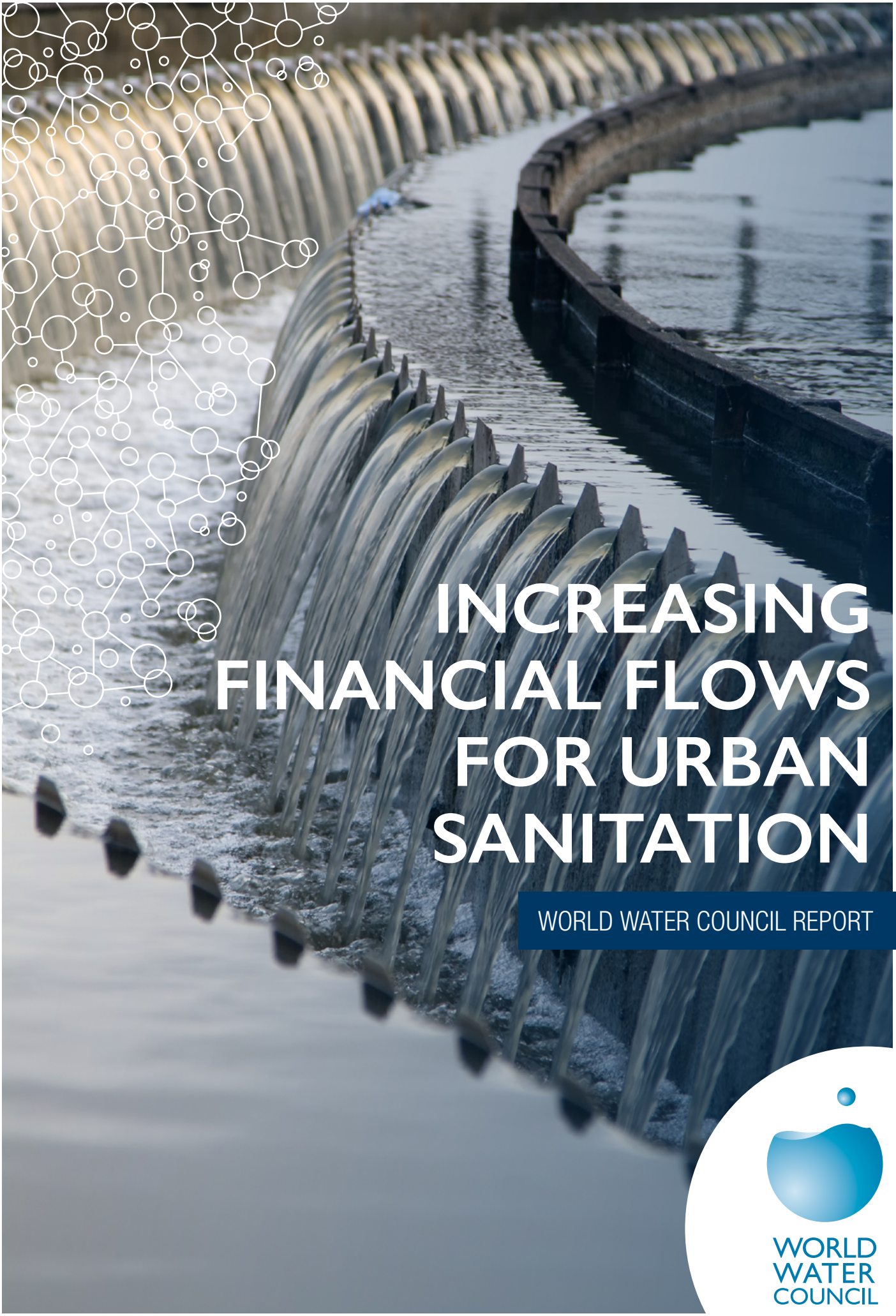
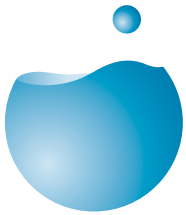


INCREASING FINANCIAL FLOWS FOR URBAN SANITATION

WORLD WATER COUNCIL REPORT

WORLD WATER COUNCIL



The World Water Council is an international multi-stakeholder platform organization, the founder and co-organizer of the World Water Forum. The Council's mission is to mobilize action on critical water issues at all levels, including the highest decision-making level, by engaging people in debate and challenging conventional thinking. The World Water Council, headquartered in Marseille, France, was created in 1996. It brings together over 300 member organizations from more than 50 different countries.
www.worldwatercouncil.org

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FOREWORD

Our founding goal at the World Water Council has been to place water at the heart of our planet's most pressing political priorities. The Council's number one concern is global water security, and the infrastructure which supplies water for drinking and sanitation must be a priority. Without these, societies cannot grow, countries cannot develop. One out of five children under the age of five still die prematurely each year from water-related diseases and nearly a third of the world's population does not have adequate sanitation. A frightening reality considering we are already nearly a quarter of the way through the 21st Century.

These facts are only compounded by the knowledge that the Millennium Development Goal target for sanitation, which aimed to reduce by 50% the world's unserved population, was not even close to being achieved. Now, the Sustainable Development Goals aim for full coverage, which is even more ambitious. As the publication points out, in the next 12 years, sanitation services will need to reach over three billion people in urban environments and 5.5 billion in total. The spending will, therefore, have to follow to cover up to $45 billion in costs per year in urban areas alone, up to five times as much as is now invested.

Business as usual is not going to get us there. Whilst this represents a huge amount for our already overburdened public funds, we must not let it weaken our endeavour. Instead, we must be smarter in our investment, of both money and political will, to ensure sanitation is sufficiently and intelligently financed.

A major re-think of how we do sanitation has to take place if we are to offer a convincing answer to these problems, and the findings in this report provide many promising solutions. Herein, policy recommendations offer pre-emptive responses to trends we know will continue unfolding in the coming years.

I have spoken before about the three I's, three essential pillars on which effective water policy is built – institutions, infrastructure and investment – and this report elaborates on how all three have a role to play. Institutions must come together to promote circular economies of treated wastewater resources and enable financial flows through new and existing financing instruments. Infrastructure can reduce costs by moving away from traditional sewered sanitation to localised solutions. Investment must be increased through improved governance and incentivizing the performance of service providers.

Water management and sanitation in particular needs to be at the heart of global political discussions as integrated approaches are the only guarantee of a sustainable future. Sanitation is at the same time an environmental, social and economic issue and effective sanitation impacts positively the lives and livelihoods of millions throughout the world.
I invite you to read these policy recommendations and join the debate for change.

Benedito BRAGA
President
World Water Council

By initiating its first project on innovative financial mechanisms for urban sanitation, the World Water Council has prepared an analytical study based on eight cities from different continents that agreed to participate in the program. The World Water Council acknowledges the voluntary contribution of these eight cities and would like to express gratitude for their commitment to improving sanitation services.

This project has enabled the evaluation of these cities' potential capacity in delivering on one of the core requirements to achieve Sustainable Development Goal 6, bearing in mind that two other priority areas - namely adequate acquisition of knowledge and adapted technologies, and governance related to urban wastewater management - are also needed to reach SDG6.

The project also contributes to the understanding of basic principles on innovative financial mechanisms to better support the development of the sanitation sector and identifies the messages to be brought to the attention of the main stakeholders, in particular decision makers, professionals, donors and civil society.

For the World Water Council and its partners, the presentation of the project's outcomes at the 8th World Water Forum in Brasilia (Brazil) will provide the opportunity to consider extending the analysis to a larger number of cities. This analysis could start as early as 2019 with the aim to share the outcomes at the 9th World Water Forum in Dakar (Senegal).

The endeavour should be pursued by the World Water Council in perfect coordination with the international institutions and organizations that are involved in the project.

Hachmi KENNOU
Chair of the World Water Council Task Force
"Cities: At the heart of growth"
World Water Council

ACKNOWLEDGEMENTS

This work programme has been designed and directed by the Cities Task Force of the World Water Council under the leadership of Hachmi Kennou; Teresa Liguori is the Project Officer for this work programme and commissioned and managed all the consultants; Tom Soo, then Executive Director of the World Water Council, gave valuable strategic advice.

This report was written by Jon Lane, coordinating consultant to the World Water Council for this work programme. Any errors, omissions, or subjective opinions are his.

The national consultants who carried out the case studies of individual cities were: Abdelaziz Enasri, Diego Fernandez, Vikki Ferrer, John Gathenya, Murty Jonnalagadda, Neil Macleod, Cesar Seara, and Moustapha Sene.

The World Water Council and the author thank the following sector colleagues who reviewed drafts of this report: Guy Hutton (UNICEF), Dennis Mwanza (Gates Foundation), Maimuna Nalubega (African Development Bank), Lesley Pories (Water.org), Sophie Trémolet (World Bank), and Chris Zurbrügg (EAWAG).

The World Water Council and the author thank many sector colleagues who supplied information, published and unpublished material, opinions and advice; they are listed in Annex 2. Of these, Sophie Trémolet of the World Bank has been particularly generous in sharing both published and unpublished work and data on sanitation financing, upon which this report has drawn extensively.

The World Water Council wants this work to be open, collaborative and fully acknowledging the contributions and intellectual properties of others. Indeed the Council, with its unique advantage as the creator and organiser of the World Water Fora, wants to make its advocacy and communications channels available to other colleagues and partners to promulgate their messages on this subject.

EXECUTIVE SUMMARY

The analysis of current trends and innovative ideas generates an optimistic vision for the year 2030. In this vision, urban sanitation will be a tool for progress not a problem to worry about.

INTRODUCTION

Sanitation was one of the worst-performing sectors monitored by the Millennium Development Goals. Now the Sustainable Development Goal target is significantly more onerous than the MDG target was in two respects. First, it aims for sanitation for everybody, rather than only for halving the people without sanitation. Secondly, it aims for safely managed sanitation (the use of improved facilities which are not shared with other households and where excreta are safely disposed in situ or transported and treated off-site) rather than only for basic sanitation (the use of improved facilities which are not shared with other households). Achieving the SDG target will therefore take an enormous operational and financial effort. The World Water Council offers this report, together with eight accompanying case studies of cities, as a contribution to that collective global effort.

While the Council recognises that rural sanitation remains important, it is concentrating its attention on urban sanitation because urban sanitation services need to reach over three billion people in the next 12 years, the technical challenges are more complicated, the costs are higher, and the economic and social benefits of success are much greater. So this report is concerned with urban sanitation.

The report follows a logical sequence: first discussing what urban sanitation could look like by 2030, then examining how that sanitation would be financed, and then identifying what decision-makers can do now in order to increase those financial flows.

WHAT COULD URBAN SANITATION LOOK LIKE IN 2030?

The analysis of current trends and innovative ideas generates an optimistic vision for the year 2030. In this vision, urban sanitation will be a tool for progress not a problem to worry about.

The economic and business case for improved sanitation will be well-understood. Urban sanitation will be a service sector not an infrastructure sector. The safe and economically productive re-use of human excreta as resources will be an integral part of sanitation services. Sewered sanitation, onsite sanitation and container-based sanitation will exist alongside each other. The roles of governments, municipalities, private sector and civil society will reflect the strengths of each. They will follow the concept of city-wide inclusive sanitation, in which all organisations concerned with sanitation in a particular city come together and agree how best to serve all the people.

The roles of governments, municipalities, private sector and civil society (...) will follow the concept of city-wide inclusive sanitation, in which all organisations concerned with sanitation in a particular city come together and agree how best to serve all the people.

HOW WOULD THAT URBAN SANITATION BE FINANCED?

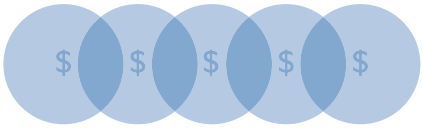
Financing that work using current strategies would require approximately $45 billion per year on urban sanitation, which is five times as much as the current level of spending. This seems a daunting prospect but there are two main ways to achieve it. The first is to reduce the headline figure of $45 billion per year by a strategic change of emphasis from sewered sanitation to on-site and container-based sanitation, which cost only half as much as sewered sanitation does. The second is to make sanitation service providers (whether they are municipal utilities, private sector companies or NGOs, large or small) financially viable and stable by reducing their expenditures and/or increasing their revenues. This report proposes several ideas to do both. By far the most significant idea to reduce expenditure is the change from sewered sanitation to onsite and container-based sanitation mentioned above. The most significant ideas to increase revenues are for regulators to reform tariffs – notably for rich people to cross-subsidise poor people – and for national governments to recognise and quantify the monetary value of the social and economic benefits of sanitation and pay that amount to the service providers.

If the service providers are financially viable and stable, they can attract new finance. The source of that new finance will not be the already-overstretched governments and donors, it will be the unprecedented sums of money saved by people around the world. Those people and their financial advisors and intermediaries are always looking for enterprises in which to invest their money. Once they become confident about the business case for sanitation enterprises, they will invest money into them. Thus, the financing needed to achieve the sanitation SDG will have changed from a headache for grant funders to a market opportunity for investors.

The critical element of this sequence is how the investors' money will reach the sanitation enterprises. This report therefore suggests various innovative ideas to enable that increased financial flow. Some suggestions are specific financial instruments, while others are financial mechanisms. Of the latter, the proposal with the biggest potential impact is for multi-stakeholder finance mechanisms that can enable many different investors to support many different enterprises simultaneously through a single platform with common monitoring and reporting systems. This report gives the working title of "sanitation financing facility" to such a platform. Sanitation financing facilities could take different legal forms and could be created at national, regional, or even global level. Other business sectors have similar platforms, but for urban sanitation they would be unfamiliar concepts requiring resolute pioneers.

These financial innovations will be supported by three main collaborative elements: measuring outcomes of sanitation services; monetising the societal benefits of improved sanitation; building trust among all the stakeholders.

45 Billion
per year in urban sanitation



5 times current level of spendingfois plus

WHAT CAN DECISION-MAKERS DO NOW TO INCREASE THE FINANCIAL FLOWS?

These financial innovations will only succeed if decision-makers at many levels enable them. This report therefore contains encouragement to all the groups of decision-makers: primarily to national politicians, and secondarily to municipal leaders, regulators, entrepreneurs, bankers, investors, and the international development community. Here are some of the important actions for those various groups:

- Establishing independent statutory bodies to set tariffs and regulations.
- Clearly defining the roles of the various institutions and entities, to give investors confidence to support sanitation service providers.
- Introducing and enforcing national and local standards and regulations for the quality and sale of the products made from treated human excreta, to encourage circular economy concepts and activities to flourish.
- Re-allocating grant funds away from expensive sewered sanitation and treatment plants towards much cheaper decentralised systems, faecal sludge management and the infrastructure for container-based sanitation.
- Encouraging commercial banks and investors to enter the sector by mitigating the risks and costs for them.
- Recognising sanitation's contribution to public health and the environment by contributing financially to service providers' operational expenses.
- Activating and encouraging markets for sanitation products by being customers for fertiliser, energy and other products generated by circular sanitation economy businesses.
- Seeing sanitation in developing countries as a new business sector in which to achieve first mover advantage.
- Developing and investing in businesses all along the sanitation value chain.
- Encouraging municipalities and commercial investors to collaborate and co-invest, in order to gain scale.

