Conference
Report

# Key Elements for a New Urban Agenda

## Integrated management of urban waters and sanitation

BORDA

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## Introduction



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# Table of Abbreviations

| | |
|---|---|
| **AKSANSI** | Association of Community Based Organization on Sanitation in Indonesia |
| **AquaFed** | The International Federation of Water Operators |
| **BOD** | biochemical oxygen demand |
| **BORDA** | Bremen Overseas Research and Development Association |
| **BMZ** | Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung / German Federal Ministry for Economic Cooperation and Development |
| **CAB** | community ablution block |
| **CBO** | community-based organisation |
| **CBS** | community-based sanitation |
| **CDD** | Consortium for DEWATS Dissemination |
| **CLUES** | community-led urban environmental sanitation planning |
| **COD** | chemical oxygen demand |
| **CSP** | city sanitation plan |
| **DEWATS** | decentralised wastewater treatment system(s) |
| **DO** | dissolved oxygen |
| **Eawag** | Swiss Federal Institute of Aquatic Science and Technology |
| **ESRISS** | Egyptian-Swiss Research on Innovations in Sustainable Sanitation |
| **EWS** | eThekwini Water and Sanitation Unit |
| **FINISH** | Financial Inclusion Improves Sanitation and Health |
| **FINISH INK** | Financial Inclusion Improves Sanitation and Health in Kenya |
| **FSM** | faecal sludge management |
| **GALS** | Gender Action Learning System |
| **GmbH** | Gesellschaft mit beschränkter Haftung (German private limited company) |
| **GIS** | geographic information system |
| **GIZ** | Deutsche Gesellschaft für Internationale Zusammenarbeit |

| | |
|---|---|
| **GWP** | German Water Partnership |
| **HCWW** | Egyptian Holding Company for Water and Wastewater |
| **HW** | HAMBURG WASSER |
| **ISSIP** | Integrated Sanitation and Sewerage Infrastructure Project |
| **ISO** | International Organization for Standardization |
| **JLG** | Joint Liability Group |
| **M&E** | monitoring and evaluation |
| **MOA** | memorandum of agreement |
| **MoU** | memorandum of understanding |
| **NABARD** | National Bank for Agriculture and Rural Development |
| **NGO** | nongovernmental organisation |
| **NUSP** | National Urban Sanitation Policy |
| **O&M** | operation and maintenance |
| **OECD** | Organisation for Economic Co-operation and Development |
| **PE** | population equivalents |
| **Sandec** | Department of Sanitation, Water and Solid Waste for Development |
| **SECO** | Swiss State Secretariat for Economic Affairs |
| **SEF** | Social Equity Fund |
| **SDG** | Sustainable Development Goal |
| **SGBs** | small and growing businesses |
| **SHG** | self-help group |
| **SIAAP** | Greater Paris sanitation utility |
| **SMEs** | small and medium enterprises |
| **SOP** | standard operating procedure |
| **UDT** | urine diversion toilet |
| **UN-Habitat** | United Nations Human Settlements Programme |
| **WASH** | water, sanitation and hygiene |
| **WSUP** | Water & Sanitation for the Urban Poor |
| **WWTP** | wastewater treatment plant |

# Strategic options for addressing the management of urban waters and sanitation in the New Urban Agenda:

## Rationale and working results of the conference

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### 1. Rationale of the conference

Sustainable Development Goal (SDG) 6 "Ensure access to water and sanitation for all" and its targets can only be achieved by establishing new models for managing water resources. The fact that the Millennium Development Goal target for sanitation was not met in many countries shows the need to overcome traditional patterns of infrastructure development.[1] Such efforts also have to be integrated with the strategies and activities to achieve SDG 11 "Make cities inclusive, safe, resilient and sustainable", and its target "By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums", which are directly related to SDG 6.

An increasingly stronger community of practice is addressing the need for adaptive, integrated, and sustainable management of the total water cycle as a key element of a comprehensive new urban agenda. As well, the community is calling for a paradigm shift from mainly hardware-driven water supply, sewerage, and flood control towards developing a living space for all that brings into practice innovative approaches, and for a holistic view of development options and human well-being in a rapidly changing urban dimension.

At the invitation of BORDA, 83 representatives from the public and the private sector, civil society, academia, media, and international donor organisations from Africa, Asia, Europe, and Latin America met on November 10 and 11, 2015 in a conference at the House of Parliament in Bremen, Germany.

The conference was organised as a response to the need for action that had been identified at prominent conferences, such as the 2015 World Water Forum in South Korea and World Water Week in Stockholm.

By linking actual experiences from implementation to innovative concepts of urban development, the conference aimed to:

1. Generate input to realise the SDGs and to formulate policy frameworks as the New Urban Agenda as part of the HABITAT III process on liveable and inclusive cities.

2. Identify key elements and practicalities for establishing water management schemes as an integral part of a holistic approach to urban development.

1 Worldwide 2.1 billion people have gained access to improved sanitation. Despite progress, 2.4 billion are still using unimproved sanitation faciliteis, including 946 million people who are still practising open defecation (United Nations, 2015).

Therefore, the conference addressed the following topics:

- Policy challenges, such as how to translate water, and especially sanitation-related, SDGs into implementation at the local level
- Conclusions drawn from the fact that conventional urban planning and development strategies find their limits in so many rapidly growing cities and regions
- Roadmaps for progressive implementation, such as how to create favourable framework conditions and adequate administrative procedures for infrastructure development at the municipal level
- Lessons learnt from countries that have achieved complete sanitation coverage within one generation, in particular how to formulate and implement comprehensive policy approaches
- Service provision and resilient business models for utilities that are increasingly facing rapidly changing social, economic, and regulatory frameworks as well as climate change impacts
- Experiences and options for community needs and gender aspects to be reflected in planning and implementation processes
- Challenges and strategic options to translate innovative pilot activities into mainstream infrastructure development
- Innovative instruments for financing sanitation services at the community level

## 2. Working results of the conference

This publication summarizes the conference presentations and working results.

### 2.1 The situation

Integrated water resource management should be perceived as an essential element of liveable and inclusive cities. As part of the hydrological cycle, used water (i.e., wastewater) especially affects the economic and social dimensions of urban and semi-urban development.

Effective and efficient sanitation and used water management is the result of complex interaction between numerous factors, including adequate legislation, comprehensive planning and implementation (especially at the city level), capacities of regulatory and operational institutions, commitment from the private and public service providers, performing financial schemes, etc.

In many countries, sanitation and the management of used water is not adequately developed. The following common patterns can be observed:

- Political decision making from central government to the municipal level gives little priority to the sector
- Policies and regulatory frameworks are often impractical and inconsistent, which hinder planning and implementation processes
- Necessary institutional and technical capacities at the municipal level are insufficiently developed, including vaguely defined mandates and poor allocation of needed resources
- Silo mentality resulting in weak cooperation between different departments of local government
- Sheer absence of a holistic view on integrated water resource management and its interfaces with urban resource management and infrastructure development
- Inflexible planning procedures and technology choices that do not correspond to the existing socioeconomic conditions of urban areas

In many places, sanitation and used water management are treated as stepchildren of urban development. Municipalities give priority to constructing hospitals, developing roads, supplying drinking water, etc. Scarce resources and capacities are allocated according to this prioritisation. As long as it does not come to the outbreak of epidemics (such as cholera) or public hygiene and water-related environmental problems, sanitation finds its place in public awareness only to a certain extent. The massive individual and economic damage deriving from

poor sanitation remains largely invisible. This invisibility contradicts the interest of politics, which is to show visible success in a relatively short time. Focusing on improved water supply alone seems to be much more appealing than investing at the same time in used water management. However, these shortsighted decisions will certainly result in severe impacts on public health and ecosystems in the near future.

### 2.2 Learning from successful models

The sector needs organic growth, which is a main pillar of urban modernisation. There is no blueprint for the design of this process, each country will have to find its own way. In this context, it is helpful to remember that even in OECD (Organisation for Economic Co-operation and Development) countries, the nowadays high quality of service provision is the result of a long-term (learning) process characterised by an incremental growth of capacities, technical standards, and technology choices.

In countries like South Korea or West Malaysia, where total sanitation was achieved in a few decades, formulating and consistently implementing a cross-sectoral approach to innovation was crucial.[2] The ultimate success was mainly due to a continuous process of capacity building at the various hierarchical levels, from national to municipal. Planning and technology choices were an integral part of a systematic process of learning and the corresponding realignment of strategic direction. High technology solutions were not used at the beginning, but at the end of the process. Still today, there is not one exclusive solution, but different and adequate technical options. Centralised and decentralised solutions are complementary to each other.

### 2.3 Toward inclusive service provision

The reality, and not just in megacities like Sao Paolo, Dar es Salaam and Mumbai, but also increasingly in many medium-sized cities all over the world, shows that a static approach for developing urban infrastructure may create islands of prosperity (in the form of gated communities) located in a vast space of underserved urban areas.

The dynamic development of many cities and a deficit of infrastructural services point to the necessity of overcoming overly schematic instruments of urban planning, such as master plans with little flexibility. There is a growing awareness that such planning and implementation processes, which intend to penetrate and structure the urban space with a uniform approach, have become obsolete.

In the same regard, reaching high effluent treatment and discharge standards is not a question of technology alone, but is above all a question of the systemic capacity of the sector. As the frequently orphaned hardware shows, the knee jerk urge to implement exclusively highly technical infrastructure does not respond to the socioeconomic realities of many countries.

Reliable service provision in informal settlements and slums has to address a whole range of urban, legal, and technical issues. It is particularly a political question, such as which sites will be modernised, which sites will be rebuilt completely new, or which residents will be relocated.

Decision makers and planners should have in mind that the residents may live there for a long time (sometimes for generations) and have invested savings in their homes, and socioeconomic structures have been developed. If the residents are to be resettled in other parts of the city, it requires a thorough dialogue or an attractive range of housing options, which are characterised by providing quality infrastructure.

If the areas are to be rehabilitated, it usually requires comprehensive packages for improved infrastructure, such as sanitary solutions combined with road access, public lighting, rainwater drainage, and especially, reliable and affordable transport. When improving sanitary facilities in homes or in public places, a comprehensive dialogue with the residents, and particularly with women, should be sought.

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2 See How did the East Asian Tigers deliver sanitation within a generation? Lessons for the Sustainable Development Goals by Henry Northover

### 2.4 New challenges

The provision of services faces new challenges, even in OECD countries. Rapid demographic and technological change, the increasingly obvious impacts of climate change, and the demand for social inclusion foster the need to rethink urban development.

The sector is challenged to balance various objectives, such as reliable service provision, social inclusion, community preferences, economic costs, and environmental impacts. New water use and reuse patterns have to be established to decrease the pressure on water resources.

Key players, such as utlilities, have to further develop their business models to meet a rapidly changing regulatory environment and the expectations of politicians, the public, and financial markets. To strengthen the resilience of their businesses, they are challenged to elaborate scenarios and new operations that justify their long-term investments in infrastructure. At the same time, they have to be flexible to respond to a rapidly changing environment and the development needs of their cities.

### 2.5 Strategic options

The discussion and results of the conference outlined the following strategic elements to achieve sustainable water resource management in a rapidly changing urban environment, and to ensure reliable service provision for liveable and inclusive cities:

- Decision makers should perceive comprehensive used water management as a cornerstone for urban modernisation. It should become an integral part of cross-sectoral development that connects to water supply, urban waterways, flood control, energy, transport systems, climate change resilience, ecosystem protection, recreation, etc.
- There is a strong need for new multi-stakeholder engagements to be established between municipalities, urban planners, utilities, technology and service providers, civil society, and local communities. Given the complexity of the challenge, comprehensive leadership at the different decision making levels is needed.
- Legislators, municipal authorities, and urban planners are called upon to face the realities of dynamic and fragmented cities by developing flexible concepts and instruments that leaves behind the typical planning model that barely reflects the socioeconomic realities of many cities.
- Planning and implementation of sanitation infrastructure should be guided by realism and pragmatism, and less by wishful thinking. Decision making processes for technology selection need to screen a whole range of valuable options.
- Reliable service provision is closely linked to good governance. Only when there is a stable framework (such as comprehensive law enforcement), then the private sector will engage in investing and building a critical mass of business activities that ensures complete service coverage.
- Strategy development and resource allocation should focus on building a critical mass of interventions that fosters the dynamic development of service provision.
- Comprehensive capacity development programmes are key for successfully providing public goods. In many places, government agencies and municipalities do not need further pilot projects, but rather support on how to translate successful initiatives and good practices into overall capacity development of relevant entities and actors.
- Behavioural change of customers (i.e. of users of water services) is key for robust financial schemes. Providers have to prove that they are in position to deliver reliable services. Communication, especially involving communities, has to be strengthened.

**References**

United Nations (2015). *Millennium development goals and beyond 2015, Goal 7: Ensure environmental sustainability.* Retrieved from http://www.un.org/millenniumgoals/environ.shtml

# From policy formulation to practice

# Transforming informal settlements towards more liveable urban spaces

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**1. The situation**

Today, 54 % of the world's population reside in urban areas compared to 30 % in 1950. Models project that 66 % of the world's population will live in urban areas by the year 2050. The least urbanised regions are Africa and Asia with 40 % and 48 % urban populations, respectively, and by 2050 this will increase to 56 % and 64 %.

This development goes along with an unprecedented growth of slums. There were 18 million new slum dwellers per year during 1990–2001; the projected growth for the period between 2005 until 2012 was around 27 million people a year. The growth of slums today accounts for 38 % of world's total urban growth.[1]

The overall development will result in increasing inequalities. One in five urban dwellers live in medium-sized cities with populations of one to five million people. In 2014, close to half of all urban residents live in settlements smaller than 500,000 people. The fastest growing agglomerations are medium-sized cities and cities with populations of less than one million in Africa and Asia. The smaller urban areas that have less resources and where there is uncontrolled urbanisation will be most at risk from the inability to deliver services to their populations.

In general, for slums and poorer sections of the population there is a lack of:

- An integrated approach to water, sanitation, drainage and solid waste management
- Comprehensive institutional models for system implementation
- Institutions and/or political will to adopt and scale-up good financial business models

**2. Understanding "urban"**

Understanding "urban" is critical; both typologies and their differing service needs, and how to monitor coverage and use more effectively. In addition to high- and middle-income areas, many urban centres have intra-urban slums, low-income peri-urban areas, and satellite small urban centres. Service levels will often need to vary to cater for these differences. Provision of services can drive urbanisation patterns. Due to the related higher network costs, urban sprawl is a major obstacle for comprehensive service provision.

For slum dwellers and the disadvantaged, good management of the domestic and peri-domestic environment combined with improved lifestyles will be the most effective

1 Urban is a "technical" definition and many smaller urban areas are not captured in official statistics.

**Figure 1**
Rocinha favela, Brazil. The formation of slums is closely linked to urbanization.

way to improve health and will reduce the burden on the poor. But in many slums, there is an absence of a common identity of the unserved. They are not officially recognised and not part of urban estimates, they have no official address, and they are not recognised as a critical part of the city's economy.

### 3. Strategic options for service delivery

- **Focus on smaller urban centres**
  There should be focused attention on the development of systems for smaller urban centres and agglomerations.
- **Urban rules and regulation**
  Adequate planning rules and regulations are a prerequisite to the design, production, and management of efficient, equitable, and healthy human settlements.
- **Urban planning and design**
  The quality of urban planning and design has a determining impact on the value generated by human settlements through efficient and equitable public space, streets, and buildable areas.
- **Service delivery**
  Comprehensive models for service delivery exist, but they need some critical elements and the right institutions to shift.
- **Recognition**
  Recognising the poor and their official status and identity is very important. Programmes have to comprehensively address these features.
- **Municipal finance**
  Efficient and transparent municipal finance systems are key to investments, maintenance, and management of the city. They should ensure redistribution of benefits generated by urban endogenous development.
- **Engagement**
  Engaging civil society as part of the solution, not the problem.

#### References


United Nations Human Settlements Programme (2013). *State of the world's cities 2012/2013*. New York, NY: Routledge.

United Nations Human Settlements Programme (2014). *The state of African cities 2014: Re-imagining sustainable urban transitions.* Nairobi: UN-Habitat.

# Progressive implementation:

## Launching initiatives to draft more realistic legal frameworks

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While untreated wastewater is a global problem, its impact on people and the environment varies across the regions. Up to 90 percent of wastewater in developing countries flows without treatment into rivers, lakes, and highly productive coastal zones. This contamination threatens people's health, nutrition security, access to safe drinking and bathing water, as well as water for food and energy production (Corcoran et al., 2010).

It is obvious that with a rapidly growing urban population, this problematic situation will exacerbate dramatically. Without effective strategies to manage urban wastewater (including its conveyance or transport, treatment, and potential reuse), development will be constrained, particularly in water-scarce economies.

A comprehensive legal framework and its efficient enforcement at the local level are essential for the success of sanitation and wastewater treatment strategies.[1]

Wastewater treatment schemes must meet the legal discharge standards, defined within the legislation and regulatory framework of each country. Those standards, however, are rarely met in developing countries. The reasons for this are manifold. In most countries, environmental and discharge standards are based on the most scientifically advanced treatment technologies available on the market. Discharge standards in developing countries often refer to those from industrialised countries, where sophisticated treatment technologies can be used to treat the highly diluted municipal sewage.

The different prerequisites in developing countries, including wastewater composition, economic and socioeconomic conditions as well as financial and organisational restrictions, create large discrepancies between desired discharge standards and the actual treatment levels that can be provided. In some cases, standards achieve the opposite of their intention; they are considered unrealistic and ignored.

Compliance with discharge standards at effluent point sources, like hospitals and small-scale industries, often proves too expensive. Thus, individual polluters frequently decide to either completely ignore the problem or set up an inadequate treatment system to please the environmental authorities. In other cases, complicated technology is implemented, but often results in the following performance problems described by Johnson et al. (1996):

Undue haste in adopting standards, which are currently too high, can lead to the use of

1 This paper reflects the results of the working group "Urban sanitation and protection of receiving waters: A call for progressive implementation" at the World Water Forum 7, 2007, Daegu & Gyeongbuk, South Korea.

inappropriate technology in pursuit of unattainable or unaffordable objectives and, in doing so, produces an unsustainable system. There is a great danger in setting standards and then ignoring them. It is often better to set appropriate and affordable standards and to have a phased approach to improving the standards as and when affordable. In addition, such an approach permits the country the opportunity to develop its own standards and gives adequate time to implement a suitable regulatory framework and to develop the institutional capacity necessary for enforcement.

Accordingly, to systematically overcome the backlog of untreated wastewater, there is a need for launching initiatives to draft more realistic legal frameworks. Regulations should cover a wide range of topics carefully adapted to the local conditions, including the practices of service providers, design standards, tariffs, discharge standards, and contracts.

The call for progressive implementation draws on the United Nations principle of progressive realisation. This principle affirms the state's duty to take deliberate and targeted steps towards meeting the human rights to water and sanitation. It recognises that full realisation is a long-term process that is often constrained by economic, political, and technical limitations and, thus, full realisation is normally achieved incrementally.

A progressive implementation mechanism could provide for modular upgrading of a treatment system from 60 % up to 90 or 100 % treatment performance over a period of 10 to 15 years:[2] For example, an approach for progressive implementation could include the following phases:

- **Submit full design**

  Permits for construction and/or discharge require that the wastewater treatment design meets the existing discharge standard, and allow expansion to accommodate more stringent discharge standards in the future.

- **Phase 1:**

  The permit requires immediate compliance with discharge standards for organic loads (i.e., chemical oxygen demand [COD] and biological oxygen demand [BOD]). It includes mandatory (e.g., monthly) monitoring to validate the treatment performance.

- **Phase 2:**

  The permit requires partial nutrient recovery. Again, regular monitoring of the treatment performance enables understanding and management of the system, both for the operator as well as for the regulatory authority.

- **Phase 3:**

  The permit requires full organic removal and nutrient recovery as per the initial design. Internal and external monitoring carries on.

2 It is important to note, priorities for areas of progress may be adjusted according to local requirements and available resources.

**References**


United Nations, General Assembly, Human Rights Council. (2013) The Special Rapporteur on the human right to safe drinking water and sanitation. Catarina de Albuquerque

Corcoran, E., Nellemann, C., Baker, E., Bos, R., Osborn, D. & Savelli, H. (Eds). (2010). Sick water? The central role of wastewater management in sustainable development. A rapid response assessment. United Nations Environment Programme, UN-Habitat, GRID-Arendal.

Johnstone, D.J. & Horan, N.J. (1996). Institutional developments, standards and river quality: A UK history and some lessons for industrialising countries. *Water Science and Technology*(33) 3, 211 – 222.

# Used water management is resource management

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## 1. Introduction

This paper brings some private sector perspectives on the management of used water in an urban environment in the context of the 2030 Agenda for Sustainable Development.

AquaFed, the International Federation of Private Water Operators brings together over 400 companies from more than 40 countries around the world.[1] Our members are formal utilities of all sizes, which deliver water and wastewater services to the communities they work in, under the control of the public authorities with whom they have contracts or licences. Wastewater management is their core business. Even though the formal private sector plays an important role in providing services, as many as four billion people do not have their rights to water and sanitation respected because there is no formal delivery system (neither public nor private).[2] These people rely on the informal sector, and are often forced to practise open defecation.

This is what we are facing: the challenge of the unserved (such as building the systems that are inexistent today, especially in slum and urban environments), and future-proofing existing utilities so that they are sustainable and performing over the long run (for example, investing in the renewal of networks, improving current infrastructure).

Sustainable Development Goal (SDG) 6 includes two concrete targets on used water, which is completely new in the international architecture on water[3]:

- By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
- By 2030, improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
- By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies

1 www.aquafed.org

2 See: www.aquafed.org/pages/fr/admin/UserFiles/pdf/UNGA-RTWS_AquaFed_Press%20Release_Pc_Rev1_EN_2010-07-29.pdf

3 Sustainable Development Goal 6: www.un.org/sustainabledevelopment/water-and-sanitation/

- Support and strengthen the participation of local communities in improving water and sanitation management

The private sector is clearly part of the solution to address the world's tremendous challenges under the 2030 Agenda for Sustainable Development.[4] All energies should be harnessed and responsible public authorities that want to implement the SDGs should consider solutions that deliver performance. The interconnections of the SDGs and the crucial role that access to safe drinking water and wastewater management plays in realising the other SDGs (such as those on health, housing, and gender equality) warrant that we demand higher political priorities. There is also an economic impact of not having adequate wastewater management in our cities.

Responsible public authorities have to make informed choices and prioritise water and used water into their budgets. They need competent operators (public, private or mixed) that deal with the full water cycle and deliver performance.

To reach SDG 6, all stakeholders need to step up our collective action to make sure that water, and especially, used water management gets a much higher priority in political decision making. We can only achieve this if we do this together and break down the silos.

**2. Finding the right words...**

Over the years, the perspective on sanitation and wastewater has changed. In the MDG framework, people used to think that "taps and toilets" were sufficient. We now know that this is not enough to eradicate poverty, and improve people's chances in life. We know that progress has been slow and that the MDG on sanitation has failed.[5] Over one billion people still practice open defecation.[6]

From the human right to water and sanitation perspective, it is interesting to understand what your right to sanitation means[7]. Sanitation should be implemented progressively and there should be a real focus on the most vulnerable first, especially the unserved. The ultimate goal is to build up sanitation systems that deliver to everyone forever, while leaving no one behind.

The SDG framework provides the water and used water community with a unique opportunity to step up progress. An efficient coalition of organisations coming from a wide background has been working on water and used water in the post-2015 MDG discussions. AquaFed is proud to be a part of this with BORDA, and we were especially proud that the Wastewater and Water Quality stream in the run up to the adoption in Rio+20 United Nations Conference on Sustainable Development was so successful.[8,9] One of our joint Twitter Tweets on the importance of wastewater management was even shared

4 https://sustainabledevelopment.un.org/post2015/transformingourworld

5 Only 95 countries met the MDG target of halving the population without access to improved sanitation: www.undp.org/content/undp/en/home/librarypage/mdg/the-millennium-development-goals-report-2015.html

6 http://opendefecation.org/

7 http://sr-watersanitation.ohchr.org/en/issuesinfocus_6.html Regrettably, studies on progress toward the achievement of the MDGs reveal that the sanitation target is one of the most off track of all the MDGs. And even if the world harnesses all of its political will and resources to meet that MDG target, 1.8 billion people will still not have access to sanitation. Human rights demand universal access.

