workshop also included modules designed to enhance partnership skills, thus promoting further multi-stakeholder interactions (either for projects or for learning) between the participants.

8 The workshop was organised with the support of BPD's strategic partner, IPES Promoción del Desarrollo Sostenible (www.ipes.org).

9 A sixth case was analysed in mid 2011 entitled, *Ecological sanitation and waste management in Barra de Valizas, Rocha, Uruguay*. Although this case does not form part of the formal research process, it offered valuable insights into different stakeholders' incentives in a difficult geographic zone and context. It is available in Spanish and English at www.bpdws.org.

10 See the complementary briefing note *Do synergies exist between environmental regulations and the delivery of water and sanitation services?* (BPD, 2012). For further information on the role of regulators in relation to supply and environmental protection in Latin America see ADERASA (www.aderasa.org) and CEPAL (www.eclac.cl).

11 For further information on 'partnerships in practice' see BPD's work, *Flexibility by Design: Lessons from Multi-Sector Partnerships in Water & Sanitation Projects* (Caplan et al., 2001).

12 Public health, citizenship, technical fixes or other considerations may all be the overarching focus for a water and sanitation partnership. Either way, environmental concerns are usually not top of the list.

13 Throughout this document, the four dimensions are used to structure analysis for simplicity and for coherence; in understanding both contextual aspects and the different elements contributing to overall sustainability.

14 For example, *Responding to Global Changes: Accessing Water for the Common Good* was the overarching theme for Stockholm World Water Week in 2009. The Stockholm Message resulting from the Week was for COP-15 negotiators to include water in any agreements on climate change.

15 Such arrangements have been termed a 'common property regime'. They are usually perceived as an institution or mechanism by which co-ordination takes place. The name attracts criticism when the resource in question is not seen as anyone's 'property'. In addition, critics question why certain resources should have more of a propensity than others to be governed in this way and what impact that has on potential management structures. Another criticism, suggested by Copeland and Taylor (2009), is that the characteristics of various resources may lead one institution to usurp others in resource management and thereby the lead institution's motives predominate. In this case, health concerns have traditionally prevailed over environmental protection due to the clear arguments and pressing needs to ensure public health for populations at reasonable cost.

16 Adapted from *Improving Partnership Governance in Water Services Series – Theme: Water Resource Protection* (BPD, 2011) and supplemented by practices employed by the MSP case studies.

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"The impacts and costs of upstream environmental degradation on the sustainability of water supply and sanitation services are beginning to be recognised downstream; it is therefore imperative to ensure that service delivery models factor in what is happening at source. This research responds to a clear need to better understand and articulate the needs, capacity and contribution to multi-stakeholder partnerships of the 'environment' – the so-called 'silent partner' of this report."

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