CONCLUSION

Among all the complexity and detail, there are three fundamental messages to all stakeholders in urban sanitation. They are:

- Save huge amounts of money by moving emphasis from sewered sanitation to onsite and container-based sanitation.
- Increase financial flows by using a range of existing and new financing instruments and mechanisms.
- Attract new money into the sector by improving the governance conditions and the performance of the service providers.

If people of power, goodwill and vision come together boldly in this cause, they can attract the increased finance needed to achieve the sanitation SDG and to create cities in which healthy happy people can lead lives sustainably.

INTRODUCTION TO THE WORLD WATER COUNCIL'S WORK PROGRAMME ON SANITATION FINANCING

THE DEFINITION OF SANITATION FOR THE PURPOSE OF THIS WORK PROGRAMME

For this work programme, sanitation is defined as the management, treatment and re-use of human excreta. Greywater (waste water from kitchens, bathrooms etc) is often managed together with human excreta, and compostable solid waste can be co-managed with human excreta. So this work programme does also consider both greywater and compostable solid waste in those situations, based on the local context. Stormwater drainage is associated with sewerage in some cities, but this work programme does not study stormwater drainage itself.

The work programme is about financing sanitation, not about sanitation overall: it only studies enough about doing sanitation in order to inform the analysis about financing it.

THE REASONS FOR UNDERTAKING THE WORK PROGRAMME

Since the Millennium Development Goals (MDGs) were established in 2000, concerted global efforts have been made to improve sustainable access to safe drinking water and basic sanitation. The water MDG target was achieved, while the sanitation target was not: one third of the world's people still lack basic sanitation. Now that the MDGs have been superseded by the Sustainable Development Goals, the definition of adequate sanitation has become more stringent, notably through the concept of "safely managed sanitation", and so the sanitation figures look even worse.[1]

1 The authoritative definitions of all terms such as basic, adequate and safely-managed sanitation are on the Joint Monitoring Program's website www.washdata.org The biggest impact on sanitation finance is that safely-managed sanitation requires proper disposal or re-use of all the human excreta.

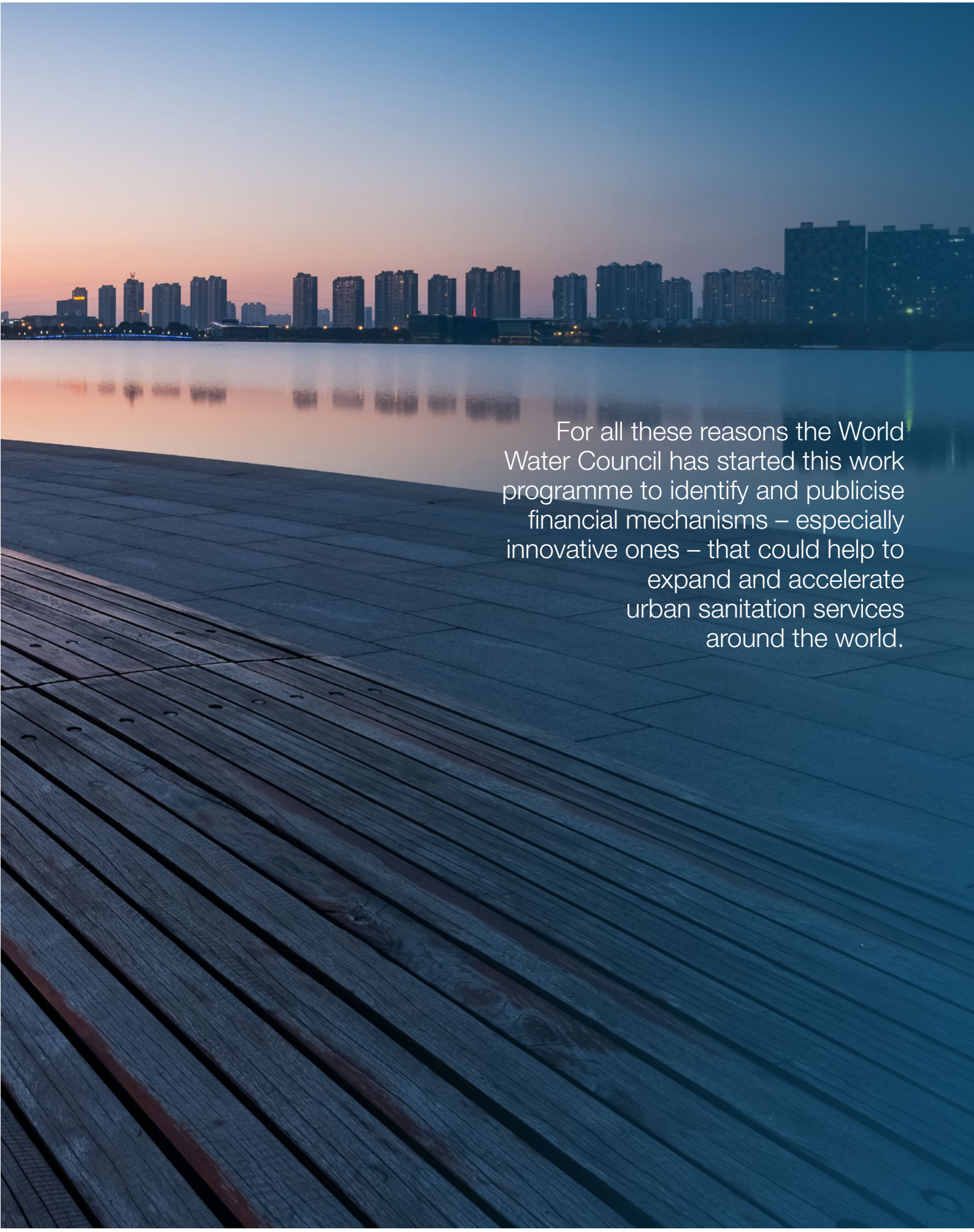
Despite the fact that the economic and health benefits of access to sanitation have been extensively researched and acknowledged, the issue is generally low on the priorities of national politicians and other decision-makers.

Compared to many other development sectors, sanitation is still a specialist and minor topic for donors and concessional financiers, let alone for commercial investors.

Although the absolute number of people in rural areas lacking access to adequate sanitation is still higher than in urban areas, rapid urban population growth and migration are making the situation more acute in urban areas. The urban statistics mask huge disparities between rich and poor people. Urban sanitation is technically more difficult and more expensive than rural. The health, economic and societal costs of inadequate urban sanitation are higher.

Urban sanitation has traditionally been seen as an adjunct to water, consisting of sewers and waste water treatment plants: this solution is convenient for those lucky enough to afford it but costs a lot of money and needs a lot of water. Adequate lower-cost solutions exist but are poorly explained or understood. Therefore, because they perceive that sanitation is expensive and difficult, many cities around the world have done very little about it. Householders themselves have had to improve their own sanitation, often on an ad hoc and unregulated basis.

For all these reasons the World Water Council has started this work programme to identify and publicise financial mechanisms – especially innovative ones – that could help to expand and accelerate urban sanitation services around the world.



For all these reasons the World Water Council has started this work programme to identify and publicise financial mechanisms – especially innovative ones – that could help to expand and accelerate urban sanitation services around the world.

THE CONTENT OF THE WORK PROGRAMME

The work programme has two main elements: case studies of eight cities by national consultants, and general analysis by the coordinating consultant.

The cities were selected by the World Water Council through its professional networks, on the basis of their expressed interest in this work and their readiness to try out innovative financing mechanisms. They are spread across Africa, Asia and South America, and they vary in population, in wealth, in political structures, and in sanitation coverage, technologies and service providers. The case studies illustrate successes, challenges and future aspirations relating to sanitation financing. Some of them have already started to innovate, but that was not mandatory in selecting them for this study. The cities are: Baguio (The Philippines), Blumenau (Brazil), Bogota (Colombia), Dakar (Senegal), eThekwini (Durban, South Africa), Jodhpur (India), Marrakech (Morocco) and Nairobi (Kenya).

Each national consultant has followed a consistent analytical framework comprising a short background on the country and on the study city, detailed information about sanitation financing in the study city, and analysis. Each has worked closely with the authority responsible for sanitation in that city, collecting data from that authority and from other relevant organizations. The output of this work is a set of eight case studies, published by the World Water Council, which can be read singly or alongside each other and this report.

The coordinating consultant's work is based on personal knowledge and study and on good work already done by other people on sanitation financing. It also draws on examples, opinions and information from the case studies of the eight cities. The output of this work is this report.

THE PURPOSE AND STRUCTURE OF THIS REPORT

This report is not an academic paper but a descriptive introduction to the subject of financing urban sanitation. Its purpose is to advocate for increased financial flows to sanitation in order to achieve a positive vision of the sector by 2030. It describes and analyses the subject and generates policy implications and messages to decision-makers. The World Water Council aims that this report will trigger relevant action by the target decision makers, and also that it will encourage other people to carry out more analyses of the financing needs, mechanisms and sources.

The report follows a logical sequence: first envisioning what urban sanitation services could look like by 2030, then analysing how those services would be financed, and then identifying what decisions need to be made now by whom in order to increase those financial flows.

The final section, on decisions to be made now, is also being summarised into a short leaflet that can be read quickly by busy senior people. That leaflet should contain all they need to know in order to make decisions, while their staff and colleagues can study the more detailed materials on their behalf.

This report combines generic material obtained by personal enquiry, expert interviews and study of publications, with specific lessons from the eight city case studies. These lessons are incorporated into the main text and the individual case studies are also briefly summarised in the Annexes.

NEXTS STEPS IN THIS WORK

This will be an ongoing work programme for the World Water Council. Several sessions and activities are planned at the 8th World Water Forum in Brasilia, at which this report is being launched. After that Forum, the Council will continue with various work streams, including supporting the eight study cities to be early adopters and advocates on this subject. It will also work globally alongside others to help promote the innovative finance mechanisms described in this report.

I. WHAT COULD URBAN SANITATION LOOK LIKE IN 2030?

For professionals who have already worked in this field for 20 or 30 years, projecting another 12 years is not speculative futurology but informed prediction based on current trends and upcoming ideas. That is the basis of this section of the report. The underlying tone is unapologetically positive and optimistic: envisioning that urban sanitation can be well-managed and adequately financed by 2030, while examining how that optimism can be justified.

1.1 THE DEMOGRAPHIC AND POLITICAL CONTEXT

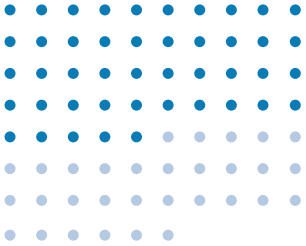
According to UN-DESA statistics and projections there are now 7.6 billion people in the world, of whom 3.1 billion live in urban areas in less developed regions. By 2030 there will be an extra 1.0 billion people, almost all of whom will live in those same urban areas in those same less developed regions. That is one billion more mouths to feed and one billion more bottoms to serve with sanitation.

The Sustainable Development Goals (SDGs) understandably set more rigorous targets than those of the Millennium Development Goals (MDGs). Specifically on urban sanitation, the UN's Joint Monitoring Program data show that in 2015 83% of the world's urban population had improved sanitation (this was the MDG target definition - facilities designed to hygienically separate excreta from human contact) but only 43% had safely-managed sanitation (this is the SDG target definition - improved sanitation facilities, not shared with other households, from which the excreta produced should either be treated and disposed in situ, stored temporarily and then emptied and transported to treatment off-site, or transported through a sewer with wastewater and then treated off-site). That means that 40% of the world's urban population either had improved sanitation facilities shared with other households or had improved sanitation facilities from which the excreta were not properly treated.

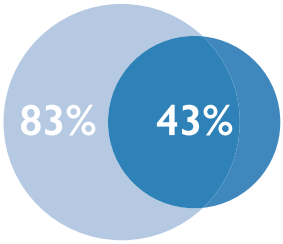
Those headline figures, onerous as they are, hide big disparities between rich and poor. Urban areas are diverse in terms of socio-economic conditions, settlement patterns, infrastructure and services. Rich neighbourhoods are often very well s erviced with sanitation while poor (especially slum) areas are much worse off. This issue of inequity is a major political and demographic problem.

In order to achieve the SDG targets for sanitation, by 2030 an extra 3.2 billion urban people and an extra 2.1 billion rural people will need to achieve safely managed sanitation, while the excreta of all 8.6 billion people in the world must be treated.

By 2030 the leaders of mankind will be struggling to find a balance between improving the quality of life for ever-increasing billions of people and conserving the stability and health of the natural environment on which they and all other species depend. Decision-makers will need to take historically unprecedented measures to achieve and sustain that balance. Sanitation professionals can help those leaders by converting human excreta from a waste to a resource and offering urban sanitation as a tool for progress rather than as yet another problem to worry about. This can be done by revising conventional ways of working and applying some new ideas both about the sanitation service and about its financing.



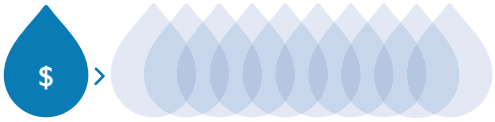
7.6 Billion
people in the world
3.1 Billion
live in urban areas
in less developed regions.



In 2015 **83%** of the world's urban population had improved sanitation but only **43%** had safely-managed sanitation
*UN's Joint Monitoring Program

1.2 THE ECONOMIC AND BUSINESS CASES FOR IMPROVED SANITATION

The economic case and the business case are similar phrases but they refer to different aspects of sanitation. The economic case for improved sanitation demonstrates that improved sanitation benefits the national or local economy. The business case for sanitation demonstrates that companies can run profitable businesses working in improving sanitation. Already in 2018 both the economic case and the business case are well-established as described below. Given the bases of their calculations and the current trends, by 2030 both cases will have become stronger.



Typical figures are that **$1** invested in water and sanitation yields in the order of **$5 -10** of economic benefits

The economic case

This essentially addresses the question of why politicians should care about urban sanitation in general and about universal safely-managed sanitation in particular. It builds an economic case by quantifying the benefits due to improved sanitation.

Several studies have demonstrated the good economic returns on investing in improved water and sanitation. Generally their format has been to calculate only the economic benefits most directly related, i.e. the time savings associated with better access to water and sanitation facilities, the gain in productive time due to less time spent ill, the health sector and patients costs saved due to less treatment of diarrhoeal diseases, and the value of prevented deaths. The recognised authority on these economic analyses is Guy Hutton, originally for WHO and latterly as part of a team conducting the Economics of Sanitation Initiative at the Water and Sanitation Program / World Bank. The WHO and ESI results are typically framed, at global, regional or national level, either in terms of the benefit:cost analysis of investing in sanitation or in terms of the GDP lost by poor sanitation. Typical figures are that $1 invested in water and sanitation yields in the order of $5-10 of economic benefits, and that poor sanitation costs countries 2-6% of their GDP. These are hugely significant numbers. While those earlier studies did not provide separate rural and urban analyses, Hutton's recent paper for the Copenhagen Consensus Center on the benefits and costs of water and sanitation does provide the breakdown specific to urban sanitation, based on 2015 numbers and costs. It gives a benefit:cost ratio of between 2.5 and 3, depending on the economic assumptions used.

Strong as these analyses are, overall they probably under-estimate the political case for sanitation because they do not quantify the benefits that are less directly related to sanitation such as the benefits to the environment, to people's feelings of safety, convenience, status and wellbeing, and ultimately to national economic development. The political case for sanitation can even acknowledge its impact on tourism, international trade and international economic investment, political stability and reduction of migration and displacement of people.