8 Full report is available at: www.worldwewant2030.org/water

9 See the "Danger Downstream" framing paper (2013) written by Jack Moss, on behalf of the Ad Hoc Coordination Group of the Wastewater Management stream in the post-2015 consultations www.unece.org/fileadmin/DAM/env/water/meetings/Post_2015_Water_Thematic_Consultation/Collect_and_Treat_Wastewater_Framing_Paper.pdf

by Gisele Bündchen (fashion model and Goodwill Ambassador for the United Nations Environment Programme) to millions of her followers. This shows that it is important to stop treating wastewater as a stepchild in the water discussions. We have to talk about shit, sanitation, and wastewater management.

A wide range of definitions exists on what sanitation really means. A good one is the "safe collection, storage, treatment, disposal and reuse or recycling of human excreta (faeces and urine), household water, storm water, solid waste, all other types of water that have been used (urban, agricultural, industrial) and hazardous water".[10]

There is an opportunity to consider sanitation from a resource recovery perspective rather than dealing with a nuisance. New technology and approaches have helped in this change of perspective. There is a strong imperative to stop speaking about "wastewater" and to start referring to "used water management".

**3. Looking at the value chain of water and used water management**

Communities and their operators have to start dealing with the full cycle of water and better organise the successive uses of water. Water is a limited and precious resource and we cannot afford to waste it.

Organised successive use of water goes far beyond just controlling flows and combatting pollution. It will also lead to health improvements, economic generation, ecosystem protection, and mitigation of water scarcity. The costs of inaction or insufficient action also have to be factored into political decision-making. For example in India, inadequate sanitation causes considerable economic losses, equivalent to 6.4 percent of its gross domestic product (GDP). In 2006, this amounted to US$53.8 billion (World Bank, 2010). These costs disproportionally impact women, children, and poor households.

Under the current population growth projections, the needs for energy (+50%), food (+35%), and water (+40%) are going to explode by 2030.[11] This perfect storm scenario is putting policy makers in front of difficult trade-offs in the governance decisions they have to make (Population Institute, no date).

The SDGs are not only for developing countries. They require all countries to make investments in new infrastructure, and there is a need to upkeep existing infrastructure, which is breaking down in some cases due to old age (for example, sewerage networks in some European cities). Used water resource management has direct positive impacts on people (health, especially women's lives), business (energy and nutrient recovery), food production, the environment (aquifer recharge, growing levels of untreated pollution), and climate change mitigation.

From the perspective of an increasingly circular economy, dealing with the water-energy-food nexus is crucial. There should not be "wasted" water, and there is an entrepreneurial case that can be made at each stage, where we look at this "used water" as a productive resource.

We increasingly and ever more rapidly live in an urbanised world. Megacities with more than 20 million inhabitants have already been established and will increase in the next 15 years. Projections that by 2030 up to 70 percent of the world population will live in cities point to the speed of growth in urban and peri-urban areas (UN DESA, 2014). This requires new thinking on urban planning and the types of services that should be put in those cities. Protecting water as a resource and carefully organising its multiple and successive uses should be part of the cities' future agenda.

**4. Various roles in a new urban agenda**

Business, and in our case, private water operators are part of the solution to address these challenges. Business processes and industrial cycles can be optimised to reduce pollution levels. The private sector (industry) can make significant efforts in protecting their environments and helping to break down cultural taboos on menstrual hygiene, open defecation, and the lack of toilets in the workplace.

Private sector innovation and efficiency will bring about the utilities of the future. Private operators can perform very well for

10 www.unwater.org/downloads/media/sanitation/10Things.pdf

11 International Energy Agency and Food and Agricultural Organisation

responsible public authorities, yet they can never substitute for policy making. The public should govern the water cycle with appropriate and meaningful participation.

Governments, particularly local authorities, must make choices about the use of water resources, which are public goods. They must also manage more carefully the pollution that is generated in society. Together with all stakeholders, we must make sure that controlling human-made pollution remains a high priority in the building of a common vision of urban, industrial, and agricultural "used water management". This will be done in a renewed urban agenda that requires much more effort in terms of long-term thinking, and urban planning. Some places are a step ahead (such as South Korea), while others are lagging and facing the highest urban growth (like Lagos, Nigeria).

**5. Looking ahead**

We all have a role to play in developing and implementing the SDG national plans and in creating indicators as part of a new comprehensive monitoring framework. In addition, we are going to need a sound accountability mechanism at the highest level so that states will report regularly on the implementation of the SDG 6, and so that there is sustained dialogue between states and stakeholders.

United Nations data shows that the development of access to water and sanitation in cities has not been keeping up with the demographic realities. AquaFed has shown in 2010 that the development of adequate water and wastewater services in cities is not in line with the population growth trends in cities.[12] The projections show that the world's urban population is going to increase even more by 2050. To face this urban urgency, responsible authorities and stakeholders must collectively develop new tools and resources as well as more cooperation and partnerships.[13] The technical challenges can be surmounted, and it is not rocket science to build the financial models (Hutton & Varughese, 2016).

In addition to the 3T financing sources (tariffs, taxes, and transfers), fourth, fifth and sixth resources can be found in the gender agenda; in better dealing with (big) data; and in looking at the next new (inter)generational partnerships.

Our complex urban urgency requires creative thinking for used water management. The design and planning of the infrastructure is one aspect. Managing the performance of urban utilities of the future is even more important. Overall governance and organisation of our services delivery models are essential if we want to ensure the human rights of our urban citizens.[14] The private sector has a role to play in each of these aspects.

12 Urban Urgency: www.aquafed.org/page-5-121.html

13 Urban Urgency: www.aquafed.org/page-5-121.html

14 OECD Programme on Water Governance: www.oecd.org/env/watergovernanceprogramme.html

**References**


Hutton, G. & Varughese, M. (2016). *The costs of meeting the 2030 sustainable development goal targets on drinking water sanitation, and hygiene*. Water and Sanitation Program: Technical paper. Washington, D.C.: World Bank Group. Retrieved from http://documents.worldbank.org/curated/en/2016/02/25886251/costs-meeting-2030-sustainable-development-goal-targets-drinking-water-sanitation-hygiene

International Energy Agency and Food and Agricultural Organisation

Population Institute (no date). *2030: The "Perfect Storm" Scenario.* Retrieved from www.populationinstitute.org/resources/reports/Perfectstormscenario/

United Nations Department of Economic and Social Affairs (2014, July 10). World's population increasingly urban with more than half living in urban areas. Retrieved from www.un.org/en/development/desa/news/population/world-urbanization-prospects-2014.html

World Bank (2010, December 20). Press release: *Inadequate sanitation costs India the equivalent of 6.4 per cent of GDP.* Retrieved from www.worldbank.org/en/news/press-release/2010/12/20/inadequate-sanitation-costs-india-the-equivalent-of-64-per-cent-of-gdp

# How did the East Asian Tigers deliver sanitation within a generation?

## Lessons for the Sustainable Development Goals

HENRY NORTHOVER, WATERAID, LONDON, UNITED KINGDOM

Civil servants might say of the Sustainable Development Goal (SDG) target on sanitation: "It's going to be a challenge." And that official code for alarm is not just because of the eye-watering numbers involved in reaching universal access to sanitation. It's going to require a decisive shift in the sanitation sector's record. Of all basic service sectors, such as health and education, sanitation is the worst performer when it comes to extending and sustaining services in the poorest countries, and some middle-income ones too. What's required to reach 2.74 billion people over the next 15 years is nothing short of big bang change. So, what is to be done and how?

Policy makers would do well to start by looking at the case examples of where universal access to sanitation and hygiene practices has been achieved in a generation. WaterAid has looked at the case histories of some, so-called, Tiger States—Singapore, West Malaysia and South Korea—to see if there are instructive pointers for a sector needing to rethink how to deliver transformational change. At first sight, the initial conditions in East Asian states are so markedly different to those in the least developed, most off-track countries, that the value of looking at the East Asian case examples might look questionable, if not entirely irrelevant.[1] But that would be wrong.

In 1960, when South Korea made the strategic choice to push for total sanitation as central to its national development strategy, its per capita income levels were less than Ghana, Zambia, and Senegal's. South Korea's aid inflows were also less than Ghana's. But also the history of sanitation development in East Asia challenges a prevailing assumption dominating international development policy—namely that access to sanitation is an outcome of development and not a driver of public health and common goods. For the East Asian Tigers, sanitation was front and centre of their national development strategies. It was formative in their nation-building project.

So, how did they do it? What were some of the political and policy drivers that delivered universal access to sanitation and, importantly, hygiene practice? In WaterAid's research, we discerned at least five defining characteristics in East Asia's sanitation story that are useful to consider in the drive to achieving the SDG target on sanitation in the most off-track countries.

1 Northover, H., Brewer, T. & Kue, S.R. (2015). *Achieving total sanitation and hygiene coverage within a generation – lessons from East Asia*. London: WaterAid.

First, there's the by now familiar refrain that leadership matters and that political will is a necessary condition for achieving sustained development outcomes. But it is also important to understand the nature of that leadership and drive. For progress in extending sanitation coverage and hygienic practices, what mattered was a leadership that created a nation-building project around the pursuit of modernity and its trappings. The impulse for nation-building involved developing the conditions that would attract inward investment and maintain a competitive edge in international trade. In a series of high profile speeches to both the general public and civil servants, sanitation was articulated as a central part of the necessary conditions of the modern successful state and also the government's social contract with civil society. As the then Prime Minister of Singapore Lee Kuan Yew said,

We shall establish better conditions of community living, norms which will make for a more pleasant, healthier and better life for all. These standards will keep morale high, sickness rate low, and so create the necessary social conditions for higher economic growth in industry and tourism.[2]

The second characteristic of this leadership was its ongoing engagement and drive in refining the implementation agenda. In a sector that is today too frequently satisfied with mentions of sanitation in speeches and in international declarations, the defining difference in leadership in East Asia was its intimate involvement with resolving the challenges in delivering change.

Leaders referred to specific local observations and used them to point to progress, but also to chastise the lack of progress.

People's Action Party leader and later Prime Minister of Singapore, Lee Kuan Yew, talking to civil servants and technicians said, I mean to plan, to analyse, to conceive, as good as any in the world. But finally you go down, somebody's got to put a screw, tighten the bolt, and has to see that he does it, the drive that he puts into it, that determines the pace.[3]

Likewise, former President Park Chung Hee in South Korea was interested in keeping a tight cycle between understanding what was and what was not working, why these bottlenecks were forming, and then responding with remedial policies. These were not one-off reforms, but it was essentially a cycle of iterative change to the extent that for a decade there were Presidential Decrees on sanitation—the highest executive order—issued once every two years. And these course correction mechanisms were replicated at the relevant levels of decentralised sector management. The activist monitoring was never a case of passive data tracking. It was fundamentally a means for diagnosing and remedying bottlenecks. The leadership was insisting on a culture of adaptive management, as exemplified by the Deputy Prime Minister of Malaysia,

Your function, first and foremost, is a function of a 'breaker of bottlenecks'. You must get out and around to every district looking for frustrations, looking for departmental disagreements, looking for delays, and when you have found them, you must diagnose them and then: (a) try on your own behalf to solve them; (b) if you cannot solve them yourself then report to the officers of my Ministry and ask

2 Lee Kuan Yew. To Be a Clean and Green Singapore.

3 Lee Kuan Yew, talking to civil servants and technicians at the Political Centre, 14 June 1962

them to solve them; and (c) when all else has failed then they will be brought to me and I will try and solve them.[4]

The third noteworthy feature was the primacy given to hygienic practices and behaviours. These were promoted social mores that included sanitation, but also went beyond them. In Singapore, toilet misuse risked incurring relatively heavy fines, as did littering. Contrary to contemporary practices with India's *Swachh Bharat* mission where the primary measure of success is in numbers of toilets constructed, in East Asia, behaviour change was primary. In administrative structures, the software behaviour change functions were given seniority equal to those departments responsible for engineering and hardware delivery.

The fourth feature of the East Asian success story related to the wholesale and cross-sectoral approach of implementing such wide-sweeping change. There was no such administrative unit as a stand-alone sanitation department or ministry. Primary functions for delivering sanitation outcomes were anchored in cross-ministerial functions with the lead sometimes assigned to environment (Singapore) or health (Malaysia), but with others playing a critical part, particularly education and housing. Essentially, the transformational agenda needed a whole of government approach. A big bang transformational change required reforms across the board. Capacity development happened in parallel and not as part of a neat sequential ordering of change. Human resources and the development of the necessary capabilities happened as part of the implementation agenda.

And lastly, the complexities of implementation across multiple departments and policies required a continuous and cyclical process of monitoring, analysis, and above all, coordination. This allowed national governments to identify performance and implementation weaknesses and to respond to bottlenecks with remedial improvements and reforms. In the countries studied, the defining feature of even some of the most centrally driven national sanitation policies was a process of continuous local level coordination and monitoring of programmes, from design through the delivery chain, to implementation at a project level, with ongoing follow up of reforms and improvements.

The Five Year Development Plans of South Korea were not static grand master plans. There were continuous revisions and improvements, with sometimes annual changes made through Presidential and Ministerial Decrees, each setting new enabling conditions or adjustments. For rural Malaysia, the Deputy Prime Minister established local operations rooms, where all development projects were monitored in real time so that obstacles could be identified and overcome. These were the locus of cross-sector coordination.

These were the locus of cross-sector coordination. As the Deputy Prime Minister said,

[Development teams] must also, at least once a week, have what I call 'morning prayers' where all departmental officers get together and instead of writing tedious minutes on files to each other, they settle their departmental differences together, in a coordinated way, in front of the maps in their operations rooms.[5]

Across the countries studied, the dynamic can be characterised as a cyclical process – a high-level political drive that set the extension of sanitation coverage within broader development initiatives, such as providing public health and affordable housing. This is underpinned by a compelling political narrative around the goal of building cohesive societies, or a common national identity with norms and standards built on notions of shared and collective responsibilities. National leaders and senior officials were continuously championing the benefits delivered by increased sanitation coverage and progress-chasing the planning and policies down the implementation chain to deliver improved performance. In turn, the monitoring and identification of critical bottlenecks was fed back into a reform and improvement process to deliver stronger performance and permanent outcomes. Using and responding to outcome monitoring information may be the essential ingredient of a sector that continues to make solid and rapid progress.

4 Deputy Prime Minister of Malaysia at the State Development Officers' Conference, 13 December 1965

5 National Archives of Malaysia (n.d.) "Speech by the Deputy Prime Minister to Persatuan Ekonomi Malaysia on 24th March, 1966." In Ucapan-Ucapan Tun Haji Abdul Razak Bin Hussein 1966 (pp. 54-66). Kuala Lumpur: National Archives of Malaysia.

# Scaling up small-scale sanitation in a disabling institutional and regulatory environment:

## Experiences from Egypt

PHILIPPE REYMOND, EAWAG-SANDEC, DÜBENDORF, SWITZERLAND

Since May 2010, the Egyptian-Swiss Research on Innovations in Sustainable Sanitation (ESRISS), led by the Swiss Federal Institute of Aquatic Science and Technology (Eawag) in partnership with the Egyptian Holding Company for Water and Wastewater (HCWW) and financed by the Swiss State Secretariat for Economic Affairs (SECO), has been working on the topic of small-scale sanitation in the Nile Delta, and more specifically on how it could be replicated on a wide scale. The project was originally designed as a parallel research component of the World Bank funded Integrated Sanitation and Sewerage Infrastructure Project (ISSIP) and aimed to support the ISSIP's so-called "decentralised component". The ESRISS project produced policy recommendations, strong baseline data, and a planning tool to estimate wastewater quantity and characteristics on a site-specific basis. As well, it endorsed an advisory role for the stakeholders of the sector.

To start with, the ESRISS project reviewed previous small-scale sanitation initiatives in the country. The success and failure factors were investigated in an exhaustive and multidisciplinary way. This research led to the definition of the enabling environment necessary for the expansion of such systems in Egypt. Rather than replicating a large number of discrete projects, scaling up requires integrative management and institutional schemes, innovative financing plans, and effective inclusion of the private sector.

The results of this first analysis can be found in the report entitled "Small-scale sanitation in Egypt: Challenges and ways forward" and in the addendum entitled "Factsheets on small-scale sanitation initiatives in Egypt", which reviews ten such initiatives in detail. The main recommendations of the report were synthesised in the Research for Policy Brief entitled "ESRISS 10 points to move forward". They were then further developed in the project's final report entitled "Policy recommendations for the scaling-up of small-scale sanitation in Egypt". The situation in Egypt is similar to that in many countries and the recommendations from this project can be easily translated to other contexts.

Egypt currently displays a "disabling environment" for scaling up small-scale sanitation. A disabling institutional and regulatory environment is characterised by the lack of clear responsibility for rural sanitation, lack of vision, and the lack of constructive collaboration between the different concerned Ministries (especially the Ministries of Irrigation and Health, and the utility). The implementation of small-scale systems is hindered by the lack of faith in small-scale systems at the utility, and the lack of experience with such systems within the utility and the local private sector. The management tradition of overstaffing with underskilled people goes against cost-effective small-scale systems, and the enabling regulatory framework is not in place. For example, there is no regulation

protecting communities and the private sector for the management of all or part of the sanitation system, the planning and design standards are hindering factors (but the Codes of Practice are currently under review), and there is a reluctance to increase sanitation fees. Last but not least, the effluent standards are not adapted for rural sanitation. They are too stringent (all or nothing philosophy); in particular chemical oxygen demand (COD), dissolved oxygen (DO) and pathogens are an issue, and the standards are not linked to the quality of receiving water bodies.

How to move forward in such a disabling environment? The first thing is to think at scale. The main recommendations for scaling up small-scale sanitation are that one has to think in terms of economies of scale, both at the implementation and management levels, from the start. One has to go beyond the trial of isolated pilots. Isolated pilots are not sustainable: past initiatives remain prototypes and, as such, are not cost-effective, do not receive the attention required, are considered too expensive, and/or prone to failure, and therefore are not replicated. As a general saying: "Pilots never fail, pilots never scale." It is necessary to think in terms of numbers from the beginning, i.e. start with a critical mass of projects that allow economies of scale, involvement of the private sector, and a centralised management scheme. Economies of scale at the implementation level can be achieved through standardisation of the sanitation systems. A limited number of simple and robust treatment systems should be selected. Different components of the sanitation chain can be prefabricated, which contributes to lowering the costs, improving quality control, and significantly reducing the implementation time. To further increase the cost-effectiveness, a modular and incremental implementation approach is recommended, with a planning horizon that does not go beyond 10 to 15 years for the treatment units.

Economies of scale at the management level imply the centralised management of decentralised systems. A dedicated structure should be created, with professionals specifically trained, to concentrate the skills. A management unit would have the task to monitor the planning, implementation, and operation of the systems in the villages. Management of the sewerage networks can be delegated to the communities. The policy framework should enable the private sector and communities to take an active role in managing the systems.

To sum up, economies of scale should be piloted, both at the implementation and management levels, with a focus on an increased cost-effectiveness. To solve the rural sanitation challenge, it is important to engage the demand and the supply side. How to best encourage the private sector? We recommend investigating adapted business models for rural sanitation. A starting point could be to transpose the business model of compact wastewater treatment plants in tourist resorts, in itself a market niche, to small-scale rural sanitation. The main difference lays in the incentives needed to properly run the treatment plants. Proper incentives must be developed for rural sanitation as well. Such incentives include a guarantee from the State for cost recovery, licenses, and certification. In addition, design-build-operate mechanisms should be encouraged, and local engineers and masons at the governorate-level be trained. Two scenarios can be foreseen: ① an incremental approach starting at the local level in a defined area (strategic niche management); and ② direct implementation as a national strategy and operate institutional changes.

Small-scale sanitation is a new market. We have to show the potential for the private sector and job creation. The know-how is not available in Egypt and needs to be transferred from abroad, especially for prefabricated systems; the local industry is able to produce such units when supported with expert guidance. Advocacy at the top level of the State is currently needed, aiming for a national policy. Trying to reform regulations one by one does not work in Egypt; only a decision from the top can lead to quick change.

From the bottom, it is crucial to facilitate the local utility and consultants to take up small-scale sanitation with minimal risk. This means, for example, providing local consultants with tools to help them make a relevant assessment of the initial situation (and collect good data), analyse this data properly, and estimate the design parameters on a context-specific basis. The lack of baseline data characterising wastewater in the rural areas, and hence the lack of context-appropriate

design parameters, was identified as a major gap for settlements under 5,000 inhabitants. It is an important cause of the low performance of existing treatment units, either because of over- or under-dimensioning. Rural settlements are very heterogeneous, which prevents using one-size-fits-all options and the use of generic design parameters. There is a need for simple tools to allow local practitioners to estimate the design parameters on a site-specific basis, based on collecting a minimal amount of firsthand data and without having to resort to sampling.

Based on the field experience and tools developed (including survey and interview guidelines, material flow analysis [MFA] model), the ESRISS project developed a tool package for the preliminary assessment of the situation in small settlements (see "A model-based tool to quantify and characterise wastewater in small Nile Delta settlements: User manual"). The tool package allows the user, within three working days, to estimate the characteristics and quantities of the wastewater to be treated (i. e., to determine site-specific design parameters). It also allows the user to compare sanitation system scenarios, as well as estimate the nutrient content (nitrogen and phosphorus) from the perspective of optimal wastewater and nutrient reuse. The user can thus anticipate a future situation and estimate the impact of different measures. The tool is Excel-based and includes a user manual and step-by-step procedure.

In short, scaling up small-scale sanitation systems means to create new drivers of change by:

- Thinking at scale
- Targeting a critical mass of projects and a centralised management scheme
- Piloting economies of scale, both at the implementation and management levels
- Convincing governments through business potential
- Facilitating the work of consultants and contractors
- Implementing effluent standards incrementally

**Further reading**


All ESRISS project documents can be downloaded at www.sandec.ch/esriss.

Eales, K., Siregar, R., Febriani, E. & Blackett, I. (2013). *Review of community managed decentralized wastewater treatment systems in Indonesia.* Indonesia: WSP.

Evans, B. (2013). Sanitation in cities of the global south: Is decentralisation a solution? In Larsen, T.A., Udert, K.M. & Lienert, J. (Eds.), *Source separation and decentralization for wastewater management* (pp. 117–131). London: IWA.

Jacoby, K.-P. (2012). *Decentralized wastewater management in Kafr El Sheikh Governorate: Final results and lessons learnt.* GIZ Egypt, Water and Wastewater Management Programme. Cairo, Egypt.

Reymond, Ph. (2012). *Small-scale sanitation in Egypt: Challenges and ways forward. Eawag, Switzerland-Egypt. (executive summary in Arabic)*

Reymond, Ph. (2013). *Factsheets on small-scale sanitation initiatives in Egypt. Addendum to the Report "Small-scale sanitation in Egypt: Challenges and ways forward".* Eawag, Switzerland-Egypt.

Reymond, Ph., Abdel Wahaab, R. & Moussa, M. (2012). *Small-scale sanitation in Egypt – 10 points to move forward. Research for Policy Brief.* Eawag, Switzerland-Egypt. *(available in Arabic)*

Reymond, Ph., Demars, C., Papangelou, A., Hassan Tawfik, M., Abdel Wahaab, R. & Moussa, M. (2014). *Small-scale sanitation in the Nile Delta: Baseline data and current practices.* 2nd ed. Eawag, Switzerland-Egypt. *(executive summary in Arabic)*

Reymond, Ph., Papangelou, A., Demars, C., Hassan Tawfik, M., Ulrich, L. & Abdel Wahaab, R. (2014). *Modelling small-scale sanitation in the Nile Delta: A material flow analysis with nutrient reuse perspective.* Eawag, Switzerland-Egypt.

Reymond, Ph. & Demars, C. (2014). *A model-based tool to quantify and characterise wastewater in small Nile Delta settlements: User manual.* Eawag, Switzerland-Egypt. *(step-by-step procedure in Arabic)*

Reymond, Ph., Abdel Wahaab R. & Moussa, M. (2015). *Policy recommendations for the scaling-up of small-scale sanitation in Egypt – The ESRISS project final report.* Eawag, SECO, HCWW, Cairo.

Truffer B., Binz C., Gebauer H. & Störmer E. (2013). Market success of on-site treatment: A systemic innovation problem. In Larsen, T.A., Udert, K.M. & Lienert, J. (Eds.), *Source separation and decentralization for wastewater management* (pp. 209 – 223). London: IWA.