The above analysis of quantifying benefits is, in economics terminology, monetising the externalities of improved sanitation. This will be a vital aspect of the future financing solutions for sanitation, and is discussed further in section 2.6 below.

The business case

This addresses the question of why businesspeople should be interested in working in urban sanitation. In high-income countries there are already many companies of all sizes running successful businesses in sanitation; their shareholders and managers are well aware of the business case for working in urban sanitation. As to middle- and lower-income countries, the picture is more variable. There are certainly many companies making a living out of urban sanitation, but they tend to be smaller entrepreneurs or family businesses often operating in the informal economy rather than large companies operating at the city scale: for example out of the eight study cities only one, Blumenau, has a private company managing the sanitation for the whole city.

For almost 20 years since this topic was originally championed by the Government of Switzerland, various development agencies have worked to study, promulgate and advocate for businesses to be involved in urban sanitation. This movement has recently been boosted by the attention given to climate change, to the environment and to the concept of the circular economy, because those considerations are making sanitation-related businesses inherently more profitable than they used to be.

One of the agencies most actively promoting the business case for urban sanitation is the Toilet Board Coalition (the TBC), which is a membership organisation promoting the contributions that entrepreneurs and private sector companies can make to sanitation in developing countries. The TBC estimates that toilet resources (the new name that the TBC has coined for what were previously known as excreta or human waste) amount to 3.8 trillion litres per year globally, with an economic value of many billions of dollars. The TBC and other advocates are encouraging entrepreneurs to see urban sanitation in developing countries as a new business sector in which to achieve first mover advantage. They believe that entrepreneurs can develop businesses all along the sanitation value chain, to attract various different investors.

To strengthen the business case, investors look for factors that would mitigate the risks and costs for them. In addition to the specific characteristics of the business itself, these factors could include: a clear policy framework for urban sanitation; clear definition of the roles of different government and private sector organisations; legislation and regulation that is enforced in courts of law; a stable and committed municipality, preferably willing to co-invest alongside commercial investors. These governance factors are very important to build the business case. Investors' needs are mentioned again in section 2.6 below.

1.3 CITY-WIDE INCLUSIVE SANITATION

In 2018 this is an emerging concept[2]; by 2030 it should be the norm. The basic principle is plain common sense, that all organisations concerned with sanitation in a particular city come together and agree how best to serve all the people of that city. It sounds easy but it has not yet become widespread: for example of the eight study cities only eThekwini and Dakar have really understood and adopted it to date. It is essentially a governance concept that combines planning frameworks, agreed institutional roles, legislation and regulation. Every city is unique, but there are certain underlying principles that apply to all cities:

- Working in partnership to deliver the sanitation services across the whole city. Embed sanitation within urban governance as a whole; establish clear roles and responsibilities that use the strengths of the various types of organisation; articulate and build demand through civil society; work together on mapping, planning, designing and implementing sanitation services.
- Embracing diversity. Promote a diversity of governance concepts, planning frameworks, service providers, technical solutions and finance mechanisms in order to serve everybody; avoid trying to impose one solution for the whole city.
- Fulfilling the human right to sanitation. Address inequity; reach the most vulnerable and marginalised people; focus on informal settlements; ensure affordability for the poorest people; set tariff policies accordingly.
- Recognising that sanitation contributes to a thriving urban economy. Integrate sanitation into urban planning; use circular economy concepts to increase resource recovery and reuse; link improved sanitation to progress in other urban and social development sectors.
- Achieving safe management along the whole sanitation service chain. Allow diverse solutions and approaches; promote decentralised treatment rather than centralised systems; select and use the best technologies for each stage of the service chain.

None of these ideas are strange or difficult to grasp. The effort is in actually applying them. People, especially leaders and decision-makers, need to change how they work. Those who have previously held all the power – typically the municipal leaders – need to have the dignity and vision to see that they can share that power with others without belittling themselves. The other stakeholders need to acknowledge this and support this change.

Several external stakeholders are trying to stimulate municipal leaders to take up city-wide inclusive sanitation. One unusual method is by giving prizes. For example the Sanitation Challenge for Ghana is a mechanism, initiated by the UK Department for International Development, to stimulate interest among municipalities by offering them prizes for the best liquid waste management strategies. The challenge has generated huge interest among municipalities across the country and has recently been extended to private sector and NGO partners also. The Ghanaian government is very actively supporting the municipalities' work by revising governance arrangements and regulations. The whole process has helped municipalities to think creatively, work with others in inclusive partnerships, and design and implement sustainable liquid waste management strategies that are leading to city-wide sanitation service delivery.

2 This concept has been created by a group of organisations including the World Bank, the Gates Foundation, WaterAid, Emory and Leeds Universities and others.

1.4 SANITATION AS A SERVICE SECTOR

Since the pioneering municipal programmes of the nineteenth century, sanitation has generally been categorised as an infrastructure sector. That automatically directed it towards civil engineering, large capital projects that need correspondingly large amounts of money, centralised planning, sunk assets, rigid outcomes. Planners and engineers have dominated the sector. Meanwhile inadequate sanitation is frequently labelled a public health problem – laying the burden of solving it solely upon governments and concerned donors. Householders have been categorised as recipients or beneficiaries, which are essentially passive roles.

Telecommunications was also formerly categorised as an infrastructure sector, based on the sunk assets of fixed landlines. But now with all the flexible technologies and business models and the range of communications media available to the users, it has completely changed to a service sector and has attracted huge numbers of investors and service providers. So too with sanitation: with the proliferation of new ideas (business models, service options, technology solutions, etc.) all along the sanitation value chain and a new focus on the householders as customers, the established perceptions have already started to shift and by 2030 urban sanitation should no longer be categorised as infrastructure but as a service sector.

A service relationship needs customers and service providers. For urban sanitation the customers are people, usually categorised as householders because sanitation is predominantly a household-related service. The service providers are all the organisations, from both the public and private sectors, that provide services to those householders. These include, for example, educators who explain the benefits of improved sanitation, masons who build toilets and dig pits, contractors who empty pits, entrepreneurs who supply and service container-based toilets, community groups or companies that build and manage shared toilets and public toilets, utilities that construct sewerage networks and sewage treatment plants, specialist companies that process toilet resources into desirable commodities such as water, fuel, compost or chemicals. That is a wide range of types and sizes of enterprise with one common characteristic: they all make their living from meeting the sanitation needs of their customers. Among those service providers, one of them – typically the municipality or utility – is ultimately accountable for provision of this service and for coordinating the other service providers.

1.5 THE CIRCULAR SANITATION ECONOMY

In 2018 the circular sanitation economy is a relatively new concept[3] . It is a specific application of the general concept of a circular economy in which one organisation's waste can be another organisation's inputs. Circular economy concepts such as reusing resources and generating useful products from waste have been applied to sanitation at a small scale for decades – almost all the case study cities in this work programme have examples of this at a small scale. Now these concepts are being considered at the scale of the entire sanitation service chain. At the same time renaming "human excreta" or "waste" as "toilet resources" is a symbolic step forward reminding everybody to set aside their past thinking as they look to the future. Toilet resources have energy value (for gas and biomass fuel), nutrient value (for fertilizer and feed), organic matter value (for carbon storage) and water value (for non-potable applications). By 2030 all urban sanitation services should be an integral part of a circular sanitation economy. Toilet resources will be carefully contained, transported and transformed into products that can be used as inputs to other industrial and agricultural processes.

The circular sanitation economy has built upon principles associated with ecological sanitation and sustainable sanitation. Both of those concepts have been in use for many years but have struggled to become accepted mainstream practices. The circular sanitation economy will have a broader appeal and will bring the ideas from those concepts to a much larger scale and acceptance. Many sanitation sector agencies and commentators are now seeing the circular sanitation economy as a big driver of innovation in the sector.

In **2018** the **Circular Sanitation Economy** is a relatively new concept, in which one organisation's waste can be another organisation's inputs.

3 It has been particulary championed by the Toilet Coalition (TBC), which was introduced in section 1.2 above.

The circular sanitation economy is not a technology but a concept. Its principle of generating value out of reused toilet resources can apply to many different technologies, institutional settings, organisations and scales. Some of the characteristics and benefits of the circular sanitation economy are[4] as follows:

- Environmental protection and efficient resource use and/or protection are not seen as financial burdens but as financial opportunities. The motivation to engage in this is not tokenism or a feel-good attitude but rather a business interest and an economic and employment opportunity.
- Circular economy activities are most effective when carried out collaboratively by entrepreneurs, large companies, utilities and municipalities together, not by entrepreneurs acting alone. This should encourage traditional centralised utilities to join the circular sanitation economy rather than ignore or resist it.
- Circular sanitation business models can become profitable at a city-scale if they are encouraged by the appropriate regulation of products (e.g. on quality of re-used water; fertiliser for food crops; feed-in to electricity grids; solid fuel).
- Circular economy business models can also become profitable at a more local scale such as a single factory, hospital, university or housing estate.
- The circular sanitation economy can co-treat toilet resources with other biological resources (such as food waste from factories or restaurants and other compostable solid waste) that are otherwise wasted. That co-treatment boosts the volumes of products and can improve the profitability of the process.
- The circular sanitation economy concept can be applied to sewered sanitation (for example in managing sewage treatment plants) although it tends to be more inherently suited to decentralised technologies such as on-site and container-based sanitation in which the toilet resources are not diluted with water and so are easier to process.
- Recovering resources automatically involves appropriate treatment of the wastewater or faecal sludge. For example, generating biogas involves anaerobic digestion, which is a sludge treatment process after wastewater treatment. To use wastewater for agricultural irrigation, it must be treated. To use sludge for fertilizer on agricultural land, it must be treated. So if these end products are valued, more wastewater and faecal sludge will be treated than if the end products were regarded as valueless.

Circular sanitation economy processes at a city scale are already common in developed countries, notably in Europe, but not yet common in developing countries: for example, of the eight study cities only eThekwini has started applying circular sanitation economy concepts at scale. Most circular economy activities have tended to start at a smaller scale: Jodhpur is a good example of a city that tried this at too small a small scale to become profitable. The TBC's financial models suggest that these activities should be profitable at the city scale, or at worst they should need a much lower subsidy from the government than non-circular economy systems already receive.

4 This list is based on work by the TBC.

1.6 TECHNOLOGIES

Unless currently unforeseen technologies are invented very rapidly, by 2030 the three basic technologies for urban sanitation will still be as they are today: sewered sanitation, on-site sanitation, and container-based sanitation. Some cities plan to have 100% coverage by one technology (normally sewered sanitation) but this is a very difficult aim in middle- or low-income countries. Baguio and Nairobi are typical examples of cities with unrealistic and unfunded plans to do this. Other cities will use a mix of the three: Dakar provides an interesting case where the government's long-term vision is for 100% sewerage but it knows that is unaffordable so it is promoting on-site sanitation for the medium-term. There is no absolute rule about which technologies to use: what matters is that the right technical mix is chosen to serve the people of that particular city sustainably and affordably. Under the city-wide inclusive sanitation concept, sewered sanitation, onsite sanitation and container-based sanitation will exist alongside each other. They will interact in well-planned ways, for example transferring the toilet resources from on-site toilets and container toilets into suitably-designed wastewater treatment plants. The policy decisions about the technology will usually be based on economics, demography, topography and history.

Sewered sanitation

This describes a centrally-planned network of underground sewers running from houses to wastewater treatment plants, along which the toilet resources are transported by flushing with water. Around the world this system still seems to have the highest status, mainly because the user can flush and forget, i.e. it requires no personal interaction with the toilet itself, nor with service staff visiting the home for removing containers or emptying pits. The customer only has to pay the service provider, which is normally a municipal utility, for the service.

However sewered sanitation is increasingly becoming seen as unsustainable, or even obsolete, for a number of reasons. It consumes huge quantities of water for flushing. It sinks infrastructure into the ground which cannot be moved or sold or re-purposed. It is inflexible and slow to adapt to changed human settlement patterns. Above all, it is extremely expensive. Looking at the capital cost for new infrastructure, for example, none of the eight study cities can raise enough money from the user tariffs or their own resources to pay for the capital cost of sewered sanitation. Of them, the city utility that comes closest to doing so is Marrakech, which is lucky enough to be able to fund ⅔ of its capital expenditure by cross-subsidy from its electricity operations.

Gradually the dominance of sewered sanitation in the eyes of municipal leaders is diminishing as observed, for example, in the discussions at World Water Week in Stockholm. Today's engineers and administrators have been educated in many more technical options than their predecessors were, to whom sewered sanitation was taught as the only proper form of sanitation. By 2030 sewered sanitation is still likely to be predominant in cities that are rich enough to afford it and have the sewers in place with adequate water supply, collection and treatment. In urban areas in less developed countries it might still provide the infrastructure backbone for the citywide sanitation systems into which other technologies will be integrated, and it will tend to be the dominant technology in city centres. Simplified and cheaper piped infrastructure may also be used widely for grey water and storm water disposal.

Marrakech is lucky enough to be able to fund ⅔ of its capital expenditure on sanitation by cross-subsidy from its electricity operations.

On-site sanitation with faecal sludge management (FSM)

On-site sanitation describes a system in which the toilet and the containment of the toilet resources (usually a pit or septic tank) are both within the householder's property. Any liquid overflow from the on-site container either soaks into the ground or is connected into a sewer network. In some technologies, notably twin-pit offset toilets and the more recent Reinvented Toilets[5] , the treatment of the toilet resources also takes place on the site and the householders can be, in effect, their own service providers.

The main technical problem with on-site sanitation is that it requires one or more holes in the ground, and is therefore only applicable in premises that have outdoor space such as gardens. (Occasionally the pits can be dug indoors but this needs cultural acceptance and makes emptying very awkward.) Multiple-occupancy buildings such as apartment blocks need mini-sewer systems indoors leading to a communal septic tank or other treatment facility outdoors. Properties and neighbourhoods served with onsite sanitation also need separate systems for greywater and stormwater disposal.

Householders have used on-site sanitation for many years and it is still the majority technology in many big cities including until recently Tokyo, which is the largest city in the world. The main technological developments from now until 2030 will be in the transport and treatment of the toilet resources (faecal sludge) that is removed from the on-site sanitation facilities. This activity is called faecal sludge management (FSM) and is developing into a specialist service industry of itself. The quality of the treatment is improving and many FSM enterprises have already demonstrated that they can be profitable and viable through applying principles of the circular sanitation economy. Of the study cities, Dakar has the most extensive and best-planned systems of onsite sanitation and FSM and has particularly pioneered the governance aspects of FSM.

The best source of detailed information about FSM is the ongoing series of international FSM conferences with its supporting publications.

Container-based sanitation (CBS)

In 2018 CBS is a new concept within the mainstream sanitation sector in developing countries, although similar ideas have been used for decades in rich countries in niche markets such as vehicles and boats. By 2030 CBS could be widespread. It is technically different from either sewered sanitation or on-site sanitation in that the toilet unit itself is a movable asset that belongs to the sanitation service provider, not the household. It incorporates a hygienically sealable container that is removed from the household at an agreed frequency by the service provider, to whom the householder pays a tariff, usually weekly or monthly. The toilet resources are transported for treatment either at a facility owned by that service provider or at a treatment plant owned by the municipality – in either case product sales are an important part of the concept so it integrates even more easily into the circular economy concept than either sewered sanitation or onsite sanitation. By its nature it is a decentralised and flexible service with minimal sunk costs in capital assets so it can be revised, improved or scaled up indefinitely by one or several service providers. CBS allows the householders to use ecological sanitation approaches without needing to manage the toilet

5 The Reinvented Toilet, a concept vigorously promoted by the Gates Foundation, is a modular, transformative technology that aims to destroy all pathogens onsite and recover valuable resources, operate without sewer, water or electricity connections and cost less than $0.05/user/day in a sustainable business model. Various versions are currently at the prototype stage.

resources themselves. It also allows for management of large volumes of toilet resources and so is suitable for shared and public toilets.