# Planning water and sanitation management in a changing urban environment

# Being strategic:

## Holistic urban development and infrastructure planning

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Today, 18 out of the world's 22 megacities with populations of 10 million or more are found in low- and middle-income countries. These agglomerations feature huge spatial and resource footprints, covering hundreds of square kilometres. Fortunately, they also provide opportunities for less centralised, more localised solutions that help safeguard fresh water sources and recycle valuable nutrients.

Typically, fewer than 10 percent of sub-Saharan African cities are equipped with sewers, and these are mostly in central business districts and upper class residential neighbourhoods. Fully networked services remain decades in the future because of the enormous costs involved in installing them in metropolitan areas in low- and middle-income countries. Past experience reveals that it is in many cases inappropriate and unsustainable to import sanitation planning models from the industrialised world and implement centralised one-size-fits-all solutions. Thus, planning approaches must be adapted to allow for improved development and implementation of context-specific sanitation systems. The following weaknesses are common in planning urban infrastructure:

- A narrow focus on conventional sanitation technologies often prevents improvement of sanitation in poor settlements.
- A neglect of service delivery requirements for low-income and informal settlements that feature on-site sanitation facilities.
- Insufficient attention to the role of small-scale service providers and the formal/informal interface.

Recent innovations in sanitation planning include a more integrated planning approach, greater emphasis on the actual needs and financial capacity of the users, and wider participation and consultation with all stakeholders, especially during the initial design and priority-setting stage.

Innovative planning frameworks such as Sanitation21 (IWA, 2014), CLUES (Eawag, 2011) or WSUP's Urban Planning Framework (WSUP, 2014) are based on a more realistic perspective of the need to secure the necessary finances for implementation, with less dependence on external funding and the need for full cost recovery to pay for maintaining services for long-term sustainability. Various new planning methodologies have been developed to respond to real needs; making informed decisions about investments for sanitation improvements involving the prudent use of limited resources to meet recognised priorities. The experiences from these planning approaches are incorporated in these planning frameworks, which is based upon international best practice, building upon

experiences where good planning is recognised to be integral for achieving improvements in urban sanitation.

Sanitation21 sets out key principles and process guidelines to help city stakeholders develop appropriate and affordable solutions to sanitation problems. It brings together decisions for service delivery arrangements that take into account demand for improvement from different stakeholders, management options. Institutional arrangements as well as issues related to technology. The community-led urban environmental sanitation planning (CLUES) approach is an area-based multi-actor planning framework that accounts for water supply, sanitation, solid waste management, and stormwater drainage. CLUES emphasises the participation of all stakeholders from an early stage in the planning process. Both Sanitation 21 and CLUES are process-oriented approaches that address socioeconomic and spatial diversity, and seek to overcome the limitations of blueprint approaches characterised by one-size-fits-all interventions. They incorporate the four cornerstones of strategic sanitation planning: ① realistic sector investments, ② safely managed faecal sludge solutions, ③ better sector governance, and ④ consultation and participation throughout the planning process.

**1. Financial instruments & sector investments**

Being strategic is also about making the right choices about strategic investments and the right mix of financial instruments. Leveraging finance for the poor must take a greater priority with the need for more innovative financing instruments to ensure realistic tariffs and possible subsidies for sustainable financing. Following successful redistributive urban policies from Brazil or South Africa, cross-subsidising basic services for the poor may also be explored. Other innovative mechanisms to consider include "blended" financing between governments and donor organisations or market-based solutions piloted by social entrepreneurs that provide innovative service solutions for the urban poor.

**2. Safely managed faecal sludge**

The sanitation chain refers to the combination of technologies and management arrangements required to manage excreta safety from where it is produced to the point of disposal or reuse. Failures in the chain result in environmental health hazards that place residents at risk. Thus, sanitation improvement strategies need to focus on improving the different sanitation service chains across the city as a whole. In unplanned and service-starved neighbourhoods, this will mostly take the form of faecal sludge management: the safe organisation and management of on-site waste from underserved poor urban areas.

**3. Better sector governance**

Institutional factors, such as improved city management and more responsive local government, are prerequisites to improve services for the poor. This demands for a clear assignment of roles and responsibilities in the sanitation sector that brings together public (utilities), civil society (community-based organisations and nongovernmental organisations), and private (service providers) stakeholders under the leadership of the local authority. Ensuring inclusiveness and participation of all relevant sector stakeholders can be achieved by creating an advisory City Sanitation Task Force, which has successfully been demonstrated in Indonesia and India in the recent past.

**4. Consultation and facilitation of the planning process**

The success of integrated planning processes that create ownership for integrated sanitation planning depends upon consultation of different stakeholder groups. This requires an effective communication strategy, which enables stakeholders to access all information to be able to see clearly what decisions were made, by whom and when, and what implications the implementation of the plan will have upon them. There is, therefore, often a need for an external facilitator of the planning process to support the interaction between institutional members of the City Sanitation Task Force, guide the planning process, and support stakeholder consultation.

**Further reading**


Parkinson, J., Lüthi, C. & Walther, D. (2014). *Sanitation 21: A planning framework for improving city-wide sanitation services.* IWA, Eawag-Sandec, GIZ.

Lüthi, C., Tilley, E., Morel, A., & Ulrich, L. (2011). *Community-led urban environmental sanitation planning (CLUES).* Dübendorf: Eawag/Geneva: WSSCC/Nairobi: UN-Habitat.

WSUP (2014). *The Urban programming guide: How to design and implement an effective urban WASH programme.* London: WSUP.

# Citywide sanitation planning:

## Insights from India and Bangladesh

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### 1. Evolution of an approach to citywide sanitation planning

BORDA and CDD Society, along with its partners, have been evolving an approach to address the sanitation needs of a city by integrating decentralised and localised solutions, such as decentralised wastewater treatment systems (DEWATS), with mainstream centralised systems, such as sewerage networks and conventional sewage treatment plants.

This effort started in 2006–07 with the city of Pune in Maharashtra, India. The CDD team with its partner, Inspiration, prepared a concept for using DEWATS to intercept and treat the sewage generated in the catchment of a natural stream and use the treated water to revive the stream, as shown in Figure 1. Though the project was not implemented, the exercise gave the team many insights into how such a planning process could be structured.

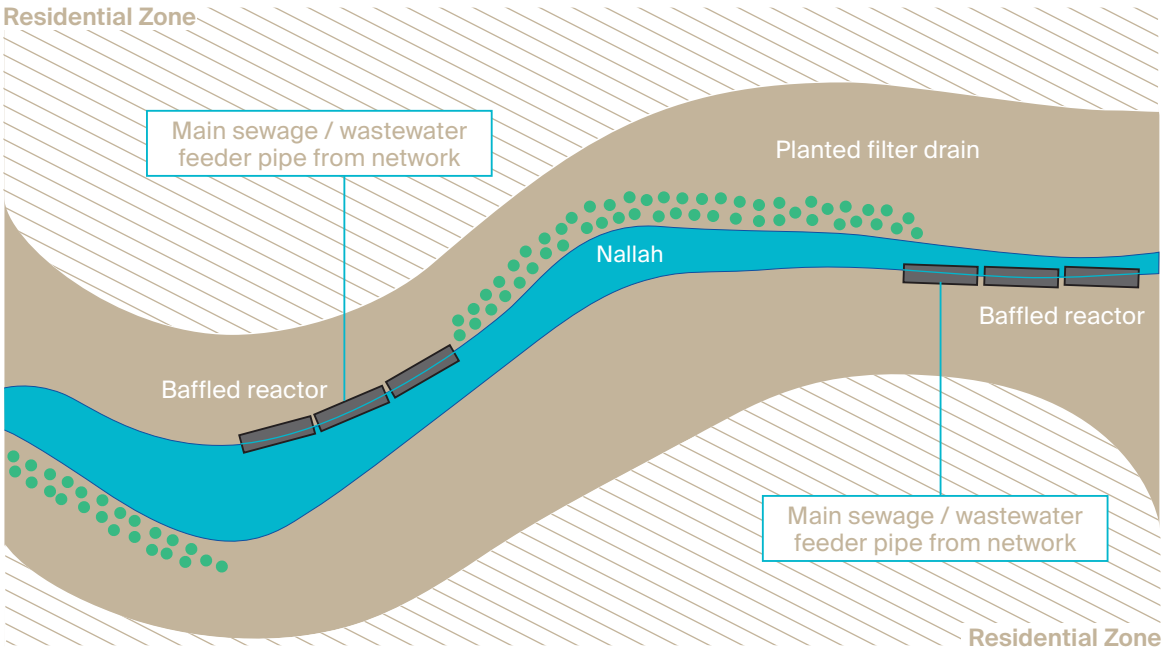



**Figure 1**
Pune – DEWATS based solution for treating wastewater along the catchment of a stream

The next opportunity came in 2008 when the city of Kolhapur, having seen the Pune effort, requested CDD to prepare a master plan for decentralised wastewater management, an excerpt of which is shown in Figure 2. Kolhapur also had a sewerage system, but they acknowledged that there were significant deficits in network coverage as well as treatment capacity. Therefore, they wanted to adopt decentralised approaches as part of the city's system. Moreover, they had already seen the success of a community toilet combined with DEWATS in one of their slums.

In this exercise, CDD and their partner, Alchemy Urban Systems Private Limited, developed a methodology for systematically assessing the demand-supply gap for sanitation using a GIS-based method of analysis. Opportunities for decentralised interventions were then identified and grouped into typologies that could be addressed in similar ways.

The Kolhapur municipal corporation also asked the team to draft a set of regulations to be included in the city's building rules, mandating DEWATS or other such solutions to be deployed in new real estate developments in the city's periphery. These regulations were later approved by the city council.

At about the time that the Kolhapur project was being completed, the Government of India's Ministry of Urban Development was in the process of preparing the National Urban Sanitation Policy (NUSP). The BORDA-CDD team's work on decentralised approaches to citywide sanitation did not go unnoticed. The NUSP mandated the preparation of a City Sanitation Plan (CSP) for each city, and even though the focus continued to be on centralised approaches, they recommended that decentralised options should also be considered. The first few CSPs were experimental in terms of methodology. Many donor agencies, lending agencies, and technical aid organisations got involved in preparing pilot CSPs to define the methodology. One of these organisations, GIZ, hired a consortium consisting of CDD Society, Alchemy Urban Systems Private Limited, and the Centre for Environmental Planning and Technology University to prepare CSPs for the cities of Shimla, Raipur, and Varanasi. The methodology developed in Kolhapur for citywide analysis and planning was further evolved in the preparation of these CSPs and expanded to include sanitation components, such as access to toilets and solid waste management. A more systematic approach to citizen engagement was also included.

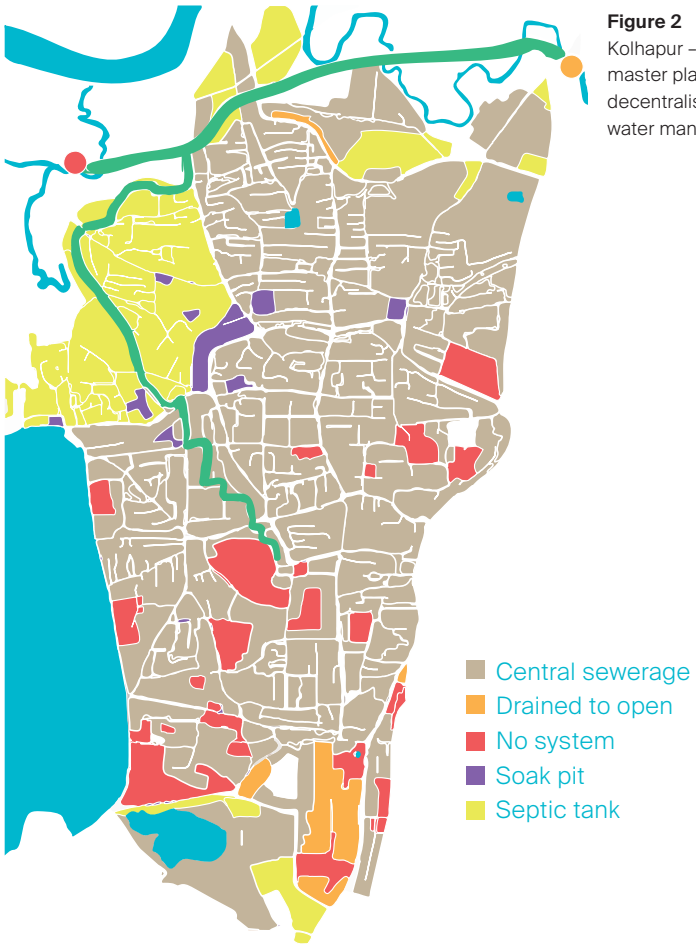
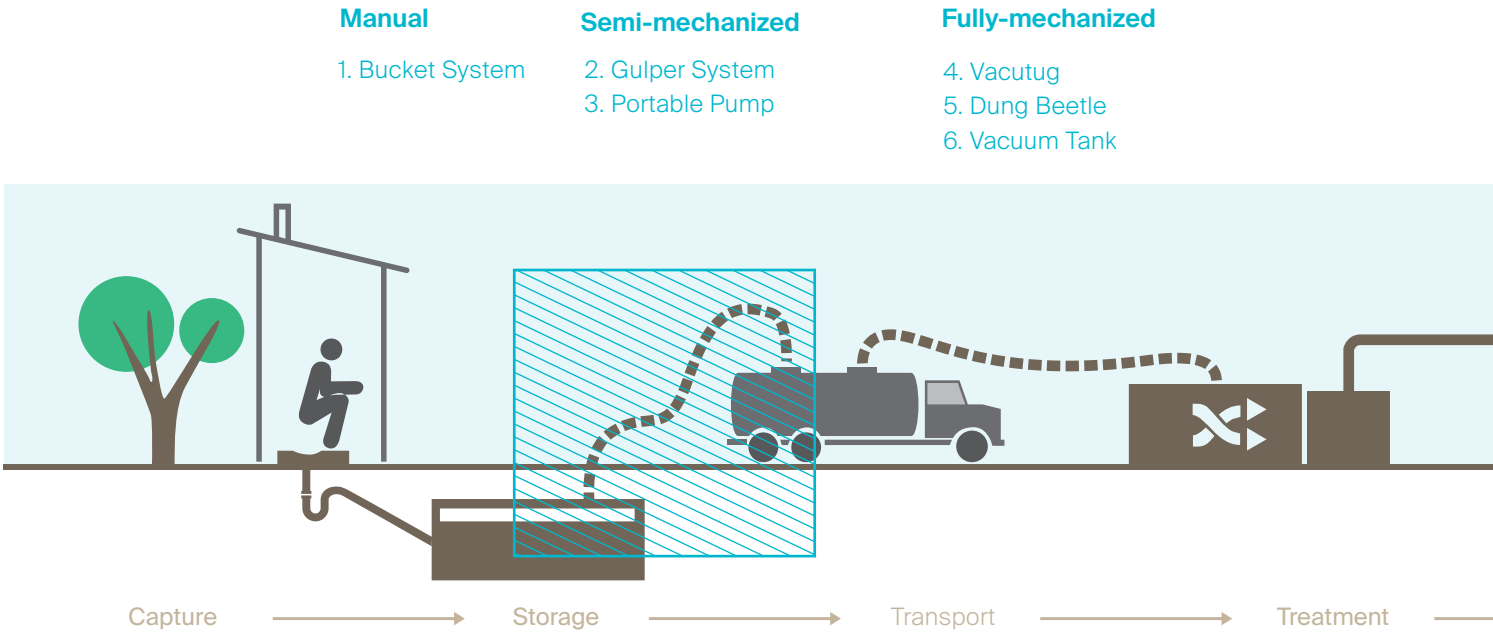



**Figure 2**
Kolhapur – Citywide master plan for decentralised wastewater management

When the CSPs were introduced, the author had hoped for a paradigm shift in the approach to sanitation – from megaprojects for sewerage networks and treatment plants to a more localised and purposeful approach to addressing sanitation at the community level. However, the CSPs in most cases turned out to be 'plans' to justify 'projects'. Pre-existing Detailed Project Reports for sewerage networks and treatment plants were presented as the outcomes of the planning exercise and put up for funding. Nearly a decade after the announcement of NUSP,

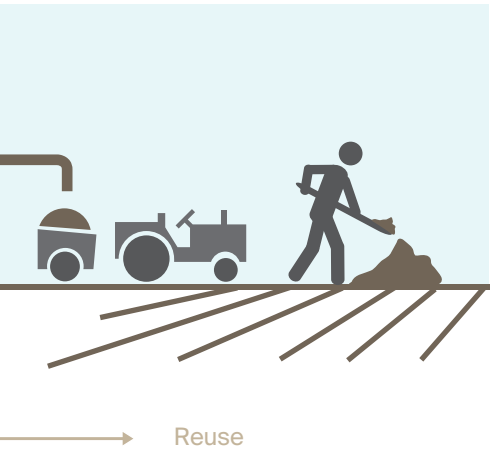



large portions of Indian cities continue to function using latrine pits and septic tanks, even in areas where sewer lines had been laid. The management of faecal sludge from these pits and septic tanks emerged as an urgent problem that needed to be addressed. CDD Society had therefore turned its attention to faecal sludge management (FSM) as a major area of its work. In 2013–14, the Bill & Melinda Gates Foundation provided a grant to BORDA and CDD to develop business and operational models for FSM.

It is during this period that an opportunity came up in Bangladesh, funded by the Asian Development Bank and indirectly by the Bill & Melinda Gates Foundation, to prepare City Sanitation Action Plans for 31 small towns (Pourashavas). BORDA won the contract to prepare these Action Plans. None of these towns had a sewerage system and did not have the resources to implement one in the near future. These towns had all done a wonderful job of reducing open defecation to less than eight percent of the population. Access to toilets had been improving over time, but the post-toilet scenario was bleak with poor quality construction and poorly maintained pits and septic tanks spilling into drains and low lying areas. After a systematic analysis of the sanitation situation in all 31 towns, the team came up with a programmatic approach to address the problems. The team produced a Catalogue of Sanitation Solutions for each stage in the sanitation value chain, illustrated in Figure 3. Guidance was provided on which solution to use in what situation. Each city was provided with a suggested Action Plan, but these documents were meant to be living documents, to be updated by the city in the course of implementation. The main report also had a Programme Design section that laid out a suggested programme to be rolled out by the central project management unit of the government. This section provided guidance for supporting each city in updating the Action Plans, and making informed choices on technology selection, methodology, and implementation strategy.

The author was the Team Leader in all of the sanitation planning exercises described above. After the recent exercise in Bangladesh, the author's view on citywide sanitation is that it is important to take a programmatic approach to build an ecosystem of decentralised sanitation solutions and service providers, rather than just focusing on technological solutions or standalone projects.

**Figure 3**
Catalogue of sanitation systems




## 2. Challenges for city level sanitation planning

This section presents the learnings from the author's work on citywide sanitation planning with BORDA and CDD.

### 2.1 Unmanaged urban growth

In South Asian cities, urban expansion (outward growth of cities) is unmanaged. The supply of urban land that is planned (properly laid out with a street network) and serviced (with water supply, drainage, and other infrastructure) lags far behind the demand for housing and other urban functions. Thus, housing comes up in a haphazard manner and provision of services becomes a complex challenge later on. The result is that existing urban development has a backlog of sanitation infrastructure. Even where some form of decentralised infrastructure exists, the support services are lacking. To make this worse, new areas keep getting added without sanitation, making problem solving even more difficult. While it may be beyond the scope of agencies working in sanitation to solve fundamental issues of urban planning, it certainly makes sense to acknowledge this reality and respond to it. Decentralised approaches to sanitation become more relevant in this context and so does the need for creating an ecosystem of solutions and services.

### 2.2 Unrealistic approach of decision makers and its consequences

Decision makers, both elected and appointed, tend to favour proposals for citywide sewerage networks and centralised sewage treatment plants even when it is obvious that the preconditions don't exist for making such systems work. The constraints include: no street network to connect all households, no willingness on the part of households to pay for sewerage network connections, no resources in the municipality to run the treatment plants, etc.

In India, many cities claim that they have a high coverage of sewerage (sometimes over 90 %), while in reality half the sewage may be going untreated into natural water bodies, as we discovered in the course of our sanitation planning efforts in various cities. What they actually mean is that 90 % of the streets have sewer lines in them. It doesn't mean that all houses are built on such streets. And even those that are, may not be connected to the sewer lines. In many places, sewer lines directly discharge into natural drains. As well, sewage treatment plants function far below their intended capacity due to various reasons. For example, sewers and stormwater drains are interconnected and, therefore, the treatment plants are overloaded in heavy rains and often they are just shut down. Establishing empirical evidence for the above, however would require the active cooperation of the concerned agencies, a rather difficult proposition.

A large number of households in Indian cities use pits and septic tanks, as shown in Figure 4. This is not acknowledged as a reality that will continue for many years to come. Therefore, there is no focus on creating or even supporting FSM services that address pits and septic tanks. The absence of such services makes it difficult to implement the next level of improved decentralised sanitation, such as DEWATS. In the absence of support services, such as regular desludging, the decentralised sanitation infrastructure also functions at suboptimal levels. In any case, FSM becomes a major concern in such situations.

### 2.3 Capacity limitations of urban local bodies

For the last few decades, development funding bodies (like donors, lenders, etc.) have been trying to promote an approach where cities take responsibility and ownership of urban management projects. However, this approach has met with limited success. In many countries, municipal bodies still work on government grants and are controlled by higher levels of government. City sanitation planning presumes that cities have a culture of planning and implementation. The unfortunate reality is that most do not. They are used only to implementing programmes launched by higher levels of government. Therefore, plans that are meant to be owned and implemented by the city usually flounder. These plans are only prepared because it is a precondition for securing funds from higher levels of government. Plans are only used to justify projects.

## 3. A viable approach for city level sanitation planning

This section presents the author's view on what could be a viable approach to city level sanitation planning, given the ground realities and challenges that have been described in the previous section.

### 3.1 Correlating the sanitation approach to the urban development process

The sanitation gap in cities should be addressed through a two-pronged strategy:

1. Ensure that new urban development happens with sanitation infrastructure and support service.
2. Cover the backlog in already developed areas.

New urban development in most cities happens in pockets in the urban periphery; therefore, decentralised approaches make more sense. Since there are significant disparities in income, there should be a diverse set of approaches tailored to address different classes of new urban households. For example, large apartment complexes, gated communities, etc. should be persuaded to implement full-fledged treatment and reuse systems, while lower income areas could have septic tanks and soak wells with a system of support services to manage the faecal sludge.

Addressing the backlog in already developed areas is a more challenging task, especially in areas with limited street access. A wider range of solutions will need to be innovated for addressing the backlog in such areas.

### 3.2 Developing an ecosystem of decentralised sanitation services

Since decentralised sanitation infrastructure seems to be an inescapable reality, it is important that a concerted effort be made to develop an ecosystem of services to support such infrastructure in each city. This could include the following:

- Producing prefabricated units, components, etc. for installing new decentralised sanitation infrastructure (including their repair and maintenance)
- Providing services for faecal sludge collection and transportation
- Constructing faecal sludge treatment plants (including their operation and maintenance)

These services could be delivered by a combination of municipal and private sector entities. To ensure sustainability in the long run, it is important that we create an environment to make private sector service delivery

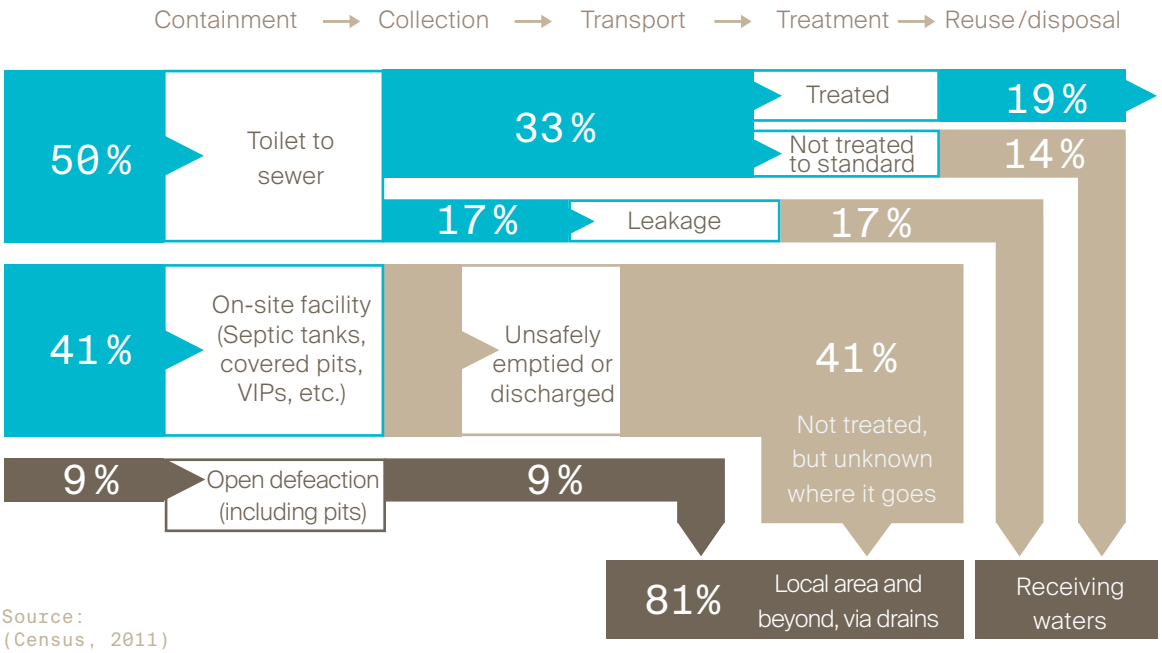



**Figure 4**
Shit flow diagram of urban India

viable. It is extremely important to run an effective awareness campaign to generate demand for good sanitation infrastructure and services. It is also important to build capacity in the municipality and among private vendors.

### 3.3 Programme approach rather than a project approach

As mentioned before, city level sanitation planning often presumes that cities have a culture of planning and implementation. Such plans are usually translated into a set of discrete projects that can be implemented individually and are effective independently. However, as explained earlier, decentralised sanitation infrastructure is ineffective without an ecosystem of decentralised sanitation services to support it. Therefore, a programme approach should be adopted, working with multiple cities in a region. Multiple initiatives are required to make such a programme successful. The initiatives could include:

- Awareness campaigns to build a critical mass of public opinion in favour of good sanitation practices
- Programme for capacity building in municipalities
- Programme for private sector vendor development
  - Manufacture of prefabricated components
  - Design and construction
  - Provision of sanitation services
- Programme for building and operating faecal sludge treatment plants
- Programme for use of treated faecal sludge and effluent

Over a period of many years, municipalities will internalise these approaches. A gestation period may be required to transition from municipality owned and operated systems to a combination of public and private sector, and eventually to largely privatised operations.

## 4. Conclusion

It is the author's contention that in contexts where municipal autonomy is limited and the culture of planning and implementation is absent or weak, citywide sanitation plans should aim to create an ecosystem of decentralised sanitation services. Creating this ecosystem requires a programmatic approach supported by agencies that can sustain a handholding effort over a long period of time.

# Integrated municipal service provision as a solution for sustainable development

CHRISTIAN GÜNNER, HAMBURG WASSER, HAMBURG, GERMANY

## 1. Introduction and approach

Municipal service providers for water and sanitation are presently facing various challenges and megatrends, like climate and demographic change, population growth, scarcity of water, surface and groundwater pollution, increasing surface sealing, and energy efficiency issues.

Furthermore, an increasing consumption of pharmaceuticals requires alternative and costly treatment technologies, and new and stronger floods and heavy rain events place an additional burden on the service providers. Costs for operation and maintenance of water and wastewater infrastructure tend to exceed the possibilities of municipalities. Fundamental system changes are difficult due to very long depreciation rates of very expensive facilities (such as sewers, pipes, and machinery).

Municipal service providers are interacting in a demanding sphere of conflicting expectations and goals. On one side, the (private and public) owners have a certain profit expectation. On the other side, the owners expect affordable service provision for the population, sustainable infrastructure, as well as adaption of the service portfolio to the needs of clients and changing external circumstances. At the same time, the new Sustainable Development Goals (SDGs) emphasise a need for safe and reliable water and wastewater management in the context of sustainable cities and communities.

To address the present challenges, manage the expectations and goals of public and private owners, and foster the realisation of SDGs, it is therefore not only necessary to optimise existing water and wastewater infrastructure, but to develop and implement new systems if the circumstances require change.

To shape a sustainable future, we need to start thinking in systems. This means:

- Managing the municipal water infrastructure with an integral and holistic perspective by:
  - Moving away from a solely technology-related perspective
  - Including ALL stakeholders
  - Thinking out of the box and creating new synergies
- Regarding full life cycles of municipal water infrastructure
- Making use of technological progress
- Considering the use of different water streams for diverse user types (for example, using greywater for watering roadside trees; using rainwater for industry)

- Integrating all municipal service providers and creating new business alliances and models for the water sector

HAMBURG WASSER, as one of Germany's largest publicly owned water and wastewater utilities, has started the process of 'thinking in systems'. As such, HAMBURG WASSER developed a demand-oriented, sustainable business model for integrated public service provision (Günner, 2008).

The HAMBURG WASSER sustainable business model for integrated services is based on 3 pillars, as shown in Figure 1:

- Blurring the boundaries between infrastructures: Technical development should be cross-factorial, such as wastewater/energy, waste/energy, energy/telecommunications, wastewater/gas, etc.
- Decentralisation of services and activities (promoting on-site technologies): For example, integrating and using wind energy and photovoltaic instead of central coal and nuclear power plants; using (self-made) biogas; using local instead of long distance heating, using decentralised combined heat and power plants and/or geothermal and solar energy; efficient energy use, smart metering, etc.

- Regarding wastewater as a resource (for example, separating partial streams; decentralised usage of distinct wastewater components)
- Providing an enabling legal framework
- Shifting the paradigm that wastewater and stormwater are a burden; they are indeed economically usable resources

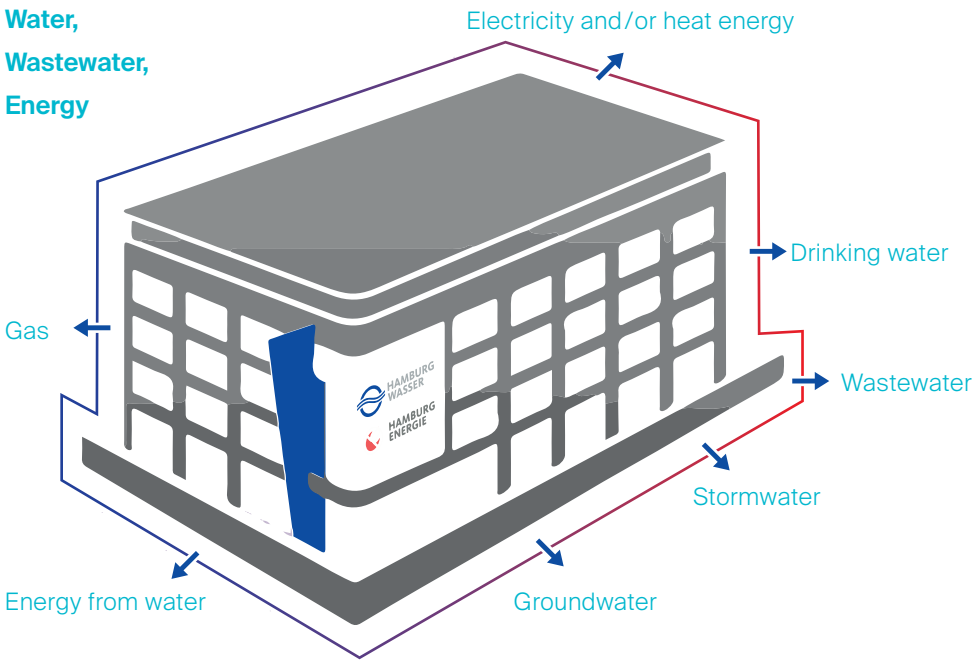



**Figure 1**
Integrated services of HAMBURG WASSER

- Centralisation of responsibilities and know-how for municipal structures of general interest within the city: For example, direct and comprehensive customer services and contact with local authorities and stakeholders; gathering and bundling of competencies to comply with legal, policy-related, procedural, financial, technical and communication requirements; creating synergies, etc.

The model is strongly demand-oriented and allows for flexible adaptation and incorporation of changing circumstances.

**2. Examples of implementing HAMBURG WASSER's sustainable business model for integrated services**

The Hamburg water supply company (Hamburger Wasserwerke GmbH, HWW) and the public sewage disposal company (Hamburger Stadtentwässerung AöR, HSE), both financially independent companies, were combined in 2006 to create the group of companies HAMBURG WASSER (HW), fully owned by the city of Hamburg. Responsibilities for the urban water cycle were combined in the hands of HW (see Figure 2). Only the city's surface waters are still managed by the authorities of the city of Hamburg. Within the new organisational structure, processes and services for urban water infrastructure were combined and synergies created. Redundant structures were minimised and the overall organisational efficiency increased significantly.

The integrative path was further followed in 2009 when HAMBURG ENERGIE, a subsidiary for renewable energy supply, was formed. Today HAMBURG ENERGIE delivers $CO_2$ neutral energy to more than 100,000 customers in Hamburg (citizens and businesses).

Parallel to this, HW continuously develops new technologies, work processes, and services, such as the following:

- Developing the HAMBURG WATER CYCLE®, a closed-loop wastewater management for a new residential area in the city. It generates heat and power from the settlement's own sewage.
- Developing cross-sectoral technical solutions
  - Generation of energy through wastewater as a resource (economical value)
  - Separation of partial wastewater streams and decentralised usage
  - Utilisation of different wastewater streams for different purposes
  - Creation of new business alliances and models
- Establishing the eco-estate Karlshöhe as an information and environmental education centre in Hamburg (information, environmental education, acquisition)
- Generating heat for buildings or businesses from untreated water, potable water, wastewater, and sewage sludge
- Constructing and operating wind turbines on its own sites
- Processing digester gas into biogas and feeding it into the municipal gas grid
- Initiating the Rain Infrastructure Adaptation project to explore solutions and opportunities to deal with changing stormwater conditions (due to increased surface sealing and climate change), a cooperation between the environmental authority of Hamburg and HW

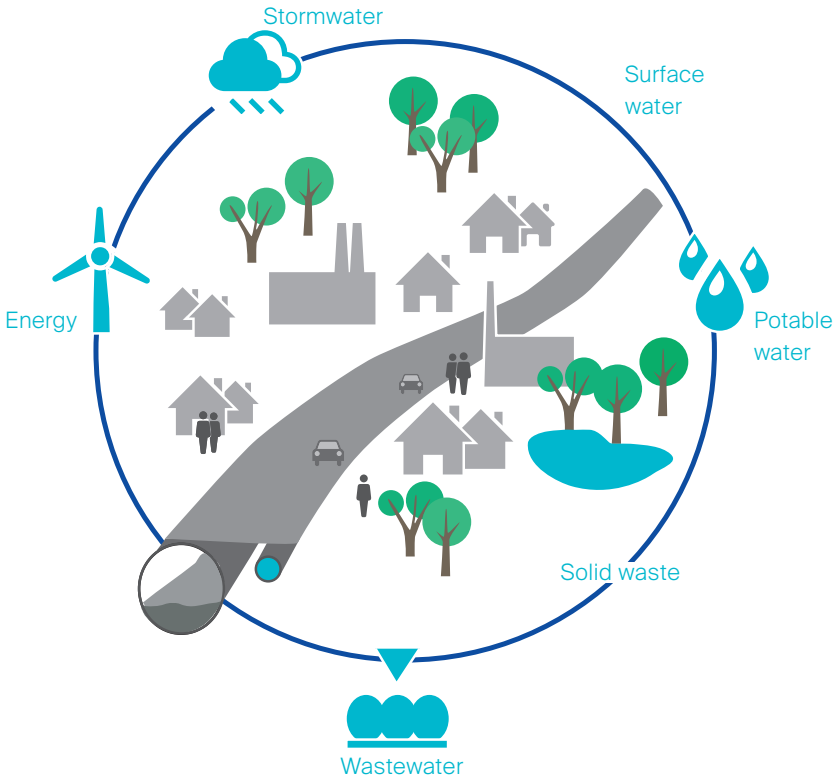



**Figure 2**
Sustainable cities and communities through integrated public service management

- Recycling phosphorus economically from sewage sludge incineration ash
- Implementing full energy self-sufficiency for the wastewater disposal process for the city of Hamburg (i.e., calculated as a balance of input and output of electricity, heat, and gas)

HAMBURG WASSER is on the way to:

- Blurring boundaries between infrastructures
- Developing on-site flexible and smart technologies
- Applying an integrative approach

### 3. Results and conclusion

To meet the SDGs and address the challenges of our present society, it is necessary to change the management patterns for water and wastewater service provision. A structural shift towards an integral and holistic management is required—we need to start thinking in systems.

Allowing for change on a global scale comprises establishing new alliances for strengthened municipalities and public companies. Operator partnerships between public utilities on a regional and international scale are a useful tool to boost this process. This means:

- Establishing long-lasting South–North collaborations between well selected public operators
- Using a peer-to-peer coaching approach (for example, twinning expert teams from both utilities)
- Making available expertise of all hierarchical levels of the water utility
- Allowing for institutional accompaniment
- Linking technical and nontechnical spheres (see Figure 3)

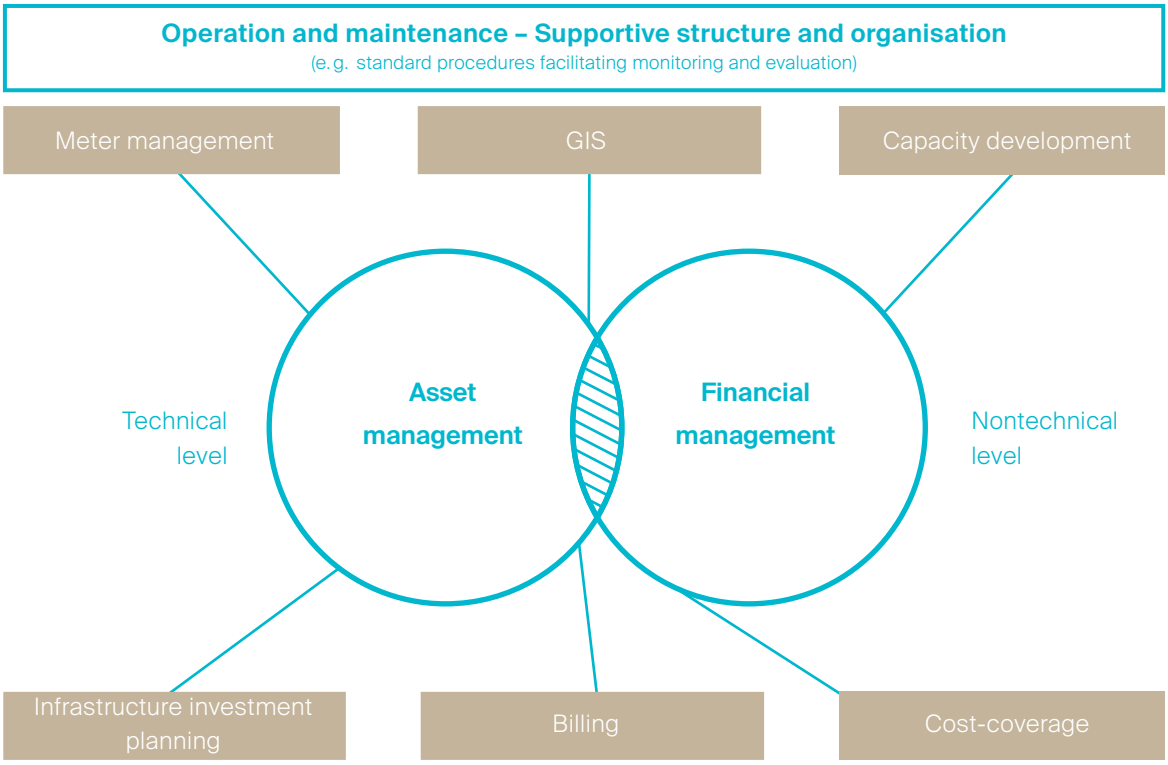



**Figure 3**
HAMBURG WASSER approach for linking technical and nontechnical spheres

The HAMBURG WASSER practice for operator partnership is driven by a process-oriented approach and the understanding of a water utility as a system. By doing so, a sustainable quality improvement is achievable in the operation and maintenance of water and wastewater infrastructure for the partner utility.

The German Water Partnership (GWP) is currently fostering the twinning of public water utilities. The GWP aims to make use of Germany's municipal water sector knowledge and experience for new types of development cooperation projects in the water sector. Therefore, alternative financial models and changed tendering procedures are necessary and stakeholders need to be involved (e.g., public utility representatives from the South and North, donor agencies, representatives from the German ministries, consulting firms).

Investments in water and wastewater infrastructure without responsible operators are like a car without a driver or a fish without water. Therefore, any investment should always be accompanied with capacity development of people and organisations.

**References**

Günner, C. (2008). Water management in Hamburg - HAMBURG WATER: Challenges and visions. Australian-German Workshop. Melbourne, Australia.

# The need for gender sensitive planning in sanitation

PETRA KOHLER, EAWAG-SANDEC, DÜBENDORF, SWITZERLAND

**1. Arguments for genderised sanitation**

It is obvious, that men and women follow different practices, encounter various challenges, and have different needs and priorities when it comes to sanitation. For example, men urinate in a different way than women, and women spend around six years menstruating in their lives (UNICEF and WHO, 2008). On average, each woman will dispose of 125 to 150 kg of sanitary material in her lifetime. In the developing world, many of these materials end up in waterways, open dumps, or litter communities (Bharadwaj & Patkar, 2004). Such differences and challenges have to be taken into account to ensure appropriate sanitation facilities for men and women.

Taboos surrounding human waste have resulted in a lack of attention for inequalities in access to sanitation. Especially in public spaces, particular groups (such as women, elderly, children, and people with disabilities) are more strongly affected by the absence of adequate sanitation in terms of their health, safety, dignity, mobility, businesses, and community interaction. Worldwide, still around 2.6 billion people – nearly half the population of the developing world – live without adequate sanitation (WHO and UNICEF, 2015). To address sanitation needs, especially gendered ones, we have to learn to dismantle the taboos around faeces and other intimate topics around bodily functions, such as menstruation.

Women and girls especially encounter various problems connected to inappropriate sanitation. Regarding safety and health issues, violent acts – even rape – have been reported when walking to a public toilet or to a place for open defecation. Moreover, women also risk urinary and genital tract infections from waiting too long to urinate or from inappropriate washing facilities (Amnesty International, 2010; Fisher, 2006). In addition to health issues, women are confronted with gender-specific social norms, like taboos, which often hinder proper hygienic habits during menstruation, also challenging their dignity (Kohler et al., 2015).

Girls' school performance is also influenced by sanitation. Many girls do not attend school due to the lack of or inadequate school sanitation, especially in secondary schools where menstrual hygiene becomes an issue. School absenteeism and dropping out lead to gaps in education between girls and boys (Sommer, 2010).

Women and men have a right to feel secure, comfortable, and respected in their dignity when practicing their daily hygiene. The challenge lies in integrating such a perspective into the sanitation planning process.

## 2. The need for innovative participatory approaches

Projects attempting to increase sanitation coverage and usage will undoubtedly confront and influence existing social relations, and hence power relations, wherever they operate. Gender relations must first be understood in their context. A mere representation of women in water and sanitation committees does not fulfil the requirements of a participatory approach.

Does participation of women in planning meetings translate into their ability to, for example, select the ideal site of the toilet? An example shows that user feedback and participation in the design process is not necessarily a guarantor of success. In rural Rajasthan, India the participation of women in planning meetings did not translate into their ability to, in a male-headed household, select the ideal toilet site. In fact, the freedom to travel away from the home to defecate, and the privacy of disposing menstrual material far from the house meant that the male-selected courtyard toilets removed all of these liberties and safety mechanisms (O'Reilly, 2010). This women-centred project lacked a truly gendered understanding of the context; one which would have resulted in technologies that considered, and then fit the expectations of both the men and women (Tilley et al., 2013).

Gender considerate sanitation technology should reach beyond the concept of a "project for women only" and must be embedded in the understanding of intimate needs, personal hygiene, social constructs of dignity (like perceptions of purity and impurity), and the social positions of women and men in the community.

## 3. Gender sensitive approach: tools for gender sensitive planning

Adequate sanitation must be gender sensitive. Therefore, it needs to recognise and highlight the management of sanitation needs, the conditions of (future) sanitary facilities, and (non) access to sanitation and its consequences. As well, the social aspects of technology need to be considered, such as investigating the cultural norms and emotions surrounding human excreta and menstruation.

An approach we are applying in an ongoing research project seems to be a very promising operational tool when it comes to gender sensitive planning in sanitation, in our case in hospital settings in rural areas. Our interdisciplinary project, combining social anthropology and gender studies with sanitary engineering, is researching users' needs and water, sanitation and hygiene (WASH) infrastructure in health-care facilities, particularly how they deal with the special needs of women during menstruation, pregnancy, and childbirth. The research aims to provide data on the sanitary requirements of the various user groups (including patients, visitors, and staff members) of health-care facilities, and address the gendered realities of intimate needs in the face of inadequate or poorly designed infrastructure (Kohler et al., 2015).

Up to now, there is lack of gender-disaggregated data for WASH performance, leading to insufficient provision of specific services, especially for women. Our approach not only respects, but highlights gender dimensions and gender specific issues by addressing and integrating them from the beginning into the project planning and design of the methodological procedure.

The project, still ongoing, assesses the state of sanitary infrastructure in four selected public health centres in India and Uganda. Due to the sensitivity of intimate sanitary needs and hygiene practices, the methodological challenges were addressed by applying a proven technique from the participatory rural appraisal repertoire. The specific needs and priorities of the different user groups (like patients, visitors, and staff members) were explored using the Gender Action Learning System (GALS). This assessment of users' needs was supplemented by semi-structured interviews with key stakeholders and gatekeepers from the medical divisions, management, and health authorities (Kohler et al., 2015). The data (still under analysis and interpretation) will provide evidence for possible interventions that are needs-based, technically appropriate, and socially acceptable (Kohler et al., 2016 forthcoming).

GALS is an applied tool for gender sensitive planning. It is a focus group discussion

method, originally used for gender justice in relation to livelihood improvement (Mayoux, 2010). It has been tested in a previous research project in different cultural contexts (Kohler et al., 2014 and Kohler, 2013) and adapted to the realm of gender and sanitation in health-care facilities. GALS has proven its strength in investigating local knowledge – the needs, concerns, and priorities of local people. It is also particularly known for its gender sensitivity because it promotes the collection of gender-disaggregated data and gender-mixed plenary discussions. Furthermore, it can capture the views of illiterate people, as it allows for non-written contributions (like drawing symbols and discussions) (Kohler et al., 2015).

**4. Practical tools for gender sensitive planning**

How can complex planning processes, like gender sensitive planning in sanitation, be translated and anchored into communal processes?

If our gender sensitive approach is applicable and effective in WASH in health-care settings (and preliminary data shows initial success), it could be adopted to sanitation planning and management in urban areas. This is provided that gender perspectives and dimensions are integrated from the very beginning of the project design and all planning guidelines are followed.

Based on success stories in urban sanitation planning, the approach of the community-led urban environmental sanitation (CLUES) planning has great promise. CLUES highlights the importance of broad community involvement (beyond the household level) in the planning and decision-making processes. The main characteristics are: a multi-actor and multi-sector approach accounting for water supply, sanitation, solid waste management, and stormwater drainage in urban areas, which emphasises the participation of all stakeholders from an early stage in the planning process (Lüthi et al., 2011).

Applying innovative gender sensitive approaches, like GALS, in combination with the CLUES planning tool is worth testing to provide demand-driven sanitation services for a greater spectrum of users – not just women – and make interventions more acceptable to the community as a whole.

**References**


Amnesty International (2010). *Risking rape to reach a toilet: Women's experiences in the slums of Nairobi, Kenya.* London: Amnesty International.

Bharadwaj, B. and Patkar, A. (2004). *Menstrual hygiene and management in developing countries: Taking stock.* Mumbai: Junction Social.

Fisher, J. (2006). *For her it's the big issue: Putting women at the centre of water supply, sanitation and hygiene.* Geneva: WSSCC.

Kohler, P., Renggli, S., Abu Atukunda, V., Niwagaba, C., Sakthivel, R. & Lüthi, C. (2015). Sandec News 16, Dübendorf: Eawag.

Kohler, P., Lanz, K. & Bieri, S. (2014). *Research methods for sensitive information: Avoiding mismatch in development interventions.* NCCR North-South Deliverable. Bern: NCCR North-South.

Kohler, P. (2013). *Intimate needs – public effects: Assessing methods to elicit delicate topics in development research and practice.* Interdisciplinary Centre for Gender Studies. Bern: NCCR North-South.