One big advantage of CBS is that the toilet can be located anywhere on the household premises, so the householder does not have to have outdoor space for it. This is very advantageous for people who live in densely-populated urban locations. On the other hand, CBS has a potential image problem: people might associate it with the failed practice of night soil collection. That now-discontinued system involved sanitation staff collecting fresh excreta from householders' bucket toilets unhygienically and was acknowledged to be a humiliating enterprise. CBS advocates intend to explain clearly that contemporary CBS is entirely different from night soil collection in terms of safety and lack of health risk to staff. CBS has other disadvantages: it needs larger containers for householders who use anal cleansing with water, it generates extra truck traffic with associated air pollution, and the container emptying service must be extremely reliable.

Currently, CBS service providers are either small entrepreneurial companies or, in the case of Manila, a city-wide utility. The latter is currently only a pilot scheme but if successful it could point the way forward for CBS because a utility can achieve the economies of scale that are so difficult for entrepreneurs to attain.

Public and shared toilets

The three main technologies have been described above in the context of sanitation services for households and commercial premises. For people living in very crowded accommodation in certain countries, however, some national policies will still allow service provision by public or shared toilets. These toilets are typically in blocks with washing facilities and other services. They are usually either connected to sewers or constructed with their own large septic tanks.

By 2030 the quality of public or shared toilets should be significantly improved, because good practice in managing the toilets will have spread. At the present time many public or shared toilet blocks are already being sold, leased or rented by municipalities to NGO or private sector enterprises: for example in Jodhpur the public toilets are run profitably by private sector concessionaires. Regarding treatment of the toilet resources, the few public or shared toilet blocks that have enough space will have their own onsite treatment facility. The majority of public or shared toilet blocks will not have that capability, however, and so their toilet resources will need to be transported either through the sewerage network or by vehicle for treatment.

The boxes below summarise two recent (2017) studies of CBS.

STUDY EVALUATING THE POTENCIAL FOR CBS, BY THE WORLD BANK

This combines an overview of CBS and detailed studies of four companies, and is generally favourable towards CBS as part of a city-wide inclusive sanitation approach. Some important points coming through are:

- Overall CBS might be more cost-effective in the long term than sewered sanitation or on-site sanitation, although the World Bank does not yet feel that enough research has been done to be definitive about this.
- Most CBS service providers provide a good quality of service to their customers with very few complaints.
- It is currently difficult to judge the relative affordability of CBS to the customers because the service providers generally set their charges to match the existing sewerage tariffs (which are usually highly-subsidised by the government).
- The four companies are making progress towards being profitable. They will definitely be more profitable if they expand their scale of operations. The barriers to going to scale include: uncertain regulation of products; low support from municipalities; no grants being offered by the government (unlike for other types of sanitation).

PUBLICATION: THE WORLD CAN'T WAIT FOR SEWERS, BY WSUP

This publication analyses success factors for CBS enterprises and presents a vision for taking CBS to scale, based mainly on the example of Clean Team in Kumasi, Ghana.
Some important points from the paper are:

- CBS is profitable in theory but difficult in practice. Among the most important economic factors are the capital cost of the container and the frequency of collections per week. The enterprise needs to have a gross profit margin of at least 50% in order to be a sustainable business. That generally corresponds to charging say $8 per household per month which is probably too high for the poorest households.
- CBS is customer-centred work. The service must be reliable as well as hygienic. Realistically it may only appeal to, say, 20% of the total population of a city.
- The future for CBS is more likely to be in partnerships between an entrepreneur and the public sector than in standalone entrepreneur companies. Thus CBS can be an integral element of a city-wide inclusive sanitation programme.
- The capital expenditure requirement for a CBS service is much lower than for sewered sanitation. The cost of treatment is a significant element and can be kept low by integrating the planning of the CBS service into the sewage treatment and faecal sludge management for the city as a whole.

2. HOW WOULD THAT URBAN SANITATION BE FINANCED?

2.1 WHO WILL NEED FINANCING AND FOR WHAT

The first step in studying appropriate finance mechanisms is to identify the people and organisations who will need to be financed, and what they need that money for. This can be confusing, especially for non-finance professionals. Different analysts and commentators have different viewpoints and definitions regarding sanitation financing. Here is a simple list of the main people and organisations that need financing.

Householders

Householders need finance for capital expenditure to construct their own toilets and either sewer connections or on-site storage such as septic tanks or pits; in a few cities they even construct neighbourhood sewer networks also. These householders' capital expenditures add up to a very big proportion of total spending on sanitation, although its dispersed nature inevitably means that it is generally not well measured and receives much less attention than the municipality/utility financing described later in this list. Moreover, the existing gaps in urban sanitation are overwhelmingly for the urban poor, who are less able to finance their own sanitation. Depending on their wealth or poverty, some householders cannot afford the capital expenditures, so they need grants. Others can afford the capital expenditures but not in a lump-sum up front, so they need loans.

Ideally, if the appropriate sanitation services have been provided to them, the householders can afford to pay the full tariffs to their sanitation service provider – whether it is a contractor providing an emptying service for on-site sanitation paid once every few years (which can be a very expensive item for poor people), or a utility charging sewerage services as a surcharge on the water bill, or a container-based sanitation provider paid monthly or weekly, or a public toilet operator paid per visit. However, depending on their economic status, some householders need ongoing help to cover these tariffs: for example in both Bogota and eThekwini a defined basic service level is provided free to the users as a matter of government policy.

Depending on their wealth or poverty, some householders cannot afford the capital expenditures, so they need grants. Others can afford the capital expenditures but not in a lump-sum up front, so they need loans.

The existing gaps in **urban sanitation** are overwhelmingly for the urban poor, who are less able to finance their own sanitation.

MAINTAINING AFFORDABILITY FOR POOR AND VULNERABLE HOUSEHOLDERS

Poor and vulnerable householders may need special measures (i.e. grants, whether direct or indirect) to help them afford the capital and operational expenditures of the service. 60% of governments responding to the 2017 GLAAS report have affordability schemes in place, although sadly half of these schemes are not widely used. The schemes include:

- Government grants to the service providers to support free, reduced or discounted tariffs, for sewerage and/or pit emptying, for specific population groups.
- Linking the sanitation tariff directly to block tariff structures for water, with a highly subsidized first block to cover basic needs.
- Free or reduced connection fees for specific population groups.
- Government grants to microfinance institutions to lend money to low-income householders with little to no collateral and with payment plans that accommodate their circumstances.
- Various forms of payment plans and revolving loan funds. These concepts are discussed in various sections of this report.

Local-scale service providers: faecal sludge management contractors and container-based sanitation companies

These are contractors that empty householders' septic tanks, toilet pits or container toilets and transport the toilet resources (excreta, faecal sludge, septage) to treatment plants that are operated either by them or by a municipality/utility.

They need finance for capital expenditure to buy container toilets and pit-emptying and transport vehicles, which are usually their main assets. They might need finance for capital expenditure to build or buy the treatment plants that create sellable products.

Depending on the economic and regulatory setting in which they operate, the scale of their operations, the travel distances and traffic congestion, and the treatment infrastructure to which they link, these companies might or might not be profitable. So they might also need grant or loan finance for their operational work.

City-scale service providers: municipalities/utilities

These are large entities operating in sanitation at a city level. They might be departments within municipalities, or separate utilities – the latter could be public sector corporations or private sector concessionaires.

They need finance for capital expenditure to build sewerage networks and wastewater treatment plants, which are their main assets. Compared to all the other activities listed here, these tend to be by far the largest capital items needing the most money and attracting the most political attention and controversy. One much-quoted example is Dar es Salaam, where 99% of the sanitation budget was allegedly spent on the capital cost of a sewered sanitation system for 10% of the people[6].

6 The investigative work on this case was done by Sophie Trémolet for WaterAid.

They also need finance for working capital for capital maintenance and rehabilitation of these big assets. They might also need finance for working capital for their operational work (which itself includes the cost of borrowing money for their capital expenditure).

Depending on their customers' ability to pay and on the political and regulatory setting in which they operate, these entities might or might not be profitable. For example the International Benchmarking Network for Water and Sanitation Utilities (IBNET) website indicates that 43% of utilities monitored in middle- and low-income countries are unprofitable on their operational expenditures alone, even without considering their capital expenditures also. Of the study cities, the utilities in Bogota and eThekwini are profitable on operating expenditure basis, while those of Jodhpur and Nairobi are not. In Baguio the capital and operating expenditures are not accounted separately and overall the municipality has to receive 40% of its income in grants from the national government.

Others

There are many other players in the sector such as public sector or NGO hygiene educators and promotors of sanitation in general, pit diggers and septic tank builders, manufacturers and hardware suppliers, community or shared toilet operators, and specialists in the various parts of the supply chain. Their finance needs are either similar to those of the main players listed above or comparatively small, so they are not repeated here.

IBNET Website indicates that **43%** of utilities monitored in **middle and low-income** countries are unprofitable on their operational expenditures alone.

2.2 HOW MUCH MONEY THEY WILL NEED

Several organisations have been studying the global, regional and national finance requirements for water and for sanitation, usually expressed in terms of the finance required to achieve the Sustainable Development Goals. Of them, the most-quoted authority is the Water and Sanitation Program and World Bank paper of 2016 authored by Guy Hutton and Mili Varughese entitled "The Costs of Meeting the 2030 Sustainable Development Goal Targets on Drinking Water, Sanitation, and Hygiene". The authors stress that their figures are based on broad assumptions so each figure has a wide possible range - but they are generally acknowledged as the best figures available. They estimate that to meet the SDG target for safely-managed sanitation for all, approximately $45 billion per year is required for urban sanitation[7]. This figure includes capital expenditure, capital maintenance for new infrastructure, and operational expenditure, but they exclude maintenance of existing infrastructure. These are huge and rather abstract numbers - the authors do not discuss the question of who has to actually find and spend the cash. The answer is that the people and organisations listed in section 2.1 do.

Putting the Hutton and Varughese figures into context to indicate the task ahead, this future funding requirement for sanitation is approximately double the corresponding requirement for drinking water and it is approximately five times more than the investments made during the MDG period. In contrast the 2017 GLAAS report shows that currently expenditure on sanitation is about 25% less than expenditure on water, and that 87% of the countries responding to the GLAAS survey reported insufficient financing to reach their national targets for urban sanitation.
The requirements are shown on a diagram prepared from the data in Hutton and Varughese by Sophie Trémolet of the World Bank.

7 They estimate a range of $25 to $70 billion depending on the assumptions made. The biggest factor is the balance between onsite (cheaper) and sewered (more expensive) sanitation.

365 Days

$45 Billion

Hutton and Varughese estimate that to meet the **SDG target** for safely-managed sanitation for all, approximately **$45 billion per year** is required for urban sanitation.This figure includes capital expenditure, capital maintenance for new infrastructure, and operational expenditure

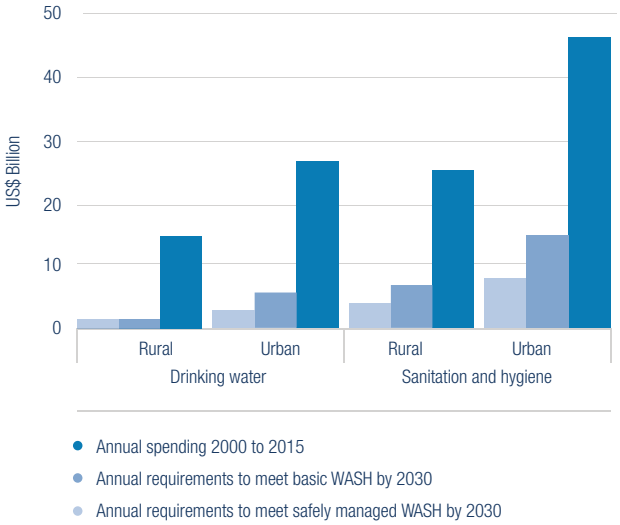


Fig 1 diagram based on data in Hutton and Varughese, Sophie Tremolet, World Bank.

Of the $45 billion headline figure, about two-thirds is for safely managing the toilet resources, and about one-third is for providing the basic level of services to the householders. Thus the inclusion of the important if deceptively innocuous phrase “safely managed” in the SDG wording triples the cost of sanitation compared to the MDG era, during which that aspect was neglected. Also, the global figures hide substantial regional and national discrepancies: for example the financing needs are greatest in Sub-Saharan Africa, and at the national level the poorest countries need to allocate a higher percentage of GDP for sanitation than the richer countries do.

Several organisations are currently working to generate updated and more nuanced estimates of various aspects of the costs of urban sanitation and to monitor expenditure on it. These include the World Bank, the UN Water GLAAS TrackFin programme, and the Climate and Costs in Urban Sanitation project implemented by the University of Leeds. During 2018 and 2019 they will generate more accurate disaggregated data which is to be welcomed, although it seems unlikely that their data will change significantly the basic arithmetic with which this report is concerned.

UN WATER GLASS TRACKFIN PROGRAMME

This programme proposes a standard methodology for tracking financial flows in the water and sanitation sector. This methodology will be used for future GLAAS reports, and all sector players are strongly encouraged to adopt it also, in order to improve consistency and comparability of data. The methodology addresses four basic questions:

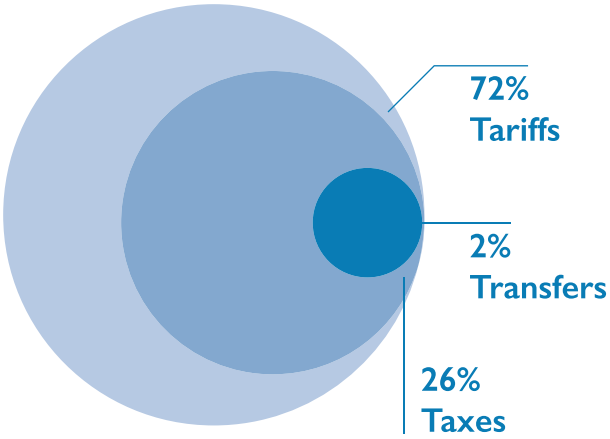
1. What is the total expenditure throughout the sector?
2. How are funds distributed between the different WASH services and types of expenditure, such as capital expenditure, operating and maintenance expenditures, and the cost of capital?
3. Who pays for WASH services?
4. Which entities are the main channels of funding for WASH and what is their respective share of total spending?

It has a comprehensive set of coded classifications covering uses of services, service providers, financing units, and financing tyWpes. Its main output is National WASH Accounts for each country. The methodology then links the information in the WASH Accounts to the key policy questions.