Lüthi, C., Tilley, E., Morel, A., & Ulrich, L. (2011). *Community-led urban environmental sanitation planning (CLUES).* Dübendorf: Eawag/Geneva: WSSCC/Nairobi: UN-HABITAT.

Mayoux, L. (2010). *Tree of diamond dreams: Visioning and committing to action on gender justice. Manual for field-testing and local adaptation GALS stage 1.* The Hague: Oxfam Novib.

O'Reilly, K. (2010). *Combining sanitation and women's participation in water supply: An example from Rajasthan. Development in Practice,* 20(1), 45–56.

Sommer, M. (2010). Putting menstrual hygiene management on to the school water and sanitation agenda. *Waterlines,* 29(4), 268–278.

Tilley, E., Bieri, S. & Kohler, P. (2013). Sanitation in developing countries: A review through a gender lens. *Journal of Water, Sanitation and Hygiene for Development,* 3(3) 298-314. DOI: 10.2166/washdev.2013.090

WHO/UNICEF (2008). *Progress on drinking water and sanitation: Special focus on sanitation.* Geneva: WHO.

WHO/UNICEF (2015). *Progress on sanitation and drinking water: 2015 update and MDG assessment.* Geneva: WHO.

# Infra-de-structuring Africa's urban revolution

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## 1. Introduction

There are powerful arguments against using planning instruments and procedures from the North in many African, and particularly sub-Saharan, urban contexts. In recent years, academic publications have called attention to this.[1] If there are arguments against North planning, then there must be analogous arguments to advance alternative and decolonised South-centred planning approaches. These arguments can derive prominently from the diachronic analysis and critique of asymmetric power relations. The exploitative control and distribution of infrastructure are significant factors in the case against the former and in favour of the latter. Indeed, infrastructure is one of the key elements that allow these relations to be positioned within a political, ideological and moral inquiry, and within one that allows for building alternative technical planning concepts.

Complementary, informal social and technical relations evolved and are still developing dependently and independently as undesired side effects of cohesive planning approaches – they are both the result of exclusionary and complementary designs of infrastructural systems and an expression of on-going African urbanity. This urbanity gains momentum in spatial and social voids where governments fail to provide services, but it also consolidates through technical and social evolution and innovation, including the development and appropriation of decentralised infrastructures that allow for a different construction and use of physical space. Strengthening these practices can help build social spaces in accordance with people's resourcefulness, needs and demands. While many of the examples in this essay are from Mozambique, cross-references with other settings position the main phenomena in the continent's wider geographical context.

## 2. Planning frameworks

The advent of urban order planned by administrative apparatuses originated in sub-Saharan Africa in the programmes and deeds of colonial administrations and complementary colonial actors. Here, urban planning was a tool for the functional instatement of colonial systems, and it provided an orderly layout and control of central administrative and transportation nodes and the spatial arrangement of its main institutions. It helped to build the logic of colonial societies by providing the spatial scaffolding for the construction of a

1 For instance, Roy, A. (2005). Urban Informality: Toward an Epistemology of Planning. *Journal of the American Planning Association*, 71(2), 147–157; Watson, V. (2009). Seeing from the South: Refocusing urban planning on the globe's central urban issues. *Urban Studies*, 46(11), 2259–2275.


**Figure 1**
Inhambane indigenous neighbourhood (Arquivo Histórico Ultramarino, Lisbon)

social environment that obeyed the interests of a power centre located elsewhere. It was therefore one among many sets of practices, instruments, rules and legislations exported by mainly European imperial powers to distant territories, and adjusted according to their interpretation of context and increasing determination to shape local conditions. Despite this being a top-down approach, its specific content evolved together with the modern planning profession, which cross-referenced colonial experiences.[2]

The core motive for domination of Africa during several successive periods of colonial rule was the creation of favourable economic conditions that strengthened empires' hegemonic interests and helped secure profit. This guiding principle translated into the development of subsidiary supply economies based on extractive industries and agricultural production. Local sub-Saharan African populations were forced into the respective cycles of colonial economies by means of coercive exploitation, including forced labour, debt bondage (termed, for instance, *chibalo* in some Portuguese colonies in Africa) and levying taxes (such as the hut tax). To satisfy the demand of such taxes, populations had to submit to unfavourable labour relations that could generate surplus income, thus surpassing customary subsistence production as well as established traditional forms of exchange.

This economic coercion was simultaneously coupled with spatial segregation, severely reduced liberty, and lack of choice regarding mobility and residential location. In colonial urban and regional planning concepts, segregation was reinforced by the design of specific areas for populations according to racial or ethnic origin. This is precisely the point where the relationship between planning and infrastructure provision becomes crucial. Residential areas for local populations on the peripheries of newly created or existing urban centres consolidated over time into dense settlements that usually lacked adequate service provision. The mid-20th century plan for the peripheral *bairro indígena* (literally: indigenous neighbourhood) of Inhambane in southern Mozambique, for instance, depicts a main water line with seven public taps serving a residential area of about half a square kilometre[3] (Figure 1). Analysis of aerial photography

2 For instance, Garth Andrew Myers and Jennifer Robinson reference the relation between centre and periphery in imperial British urban planning, as well as the exchange among colonial urban planners from different European powers. (2011) Cities, connection and circulations in Africa. In Adjaye, D. *African Metropolitan Architecture, Vol. I Essays* (p 31). Rizzoli.

3 Photo of plan taken in the Arquivo Histórico Ultramarino, Lisbon

shows that neither the planned school nor market were built, even though they were located in a part of the plan that was actually implemented. This level of service provision contrasts with the generously spaced and well provided for colonial urban centre with its coverage of basic and social infrastructures (e.g., consolidated roads, individual unit water supply, sewerage, electricity, schools, hospital). Here, as elsewhere in Africa, the city centre enjoyed much higher infrastructure coverage, and planning conformed to higher standards.

Scarce technical and social infrastructure is common for the traditional African countryside – and probably for almost any traditional rural area around the world for that matter. In the city, however, the absence of technical and social infrastructure has very different consequences for sustaining dense urban agglomerations and their populations. The absence of infrastructure and services raises, next to questions of spatial justice, issues of social development and public health. From the mid-19th century onward, emerging urban planning coupled with large-scale technical infrastructure provision and investment flourished across Europe as a model for well-functioning industrial societies. Large sewerage systems became best practice for containing cholera and other public health risks. Well into the 20th century, at a time when citywide public sewerage systems had been established in European metropolises, urban planners of the British Empire still propagated the *cordon sanitaire* around the world as a means to mitigate health risks for colonial staff and their families. This did not bring forth any benefit for local populations on the other side of such strips. Yet, the basic health and livelihood predicament on that other side was precisely the result of the relation of exploitative economic policies, segregated planning practices, and strategically calculated low infrastructure provision, with the latter two feeding comfortably into the former.

The structural framework of this situation has continued through African independence and the negative conditions have multiplied in most places since the 1960s. Many African societies continue to suffer from weak and unbalanced economic foundations and are dependent on extractive industries and agriculture.[4] Consequently, urban centres lack adequate job opportunities in the formal sector. The implications of economic development still condition low and poor quality infrastructure services to the majority of urban dwellers and contrast with the investments made in large technical infrastructure systems that pave the way to exploring the continent's natural resources. Planning mechanisms are still similar or the same as during colonial times[5] – despite the advent of geographic information systems (GIS) and other tools. Even though political framework conditions have changed considerably, this has not yet produced different spatial development models, notwithstanding the contemporary reiteration of sustainable city development on one side and the unchained post-independent African urban landscape on the other side.

Planning practice – with future development its declared object of desire – is still very much indebted to the colonial legacy. The plans that technical staff draw for neighbourhood expansion projects around Mozambican municipalities still look like blueprints from colonial neighbourhood plans for local populations from the 1960s and 1970s. And some of the new and much more ambitious city expansion developments across the continent (e.g., projects for Dar Es Salaam, Lagos, or Kinshasa) show that there are powerful interests invested in carrying these structural relations relatively unaltered forward.[6] Even formally divergent plans, like the curious animal and fruit shaped plans for city extensions around South Sudan, continue to reiterate the same inherited planning concepts.[7]

All of these examples, whether modest, ambitious or unusual, seemingly rely on the provision of general technical infrastructure systems as embodied, for instance, by the

4 Edgar Pieterse points to the relation between an urbanisation crisis and narrow economic bases in African countries. Pieterse, E. (2014) Filling the void: An agenda for tackling African urbanisation. In Parnell, S. and Pieterse, E. (Eds.) *Africa's urban revolution.* London and New York: Zed Books.

5 Watson, V. & Agbola, B. (2013) *Who will plan Africa's cities?* Counterpoints. London: Africa Research Institute.

6 For a critical assessment of these and other African urban showcase projects see Watson, V. (2013). *African urban fantasies: Dreams or nightmares? Environment and Urbanization*, 215–231.

7 See Wainwright, O. & Greenall, T. (2012, January 16) *Animal Urban Plans*. Retrieved from www. bdonline.co.uk/animal-urban-plans/5030476.article

sewage treatment plant located at the end of the tail of the giraffe-shaped layout for a new town near the city of Wau, South Sudan. Whether and when this infrastructure will actually be delivered is frequently unclear. For some projects, like the Cité du Fleuve in Kinshasa, it is to a large extent a requisite. However, whether the scarce resources for infrastructure development should be capitalised by projects whose prime prospective clientele are expatriates and people looking for investment opportunities is another question.

**3. Alternative development**

Thinking about alternative methods and ways to incorporate infrastructure into urban development can open new planning perspectives, especially by referring them to questions of settlement practice and economic development. This relation becomes tangible by looking again diachronically at planning practice paired with de facto urbanity. For at the origin of exclusionary and exploitative colonial spatial and economic planning also lies alternative settlement practice. Initially, this was not reflected in official provisioning and planning. A telling map of Ibo Island from 1885 indicates in curved writing in Portuguese above the meticulously mapped colonial core on a seemingly blank territory simply "Neighbourhood of the blacks among palm trees."[8] The map clearly reflects colonial economy, as even the palm plantations were an important pillar of the colonial economy and imported by the Portuguese from Asia, and testifies to the ideological foundations supporting planning. Yet, here as elsewhere, social life prospered in parallel to the colonial city, combining resources differently and building society by way of miscegenation of traditions and imported systems.

During the latter part of the 19th and first half of the 20th centuries, local settlements on the outskirts of the dynamic colonial capital of Maputo also show these hybrid infrastructure schemes. Over time and in correspondence to the outward expansion of the urban core, populations on these outskirts were pushed outwards. As no land rights were involved in these processes and little record of such settlement activities are documented, few traces of past urbanity remain. Yet, the fact that populations who were the pillars of urban economies lived on these fringes in transitional suburban settings is a clear indicator that some sort of infrastructure also existed. This infrastructure may not be readily recognisable as such at first sight and might require some enlargement of the concept of infrastructure itself. It actually may curiously include the absence of formal infrastructure and the placement of nature as infrastructure: In the first colonial capital on tiny Mozambique Island, for instance, the limited territory led to successive displacement, resettlement and densification processes spanning several centuries that culminated in a clear North-South division between the colonial city and the local neighbourhoods. As a result, around twelve thousand people now crowd into an area of less than one-third of a square kilometre lying partly below sea level with very few latrines and severely restricted space available for upgraded sanitary solutions, forcing people to defecate into the sea.

This also sheds some light on the question of "What is planned?" What appears to be entirely unplanned and even contradictory to planning, is actually, in most instances, a reflex of planned actions or, at the very least, conditioned by it. Additionally, such apparently unplanned action is not entirely unplanned, but a process that draws on collective and individual decisions and resources, on rudimentary and residual infrastructures, on the collateral and the precarious, and on local materials and local relations – and their friction with imported ones. These processes obey an inherent planning logic based on customary behaviour and socially tested and conditioned solutions. They are driven by low-resource, low-capital investment and low-comprehensiveness; have a short-term horizon; and very often lack the legal basis that characterises public planning. This is what offsets *informal planning* from public planning. However, this sort of planning is generally both innovative and circumstantial, which accounts for the spatial and social malleability of the respective local systems

8 The referred map is the *Planta cotada da Villa do Ibo* and published, for instance in Carrilho, J. (2005) Ibo. *A casa e o tempo* (p.24). Maputo: FAPF.


**Figure 2**
Modern decentralised infrastructure elements for sale in Inhambane

they generate. In that context, socially tested solutions can actually emerge quite quickly. What is usually misunderstood in assessing parallel urbanities is that it is not the spatial structure of formal social organisation that brings about development and against which informal development evolves, but that it is joint social action and social innovation that generates development by way of corresponding spaces advancing on both sides of the formal-informal divide.

Innovation of late has also increased on both sides through the electronic and telecommunications revolution. Mobile phones are changing people's communication behaviour and ability all over Africa (and penetrate as far into the countryside as telecommunication companies extend their networks), but also other forms of social relations (such as exchange through virtual money services like the Kenyan-developed m-pesa). Photovoltaic energy recharges phones and other appliances. These technologies are also handled and maintained by people in the informal sector. In some West African countries, economic sectors emerge from the processing of residual electronic equipment. These systems and their adaptive handling are interesting because of their decentralised and flexible structures.

Traditional industrial elements and products that compose infrastructural systems are being increasingly used in an analogous fashion. Their contribution to the functioning of urban life can be reassessed on the knowledge that the analysis of new, decentralised technologies have introduced into urban studies in recent years. This is the case with minibus transportation industries that more or less liberally provide for their own routes and schedules, or improvised systems of urban goods transportation by single axis manhandle carts, called *chovas* (derived from the English verb *shove*) in Mozambique, that are built in part from the scrap of obsolete motorised vehicles. It is also the case with connectivity practice where electricity cables zigzag from house to house, or where water is provided by flexible plastic hoses, which do not require regular street patterns beyond the few axes that host the main pipes. On the sewage side, the ubiquitous peri-urban latrines are upgraded through concrete latrine slabs, which, in Mozambique for instance, are part of the products that are or were promoted by aid agencies and government campaigns, but have also found their way into the private market and small-scale production by shops owners and artisans. Add to this plots that are redrawn and subdivided circumstantially according to competing public, semi-public

and private practices involving modern and traditional entities and where family compositions are changing quickly. The result is a more flexible city with a complementary set of infrastructure hardware providing for its evolution.

Paul Jenkins offers the following description of this process: "What is happening in Maputo peri-urban areas is *possibly* a form of gradual suburban development with slow improvements in house consolidation as well as infrastructure."[9] This practice is common for suburban development in Mozambique and is precisely a practice where new technologies and off the grid infrastructure, fragmented infrastructure systems, decentralised waste collection, individual sewerage systems, and buildings circumstantially used as public, offices, or private residences (which easily change in function or intensity of use) jointly produce a malleable urban form.

What does this mean for planning? If these resources and realities were incorporated into planning, this would certainly generate alternative approaches that contrast the belief that integrated planning needs to derive all the way down to the single unit from an overall spatial concept. Rather, infrastructure development, as a sum of small and large actions competing in space, should be what informs planning concepts. Framed like this, planning could become something else, and, if decentralised infrastructure is to a large extent a means for local development (just as centralised infrastructure is to a large extent a means of global, national or overall urban development that is supported by Northern planning), then planning decentralised infrastructure strategically can bring about beneficial economic development and urban order. So far, we have only scratched the surface of what decentralised infrastructure can and will provide.

It is fairly clear that basing integrative urban solutions on technical master planning alone simply does not provide for the majority of African urban populations. Therefore, planning should not be measured by looking at how infrastructure systems could perform or are intended to perform, but for whom they actually do perform and are likely to do so in the future. What is the net benefit of large integrated systems compared to local solutions, for instance, regarding wastewater collection, if effluent is not treated at the end of the line? What is the advantage of rational functional planning, if plans rule out local solutions and do not lead to significant added sustainability in the overall built environment or provide added comfort for inhabitants themselves? And why should we rely on imported recipes of sustainability in places where environmental footprints of large percentages of populations are sustainable until the moment when they are incorporated into the logic of larger structural change?

Much of what is outlined in the section above is feeding into urban upgrading practice, which derives from intimate and first-hand interaction with realities on the ground. However, it does not reflect much in planning models. By analysing the implications and the phenomenon of urban reality, scholars like Ananya Roy and Vanessa Watson draw attention to the necessity of formulating planning approaches that provide an alternative to established Northern planning instruments and are also rooted in the urban reality of the global South. Such South-adapted planning is likely to evolve as a more consolidated concept of adjusting and reinventing planning tools and crossbreeding them with actual spatial development patterns beyond the already well-established concept of urban renewal. It is not in the scope of this brief contribution to provide more than an attention call for the possibilities that arise from a triangulation between *infra-de-structured* planning based on social development, de facto urbanity and differentiated infrastructure services. Exploring the planning implications, however, can create promising chances for alternative urban development and help shed a different light on current debates about urban resilience and sustainability.

9 Jenkins, P. (2013) *Urbanization, urbanism and urbanity in an African City: Home spaces and house cultures* (p. 211). Basingstoke and New York: Palgrave Macmillan.

# How to make urban and sanitation planning work?

## Lessons learnt from West Africa, South East Asia, Madagascar, and Haiti

JULIEN GABERT, GRET, NOGENT-SUR-MARNE, FRANCE

### 1. Introduction

In preparation for the 2015 BORDA Symposium, BORDA had asked GRET to address the following questions:

- What are the main challenges to make sanitation programmes at the municipal level successful?
- What bottlenecks and mistakes in international cooperation should be avoided?
- What is needed from national and local players and the international community to ensure integrated management of used water and sanitation (especially for the West African region)?

This presentation paper will give some suggestions to answer these questions, based on the experience of field projects in Africa, Southeast Asia, and Haiti. Starting from GRET's strategic frame for action in water and sanitation, the presentation will first focus on strengthening local actors in the sanitation sector, before investigating the three axes that are necessary to implement an integrated approach. Finally, some mistakes that should be avoided and some advice to ensure integrated management of used water and sanitation will be presented.

**Figure 1** (left) Sanitation mapping in Madagascar

**Figure 2** (right) Faecal sludge treatment plant operated by a local municipality

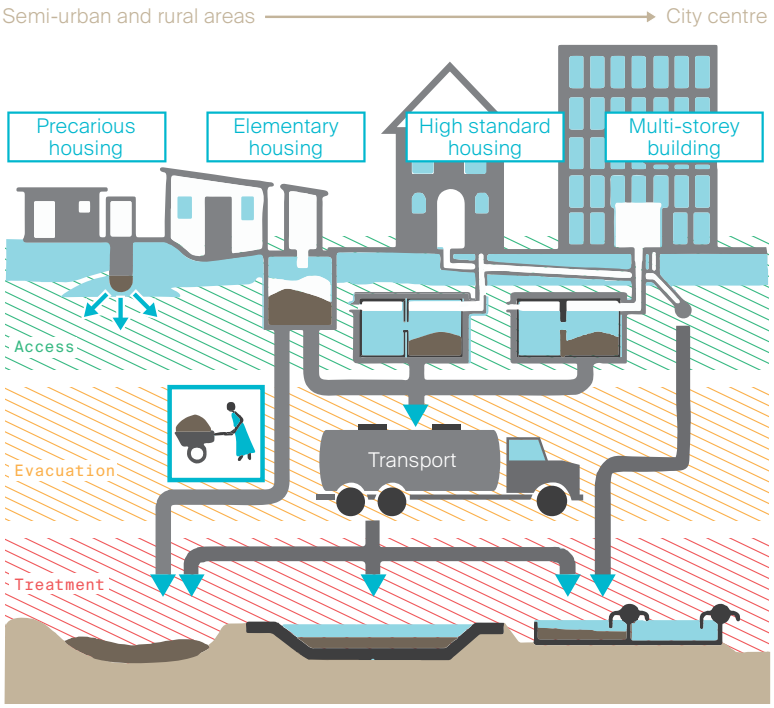



**Figure 3**
Complete sanitation chain (Projection Network)

**2. Strengthening the sanitation sector actors**

Capacity building of the actors in the sanitation sector is one of the main objectives of GRET's projects. This ensures that sanitation services will be correctly delivered to its users over the long-term. GRET's capacity building takes place through the following three types of actions:

1. Training: Theoretical and practical trainings are delivered so that local actors can learn their roles and responsibilities, and how to put them into practice when providing sanitation services.
2. "Learning by doing" over the long-term: Through implementing field projects, local actors actually experience what they have learnt during the trainings, ranging from local diagnostics to service delivery and follow up.
3. Technical assistance: GRET builds long-term partnerships with local sanitation actors and assist, train and accompany them over the years to be fully operational in providing sanitation services, which are often something new for these actors.

Two actors are especially targeted by GRET for capacity building: sanitation service owners and sanitation service providers.

Service owners (generally municipalities or national utilities) are supported in their responsibilities, including sanitation planning, service definition, service implementation, control of sanitation services, social role, etc.

For example, in Antananarivo, Madagascar, local sanitation authorities have been trained on how to conduct sanitation mapping and how to control the faecal sludge management services that are delivered by local operators.

In Diawara, Senegal, the municipality conducted local water and sanitation planning which was implemented with GRET's assistance over 10 years, including: water supply system (2008–2012), solid waste collection and treatment (2012–2015), rainwater management (2014–2016), and wastewater management (2014 to present).

Local service providers are professionalised on technical solutions, management schemes, communications, service user relations, financial management, etc. For example, Sanimart (toilets stores) managers in Mauritania have been trained on the production of moulded toilets, on small business administration, and on marketing communications to sell their products.

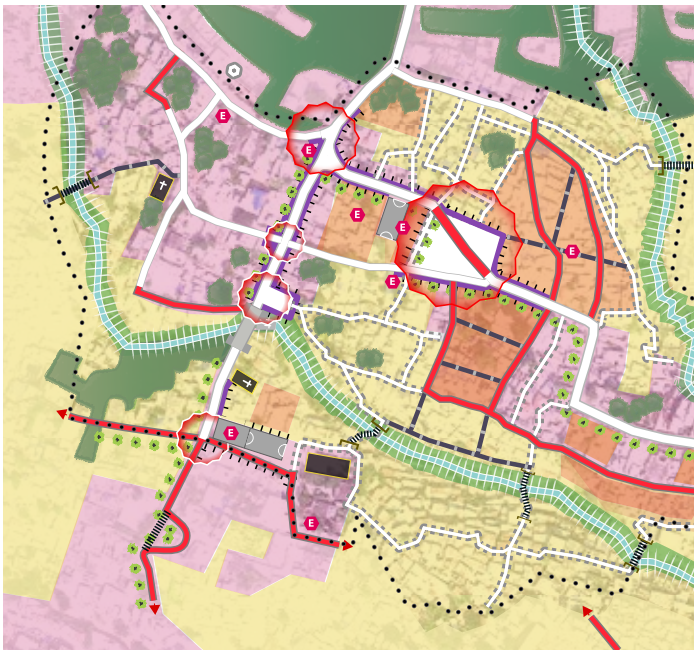
### 3. Three axes for implementing an integrated approach

An integrated approach must be used for a sanitation service to operate in an effective manner over the long-term. All sanitation projects and services should address the following three axes for an integrated approach:

1. Take into account all segments of the sanitation chain, including access to sanitation, waste water collection and treatment. Sanitation is not only restricted to toilets, as shown in Figure 2.
2. Propose actions based on in-depth diagnostics and local sanitation planning.

To adapt to the local context, a sanitation service must be defined and designed based on a diagnostic of the real field situation, such as existing sanitation solutions and actors, socioeconomic aspects, urban and physical constraints, etc. This diagnostic is used to define a realistic local sanitation plan to guide interventions over a period of five to fifteen years. Ideally, sanitation planning should be integrated into a local urban master plan to take into account interactions with other services that can interfere with sanitation (e.g., solid waste management, water systems, stormwater management). As well, sanitation can be relevant with other urban actions.

3. Take into account all aspects of sanitation:
   - Stakeholders: Management systems must be clearly defined, and local actors must be supported in their roles and responsibilities.
   - Communication: A strategy must be defined to correctly implement awareness raising campaigns and marketing communications.
   - Technical: Adapted, affordable, and relevant solutions must be chosen and designed taking into account local constraints, and technical and financial capacities.
   - Financing: Financing schemes covering the operation and maintenance costs of sanitation services must be implemented, so that these services can be delivered over the long-term.



### 4. Bottlenecks and mistakes in international cooperation to avoid

Two main problems arise in international cooperation concerning the current funding of sanitation projects and services:

- Short-term funding cannot succeed in implementing a sustainable sanitation service. From the initial diagnostic to effective service delivery, many phases must be implemented (e.g., land tenure, environmental administrative procedures, validation from all stakeholders, appropriation, consultation with residents). Some of these phases are time-consuming and not compatible with the traditional three-year project funding approach used by most donors. For example, in Madagascar, the environmental procedures needed for authorisation to use a new faecal sludge treatment station take between 18 to 24 months. Under these conditions, a minimum five-year programme approach is needed. As a reminder, in France, it takes eight to twenty years between the day it is decided to build a new wastewater treatment plant and the day the plant starts being operational.

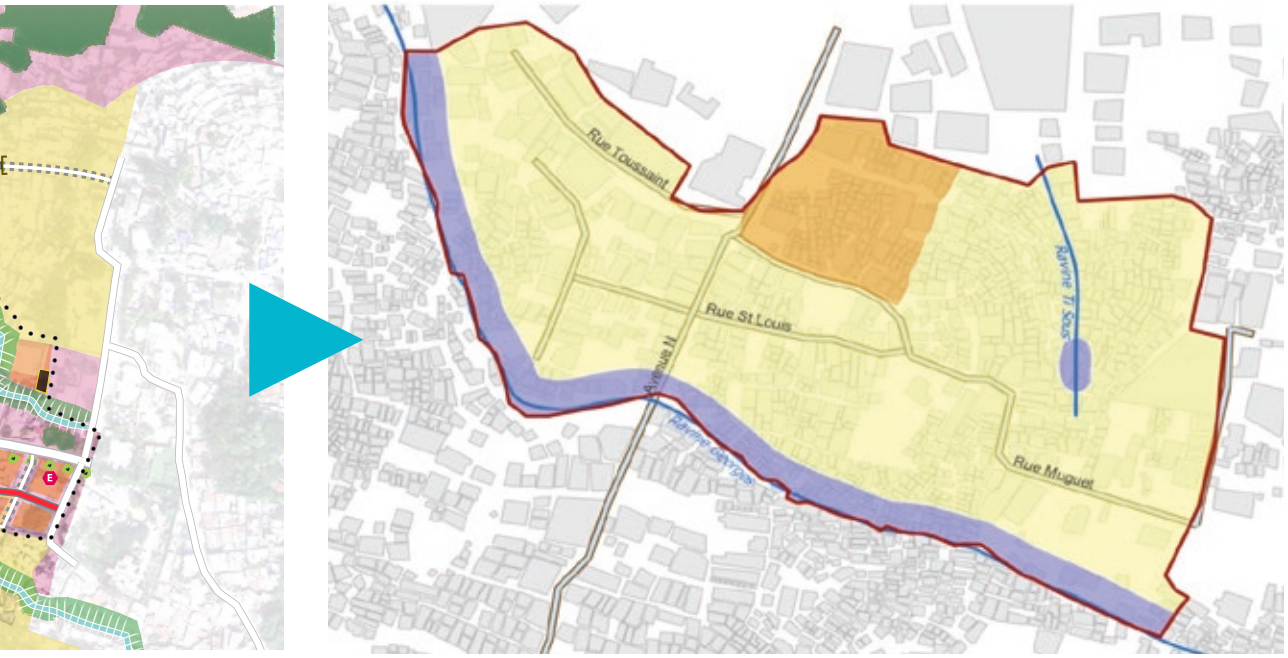



**Figure 4**
Urban master plan and sanitation mapping of the Baillergeau district in Port-au-Prince, Haiti

- Funding in the sanitation sector is still too focused on building infrastructure and not enough on human resources and soft activities (e.g., long-term capacity building). At the same time, innovative approaches for sanitation services are needed to deal with the current challenges and to reduce infrastructure costs and funding. For example, when innovating in a sanitation market-based approach in Mauritania, GRET succeeded in lowering the price of a toilet from € 100 to € 60, and lowered the subsidy needed from € 94 to € 24 per toilet. This approach first needed to invest in skilled human resources, but has now multiplied four times the impact of a given infrastructure subsidy fund.

**5. Integrated management of used water and sanitation**

First of all, as discussed earlier, sanitation actors in the international community should implement a vision taking into account the complete sanitation chain. A first step in this direction has been taken when going from the Millennium Development Goals, which focused on toilet building, to the Sustainable Development Goals, which will deal will collection, transport, and treatment of wastewater. Indicators and observations of the complete sanitation chain must now be defined and implemented to help monitor progress.

Secondly, sanitation projects and programmes should also focus on small- and medium-sized cities, which are currently quite forgotten by sanitation actors. These cities do not have the means, nor the capacities, to deal with their own sanitation problems.

Finally, national and local players and the international community must be aware of the need for realistic and adapted sanitation planning and solutions. For example, on-site and decentralised sanitation solutions should be more systematically investigated, even in large cities. Sewerage systems are not "the ultimate sanitation solution" and they are usually far too expensive for locally available funds. Decentralised and modular sanitation services and solutions often provide far more adapted alternatives, and support a progressive approach that is more relevant with local finances (e.g., modular sludge treatment plants built in Antananarivo, Madagascar during the Miasa project, as shown in Figure 1).

# Participatory approach to the progressive implementation of sanitation services in eThekwini

TEDDY GOUNDEN, ETHEKWINI WATER AND SANITATION, DURBAN, SOUTH AFRICA

## 1. Introduction

The eThekwini Water and Sanitation Unit (EWS) has the responsibility of managing water and sanitation services to the more than 3.4 million people living within the eThekwini Municipality. In 1996, the boundaries of the municipality were extended to create a Metro, and then again in 2000 to become a Unicity. These changing borders resulted in an increase in the number of households with no access to water or sanitation being incorporated into the EWS service mandate.

It was realised that in order to meet the different demands of service delivery to this diverse customer base innovative solutions needed to be found. Within eThekwini, the most basic form of sanitation present in areas not linked to the water borne sewerage system were pit latrines, both unimproved and improved, many of which were already full. Dense informal settlements had limited services, with open defecation taking place or home-built pit latrines being utilised. Water supply to these areas was also problematic. In addition, South Africa is a semi-arid country with less than half of the world's average annual rainfall. Water demand management is therefore a key factor in the roll out of water and sanitation services within municipalities, with the need for water and sanitation to be provided as a package.

EWS embarked on a process of identifying ways in which service delivery to these areas could be provided which was equitable, environmentally, socially and financially sustainable, and technically excellent.

Support for innovative thinking and a participatory approach was provided at a national government level through the Department of Water and Sanitation by policies such as the *White Paper on Water Supply and Sanitation* (1994, revised in 2011), the *White Paper on Basic Household Sanitation* (2001), and the *National Sanitation Strategy* (2005).

## 2. Identifying Challenges

The main challenges faced by EWS in the provision of sanitation services included:

- Identifying systems suitable for the various areas (e.g., rural, dense informal settlements, new housing estates)
- Increasing awareness and education
  - Lack of awareness among new customers as to the correct use of sanitation systems
  - The need to educate customers and increase acceptance of sanitation systems
  - Changing the perception that the flushing toilet linked to a sewerage system is the *gold standard of sanitation* and that there are other more appropriate systems

**Figures 1**
(left top and bottom) Settlements in eThekwini

**Figure 2 (right)**
Community ablution block

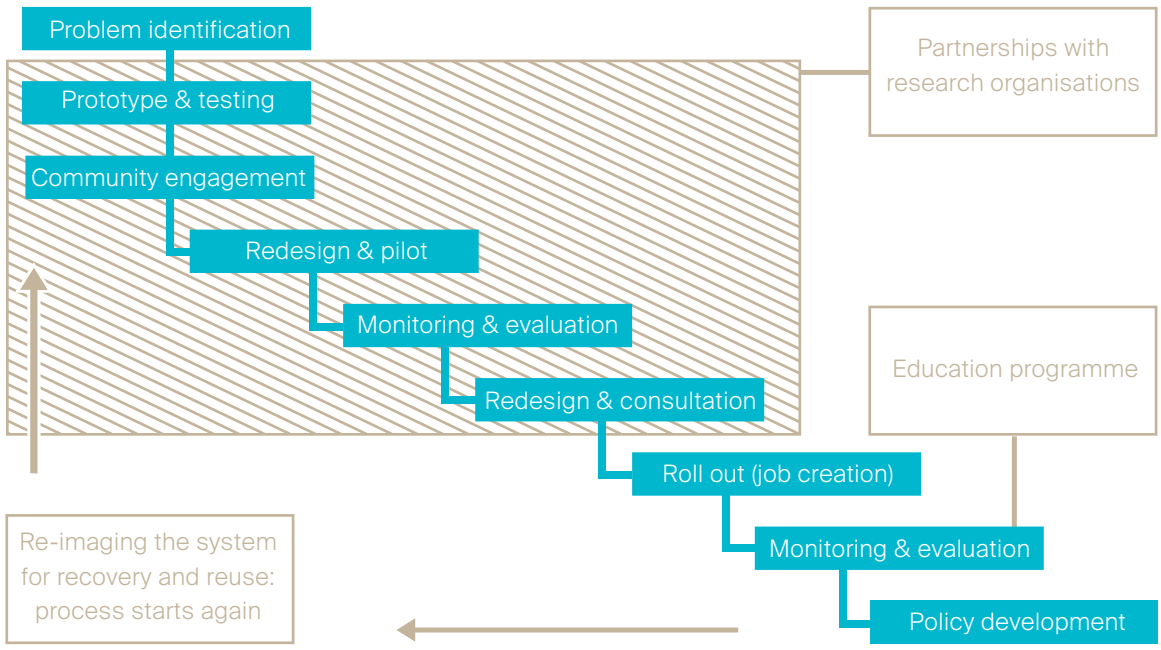
### 3. Overcoming challenges

In identifying sanitation systems for each of the very different areas, a decision was made to not wait for the *perfect* solution, but to rather follow a *learning by doing* approach. The best available technology was implemented followed by technology improvements and policy amendments based on lessons learnt from surveys and community feedback (represented in Figure 3).

For example, dry sanitation (like urine diversion toilets [UDTs]) were identified as the most appropriate solution for rural areas. More than 85,000 UDTs have been installed since 2002 and during the roll out of this programme, various modifications and improvements have been made to the toilets based on user feedback via surveys and community forums. This led to improved, more robust design of the top structure, inclusion of a child seat, and a free emptying service planned for 2016.

In other areas of the municipality, low flush toilets are also being trialled where between one and two litres of water are required per flush. The toilet is also designed such that no solid waste can be disposed in it (apart from toilet paper), thereby preventing trash from entering the toilet leach pits.

**Figure 3**
Decision making process for the roll out of water and sanitation technologies within eThekwini Water and Sanitation



In informal settlements, sanitation is provided by means of community ablution blocks (CABs) with toilets, showers, wash basins, and laundry facilities. Through interaction with the community, caretakers are employed from the area to maintain the CABs and paid by the municipality. Toilet paper and cleaning materials are also provided by EWS. Regular feedback sessions are held with the community members to ensure that all concerns are heard and taken into account where possible.

Increasing population growth and the establishment of low-cost housing estates has meant that EWS has to look to further innovative sanitation solutions for communities. This has led to the implementation of decentralised wastewater treatment systems which operate with minimal electricity and produce a final effluent that meets general discharge standards. Research into using the effluent for agriculture is ongoing and a pilot plant, together with agricultural trials, has been established in Newlands Mashu (north of Durban) where municipal councillors and community members can be exposed to this solution (see Figures 4 and 5).

An education and awareness programme (initiated in 1997) works alongside the service provision programme to ensure continuous interaction with the target communities, awareness and education in the proper use and management of the services, and to monitor the acceptance, problems and successes of the services delivered. Tools used to interact with the communities include brochures (in English and isiZulu), street theatre, school programmes, clinic visits, radio, and an education centre at a wastewater treatment works.

**4. Success factors**

Key success factors of this participatory approach include:

- Strong political support for innovative thinking on a national, provincial, and municipal level
- Involvement of community leaders
- Various participatory community forums
- Good technical capacity within EWS
- Implementation supported by research through memorandums of agreement with tertiary educational institutions
- Continuous monitoring and evaluation by independent parties

**Figure 4** (left) Newlands Mashu research site

**Figure 5** (right) Agricultural field trials

# Modern infrastructure for managing used water in Europe:

## The result of a progressive implementation process

RAIMUND MEYER AND WIEBKE WEMMEL, MUNICIPAL WASTEWATER MANAGEMENT AND DRAINAGE, UMWELTBETRIEB BREMEN, GERMANY

The way wastewater is handled in Bremen has a long history. The past 150 years have had a significant effect on this development. The rapid industrialisation and urbanisation in the second half of the 19th century in Germany had an increasing impact on wastewater in the fast growing cities. The population of Bremen rose from 36,630 at the beginning of the 19th century to 82,969 in 1871 and to up to 265,711 people by 1913, see Figure 1.

The “bucket” was a common solution to get rid of sewage, household garbage and other waste in the 19th century, in which the waste was collected and later put on the street. From here, the buckets were emptied and picked up by farmers from outside of the city. Street-drainage facilities in Bremen at that time were not designed to handle the increasing quantities of wastewater produced in the more and more densely populated city. Like in other parts of Germany, poor sanitary conditions led to waterborne diseases. Typhoid fever and cholera epidemics were permanently present. When the outbreaks peaked in 1892, municipalities were forced to take action. To respond to these epidemics and shortfalls in urban planning, Bremen also needed to find a solution for cleaning the streets and alleys from urine and faeces.

Unlike other municipalities, such as Hamburg, Frankfurt or Berlin which responded with rapidly building a centralised sewer network, Bremen, comparing the costs and time needed, decided to replace

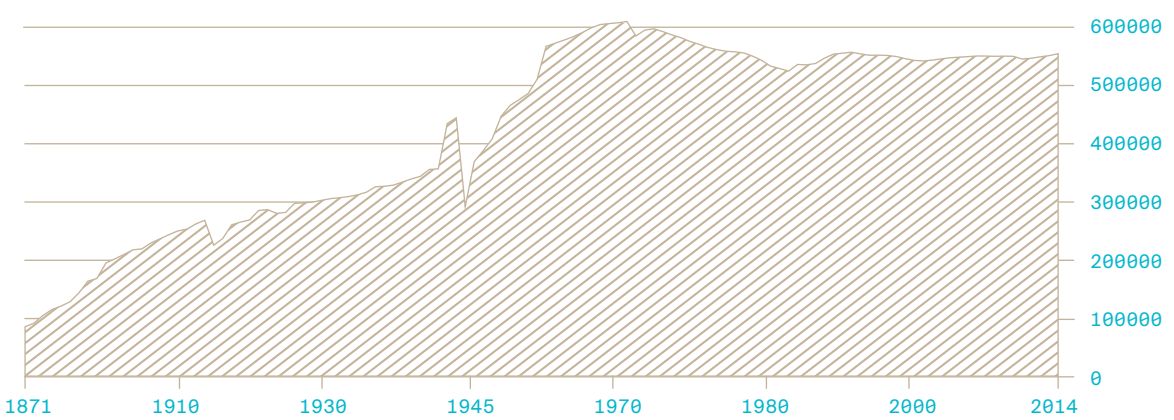
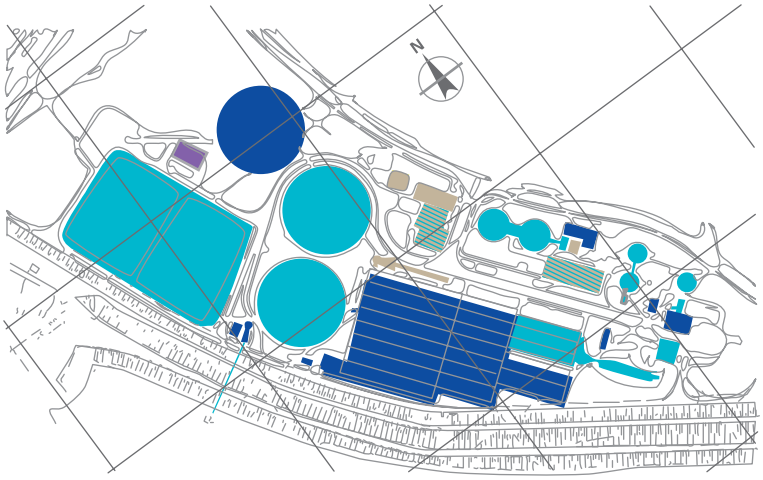



**Figure 1**
Bremen population 1871–2014 (Statistisches Landesamt Bremen, 2015)

**Figure 2**
Construction phases of the treatment plant Bremen-Farge (PFI Planungs-gemeinschaft GbR, 2013)




the "bucket" with the "bin". The bin collection and disposal was assigned to one single company, called "Schieten-Alfes", who was paid for its services by the City of Bremen. The company's business concept was to collect the sewage in town, operate a "Poudrette Factory" and sell the fertiliser to famers. Unfortunately, for Bremen, the demand for Poudrette fertiliser was not as high as assumed since at that time inorganic fertilisers had become popular. Thus, the costs for the sewage disposal, which the company demanded from Bremen, were rising. Another affordable solution needed to be found. Nearly forty years later than other major German cities, Bremen decided in 1903 to expand the existing sewer system to a waterborne sewer system. By 1906 the number of bins used was reduced from 30,000 to only 6,000.

In 1910, the first public works authority was established in Bremen. The challenge of how to drain the low-lying urban areas of Bremen into the receiving waters had to be met. The sewer system was further extended and three electrical pumping stations were installed from where the wastewater was collected and pumped, via an 11 kilometre forcemain, into the river Weser. To protect the pumps, primary treatment (in the form of a grit chamber, screen, and settling tank) was constructed.

In the Second World War nearly 60 % of Bremen's infrastructure was destroyed. The population decreased from over 400,000 to 290,000 people in 1945. Subsequently, reconstruction of the sewer network was one main long-term objective. In the following 20 years, the population in Bremen rose rapidly again. New urban districts were built and the outskirts were equipped with a separate sewer system.

The first mechanical wastewater treatment plant was built in 1966 in Bremen-Seehausen. Seven years later, in 1973, a second wastewater treatment plant with mechanical and biological treatment was established in Bremen-Farge. This plant receives the wastewater from the Bremen-North catchment area.

In spite of these improvements, the river Weser suffered from anoxic conditions in 1976 and needed to be artificially aerated. Four years later, the main treatment plant in Bremen-Seehausen was equipped with biological treatment to improve the water quality of the river Weser. In 1986, further measures were taken and a river protection programme "Mischwasser 90" was implemented.

The mass death of harbour seals in the North Sea in 1988 served as incentive to implement strict regulations for surface water nutrient reduction in Germany. The


**Figure 3**
Administrative organisation of wastewater management in the municipality of Bremen

first Earth Summit held in Rio de Janeiro in 1992 and the Agenda 21 had further impacts on local activities.

The public utility "Bremer Entsorgungsbetriebe" was founded in 1992. In the following five years, the nutrient removal capacity (tertiary treatment) of the two wastewater treatment plants was enhanced. The wastewater fee was increased from DM 3.95 (€ 2.00) to DM 5.20 (€ 2.65) in 1996. Even today, the fee has been kept at that level.

The municipality of Bremen decided to partially privatise Bremer Entsorgungsbetriebe. In 1999, the joint venture hanseWasser Bremen GmbH was formed. Today, the municipality of Bremen holds 25.1 % of hanseWasser Bremen GmbH and is solely in charge of the statutory duties of wastewater management. All operational works were assigned to the hanseWasser Bremen GmbH, see Figure 3.

The European Water Framework Directive was passed in the year 2000, and the environmental policy requirements and regulations became stricter.

Against the background of the political decisions to reduce carbon dioxide ($CO_2$) emissions in the federal state of Bremen in 2010, hanseWasser launched the "kliEN" programme. Its goal was to reach carbon neutrality in 2015. By 2014, up to 45 million cubic metres of wastewater per year was treated carbon neutrally in the wastewater treatment plant Bremen-Seehausen.

Today, 150,000 properties in Bremen are connected to the gravity sewer system, which has a total length of 2,476 kilometres (km). The majority of the sewers are built as a separate system (1,762 km), while 714 km of sewers form a combined system for wastewater and stormwater. Additionally, 176 km of forcemain and 183 pumping stations are needed to transport the water to the treatment plants. The stormwater retention storage capacities of the sewer system, reservoirs and overflow tanks add up to a total volume of 270,000 cubic metres.

The sewer system delivers an average of 50 million cubic metres of wastewater and stormwater annually to both treatment plants. The Bremen-Seehausen plant handles an influent between 130,000 to 432,000 cubic metres per day, depending on whether stormwater needs to be treated or not. Annually, 44 million cubic metres are treated in Bremen-Seehausen, which would fill an imaginary cube of roughly 350 metres per side. Compared to this, the volume of around 5 million cubic metres of wastewater treated annually in Bremen-Farge appears small. Figure 4 shows the design capacity of the wastewater treatment plants.

In the past years, the two municipal wastewater treatment plants have achieved

a treatment efficiency of over 94 % for total phosphorous and chemical oxygen demand (COD) and 84 % for total nitrogen. The European Union Urban Wastewater Treatment Directive requires a reduction of 70 % for nitrogen, 75 % for COD and 80 % for phosphorous, which has always been met.

The annual discharge rates of combined sewerage overflow in Bremen lie far below the legal requirements. The overflow from retention basins is mechanically pre-cleaned. Since 2002, the discharge can be automatically monitored and remotely controlled from the control centre at the wastewater treatment plant Bremen-Seehausen.

Industrial wastewater is polluted by various production processes and usages. Substances that cannot be adequately treated in municipal wastewater treatment plants (such as heavy metals) need to be pre-treated in appropriate treatment facilities before being discharged into the sewer network. Today in Bremen, 1,056 indirect dischargers are monitored and their compliance with the threshold limit values is verified. Furthermore, regular annual inspections and periodical sampling of 375 dischargers are mandatory.

It is a challenge in Germany to reach 100 % self-sustainability for the energy demand of sewage treatment. Therefore, in the past five years, the energy generation of the treatment plants was increased and the energy consumption reduced. With the installation of a wind turbine that generated up to 5,000 Megawatt hours per year in 2013, the wastewater treatment plant Bremen-Seehausen produces today more energy than it needs and is able to feed power into the public grid, see Figure 5.

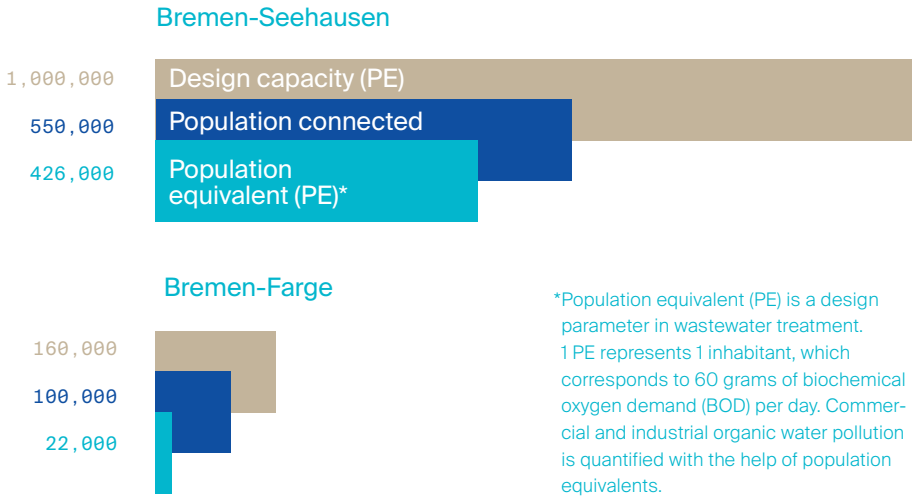
On today's agenda, there are investment strategies for the sewer network and the wastewater treatment plants. The majority of the sewers, pumping stations, and other constructions are over 60 years old and need to be gradually rehabilitated. Sewer pipe rehabilitation is based on optical inspections and evaluation of the sewer conditions. Once every 10 years, all sewer pipes (2,476 km) are inspected and classified.

To enhance its climate change resilience, Bremen is developing a concept for integrated urban stormwater management and stormwater flood simulation.

The German Federal Environment Ministry has also published a draft law, according to which, by 2025 the soil-related use of sewage sludge has to end and the recovery of phosphorus and other nutrients from sewage has to be undertaken. Currently, one-third of Bremen's sewage sludge is used for farming and the rest is incinerated. Against the background of the upcoming changes, a sound sewage sludge strategy and a solution to the mandatory phosphorus recovery need to be found.