2.3 WHERE THAT MONEY WILL COME FROM

Ultimately there will only be three sources for the money needed both for capital expenditure and operational expenditure. They are generally known as the three Ts:

- Tariffs: paid by customers to the sanitation service providers. Those customers include the householders and businesses who receive sanitation services and the people and businesses who buy products generated from the toilet resources.
- Taxes: domestic taxes raised by local or national governments and given either to the householders or to the sanitation service providers.
- Transfers: grants from other sources, such as international donors, foundations, NGOs, individual people's remittances, given either to the householders or to the sanitation service providers.



GLAAS report states that, in the **25 countries** that responded to this part of its survey, an average of 72% of water, sanitation and hygiene funding comes from tariffs, 26% from taxes, and 2% from transfers.

As to the relative contributions of the three sources, the 2017 GLAAS report states that, in the 25 countries that responded to this part of its survey, an average of 72% of water, sanitation and hygiene funding comes from tariffs, 26% from taxes, and 2% from transfers[8] . With a few notable exceptions such as China, most countries have slow economic growth and extremely constrained public finances available for sanitation. In future therefore, given the current trends in international development financing and the general weakness of many national economies, the proportion from tariffs will probably rise: the cases of Baguio, Marrakech and Nairobi are typical in this respect.

Any other money flowing into sanitation will be loan money that has to be repaid. This is normally used for capital expenditure and only rarely (never in the eight study cities) for operational expenditure. It subdivides into several categories:

- Concessional loans: loans at below-market interest rates, typically with long repayment periods and grace periods, obtained from the development finance sector, e.g. multilateral development banks, national development banks, donors.
- Commercial loans: loans at market rates, obtained from the commercial finance sector, e.g. banks or the bond market, with or without loan guarantee mechanisms supported by governments or donors.
- Micro-finance: small loans offered to low-income people (often people who are otherwise excluded from the formal banking sector) with little or no collateral and specially-designed repayment schedules. This niche lending service can be provided by specialized microfinance institutions, banks, or NGOs.

Loan money can be useful for bridging short-term finance shortfalls or for financing large sums up front, but ultimately it all has to be repaid, either through tariffs, taxes or transfers.

The many permutations of sources of funds, types of recipients, capital and operating expenditure, grants and loans, can make a complicated picture. That complication itself is an obstacle to increasing financing because neither the recipients nor the funders fully understand how and where the money flows. To understand that complication, TrackFin has developed a standard diagram of financial flows (See Fig. 2 on following page).

8 These percentages are national not urban, and they cover water, sanitation and hygiene, but there is no inherent reason to suppose that the percentages for urban sanitation would be very different.

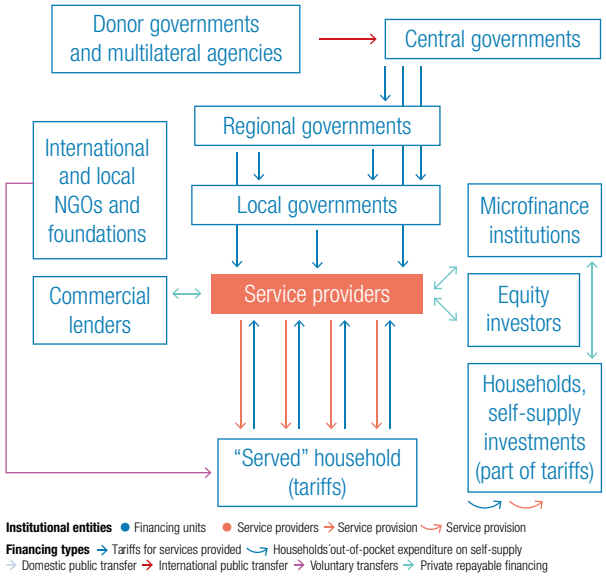


Fig 2: Trackfin, mapping financial flows for WASH service provision

The World Bank paper by Amanda Goksu et al covers this subject in considerable detail and emphasises the importance of understanding all the finance flows in order to decide policies and investments.

Understanding the financial overview for a whole city links well with the concept of city-wide inclusive sanitation described in section 1.3 above. The financing strategies for the various parts of the sanitation supply chain, across the city, need to add up to a coherent whole.

Sector commentators generally agree that grant finance from tariffs, taxes and transfers is very unlikely to increase five-fold as required by the figures in section 2.2 above, and that existing lenders are unlikely to increase their loan allocations to sanitation significantly. That means two things: that sanitation enterprises must become more viable for investment, which is the subject of section 2.4 below; and that new investors must be attracted to the sector, which is one of the subjects of section 2.5 below.

2.4 GENERIC FINANCIAL ANALYSIS OF A SANITATION SERVICE PROVIDER

Having identified the organisations that need finance and the amount and possible sources of it, this section concentrates on the financial analysis of a sanitation service provider. This is a generic analysis that could apply, with minor variations, to a small entrepreneur, a large company, a standalone utility or a part of a municipality – they are all enterprises.

The basic point is that if an enterprise is financially successful, it will attract investors. Off-grid solar power is one current example of a socially- and environmentally-beneficial utility sector in which successful enterprises are attracting significant commercial investment, and there is no inherent reason why sanitation enterprises cannot do the same. Whether an enterprise is for-profit or non-profit or even a hybrid of those two, and however it defines its criteria for financial success, there are some fundamental actions that it can take in order to become more financially successful, as follows.

EXPENDITURES AND HOW TO REDUCE THEM

Any sanitation enterprise has two types of expenditures: capital expenditures[9] and operational expenditures . To improve its financial viability, the enterprise must try to reduce both of them. Here are some suggestions for doing that.

Reducing capital expenditures

The single biggest way to reduce capital expenditure is to move the emphasis of future planning from sewered sanitation to

9 The TrackFin programme guide Table 12 has a useful standard classification of expenditures for any enterprise.

on-site and container-based sanitation. While container-based sanitation is a new concept with little historical data yet available, on-site sanitation has well-documented costs. For example Hutton and Varughese tabulate unit capital costs for sewerage with treatment and for onsite sanitation with FSM for 160 countries. While they do not tabulate unit capital costs for the world, their Fig 3.4 implies an average cost ratio of 2:1 between these two technologies. This study has calculated a weighted average cost ratio for the unserved urban people of the world, which is also 2:1 (see box for the methodology). Sewered sanitation with treatment costs twice as much per person as onsite sanitation with faecal sludge management. Switching future plans from sewered sanitation to onsite sanitation can halve the capital expenditure needed.

The current indications are that the capital expenditure for CBS would be comparable to that of on-site sanitation, i.e. about half that of sewerage, although the extra costs of grey water and storm water disposal would also need to be taken into account.

In addition to that major point, here are some other ways to reduce the enterprise's capital expenditures:

- When constructing sewered sanitation systems, adopt the most modern research on optimising pipe flows, networks and treatment processes.
- Ask the householders to invest more in their own infrastructure within their own properties - and sometimes, as with Orangi Pilot Project's neighbourhood or condominial sewers in South America, outside their properties.
- Produce larger numbers of units on an industrial scale to achieve unit cost savings.

Reducing operational expenditures

Here are some ways to reduce the enterprise's operational expenditure:

- Use Information Technology better. Tariffs can be paid by mobile money. A call centre or hotline coupled to a market platform can improve the flow of communications between customers and service providers e.g. toilet pit emptiers, improving competition and lowering the price to the customer. Vehicle tracking and fleet management can reduce the cost of transporting toilet resources. Flow and process monitoring can optimise the management of inputting faecal sludge into sewage treatment plants, reducing expenditures overall.
- In sewered systems, optimise flow performance and reduce pumping costs, which are typically a high proportion of operating expenditures.
- In onsite systems, reduce costs of pit emptying and transport which typically represent a very large proportion of total cost.
- Use clear regulatory and licensing frameworks to grant two or three Faecal Sludge Management operators licences extending across a whole city, thus achieving economies of scale[10] while maintaining competition.
- Reduce the cost of borrowing money by improving the credit rating of the enterprise, or even by persuading the national government to borrow and repay money on behalf of the enterprise, as happens in the case of Dakar.

10 A good example of this is the Blue Water Company in the city of Leh, India.

METHOD OF CALCULATING THE RELATIVE COSTS OF SEWERED AND ONSITE URBAN SANITATION

First, for each country:

- Use Annex 4 of the JMP 2017 report to calculate the number of urban people without at least basic sanitation: these are the people who currently need a full sanitation service of either sewerage or on-site sanitation with safe management of the excreta.
- Use Table E1 of Hutton and Varughese to find the incremental offsite sanitation cost per person (i) for sewerage with treatment and (ii) for onsite sanitation (septic tanks) with treatment. Note that the offsite cost is the cost to the service provider e.g. a utility, separate from the onsite cost borne by the householder.
- Multiply the number of people needing the service by the two costs per person to get the total capital costs for all the people to be served with either of the two technologies.
- Divide the sewerage figure by the on-site figure to get the ratio of the two costs.

Then, for the unserved people of the world:

- Tabulate the two total capital costs for the 59 countries that each have at least 1 million people needing the service. (Between them they have 96% of the people in the world needing the service.)
- Add up the two totals and divide by the total number of people in those 59 countries needing the service.
- This gives the two costs per person, as a global weighted averaged.
- Divide the sewerage figure by the on-site figure to get the global weighted ratio of the two costs.

REVENUES AND HOW TO INCREASE THEM

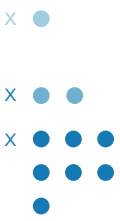
Any sanitation enterprise only has three possible revenues: tariffs from services rendered and from sales of products; grants; and equity investment. To improve its financial viability, the enterprise must try to increase some or all of them.

Increasing tariffs from households and commercial customers

This is the likeliest area for improvement – after all, this is how sanitation enterprises in rich countries are financed. Across many developing countries, current sanitation tariffs are very low and/or not collected; increasing and collecting tariffs is therefore an obvious way to improve the financial strength of the enterprise. The case study of Bogota gives a clear example; in 1996 the Mayor pushed through big tariff increases which have given the public-sector utility a strong financial position. Many studies show that people are able and willing to pay more for a better service. However, tariff policy is a complex and emotive topic. To give one much-quoted example, politicians like to keep tariffs low in order to win popular support. (The case study of Baguio is an example of this reticence by politicians, combined with an unusual tariff system in which the sewerage charge is calculated per toilet rather than per house or per volume of water.) One way around that conundrum is for the politicians to delegate the tariff-setting to an independent regulator who can set realistic tariffs. But even regulators can be reluctant to impose their decisions: for example, more than half of the urban utilities that reported to the 2011/12 GLAAS review stated that tariffs were either not regularly reviewed or were reviewed but not increased.

In rich countries tariffs for sanitation are typically higher than those for water, because the service providers and regulators have analysed the actual costs of the services and agreed to match the tariffs to the expenditures. In poorer countries the opposite is generally the case, that tariffs for sanitation are much lower than those for water. For example many utilities that provide both water and sanitation services charge a metered tariff for water and either no tariff or a pro-rata surcharge for sanitation. If the water tariff is set low, the sanitation tariff is also low. However if the two elements are separated out, the two tariffs can be set separately at viable rates to cover the utility's two respective expenditures. The case studies of Bogota and eThekwini provide examples of this separation.

The people who set tariffs need to decide which expenditures are to be covered by the tariff e.g.: operational expenditures; depreciation of capital assets; cost of new capital assets; finance costs; a profit for the service provider. This decision makes a huge difference to the tariffs. One example comes from a study of sanitation tariffs in Uganda commissioned by the National Water and Sanitation Corporation in 2015. The current sanitation tariff paid by people connected to the sewerage system just covered the operational expenditures of the sanitation service provider. To also cover the depreciation of capital assets it would need to double. To also cover the costs of new capital assets and the cost of finance (but not a profit for the service provider) it would have to increase seven times. For most countries, the latter feels politically and economically unrealistic, while the former would be a reasonable level to aim for. However at present



Tariff paid by people connected to the sewerage system

To also cover the depreciation of capital assets it would need to double. To cover the costs of new capital assets and finance it would have to increase **seven times.**

even that level is far from being achieved: only 39% of the countries responding to the 2017 GLAAS survey said that their urban sanitation tariffs cover more than 80% of operational expenditures. Of the study cities, only Blumenau, Bogota and eThekwini reach that benchmark.

When increasing tariffs overall there is a risk that the poorest people might not be able to afford higher tariffs. The regulator or the enterprise can design internal cross-subsidy mechanisms for them – utilities around the world have been doing that for decades already, and modern IT enables it to be done more easily. There are many such mechanisms including rising-block tariffs, means-tested tariff rebates, property-based tariffs. Whatever the chosen mechanism, the underlying principle of cross-subsidies is that the enterprise's total revenue from tariffs does not change, just the balance of payment levels among its various customers.

An equitable tariff policy would strike a balance between covering the operational expenditures for people who already have the services and enabling people who do not have the services (almost always poorer people) to gain access to them. That involves setting tariffs with an eye to the underlying social aim, by charging more to richer people and less to poorer people.

The above analysis of tariffs applies primarily to customers connected to sewered sanitation. Customers for onsite or container-based sanitation pay fees per operation or per time period which are more difficult to regulate. However, many of the same principles for tariff regulation and reform still apply: for example septic tank emptying contractors generally make their profits from their richer customers, so careful regulation and tariff-setting is needed to ensure that these companies must also serve poorer customers.

Increasing revenues from sales of products

Making money by selling the end products of excreta treatment processes is a relatively new concept. Only a few utilities have been doing this, notably in Europe: for example GENeco in Bristol, UK, is a very impressive example of a private sector company running a city's sewage treatment plant and generating a revenue from every single substance that leaves the premises. Human toilet resources contain nutrient and calorific value and can be processed into various commercially viable products notably water, fertiliser, biogas, solid fuel and chemicals. There are ready markets for all of those products. Of course the price must be right for the particular market, and that might mean that the vendor (the sanitation enterprise) will not receive a huge revenue from them, but it will create a revenue stream that augments the revenue from its customer tariffs.

Because this is a new concept, sales of these products can be hampered by stigma or regulation. For some years, the Public Utility Board of Singapore has produced potabe-quality water derived from its sewage treatment plants under the brand of "NEWater". It took years to overcome the public's sense of revulsion at drinking treated sewerage – when in fact this has been routine for water supplies in many cities for a long time. Similarly growing food fertilised by products derived from human excreta is not allowed in some countries, whereas in other countries even fresh human excreta have been used as fertiliser for centuries. Regulation tends to reflect public and cultural perceptions.

Receiving increased grants

The decisions about this are made by the national or regional government or donor agency that is giving the grants, rather than by the enterprise itself. Governments more commonly provide grants for capital expenditure than for operational expenditure.

Regarding grants for capital expenditure, on the one hand the Bogota case study gives an example of a national government

that regards it as its duty to provide the grant finance for capital expenditure on sanitation.
On the other hand, the Jodhpur case study gives an example of the unintended consequences of these grants. The Government of India invests huge sums into capital expenditure for sanitation. Consequently the service provider, Jodhpur Municipal Corporation, has little incentive to increase its customer tariffs and is financially wholly dependent on the national government and therefore vulnerable to any future change in national policy.

Regarding grants for operational expenditure, these are sometimes given directly to the enterprise, and sometimes to the householders to help them pay the tariffs (see the box in section 2.1 above).

Increasing equity investments

Equity investment is the regular mechanism for enterprises in all countries and business sectors to raise money to finance their operations. A sanitation enterprise will be competing for the investor's money against many other enterprises. Here are some ways to increase its chance of success:

- Prepare clear and understandable business models that explain its work and its financial requirements and prospects and that explain to the potential investors the balance between the risks they are taking and the returns they can anticipate.
- Demonstrate good understanding and engagement with the householders who are the enterprise's customers.
- Offer co-investment by the municipality because this demonstrates to potential investors that the municipality has a direct stake in the success of the enterprise.
- Demonstrate that the regulator and municipality have a good track record of enforcing regulations, by-laws, tariffs etc because this makes a potential investor feel more secure.
- Explain the positive effect of investing in sanitation on the local economy and on the health of the community and workforce. This will be of particular interest to the category of investor known as impact investors, who seek both societal and financial returns on their investments.

As the list indicates, several of these suggestions require close collaboration between the enterprise and the municipality where it works. In some cities this will require a significant change of mindset by the municipal leaders.

THE NEXT STEP IF THOSE MEASURES ARE INSUFFICIENT

Even after taking all the above measures, some sanitation service providers – either public or private – will still not be financially viable. The next step is for the national government, recognising that sanitation is an activity that generates societal gains, to put into the enterprise money that corresponds to the value of the societal gains. Of the study cities, Bogota receives money from the national government that recognise the societal gains from sanitation (although the national government does not use those exact words to describe it). This point cannot be over-stressed: the positive social and economic impact of sanitation on the society as a whole is of no help to the enterprise providing the service unless that impact can be translated into a positive financial benefit for that enterprise. For example, one of the overarching conclusions from World Water Week 2017 was that Resource Recovery and Reuse (i.e. circular economy) activities are economically viable but need to internalise the societal benefits in order to make them financially viable – this is the same message that the World Bank and others are saying.

Commonly called subsidies, these payments by the government to the enterprise are legitimate financial measures that recognise sanitation as a public good and as an investment that will increase the national GDP and therefore the tax base and reduce the government's health costs.
The word subsidy seems to agitate many critics, and yet it describes one of the fundamental duties of governments for mi-

llennia: to provide for the needs of their people. One source of the agitation is the perception that the subsidy is benefitting a profit-making entity and thus constitutes unfair government support - this perception can be diminished either by giving the grants directly to the householders or by labelling them transparently as payments for societal gains (also referred to variously as public goods or merit goods). Another source of agitation is a concern to avoid favouring individuals: ironically, many governments that are happy to subsidise off-site treatment by allocating huge sums to construct sewerage networks with centralised treatment plants that favour some communities over others refuse to subsidise (much cheaper) onsite treatment on the spurious grounds that it favours individual people.

Historically the sanitation sector has tended to be under-prioritised compared to other sectors when governments are making payments for societal gains, for two main reasons. First, sanitation has not been presented as a politically attractive subject. Secondly, the economic and social costs of poor sanitation have too often been under-estimated and not well-explained. Now several global organisations are generated better data and clearer messages for this advocacy work, which should lead to increased payments of this sort in future.

In summary, if an enterprise has done its best to reduce its expenditures and increase its revenues but still cannot become financially viable, it is both legitimate and sensible for the government to pay money to the enterprise that transparently represents the value of that enterprise's work to society as a whole. Those payments should secure the financial viability of the enterprise.

2.5 SOME INNOVATIVE FINANCIAL IDEAS

Part of this work programme's purpose was to examine whether there are innovations in sanitation finance that are already working[11]. The general conclusion is that many innovative financial ideas relevant to sanitation have been discussed or proposed, but that disappointingly few have actually been implemented. However, given the difficult financial situation described in the preceding sections of this report, and the short time frame to 2030, sanitation leaders and financiers must press ahead and apply these innovations now. Here are three lists of innovations: financiers; financial instruments; and financial mechanisms. Individual items have been included here based on a combination of their track record, their future usefulness, and their potential to deliver benefits at scale. Each idea is only described briefly: several organisations and websites such as the WSUP/IRC/Trémolet website www.publicfinanceforwash.com give more details about them.

The following section 2.6 contains some conceptual tools and building blocks to support them all.

NEW FINANCIERS

Several earlier sections of this report have observed that the traditional financiers (national governments and donors) have limited funds to invest in sanitation. This is just a symptom of a major global change that has occurred over the past few decades, accelerated by the financial crisis of 2007/2008, that governments have less money or willingness to invest while individual people have more wealth now than ever before in human history. They can become the new financiers of urban sanitation in developing countries.

The people of the world are collectively saving unprecedented sums of money measured in the trillions of dollars, and continue to save more every year. Much of that money is being saved

11 Note that not all innovations have to be brand-new: instead, the innovation could come from using a given approach within a sector in which it had not been previously applied.

within the very same countries that have the largest needs for sanitation finance; for example Pension Funds in developing countries are estimated to have over $1 trillion under their management. The individuals and the institutions to which they entrust this money, such as family offices, investment managers, pension funds, insurance companies, and (indirectly) Sovereign Wealth Funds, are constantly scouring the national and global financial markets looking for new investment opportunities. Investing even a tiny fraction of those savings would make a huge boost to the finance flows into urban sanitation. However these potential financiers do not currently invest much in sanitation because they cannot understand or reduce the risk, they cannot identify a suitable financial instrument through which to invest, and they all want to invest at different levels, timescales and currencies.

The sanitation enterprises therefore need to put in a lot of groundwork to communicate their investment propositions to these new financiers. It is difficult for the enterprises to contact the financiers directly. Instead they can communicate through intermediaries, trade groups, professional associations, the specialist media etc. Globally there are several intermediaries that have expressed particular interest in urban sanitation, for example the Global Impact Investors Network, Circularity Capital, and Social Finance Ltd. Nationally the intermediaries could include pension funds, banks and investors' groups.

INNOVATIVE FINANCING INSTRUMENTS

Cross-subsidies

Cross-subsidies are already quite common in sanitation tariff policies around the world. They enable rich people to help finance poor people's sanitation. They can be internal transfers within the design of the sanitation tariff itself, or transfers from the water tariff or even, as in the case of Marrakech, electricity tariff. A sanitation levy, which is used routinely in Burkina Faso and was tried in Lusaka, is a surcharge on the water tariff earmarked for onsite sanitation investments, so that people with house connections to water pay for those depending on onsite sanitation.

By their nature, cross-subsidies can be more effectively managed within a city-wide inclusive approach than by service providers working in isolation.

Impact investment

An impact investor is an investor who seeks both financial and social returns. The investor's desired financial return might be at market rates or below market rates, the latter being of course more desirable to the investee. The investor's desired social return must be measurable using good impact indicators – sanitation has exactly that quality of indicators, as mentioned in section 2.6 below. Impact investors have enormous amounts of money under their control and are said (by their membership organisation the Global Impact Investors Network) to be eager to contribute to the SDGs but they are short of investment opportunities.

When an impact investor checks a potential investment, the first hurdle is usually a financial one, at which stage many investments with unproven business models fail because their internal rates of return (IRR) are deemed too low for an impact investor to proceed to the next hurdle. Typically those IRRs are slightly ne gative – dubbed the "blue zone" by the Chair of the CDC Group[12].

12 The UK government´s Developtment Finance Institution formerly known as the Commonwealth Development Corporation.

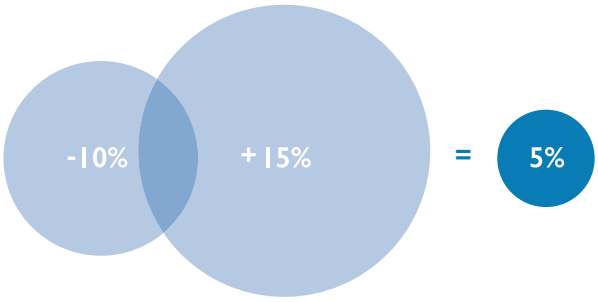
Many sanitation service providers, such as container-based sanitation contractors, are investees that operate in precisely this financial region. The IRR for the investor can be improved either by reducing the discount rate applied to the future revenues or by using grant funding from a donor to cover the loss, thus enabling an investment with slightly negative overall IRR to make a positive IRR for the impact investor[13]. This last scenario is an example of blended finance.

Blended finance

Blended finance is the strategic use of public finance to catalyse commercial finance, either where it would not have previously entered or at a scale that it would not have previously reached. Blended finance encompasses a range of instruments and processes in which public and commercial money can be invested side by side with different but complementary aims. To illustrate by some simple arithmetic: if a sanitation enterprise operates at a loss of, say, 10%, a public funder can give it a grant of 15% which would enable a commercial investor to invest in it and get a return of 5%. This is a win-win: the commercial investor benefits from lower risk and/or enhanced returns on its investment and the public funder can magnify the impact of its funding – in this example by only needing to give a grant of 15% of the value of the enterprise's work rather than 100% of it. The two financial streams are blended to achieve the desired overall result.

The World Bank is promoting blended finance that supports credit-worthy enterprises (defined as those that at least recover their operating costs) by reducing the financial risks of their work and hence helping them to reduce the interest rates at which they borrow from commercial banks.

Some organisations talk about crowding in private sector (i.e. commercial) finance, which means much the same as blended finance. For example the G20's working paper on crowding in private sector finance sets out principles for Multilateral Development Banks to follow; these include creating an investment-friendly environment, expanding and standardising credit enhancement, blending concessional finance and commercial finance. The underlying premise of the paper is the same as that of blended finance, to attract commercial finance to augment public sector funding because the latter is insufficient to achieve the SDGs. Meanwhile the OECD and the Global Impact Investors Network have both pointed out that there are currently very few commercial investors putting money into blended finance, so OECD is trying to encourage them by establishing blended finance principles.



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13 The organisation Social Finance calls this concept a Missed Opportunities Fund because it has not yet been taken up at scale.

WATER CREDIT

An example of successful blended finance is Water.org's Water Credit programme, in which about $20 million-worth of institutional support by Water.org to micro-finance institutions has facilitated $600 million of commercial capital to flow from those institutions to lend to householders for water and sanitation improvements such as toilet construction.

To date, over 90% of borrowers are women, their repayment rates are well above 90%, and the finance institutions are largely incorporating these loan products into their mainstream loan portfolios. Water.org is using this positive experience to expand its work in advising and training more finance institutions to become involved in this lending sector.

Credit enhancement to reduce risk/return profiles e.g. catalytic first-loss capital

This is a particular form of blended finance in which one financier puts money into an enterprise and voluntarily positions itself at the back of the queue for repayment, thus enabling other financiers to put money in with more reliable expectation that they will recoup their investments. The United States Agency for International Development (USAID), for example, operates a Development Credit Authority (DCA), which will guarantee to cover the first stipulated percentage (often around 15%) of loss for a given investment. In that situation, the commercial investor is not at risk of losing money until 16 percent of borrowers have defaulted on a loan. This reduction of risk can convince sceptical potential investors to invest.

Output-based aid

Output-based aid (OBA), also sometimes entitled results-based aid, is an already established type of funding by governments and international development financiers that has become more prominent in recent years as development stakeholders have sought to make aid more efficient. OBA ties the release of public grant funding to the achievement of clearly specified results that support improved access to basic services. It works on a reimbursement basis: the service provider invests its own money and when the project or work programme is complete an assessment is made to determine whether the agreed results have been achieved. If they have, then usually around 50-70% of the project cost is reimbursed to the service provider. OBA has gradually emerged as an important way to finance access to basic services, albeit that the service provider still has to find the cash upfront to finance its work prior to being reimbursed. Evidence from existing projects suggests that OBA could improve the targeting and efficiency of delivering the grants.

Contingent funding, SIBs and DIBs

Contingent funding is similar to output-based aid funding. A public or philanthropic donor wishes to spend money to achieve a certain societal gain. Instead of giving that money up-front to an enterprise that tries to achieve that aim, this donor does nothing initially. Another financier, this one being a commercial investor, lends the money to the enterprise. The donor then pays money only if the gain actually ensues, i.e. its payment is contingent on the outcome being achieved. It is known as an outcome funder.

There are various ways to structure contingent funding. One idea that is becoming increasingly prominent is called a Social Impact Bond or a Development Impact Bond. This brief description of a Development Impact Bond (DIB) is based on a recent presentation by Jeremy Keele of the Sorenson Impact Centre speaking at the WASTE Conference entitled Beyond Development Aid:

- There are four parties involved in a DIB. An investor invests money through an intermediary into a service provider. The service provider delivers services to a target population. If those services succeed in achieving an agreed and measurable outcome, an outcome funder pays for that success to the intermediary. The intermediary uses that money to repay the original investor its capital plus interest.
- A DIB needs a reasonable time horizon, a meaningful and measurable outcome, appropriate legal and political conditions, and evidence of success using standard metrics that all four parties can all agree to use.
- Some problems with DIBs are lengthy negotiations, high transaction cost, insufficient data, and metrics that are difficult to agree.
- To date over 55 DIBs have raised approx. $180 million, but none of them are yet in sanitation.

One criticism of SIBs and DIBs is that they don't raise any more money for a programme of work, they just provide a way to mobilise the money up-front – ultimately the outcome funder pays for the work anyway, just as if it had given a grant to the service provider. This analysis overlooks a couple of aspects. One is that if the work fails to result in the desired outcome, the outcome funder pays nothing and the loss is borne by the investor. The other is that the pressure exerted by the investor onto the service provider's financial management skill increases the likelihood that the work will succeed. So the same aggregate amount of money put into sanitation programmes by the outcomes funder will result in more success overall than under a conventional system in which it gives grants to some programmes that succeed and to others that do not.

Tax Increment Financing

Tax Increment Financing is a public-sector finance tool in which a local government body such as a municipality borrows a loan from a commercial bank in order to fund a specific public infrastructure improvement, using the future increases in local tax revenue to repay the loan. The underlying logic is that the infrastructure improvement, for example improved sanitation, will increase the desirability of living in its area and hence the value of properties and hence the tax paid by the owners to the municipality. This instrument was first used in the USA in the 1950s and has not yet been used much in other countries. This study has not found an example of its use for sanitation but it is included in this list because it might be a useful instrument.

INNOVATIVE FINANCING MECHANISMS

Community Finance

This term refers mainly to savings schemes set up by poor people living in urban areas, in order to improve their own living conditions including sanitation. If the national regulators recognise these schemes and integrate them with the commercial market, other commercial finance can be mobilised to augment the community finance. This is a particularly valuable mechanism because it can bridge the gap between households spending their own money on their sanitation and utilities raising external finance to improve those householders' sanitation.

Guarantee Fund

This is a fund set up by a public or philanthropic financier to underwrite enterprises to lease or buy capital assets. One example in the sanitation sector comes from the study city of Dakar where the Gates Foundation provided a guarantee fund through the Government to a private bank, to enable private sector enterprises to borrow money on commercial terms to purchase trucks for emptying septic tanks. The guarantee is a safe guard for the bank in case of default by the borrowers. This mechanism has the advantage from the financier's viewpoint that if the borrower does not default, the guarantee is not called in and therefore it costs the financier nothing more than the administrative costs of setting it up. The advantage to the enterprises is that they can access loans that they would otherwise not access due to their low credit ratings or lack of collateral: in the case of the Dakar guarantee fund the interest rate is typically 7.5% rather than 11 or 12%, and only 8% of the loans are not performing fully.