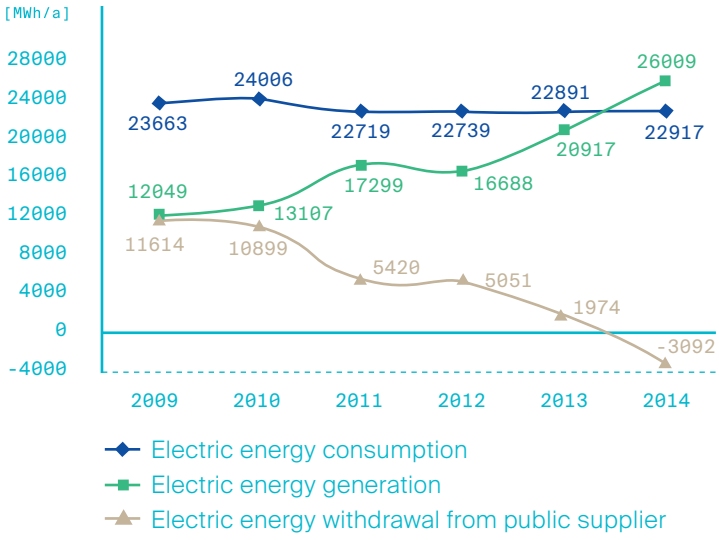
A major task for the future will be the question on how to eliminate micropollutants in wastewater, which to date have not been taken into account in wastewater treatment. Micropollutants are, for example, pharmaceutical residues, antibiotics or chemicals displaying hormone-like effects. Since contemporary treatment technologies are not able to remove these trace substances, implementing additional treatment steps, such as special membranes, carbon adsorption or oxidisation processes, might be necessary. To date, there are no legal limit values defined, which could serve as guidance for decision makers while planning a prospective fourth wastewater treatment stage.

**Figure 4**
Treatment capacity of Bremen's wastewater treatment plants (Senator für Umwelt, Bau und Verkehr der Freien Hansestadt Bremen, 2015)




*Population equivalent (PE) is a design parameter in wastewater treatment. 1 PE represents 1 inhabitant, which corresponds to 60 grams of biochemical oxygen demand (BOD) per day. Commercial and industrial organic water pollution is quantified with the help of population equivalents.

**Figure 5**
Changes in energy consumption, wastewater treatment plant Bremen-Seehausen (hanseWasser Bremen GmbH, 2015)




## References


hanseWasser Bremen GmbH (2015). Changes in energy consumption wastewater treatment plant Bremen-Seehausen.

PFI Planungsgemeinschaft GbR (2013). Kläranlage Bremen-Farge, Lageplan mit Ausbauphasen.

Senator für Umwelt, Bau und Verkehr der Freien Hansestadt Bremen (2015). Kommunale Abwasserentsorgung im Bundesland Bremen.

Statistisches Landesamt Bremen (2015). Statistisches Jahrbuch, Bremen.

# Establishing sustainable Operation & Maintenance and Monitoring & Evaluation schemes for Community-Based Sanitation infrastructure:

## Experiences from Indonesia

MARINA BRÜCKNER AND MIRKO DIETRICH, BORDA, YOGYAKARTA, INDONESIA

### 1. Background

Indonesia has a population of 255 million people, 52 % of them living in urban areas. Indonesia faces significant sanitation challenges with less than two percent of the residents connected to centralised sewerage systems, an open defecation rate of approximately 14 %, 50,000 deaths related to poor sanitation, and US $ 6.3 billion lost per year due to poor sanitation.

As part of the decentralisation process, the Indonesian National Planning Authority initiated a project in 2003 named SANIMAS (Sanitation by Communities) in cooperation with the Ministry of Public Works, the Water and Sanitation Program of the World Bank, as well as BORDA. SANIMAS was continued in 2006 as a national dissemination programme by Indonesian authorities in cooperation with BORDA.

According to UTS/ISF (2015), approxiamtely 13,000 decentralised wastewater treatment systems were implemented under the framework of various investment programmes (government funds supplemented by contributions from the World Bank, Asian Development Bank, and Islamic Development Band) and mechanisms applying the SANIMAS approach.

The Indonesian National Medium-Term Development Plan 2015 – 2019 aims to increase the sanitation access from current levels of 60.9 % to 100 %. Due to this plan, it is estimated that at least another 2,000 decentralised wastewater treatment systems will be implemented every year by different stakeholders.

To support the National Plan, BORDA Indonesia and its local partner organisations are implementing about 200 to 300 DEWATS each year for Community-Based Sanitation (CBS) projects throughout Indonesia, in particular in densely populated, urban and peri-urban, low-income areas.

The DEWATS CBS approach, developed by BORDA and replicated in the SANIMAS programme, fills the gap between insufficent on-site sanitation and the shortcomings of expensive conventional centralised sewerage collection and treatment systems.

DEWATS CBS projects are cost-efficent, require low maintenance, are highly demand responsive, and ensure active participation, as well as contributions from the target communities and municipalities. Communities are, for example, provided with health, hygiene and financial management trainings (in particular regarding the operation and maintenance of implemented DEWATS). As a result, a Community Action Plan is developed by the community-based organisation (CBO).

## 2. Problem description and possible solution approaches

The associated risks and challenges of nationwide dissemination of CBS lie in following areas:

- Planning and implementation phase: Implementation in connection with establishing user groups (CBOs) for sustainable Operation and Maintenance (O&M) of the sanitation infrastructure
- Post-implementation phase: Support of user groups for O&M, as well as support for municipalities in setting up a monitoring, evaluation and steering system for O&M of DEWATS CBS

The problems and solution approaches for each phase are further discussed below.

### 2.1 Planning and implementation phase

The amount of planned systems in Indonesia for the next couple of years could significally exceed the management capacity of implementing institutions. Inappropriate support, in terms of capacity development and quality management, could lead to decreased quality in DEWATS CBS Service Packages. Poor DEWATS CBS implementations could also negatively influence O&M performance, as the risk of operation failures and major maintenance issues could increase (e.g., repairs needed for low quality infrastructure).

Solution approach: Prefabrication and social Standardised Operating Procedures (SOPs)

To respond to the very high demand for DEWATS implementations, which cannot be served only by local construction companies, approaches for prefabricated DEWATS were developed by BORDA and introduced in cooperation with the private sector. The prefabricated DEWATS (supplied by certified manufacturers) not only significantly reduce construction time, but also guarantee standardisation. As such, there is higher quality technology and implementations, as well as reduced project management risks.

Besides other specified quality and performance standards, using Social SOPs is crucial for sustainably establishing CBOs, creating ownership, planning operational budgets, setting up user fee schemes, capacity building for operators and users, and linking CBOs to local governments as well as to O&M supporting agencies (such as AKSANSI, see section 2a).

### 2.2 Post-implementation phase

a) Operation and Maintenance

Nationwide standardised or institutionalised local government contributions for O&M of decentralised sanitation infrastructure do not exist yet. It is often assumed by government authorities that communities, specifically CBOs, are the only entity to conduct O&M of DEWATS CBS. Findings from WSP (2013) show that the CBOs' capacities are limited to routine O&M activities, as shown in the following table.

| What communities can be expected to manage | |
|---|---|
| Can | Clean community sanitation centre<br>Keep simplified sewer networks unblocked<br>Routine building maintenance (e.g., painting)<br>Minor repairs (e.g., taps, blockages)<br>Check inlets<br>Buy supplies<br>Manage operator |
| Maybe | De-scum settler<br>Check outlets |
| Cannot | Monitor effluent quality<br>Desludging<br>Do major maintenance<br>Do post-disaster repairs |

Therefore, local governments as the authorities in charge for the provision of basic needs services should take responsibility for major technical and non-technical O&M or outsource the respective activities to service providers (such as social entrepreneurs, non-governmental organisations) or to the private sector.

According to experiences from Indonesia, sustainable O&M could be achieved through Co-Management of the facilities by the CBOs and local governments. However, a significant constraint for this approach is the absence of clear regulatory frameworks for local governments' post-implementation role.

Solution approach: Co-Management

Founded in 2006, the Association of Community Based Organizations on Sanitation in Indonesia (AKSANSI) is an umbrella association created to accommodate the needs of CBOs and lobby the Co-Management approach. The AKSANSI Secretariat and its 28 branches provide technical, social and institutional services for more than 2,000 CBOs and various local governments, including:

- Providing technical, social and institutional expertise on demand (e.g., through a call centre and SMS information service)
- Building capacity (e.g., operator trainings) and education (e.g., O&M posters, brochures, public relations and social marketing tools)
- Conducting sanitation, health and hygiene promotions and events
- Supporting biogas utilisation (e.g., biogas task force)
- Conducting social optimisation and rehabilitation, as well as technical rehabilitation
- Providing data management, monitoring and evaluation
- Conducting or supporting the facilitation of stakeholders, policy and decision makers meetings, communications, and networking
- Enforcing the Co-Management approach and its application

After intensely promoting the Co-Management approach, AKSANSI managed to formalise local governments' O&M contributions by signing cooperation agreements (i.e., Memorandum of Understanding [MoU]) with five local governments so far. Since the National Ministry of Public Works and the National Planning Agency as well as other policy makers show high interest in the approach, it is expected that the demand for further MoUs will increase exponentially in the next years. The specific contributions of the local governments stated in the MoUs vary depending on the local circumstances, but are basically only co-financing contributions for now (e.g., for trainings, stakeholder meetings, publications, rehabilitation of sanitation infrastructure). Nevertheless, some local governments also committed themselves to co-facilitate events and CBS stakeholder meetings, or to provide office space for AKSANSI branches.

The private sector is not yet involved in the current Co-Management scheme.

b) Monitoring and Evaluation

Even though provincial government units conduct some monitoring after the first year of implementation, a structured and nationwide systemised governmental M&E system, including long-term monitoring as well as access to comprehensive and complete technical, financial or management performance data, is still missing[1].

The lack of this information hinders systematic follow-up and steering actions, in particular by government agencies.

1 Government database "Nawasis" focuses only on technical and financial aspects, see: http://ppsp.nawasis.info/?modules=other&fl=mck.rencana

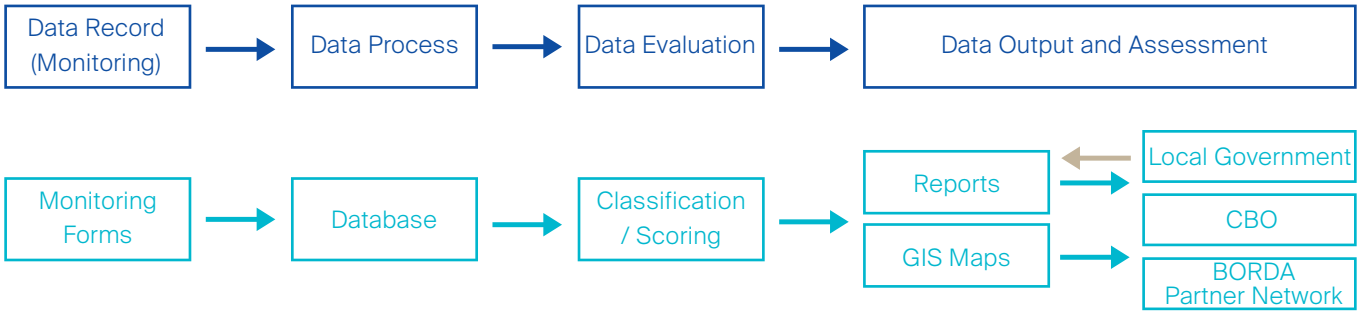



**Figure 1**
Steps and tools of the AKSANSI M&E cycle

Solution approach:
Comprehensive M&E scheme

AKSANSI is conducting M&E on technical, social, financial, and institutional DEWATS CBS performance in order to:

- Identify the DEWATS CBS situation nationwide or for specific locations as an O&M steering tool
- Inform CBS stakeholders on frequently occurring O&M issues and best practices
- Develop follow-up proposals and actions (e.g., troubleshooting)
- Lobby the needs of CBOs to local governments
- Promote the DEWATS CBS approach to various stakeholders, decision makers, etc.
- Further develop training modules for AKSANSI O&M staff, and O&M training and education tools for CBOs
- Exchange knowledge with BORDA Indonesia and its partner network for DEWATS quality management and to identify expertise support required (e.g., specific technical assistance)

Usually, AKSANSI conducts monitoring about once a year after DEWATS CBS have been implemented (about 200 to 300 locations per year) using a comprehensive on-site monitoring scheme, known as Global Monitoring. A "slim" monitoring (called Pre-Monitoring) is sometimes conducted to complete data, prepare for Global Monitoring, or on demand. Some long-term monitoring activities have also been conducted. Systemised long-term monitoring schemes have not yet been set up due to the lack of funds.

AKSANSI's database currently comprises 2,860 data sets from 2,500 DEWATS CBS locations. Of these locations, 725 have been monitored.

Since a comparable nationwide DEWATS CBS monitoring system of this scale has not been set up anywhere else, the current AKSANSI M&E system is the result of "learning by doing" combined with systematic development of M&E tools, infrastructure, standardised procedures, and staff capacity building. The introduction of prefabricated DEWATS required an adaptation of the existing forms as well as the database structure.

Figure 1 briefly shows the different steps and tools of the AKSANSI M&E cycle.

## 3. Summary of lessons learnt

### 3.1 Planning and implementation phase

- Prefabricated systems and Social SOPs contribute to high quality implementation and O&M

### 3.2 Post-implementation phase

#### a) Co-Management

- Sustainable O&M of CBS projects requires local governments to support the communities
- Co-Management can achieve sustainable O&M
- Intense awareness raising and promotion activities aimed towards local governments, and policy and decision makers are necessary to lobby CBOs needs
- Co-Management regulatory frameworks should be established
- Co-Management approaches should be developed before nationwide CBS dissemination

#### b) Monitoring & Evaluation

- Identifying the purpose of intended M&E activities is essential and should guide M&E indicators, schemes and tools development
- Data quality (i.e., complete, clear, accurate, consistent data) is crucial for useful data output and sustainable follow-up actions
- SOPs should be developed for each M&E project cycle step
- Due to changing conditions, regularly assessing M&E data and adapting monitoring tools and schemes are crucial for quality management, as well as improving planning, implementation, O&M approaches and innovations
- M&E tools, schemes and software should be flexible for future sanitation technology adaptations, increasing data volumes, and changing data output demands
- Specific capacity building for M&E staff (e.g., interview technique training, software training) is essential for data quality
- The necessity of long-term monitoring schemes needs to be communicated to policy and decision makers, and funding should be provided

**References**

Ross, K.E., Mitchell, C., Abeysuriya, Puspowardoyo, P. & Wedahuditama, F. ISF, UTS (2015). *Effective governance for the successful long-term operation of community scale air limbah systems: Mid-term Observations Report.* repared by the ISF, UTS as part of the Australian Development Research Award Scheme.

WSP (2013). *Review of community-managed decentralized wastewater treatment systems in Indonesia: Final report.* Washington, DC: International Bank for Reconstruction and Development/The World Bank.

**Further reading**

For further information on DEWATS and CBS types (e.g., simplified sewerage systems; Community Sanitation Centres), see: www.borda-sea.org/basic-needs-services.html

# New ways to finance access to water and sanitation

# Decentralised solidarity financing for access to water and sanitation for all:

## The French experience

CHRISTOPHE LE JALLÉ, PS-EAU, PARIS, FRANCE
CLÉO LOSSOUARN, SIAAP, PARIS, FRANCE

**History of French international cooperation**

**1950s** Twinnings for reconciliation between German and French towns

**1970s** Twinnings for cooperation between African and French towns following the independence of African countries

**1982** Decentralisation laws in France, which increased the competencies of the municipalities and created a framework to develop the principles of decentralised cooperation

**1984** Creation of pS-Eau at the European level, to develop the principle of the cent/m³

**1992** Decentralised cooperation law: French local authorities can lead international cooperation action by using their general budget

**2005** Oudin-Santini law (specifically for water and sanitation)

- ▷ Targeted to municipalities and any local government in charge of water and sanitation, including inter-local government groupings and basin agencies
- ▷ Can allocate up to one percent of the water and sanitation budget (painless) to undertake international cooperation actions for access to water and sanitation

### 1. The framework of the decentralised cooperation

#### 1.1 Toward a favorable legislative framework

French local authorities have a long story of partnership with local authorities from other countries. Since 1992, French local authorities can develop international cooperation actions in any sector, by using their general budget.

In 2005, the Oudin-Santini law adopted by the French Parliament allowed local authorities to allocate up to one percent of their water and sanitation budget to undertake international cooperation actions related to water and sanitation in developing countries. Furthermore, this law allows water and sanitation syndicates and water basin agencies to undertake such cooperation.

#### 1.2 Added value of decentralised cooperation

- Complementary, but independent, with French national government development aid
- Long-term partnership
- Mobilise various stakeholders and competencies from the French local authorities
- Leverage effect
- Soft support and subsidies

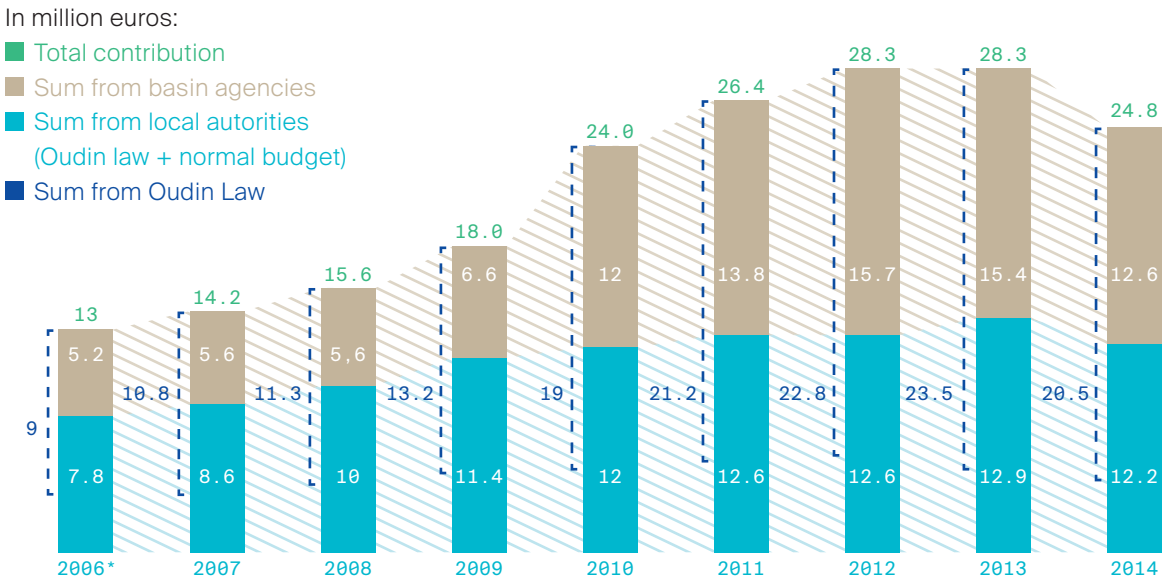



**Figure 1**
Overview of the Oudin-Santini law

*Estimation

Total 2006 – 2014: € 193 million, Total Oudin-Santini law 2006 – 2004: € 151 million (78 %)

### 1.3 Added value of the Oudin-Santini law

- Increases the competencies of French river basin agencies and water and sanitation syndicates, who could not use their resources to finance any actions undertaken outside of their territory before the Oudin-Santini law was adopted
- Increases the financial opportunities for French local authorities to finance international solidarity actions
- Collaboration between professionals having the same responsibilities of local public services
- Solidarity between citizens and water users from North and South

### 1.4 Different degrees of involvement

There are two main ways for a French local authority to be involved, they can:
1. Undertake decentralised cooperation partnership and actions managed internally or with external support
2. Create a fund with grants available for non-governmental organisations or other local authorities

### 1.5 Ten years of Oudin-Santini law: Overview of the support from French local authorities for the water sector

- Around 250 French local authorities finance international solidarity actions for water and sanitation
- Eight French actors annually give more than one million Euros each
- Some small French cities only contribute between 5,000 to 30,000 Euros, but there is a leverage effect. We estimate that one million Euros from local authorities helped to raise three to ten million Euros from various partners.

### 1.6 Qualitative outcomes

- Put the light on water and sanitation matters
- Dedicated and regular funds
- Quality improvement
- Professionalisation of cooperation actions
- Progressive focus on sanitation and urban areas
- Focus on capacity building
- Towards sustainable public services

### 1.7 Quantitative outcomes for the period 2006 – 2014

- About 190 million Euros mobilised by French local authorities (co-financing for 560 million Euros)
- 4.6 million people gained improved water services
- 0.4 million people gained improved sanitation services
- 70 % of the actions focused on rural areas
- Actions mainly focused on water supply

## 2. Case study: Greater Paris sanitation utility (SIAAP)

SIAAP is the public service utility that transports and treats wastewater every day from nine million inhabitants, including stormwater and industrial wastewater. SIAAP, with more than 1,700 agents, treats almost 2.5 million cubic meters of water transported by 440 km of main sewers and treated by six wastewater treatment plants. This has enabled a sizeable improvement in the Seine and the Marne river quality.

A public service utility founded in 1970, SIAAP became a local authority in 2000. Effective management of wastewater within its 2,000 square kilometers area requires cutting-edge skills and prospective means. SIAAP takes concrete action in terms of protecting the natural environment and biodiversity, and promoting sustainable development. It had an annual budget of 1.2 billion Euros in 2014.

**Overview of SIAAP**

4 Provinces – 23 EPCI
Board: 33 elected people

2,000 km²
8.9 million habitants
400 industries

420 km networks
6 wastewater treatment plants
3 pre-treatment plants
8 storage ponds

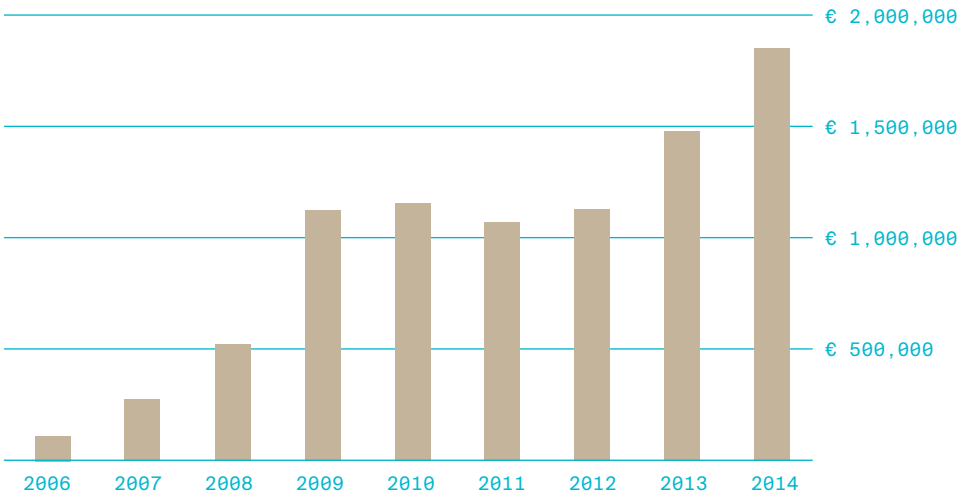
Almost 1,700 employed
Budget 2014: € 1.2 billion

### 2.1 SIAAP, an internationally committed stakeholder

Underway for a good many years now, SIAAP's decentralised cooperation policy was shored up by the 2005 Oudin-Santini law. SIAAP's locally elected representatives had a real and sustainable commitment in mind when setting up a strong, fair and effective cooperation policy aimed at sustainably improving access to sanitation in developing countries.

Specialising in the sanitation sector, SIAAP provides customised solutions developed in close liaison with its contacts, such as providing technical expertise and support for project contractors, delivering staff training and community awareness, and contributing to logistics and equipment. Its commitment is based on four key principles: (1) targeting action on the basis of existing skills, (2) listening to the specific needs of populations so as to provide an effective and sustainable solution, (3) sharing experiences and transferring skills, and (4) encouraging the population and local authorities to get involved in the projects undertaken.

**Figure 2**
SIAAP's decentralised cooperation subsidies




### 2.2 A constantly expanding budget

SIAAP's decentralised cooperation budget has steadily increased since 2006, making it possible to lend assistance to more beneficiaries, as shown in Figure 2. The potential amount available within the framework of the Oudin-Santini law was 4.42 million Euros in 2014 (1% of the sanitation levy collected that year).

In 2014, SIAAP allocated half of the available funds under the Oudin-Santini law to international cooperation; 2.14 million Euros in total, including 1.85 million Euros by way of donations. The grants paid out to cooperation partners (primarily local authorities) have made 25 projects possible in 17 countries across 5 continents.