Climate-related grant or loan funders, including the Green Climate Fund

The water and sanitation sector has been slow and unimaginative in trying to attract climate-related funds. There is no consistent intellectual approach. Some thought leaders, such as the Toilet Board Coalition, stress the positive aspect and promote the role that sanitation can have in mitigating climate change. Meanwhile some other thought leaders, such as the Sustainable Development Solutions Network which is a global think-tank for the UN chaired by Jeffrey Sachs, stress the negative aspect and suggest adding 25% to Hutton and Varughese's capital expenditure costs as the extra cost of adapting to climate change.

Meanwhile the Green Climate Fund, which is the largest fund that invests in climate change adaptation or mitigation, has only made one water or sanitation investment to date - for urban water supply in Fiji. The reason is apparently not that the Green Climate Fund discourages sanitation investments but that no potential sanitation investee has yet submitted a sufficiently robust proposal. There are admittedly technical difficulties, for example in verifying climate improvements due to dispersed activities such as household sanitation, but other sectors such as cookstoves and off-grid solar are addressing these problems much more vigorously than the sanitation sector. The Green Climate Fund and other climate-related funders could be big potential future funding mechanisms for urban sanitation programmes.

Sanitation Financing Facilities

A "sanitation financing facility" is the name that this study gives to a multi-stakeholder mechanism that enables many different grant and loan financiers to invest new money in many different sanitation enterprises simultaneously. It is an efficient one-stop platform. On the one hand it helps the investees to present their proposals to many potential investors simultaneously. On the

other hand it offers the investors many investable propositions into which they can place their money at the timescales, risk levels and currencies that they prefer.

This type of mechanism addresses many of the obstacles that have been described in previous sections of this report. It can use several of the innovative instruments described above such as impact investment, blended finance, and contingent funding. A sanitation finance facility could be set up in one country or across a region or even globally, to serve one technology type or all of them, for private sector contractors or municipal utilities. Different sanitation financing facilities could be independent or linked.

Several organisations have recognised the need for mechanisms or platforms of this sort. The Dutch Water Financing Facility has similar elements. The Sustainable Development Solutions Network has concluded that the WASH sector needs a dedicated pooled financing mechanism. The World Bank is proposing a conceptual framework combining three elements: public finances that are better planned and allocated; service providers that perform better; and commercial investors that are attracted in by the public finance. The African Development Bank and the Bill and Melinda Gates Foundation are setting up the Africa Urban Sanitation Investment Fund (AUSIF[14]) which will have several features similar to a sanitation financing facility notably the pooled funding and the range of investment ideas.

The overarching conclusions from World Water Week 2017 refer to innovative business models and financing mechanisms to attract all available sources of finance, the need for simplicity in the design of financial structures to mitigate perceived high risk and uncertainty, using innovations in partnerships, and designing business models to turn economically beneficial projects into bankable ones. Sanitation financing facilities correspond well to all these strategic concepts and directions.

No sanitation financing facility yet exists but a multisectoral team of thinkers, convened by Arthur Wood of Total Impact Advisers with the support of a group of far-sighted donors, is currently designing a generic finance facility applicable to regional water resources management or indeed to sanitation. This work can be traced back to 2009 when a similar team led by Wood had designed a World Sanitation Financing Facility. The idea did not progress beyond the planning stage: funders were reluctant to pay for creating a global platform with complex monitoring systems designed by a leading company of management consultants, its concept was ahead of its time in the eyes of the banking and finance sector which was unwilling to support collaborative finance models, and perhaps its designers did not explain it clearly enough within the sanitation sector. However the idea was never abandoned and was described in a paper written by Wood and Hutton in 2013 for UNESCAP, which drew on the previous design work; the paper used sanitation in Asia as a case study but was applicable around the world.

14 AUSIF will mobilise additional funding from a variety of donors including traditional development partners, the private sector and Governments to increase access to innovative sanitation in urban areas. It will: (i) support institutional development and capacity enhancement programs; (ii) provide incentives for enhanced focus on sustainable urban sanitation services delivery; (iii) increase attention on greater uptake of innovative approaches and technologies; and, (iv) support knowledge management for increased impact.

That concept was the starting point for Wood's current work. The design of the generic facility currently under development is summarised in the accompanying box, as applied to sanitation.

The conditions for the success of a financing facility are now significantly different from 2009. The design has been softened and scaled down so it does not create another intermediary competing with existing stakeholders but rather a platform to help those stakeholders collaborate. The technology platform now exists and is in use in other sectors such as housing and health, as is a standard and trusted monitoring system to measure outcomes. That monitoring system has evolved from a top-down global model to a local one that measures and monetises the outcomes of specified activities. It is still an unfamiliar concept to people in the sanitation sector, but organisations from other sectors[15] could share their experiences and give advice on how to get started and how to overcome the inevitable initial problems.

Sanitation financing facilities are innovative because they present the amount of funding needed to achieve the sanitation SDG as a market opportunity for investors rather than as a headache for grant funders. Sanitation financing facilities have the flexibility, the scope and the sheer vision to make a major contribution to financing urban sanitation by 2030.

15 For example the Greater Cincinnati Foundation's Collective Impact platform, or the National Affordable Housing Trust, both in USA.

THE MAIN FEATURES OF SANITATION FINANCING FACILITY

A sanitation financing facility is a legally-registered non-profit association whose members can themselves be either for-profit or non-profit organisations (many legal systems around the world now permit these hybrid or mutual types of associations). Its member stakeholders would include:

- Sanitation service providers of all sorts
- A social intermediary to monitor the sanitation work
- A financial intermediary to set up the investment deals
- Investors of all sorts

Its governance structure is decided by those stakeholders.

Many different financial flows can pass through the facility in individual contractual arrangements designed by the stakeholders concerned (for example using the types of innovative financial instruments described above). The outcomes of the sanitation services are reported back through the facility, all using a common set of agreed indicators. The facility can simplify financial structures to reduce risk and uncertainty and transaction costs, achieve economies of scale, and improve the efficiency and impact of current and future investments and therefore significantly increase financial flows for sanitation.

2.6 SOME TOOLS TO ENHANCE AND ENABLE THESE INNOVATIONS

The following are some conceptual tools and building blocks that support the innovative financing instruments and mechanisms described in section 2.5 above and can improve the attractiveness of sanitation to new investors.

Measuring outcomes

Standard indicators are needed for measuring the outcomes of the sanitation work. They may be tangible or intangible, behavioural or financial, internal or external to the work itself. Their key characteristics are that they can be measured, recognised and trusted by all the stakeholders – this mutual trust is particularly important if the indicators are used to judge contractual progress and hence payments. Here are some relevant examples of devising indicators and measuring outcomes:

- The official indicators of progress towards the sanitation SDG targets are devised and monitored by the WHO/UNICEF Joint Monitoring Program (JMP) under the aegis of UN-Water. The JMP website provides full details of them, including the work currently being done to develop indicators for the aspects of the SDGs that were not present in the MDGs.
- The Social Progress Index has been devised by the Social Progress Imperative in order to objectively measure the well-being and quality of life of a population. It generates a single-number index that can be tabulated and analysed just as the GDP can be. It is intended to remind everybody that economic indicators are not the only ones that matter. There might be too many confounding variables for it to be used as a measure of outcomes of sanitation, but it could have a valuable role alongside health indicators and GDP.
- The organisation Integrity Action has developed a methodology for real-time monitoring that can be applied to many types of activities and indicators including improved sanitation. It is an open-source methodology in which everybody is encouraged to contribute to the monitoring process. In this model, the process for monitoring is as important as the indicators themselves.
- Just as mitigation of CO2 equivalents is a measure of the impact of climate projects, this approach could be translated to sanitation with a comparable measure (for example mitigation of unmanaged excreta flow units). This study has not yet identified any organisations that are currently working on this idea.

An early example of an innovative finance instrument provides a salutary tale in devising indicators. In 2014 the State of Utah, USA, issued a Social Impact Bond to an investor to improve pre-school learning; the agreed outcome indicator was the reduction in percentage of children needing special needs education at the next stage of their schooling. The investor put its money into the service provider. At the end of the project period, the outcome funder stated that the outcome indicator had been attained and repaid the investor its capital plus interest. It later became clear that the achievement was extraordinarily high (99% reduction compared to a normal 10-20% reduction) and the financial investment unusually low (about half the normal amount), and hence that the indicator was probably faulty and should not have been used in the contract.

Monetising externalities

This concept is very important for the success of many of the new financing mechanisms. It simply means calculating a financial value for benefits that are traditionally regarded as being outside the financial arithmetic, such as environmental, health or social impacts. Several organisations are working to develop tools that everybody could use to monetise these externalities. Sanitation would be a candidate for this approach because

the benefits of improved sanitation, notably in public health, environmental cleanliness and productive time gain, are substantial[16] but have historically not been expressed in monetary terms. Some relevant examples are given below:

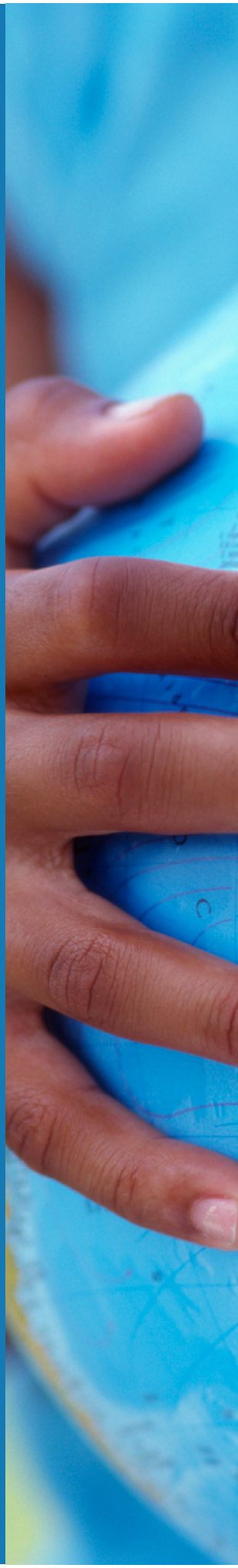
- The International Organization for Standardization, recognising the high level of interest and activity in this subject, is currently developing ISO 14008 on "monetary valuation of environmental impacts and related environmental aspects". The standard will provide organizations a common framework including established methods as well as common terms in the field of monetary valuations. It looks at environmental indicators, not at social indicators, but its methodology and language may also be useful for the latter.
- Natural Cost Accounting is an established methodology to assess the impact of an intervention in physical units and then convert those to monetary value. It could be used in the field of sanitation.
- The Gold Standard Foundation is a standards and certification body that develops methodologies to measure outcomes of development activities. Its original work was on climate-related outcomes, and it has subsequently broadened its work to include SDG-related outcomes under the general heading of Gold Standard for the Global Goals. The Gold Standard can certify projects or their impacts. The Foundation has recently developed Water Benefit Certificates which represent a volume of water supplied, treated or conserved, and also ADALYs Certification to quantify the health benefits of reduced air pollution (e.g. by improved cookstoves). Both Water Benefit Certificates and ADALYs Certifications are intended for purchase by donors, philanthropists and social investors, although they are not yet tradable instruments like carbon credits. The Foundation is willing to advise other organisations on how to develop ADALYs Certification to quantify the health – and potentially the economic – benefits of sanitation. This could become the recognised standard way to monetise the externalities of sanitation.

Building trust

This is itself a tool for financial progress. Many commentators stress that strong governance attracts investment because it helps newcomers to trust the service providers and governments. Investors are more likely to enter a particular country or marketplace if they can see that contracts are upheld in courts of law. Trustworthy information technology is vital for collecting clear objective data to measure outputs and outcomes that all parties can believe. For example, the monetised external benefits described above have not yet become tradable products because finance professionals have not yet become involved in making them so. If and when they do, they will need auditable results measurements so that the market has confidence in buying and selling the instruments.

16 Total Impact Advisors estimate them to be in the hundreds of billion of dollars.

3. WHAT CAN DECISION-MAKERS DO NOW TO INCREASE THE FINANCIAL FLOWS?




ALGERIA
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EGYPT
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BURKINA FASO
NIGERIA
GHANA
GULF OF GUINEA
CENTRAL AFRICAN REP.
SUDAN
ETHIOPIA
DEM. REP. OF CONGO
ANGOLA
ZAMBIA
TANZANIA
MALAWI
ZIMBABWE
NAMIBIA
BOTSWANA
SOUTH AFRICA
Cape Town
Maputo
South Eastern
Atlantic Basin
Walvis Ridge
Tristan da Cunha
Gough Is.
Prince Edward Is.
Bouvet Is.
Atlantic Indian Antarctic

3.1 DECISION-MAKERS AND HOW TO INFLUENCE THEM

This report aims to influence the decisions made by several groups of people and organisations associated with urban sanitation:

- National (and, to a lesser extent, regional) politicians set policies and decide legislation, and are consequently the primary target audience of this work programme.
- Municipal leaders make important decisions and also decide whether and how to implement the policies set by the national and regional politicians. They are the secondary target audience of this work programme.
- National regulators, entrepreneurs, bankers, investors, and the international development community are also decision-makers on this subject. They are all target audiences of this work programme.
- Householders decide their own needs and priorities for their sanitation but the World Water Council has no direct channel of communication to them. Therefore, they are only an indirect target group for this work programme.

All of these target audiences want to create healthy, happy, liveable cities. Sanitation can be an important element in achieving that aim. It competes for financial resources against many other economic and social development sectors. By making use of the latest ideas on financing for sanitation, the politicians, municipal leaders and other stakeholders can achieve more while spending less. This requires a change of mindset as explained in the previous sections of this report, essentially: to favour less expensive sanitation technologies, to put a financial value on the improvements created by sanitation, and to attract new investors into this sector.

The World Water Council encourages all the readers of this report to feel ownership of the ideas in it and commitment to carry the relevant message to the right target audience. The political leaders of the eight study cities have a special role because they themselves expressed interest in this subject. That is why the World Water Council chose to study their cities. The Council will work closely with them to make decisions for their own cities, and then support them to persuade other politicians at a peer-to-peer level to make similar decisions also.

3.2 MESSAGES TO THE DECISION-MAKERS

The main messages to the various groups of decision-makers have all been developed and described in sections 1 and 2 of the report, so this section is just a convenient summary of them. They are subdivided into lists for the various target audiences. Not all the items in a particular list will apply to every decision-maker or to every city.

Messages to national politicians

- Clearly define the roles of the various institutions and entities, to give investors confidence to support sanitation service providers.
- Legislate that service providers that supply both water and sanitation should keep the finances of the two activities separate.
- Introduce national standards and regulations for the quality and sale of the products made from treated toilet resources, to encourage circular economy concepts and activities to flourish.
- Take a strong hand in planning and financing the needed infrastructure. Adequate sanitation cannot be achieved by the private sector and NGO investment alone, no matter how well intentioned.
- To eliminate a historical backlog of sanitation services, provide grants to make it affordable to both the service provider and the customers. If this is not done, eradication of any backlog will take too long and will have adverse economic impacts that exceed the cost of not ensuring adequate safe sanitation.
- Re-allocate grant funds away from expensive sewered sanitation and treatment plants towards much cheaper decentralised systems, faecal sludge management and the infrastructure for container-based sanitation.
- Recognise sanitation's contribution to public health and the environment by contributing financially to service providers' operational expenses.
- Encourage commercial banks and investors to enter the sector by mitigating the risks and costs for them e.g. through strong enforcement of contracts, active regulation, minimum revenue guarantees and other forms of blended finance.
- Hold investor forums to attract new investors into the sanitation sector.