Pure technical assistance has also been provided through "Sanitation water operator partnerships", particularly in conjunction with projects funded through bilateral cooperation by the French Development Agency (AFD).

All of the cooperation schemes conducted by SIAAP are characterised by an approach that guarantees continuity of the public sanitation service, which implies special consideration of the institutional and administrative aspects.

The SIAAP International Relations team, made up of five members including three project managers, is part of the Department for International Relations and Communication. The Decentralised Cooperation Committee brings together 18 elected members of the Board who define the cooperation policy and involvement in new projects.

For each cooperation scheme, technical assistance and monitoring is carried out by a team of three people: an elected representative working together with an international relations project manager to provide an overview and ensure that the project is relevant and in keeping with local resources (e.g., human, financial), and an engineer or technical specialist recruited from within SIAAP based on the project's specific requirements (e.g., master plan, trickling filter, industrial concern). This team conducts regular monitoring with partners abroad through distance communication and regular field missions.

### 2.3 Success factors and challenges

Because of its approach involving French local authorities, decentralised cooperation is undoubtedly a wholly worthwhile form of partnership within the context of recent decentralisation processes. There are specific success factors associated with each stage, as shown in Figure 3.

Moreover, partnerships that are forged over the long-term are unique in that they enable public policies to be implemented over time periods that better take account of the reality of the beneficiary areas. That said, since involvement in a partnership is the fruit of political will in both North and South communities alike, it is also subject to upheavals associated with electoral processes and political change.

Lastly, service continuity requires increasing the capacities of international partners. This major aspect of cooperation aims to train municipal technical teams, which are generally sorely lacking in administrative, technical, financial, and economic means for public management.

### 2.4 Tessaoua, Niger

In its first stage (2008–2010), the project set out to increase Tessaoua municipality's capacities and involve civil servants in helping to manage sanitation, promote hygiene and advance the town's socioeconomic development.

This project involved constructing a range of sanitation facilities (like public latrines, family latrines and sumps, school latrines, and water supply points). It also had a strong focus on social engineering, recruiting a municipal officer, training public and private sanitation stakeholders (such as fountain engineers, latrine managers), and providing local populations with guidance on adopting good hygiene practices.

SIAAP committed to a second stage for the 2011–2015 period, focused on implementing a rainwater management project and continuing measures to increase access to sanitation for Tessaoua inhabitants.

### 2.5 Siem Reap, Cambodia

Also known as the "Garden Village", Siem Reap is home to a wealth of built, planted, and food-producing heritage that the authorities would like to protect. This involves protecting the irrigation canals that flow forth from the Siem Reap River and water the crops, which are currently polluted by the city's wastewater. As well, such canals also provide significant plant and fish life in the gardens of the traditional Khmer houses and around the canal banks that are accessible to everyone.

The Urban Heritage Development Department of the National Authority for Protection of the Site and Development of the Angkor Region (APSARA), as the main contractor delegated to the Siem Reap province, defined a pilot sanitation project in the district of Sala Kamreuk which was implemented between 2010 and 2013. This project set out to develop sanitation that was suited to the local context and compatible with enhancing the heritage and tourism in the district; inform and raise awareness among local residents about water-related challenges and practices in terms of health and hygiene; and to strengthen municipal project ownership.

Wastewater treatment in the main canal of the Sala Kamreuk municipality involved the following measures:

- Improving water circulation in the canal by building hydraulic structures and cleaning out 3.7 kilometres of the canal. This initial phase had a major immediate impact as it made it a second rice harvest possible.

**Figure 3**
Success factors for each stage of decentralised cooperation


- Building a two-tier filter planted with reeds for treating domestic wastewater. This technique was adopted because it was easy and inexpensive to operate, the treated effluent was good quality, and the system fit harmoniously into the landscape.
- Installing individual settling pits and connecting households to the filter

### 2.6 Bangangté, Cameroon

Since 2011, the district of Bangangté and its technical and financial partners – the International Association of Francophone Mayors (AIMF), the Seine Normandy River Basin Authority (AESN), the Veolia Foundation and SIAAP – have been running a programme to improve the population's access to water and sanitation. As well as generating substantial investment for the renovation and construction of water and sanitation infrastructure in the district, the MODEAB programme aims to build sustainable capacity within local technical services and to develop a management model that is wholly adapted to the context.

Fifteen blocks of ecological latrines were built in the district's schools and markets. Hygiene awareness raising activities were also conducted with users about the safe use and appropriate maintenance of the latrines. The design of the latrines includes six cabins per block with three urinals and three toilets. Urine is collected separately, stored to sanitise it, and then used as an agricultural fertilizer. There are two pits to collect faeces: one is for direct use while the other is used for composting the stored faeces.

A district-level Water and Sanitation Authority has been also created for Bangangté. Today, it is operational and three municipal agents have been trained.

As well, to ensure the long-term viability of sanitation facilities, some complementary stakeholders have been introduced, including:

- School Environment Education Committees: Students from years three and four, supervised by teachers, are responsible for regular latrine maintenance and fertilising fields with sanitised urine. The consumables are financed by the Parents' Association.
- Market Latrine Managers: Market traders collect revenue for maintaining latrines and purchasing consumables (such as water and soap for hand-washing). They charge 50 CFA francs per latrine use, and 25 CFA francs per urinal use.

Given the context, the MODEAB partners' support of the local contracting authority provides the certainty that the work undertaken will be both effective and sustainable.

# Financing sustainable development

VALENTIN POST, WASTE, THE HAGUE, THE NETHERLANDS
KAJETAN HETZER, SOCIAL EQUITY FUND, THE HAGUE, THE NETHERLANDS

The Sustainable Development Goals (SDGs) have been signed. Governments from all over the world have committed themselves to 17 ambitious goals that are designed to end poverty, protect the planet, and ensure prosperity for all. A question that requires an answer: how are we going to finance this?

During the 2015 International Conference on Financing for Development, governments from all over the world came up with a package of more than 100 concrete measures that draw upon all sources of finance, technology, innovation, and trade that is supposed to support the implementation of the SDGs. "Financing needs for sustainable development are high, but the challenges are surmountable," said UN Secretary-General Ban Ki-moon at the opening of the conference.

We believe the world has the resources and expertise it needs to reach the SDGs, but it will have to organise these differently. With our Financing Sanitation Paper Series we share our expertise on how we can apply and blend different types of finance for the Sustainable Development Goal 6: Ensure access to water and sanitation for all. However, most finance types WASTE applies are also suitable for other SDGs.

We are not only describing sanitation financing, but have taken a broader scope of financial inclusion. The idea of not having a toilet is perhaps as outlandish to many as the idea of not having a bank account, or not being insured, or not having any arrangements at all for old age, or more in general, not being able to access financial services. Yet, for many people having no toilet and being financially excluded is the reality.

Financial inclusion can be facilitated by governments, but as a rule, it is left to the private sector or the market. Sanitation having a direct impact on public health and quality of life has a much stronger government influence, but does sanitation assets need to be paid fully by governments or donors? We do not think so. After all when people pay for something themselves they tend to appreciate it more than when it is a gift, yet there are some people who are too poor to pay. Dealing with this diversity is what financial inclusion is all about. As financial engineering is not a theoretical exercise, we build on our practical experiences drawn from the Financial INclusion Improves Sanitation and Health (FINISH) programmes in India and Kenya.

FINISH was conceived to improve sanitation and the living and economic conditions of poor rural and peri-urban households. To do so in a sustainable and scalable manner, FINISH applies economic incentives, primarily enhancing financial inclusion of these

households. Since 2009, FINISH is an international public-private community partnership between financial institutions, governments, nongovernmental organisations (NGOs), and academics, initially working in India, and from 2014 also in Kenya. The overall result of FINISH in India to date is safe sanitation systems for 2,500,000 people in 10 states. It combines demand generation through behaviour change and financial inclusion measures with increased access to improved sanitary and hygienic conditions, ultimately leading to a safer environment for all.

When we started our FINISH programme in India, it was to be operated mainly through one financial instrument: microcredit. At that time, we hoped that generating demand for sanitation would work sufficiently if we created awareness through existing microfinance partners by building their institutional capacities and knowledge about sanitation. The microfinance partners could then provide microcredit to the poor to finance their sanitation needs. At the same time, it would enable the government to target with sanitation subsidies the ultra poor (or in the Indian context those below the poverty line), who are often not eligible for commercial microcredit.

However, over the years we noticed that we needed to diversify and capture many more financial instruments in sync with the diversity of the people, existing financial infrastructure, new developments (including government policies), financing and sanitation supply side interventions, financial and sanitation requirements, needs, and opportunities. Consequently, one financial instrument expanded into the use of many more financial instruments.

In the end, FINISH became a testing ground for financial engineering for sanitation.

Based on our expertise and experiences, the models to unlock private sector (from small and medium enterprises [SMEs] to large-scale entities) involvement in sanitation are different. A range of business strategies need to unfold, including: establish local partnerships, ensure a sustainable supply chain (for example through franchising), set up local building materials processing units, and create an effective sanitation value chain via decentralised reuse processing units. This has a bearing on financing for sanitation supply side development.

Large institutions that enable finance need to look at how financial inclusion processes can become more flexible in different geographies, rather than just scale through simple replication of a process through many more outlets. This diversity is also reflected in the financial instruments. From the sanitation field and the financial models developed in the programme, it can be concluded that scaling development (sanitation) can be achieved through contextual replication. This, in turn, necessitates diversity in the financing process. Developing different types of financing instruments is a response to this need for diversity due to the different situations. One-size-fits-all does not work.

Next to microfinance that is scaleable, there are a number of potentially scalable financial instruments under development, ranging from bonds to credit lines, carbon and SME financing. Developing these instruments requires different kind of partners, yet the financial expertise embedded in the networks of FINISH in India and Kenya gives new dimensions to impact investment instruments. After all, investing in sanitation has a multiple impact.

According to WHO estimates (joint WHO /UN Water press release November 19, 2014),

**Table 1**
Microfinance instruments

| Microfinance instrument | India | Kenya |
|---|---|---|
| Financial literacy | X | X |
| Microcredit | X | |
| Microsavings and microcredit | | X |
| Micro insurance | X | |
| Bank–self-help groups linkage | X | |
| Bank lending following joint liability group (JLG) model of National Bank of Agriculture and Rural Development (NABARD) | X | |
| Microfinance institution self-help groups linkage | X | |
| Table banking | | X |
| Individual microfinance | | X |
| Merry-go-rounds | | X |

**Table 2**
Financial instruments (nonmicro)

| Financial instruments | India | Kenya |
|---|---|---|
| Impact investing | X | X |
| Local government subsidies | X | |
| Use of guarantee fund | | X |
| First/second loss | X | X |
| Cooperative financing | X | |
| Self-financing | X | X |
| Output-based aid/ result-based financing | X | |
| Bank financing | X | |
| Leverage on fixed deposit | X | |
| Corporate social responsibility | X | |
| Supplier's credit | X | |
| Nonconvertible debentures | X | |
| Equity investment | X | |
| Co-investments | X | X |
| Revolving fund | X | |
| Small investment facility | X | X |
| Convertible grant | X | |
| Social Equity Fund (see below) | | X |
| Use of spread/ interest rate differential | X | |

**Table 3**
Scalable financial instruments under development

| Financial instruments | India | Kenya |
|---|---|---|
| Blended finance | X | |
| Sanitation line of credit | X | |
| Climate financing | X | X |
| Bond financing | X | |

for every dollar invested in water and sanitation, there is a US$4.30 return in the form of reduced health care costs for individuals and society. Millions of children can be saved from premature death and illness related to malnutrition and waterborne diseases. Adults can live longer and healthier lives. The benefits cut across many sectors. Economic and environmental gains include, for example, greater productivity in the workplace and reduced pollution of water and land resources. Gains in quality of life include improved school attendance, greater privacy and safety – especially for women, children and the elderly – and a greater sense of dignity for all.

As these returns are not centred on one organisation or individual, it has been difficult to finance household sanitation. However, if sanitation reaches scale, a combination of different financing instruments, may provide much needed financing to the sector. Whereby each stakeholder has its own expectations of social or monetary returns.

To date, we have locally mobilised some €68 million in India and about €600,000 in Kenya using a range of financial instruments. More details can be obtained from www.waste.nl and www.finishsociety.org.

- In the FINISH programmes a number of microfinance instruments are used. These are in the Table 1.
- In addition, several other nonmicro financial instruments are applied as well. These are listed in Table 2.
- There are also scaleable financial instruments currently under development. These are shown in Table 3.

One particular instrument, the Social Equity Fund (SEF), is described in more detail below.

**Vision:** SEF envisions a world where entrepreneurs with small and growing businesses (SGBs) that build flourishing and sustainable local economies and are engaged with the world around them, in balance with social and environmental aspects. These SGBs seek equitable relationships with their supply chain that offer value-added products and services, solutions, and facilities to low-income communities wanting to impact their livelihoods in a tangible way.

**Mission:** SEF's mission is to provide SGBs with sustainable investments and governance support (through SEF's special methodology) in their path of growth and transformation into quality businesses that seek transparent and respectful relationships with their stakeholders. SEF believes in a long-term partnership, strong local responsibility, and autonomy with openness to innovation. SEF considers the social, financial, and environmental returns on investments (community dividend) integral to the way of doing business.

SEF offers SGBs a flexible mix of financial instruments: equity, subordinated loans, long-term debt, short-term debt and working capital, current account lending, and bridge financing.

**General background and scope:** SEF is an impact investment fund that targets an economic sector in developing countries and emerging markets, which has not yet received the full attention of policy makers and finance institutions. SEF promotes, keeps pace with, and strengthens SMEs from low-income communities in Africa, Asia, and Latin America.

SEF focuses on SGBs, entrepreneurs which are lacking access to funding, since they do not fit into the schemes of conventional investors despite having a viable business and potential for upscaling. These SGBs are too large for microfinance and still too small for commercial venture capital. SEF aims to provide the "missing model for the missing middle".

SGBs are a relatively new phenomena in the developing world, and are increasingly recognised as key elements for the development of national economies. They create more jobs in comparison to microenterprises, and those jobs are better paid. They contribute increasingly to the value chain by innovating and creating new products. For customers, they can play a larger role to guarantee the provision of essential services and products such as water, sanitation, transformation of waste, agriproducts, renewable energy, and health. They have a huge impact on low-income communities.

However, traditional banks and microfinance institutions tend to direct their attention to other sectors. This makes it very difficult for SGBs to attract finance for developing their products or services. SEF explicitly targets this "missing middle" to strengthen the growth potential of local economies and to support local ownership. This is done by actively fomenting and financing these initiatives to become successful growth vectors with active participation of and benefits for local communities and the environment.

The Social Equity Fund was registered in 2014 and the Social Equity Foundation in 2010. SEF has learned from earlier initiatives, both in funding and in developing SGBs and midsized projects, in which several key SEF people actively participated. These lessons are brought into practice in different settings and can benefit from the existing networks and current activities and businesses that through the activities of the Social Equity Fund can be expanded. The initiator and founder of the Social Equity Foundation and the Social Equity Fund (Mr. Tony Fernandes) was engaged from the start with the founding of a similar fund, Pymecapital Latin American Fund S.A and has been the chairperson of the Board of Directors during the past nine years of its existence. The fund in Latin America continues to be the inspiration and the motivation for setting up SEF in Africa and Asia.

**Geographical scope:** SEF focuses primarily on setting up regional affiliates (legally part of the SEF Management B.V.) with international scope and a high degree of local autonomy for investments in Africa, Asia, and in a later stage, in Latin America.

**Sectors:** Due to its sustainability agenda, SEF focuses on basic need sectors, such as: water, sanitation, transformation of waste, renewable energy, small manufacturing, health, agriculture, and animal husbandry.

**Approach:** SEF is primarily a promoter of entrepreneurial organisations (SGBs), business talent and leadership. SEF has explicitly chosen to focus on the SGBs within the broad range of SMEs – meso-sized SMEs, realising that this sector is the basis of a meaningful and sustainable perspective offered in noncompetitive economies and for the bottom of the pyramid communities in particular. This specific sector is in between informal microentrepreneurial activities and the medium and large enterprises. It needs structural support on its path of growth and transformation. SGBs look for improvements in professional organisational structures, governance, human resource development, financial management, product and service development, logistics, and market outreach. SEF has made it its specific task to support and keep pace with the SGBs as a long-term partner offering the needed and innovative support, solutions, facilities, and services.

The local SGBs integrate the productive chains in their surroundings; value chains that are related to a substantial amount of small-scale suppliers that can help to generate and upscale a social and environmental impact. Since investments in SMEs need a special and customised approach, SEF offers a flexible mix of financial instruments: equity, subordinated loans, long-term debt, short-term debt and working capital, current account lending, and bridge financing.

SEF pays particular attention to the social and environmental returns, including the community dividend. It pays attention to the compliance with a set of universally accepted principles, like from the International Labour

**Figure 1**
Social Equity Foundation organisational structure

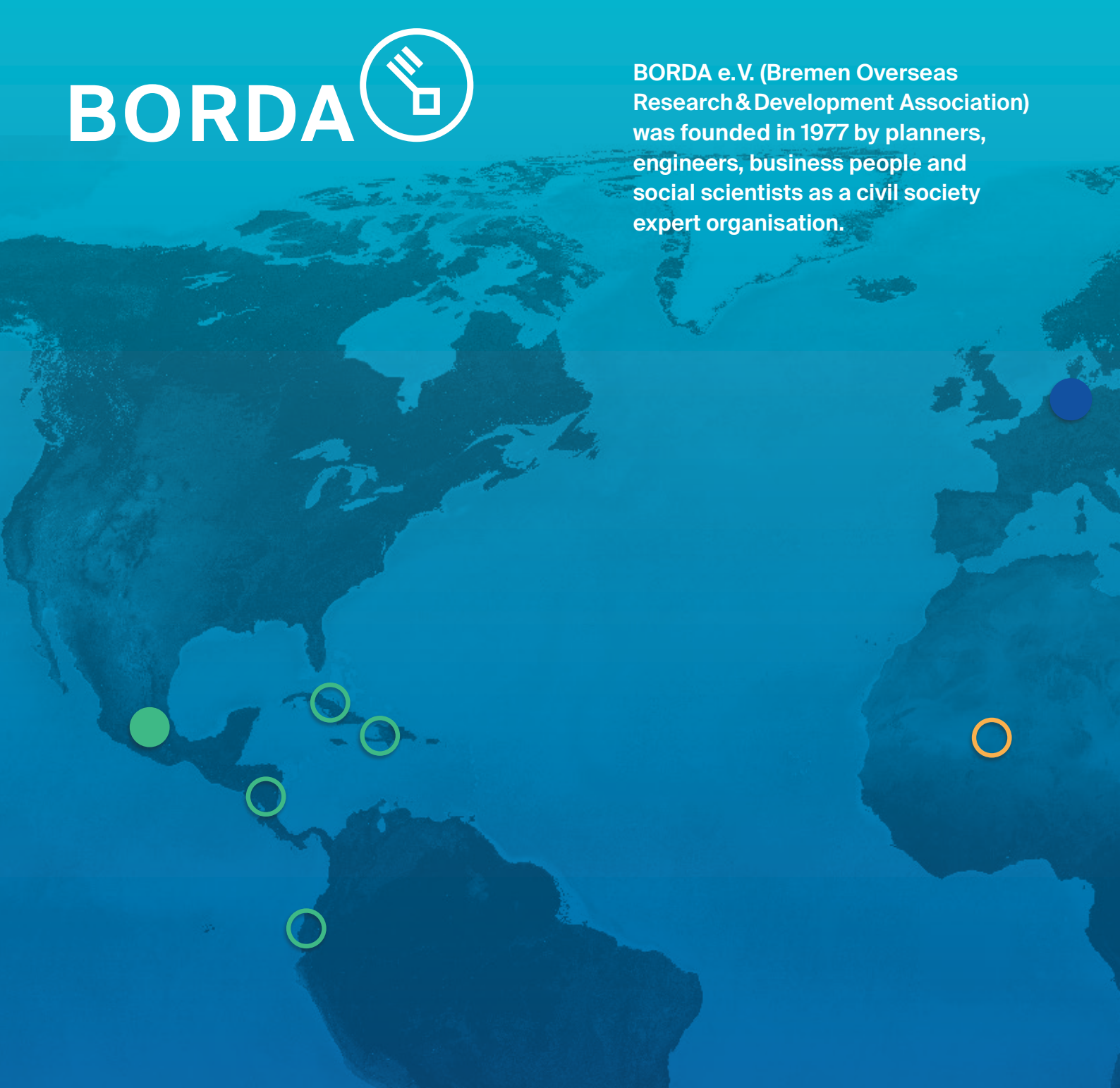

Organization, United Nations, and environmental standards (e.g. ISO), regarding the quality of the relationships between the SGB enterprise and key stakeholders. For this purpose, SEF applies a special measurement tool, the social metrics system, developed to suit the entrepreneurs' context.

**Governance:** According to SEF's policy, it does not seek profit maximisation, but client value maximisation. This is also why the operational costs in the SEF investment model are lean and mean. It has an efficient and effective governance structure, consisting of an executive team at the international level of the facility, based in the Netherlands, and a fund management team at the affiliate regional level in partnership with the local partner institutions. The Dutch organisation WASTE and German organisation BORDA are the first founding investors, and support SEF with their international knowledge and networks.

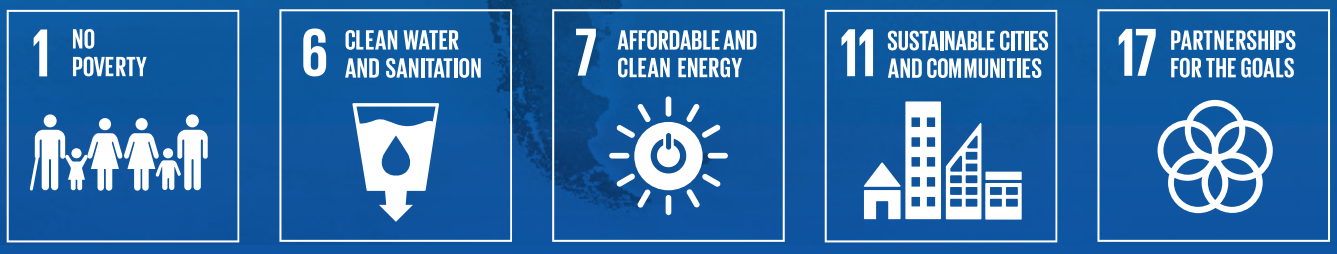
The Social Equity Fund is managed by the SEF Foundation, registered in the Netherlands since 2010. The local investments are managed by SEF local affiliates in Africa and Asia with professionals from the regions, under the umbrella of the SEF Foundation in the Netherlands. Moreover, the SEF local affiliate draws on the expertise, knowledge, and skills in the entrepreneurial sector from existing professional local partner institutions. In close collaboration with the regional fund manager of the SEF affiliate, these local partner institutions support SEF in the identification, screening, diagnostics, due diligence, monitoring, and capacity building of SGBs.

BORDA

BORDA e.V. (Bremen Overseas Research & Development Association) was founded in 1977 by planners, engineers, business people and social scientists as a civil society expert organisation.



Our commitment is focused on the realisation of the following Sustainable Development Goals:



Collaborating worldwide with more than 100 organisations, we are committed to making the transition towards liveable and inclusive cities which give disadvantaged urban populations access to essential public services such as energy, sanitation, waste management, and water.

We are active in 22 countries in Latin America, Central and West Asia, South and South-East Asia, and Sub-Saharan Africa.

We support holistic approaches on policy formulation, participative urban planning processes and infrastructure development.

In this respect, we design and implement innovative system packages together with our partners, foster capacity development at the local, national and international level, and facilitate dialogue between civil society organisations, communities, government entities, the private sector, scientific institutions, and international organisations.

ISBN 978-3-00-052550-6

Published by BORDA e.V.
Am Deich 45
28199 Bremen
www.borda-net.org



Editors Dr. Bernd Gutterer
and Stefan Reuter

Release April 2016

Photos All rights with the authors
Page 12-13 Wikimedia, ERB64
Page 15 Wikimedia, Alicia Nijdam

Print Environmentally-friendly production
on recycling paper, FSC® Blaue Engel

Layout gegenfeuer.net

Copy Editor Schuelert Consulting

With support from

Federal Ministry
for Economic Cooperation
and Development

Free
Hanseatic City
of Bremen

ISBN 978-3-00-052550-6

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