TECHNIQUES FOR INFLUENCING DECISION-MAKERS

Here are some techniques for influencing these target audiences, and especially the primary target audience of politicians:

- Understand their goals and priorities. Be ready to explain to them how your ideas can help them to achieve their goals. For example, you might think that a certain policy is technically a good one, but fail to understand the political aspects which could make it unattractive. Therefore consider the political advantages of adopting a certain policy, and explain those benefits to the decision-maker.
- Relationships matter. Ask a well-connected person who is willing to put time and effort into the initiative to be the lead advocate. Support that person to communicate verbally with the target decision-makers.
- Use written documents only to support verbal communication. Many decision-makers are overloaded and have no time to read the supporting documents. Relationships, attitudes and trust are more important.
- Use evidence based on local examples rather than examples from elsewhere. This can of course be difficult when introducing new ideas of which there are no local examples.
- Ensure that influential people are generally supportive. Try to ensure that there is not a strong politician, to whom a decision-maker might turn for approval, who opposes the ideas being put forward.
- Monitor and follow up any commitments made by your target decision-maker.

Messages to municipal leaders

- Adopt a city-wide inclusive sanitation approach.
- Avoid unrealistic city sanitation plans such as a plan that aims for 80% sewerage in a city that currently has only, say, 10%.
- Try container-based sanitation to serve customers in appropriate parts of the service area.
- Award contracts to entrepreneurs for on-site or container-based sanitation that cover large enough geographical areas to be financially viable.
- Collaborate actively with the government or regulator to review tariffs and implement the revisions proposed by the reviews.
- Maintain good cash flow and revenue collection rates that give lenders confidence in the ability of the municipality to repay loans.
- Introduce local standards and regulations for the quality and sale of the products made from treated toilet resources, to encourage circular economy concepts and activities to flourish, provided that they do not conflict with national standards under national regulation.
- Enforce all regulations and by-laws.
- Hold investor forums to attract new local investors into the sanitation sector.
- Co-invest in new enterprises alongside commercial investors.
- Activate and encourage markets for sanitation products by being a customer for fertiliser, energy and other products generated by circular sanitation economy businesses.

Messages to regulators

- Establish databases of sanitation service providers including their financial information, credit-worthiness etc.
- Allow service providers that supply both water and sanitation to keep the finances for the two operations separate.
- Regularly review tariffs and implement the revisions proposed by the reviews.
- Recognise container-based sanitation as a valid alternative to sewerage or on-site sanitation.
- Enforce national standards and regulations for the quality and sale of the products made from treated toilet resources.

Messages to entrepreneurs

- See sanitation in developing countries as a new business sector in which to achieve first mover advantage.
- Develop businesses all along the sanitation value chain, to attract various investors.
- Look to collaborate and co-invest with municipalities and utilities, in order to gain scale.
- Demonstrate that you have a commercial mindset allied to a strong governance structure, in order to attract more finance from banks and investors.

Messages to bankers

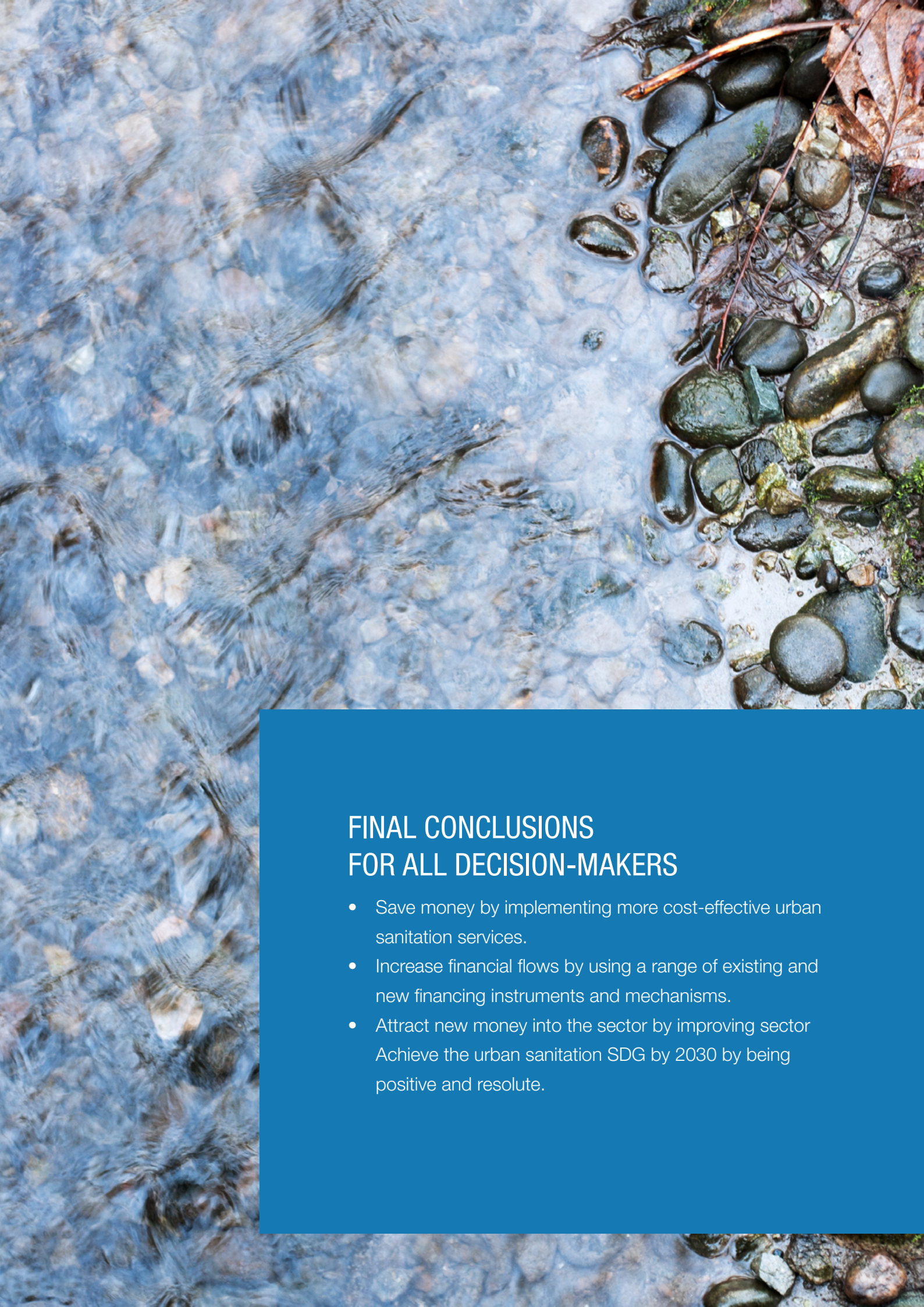
- Get first adopter advantage by becoming involved in sanitation now, before other banks do.
- Persuade your investors and clients that sanitation is now a bankable sector.
- Teach your potential borrowers (e.g. sanitation enterprises) to prepare investment-ready programmes.
- Take the lead in applying established financial instruments (e.g. pooled investment funds, municipal and corporate bonds) and new mechanisms (e.g. sanitation financing facilities) to sanitation.

Messages to national and international investors

- Invest in sanitation in developing countries because it combines financial and social returns.
- Get first adopter advantage by investing in sanitation now, before other investors do.
- Invest all along the sanitation value chain.
- Become involved in the creation of new mechanisms such as sanitation financing facilities.

Messages to the international development community

- Re-allocate grants and loans away from expensive sewered sanitation and treatment plants towards much cheaper decentralised systems, faecal sludge management and the infrastructure for container-based sanitation.
- Switch funding from fragmented expenditures on inputs to systematic solutions to achieve outcomes.
- Encourage commercial banks and investors to enter the sector by mitigating the risks and costs for them e.g. by offering guarantees or first-loss capital.
- Support the creation of new mechanisms such as sanitation financing facilities.
- Arrange and support study tours for decision-makers to specific places e.g. container-based sanitation companies.
- Embrace blended finance strategies to bring in commercial finance.
- Hold investor forums to attract new investors into the sanitation sector.



FINAL CONCLUSIONS FOR ALL DECISION-MAKERS

- Save money by implementing more cost-effective urban sanitation services.
- Increase financial flows by using a range of existing and new financing instruments and mechanisms.
- Attract new money into the sector by improving sector Achieve the urban sanitation SDG by 2030 by being positive and resolute.

ANNEX I: SUMMARIES OF THE CASE STUDIES OF CITIES

This annex only gives a very short summary of each case study. All the case studies, which are typically about 50 pages long, are being individually published by the World Water Council.

NAME OF STUDY CITY: **Baguio, Cordillera Administrative Region, The Philippines**

DATA AND CHARACTERISTICS OF THE COUNTRY AND CITY

The Philippines has a population of 103 million people of whom 45% live in urban areas. It is a unitary republic with several tiers of government: national, provincial and city/municipal. Sanitation is a city/municipality responsibility. The national government has many agencies and departments with indistinct, overlapping roles in sanitation policy, regulation and finance. Urban sanitation coverage is about 78%. The government has no clear single policy on sanitation financing. In practice, capital expenditure and operational expenditure for urban sanitation are accounted together, with funds coming from several different budget lines in the national government, funded out of taxation revenue, and from the cities/municipalities, also funded mainly out of their local tax revenue. Tariff collection for sanitation outside Metro Manila is inconsistent. The concept of the circular sanitation economy is not yet well-known in the Philippines, although some of its principles are used notably in solid waste management.

Baguio is the 25th largest highly urbanized city in the Philippines with a population of 0.35 million people. It is a compact city with high population density, known mainly for tourism and service industries. It is run by the city government, whose City Environment Office has a Wastewater, Water and Ambient Air Management Division (WAMD-CEPMO) that is responsible for sanitation, while the separate Baguio Water District (BWD) is responsible for water supply. The city has a small sewerage system which covers the city centre only and its main lines and sewage treatment plant were entirely grant-funded by the Government of Japan. About 67% of households have onsite sanitation (almost all septic tanks), while 28% are served by the sewerage system and about 5% by communal septic tanks. The city charges a sanitation tariff only to the households connected to the sewerage system – it is calculated per toilet, not per cubic metre of water used.

FINANCIAL MECHANISMS USED IN THIS CITY

For the city government, both capital expenditure and operational expenditure on sanitation are lumped together as a budget line. The city government regards sanitation as a basic service to be provided, so its expenditure on sanitation of c. $1 million far exceeds its revenue from tariffs of about $0.3 million. Of the shortfall, it puts in about 60% from its general revenues and gets about 40% in allowances from the national government. The city does not take out loans for any purposes.

For the large majority of householders, sanitation is entirely self-financed both for capital expenditure, which is mainly constructing the septic tank, and for operational expenditure, which is mainly desludging the septic tank. Desludging is done by weakly-regulated contractors who charge prices set by market conditions; only a small fraction of the faecal sludge reaches the sewage treatment plant.

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INNOVATIONS USED OR PLANNED IN THIS CITY

Baguio is not currently innovating in sanitation finance. It has some unusual features, for example charging tariffs per toilet rather than per cubic metre of water, but there is no evidence that these were done in order to innovate, and it wants to move away from them. It has a planning aspiration to provide universal sewerage by 2035 but this has no meaningful associated finance plan.

The city government and Mayor have expressed a strong interest to try out innovations in sanitation financing in order to improve quality of service.

The concept of the circular sanitation economy is not familiar by that name, but WAMD-CEPMO has tried a few activities on a small scale, such as selling treated sludge as soil conditioner.

MESSAGES TO DECISION-MAKERS SPECIFIC TO THIS CITY

Coordinate planning between BWD for water and WAMD-CEPMO for sanitation.

Ring-fence sanitation accounting in WAMD-CEPMO's budget and subdivide it into capital and operational expenditure so that the decision-makers can see the true financial picture and make decisions based on that evidence.

Plan using a city-wide inclusive approach that gives equal importance to onsite sanitation and to waterborne sewerage. Recognise that universal waterborne sewerage will not be affordable, and instead enable WAMD-CEPMO to take charge of financial planning for both onsite sanitation and waterborne sewerage.

Revise the basis of calculation and the mechanism of collecting sanitation tariffs and septage service fees, in order to fully cover WAMD-CEPMO's operational expenditure.

Recognise toilet resources as a valuable resource and not as waste to be disposed of. Encourage private entrepreneurs to become involved in this circular economy work. Increase WAMD-CEPMO's revenues from product sales.

NAME OF STUDY CITY: **Blumenau, Santa Catarina State, Brazil**

DATA AND CHARACTERISTICS OF THE COUNTRY AND CITY

Brazil has a population of 207 million people of whom 85% live in urban areas. Brazil has a federal structure with government powers shared between the national government and state governments. In water and sanitation, the national government is responsible for policies and guidance while municipal-owned corporations are responsible for service provision, except in metropolitan areas where this provision results from agreements between state-owned and municipal-owned water and sanitation corporations. In addition to that, similar agreements allow state-owned corporations to provide water and sanitation services to several municipalities in the states. Recently a few of those municipal corporations have started to contract private-sector concessionaires to deliver those urban services. 2015 data show that sanitation coverage is about 40% safely managed (i.e. through sewerage) and 50% basic (i.e. onsite). The government's policy is that capital expenditure on water and sanitation should be financed mainly from tariffs or loans, augmented by a small percentage in grants from national government funded out of taxation revenue. Operational expenditure should be financed by the municipalities through tariffs. The concept of the circular economy is familiar in solid waste management but new in sanitation: there are only a few examples of its application around the country.

Blumenau is the 78th largest city in Brazil with a population of 0.35 million people. It is a comparatively prosperous city in a prosperous state (Santa Catarina) although its sanitation coverage lags behind its economic status. The municipal water and sanitation corporation Serviço Autônomo Municipal de Água e Esgoto (SAMAE) is responsible for service delivery, and in 2010 it contracted sanitation to a private sector company on a 45-year contract. The city has an old sewerage system which covers a small area in the city centre. About 92% of households have improved sanitation, of whom only 27% are served by sewered sanitation and the balance by onsite sanitation.

FINANCIAL MECHANISMS USED IN THIS CITY

For capital expenditure on sanitation infrastructure (mainly sewers and treatment plants), the concessionaire is relying on commercial bank loans - there is considerable doubt whether that will be affordable.

For operational expenditure on sanitation, the concessionaire recovers the full cost through tariffs. The customers pay separate water and sanitation tariffs of which the sanitation tariff is slightly higher than the water one – both are based on volumetric consumption of water, with a means-tested element giving lower tariffs for poor people. The tariff collection rate is about 89%.

INNOVATIONS USED OR PLANNED IN THIS CITY

SAMAE's contract to a private sector concessionaire is itself quite innovative in the Brazilian context.

SAMAE and the concessionaire have expressed interest to try out innovations in sanitation financing in order to improve both the coverage and the quality of service.

MESSAGES TO DECISION-MAKERS SPECIFIC TO THIS CITY

Clarify the ownership of assets, the regulatory regime, and the long-term aims for sanitation services.

Recognise that sanitation has highly positive societal impact, and monetize that impact by, for example, reduced taxation of the service provider.

Improve tariff collection.

Change the future plans from expansion of sewered sanitation – which will probably be unaffordable – to improvement of the onsite sanitation services.

Integrate circular economy concepts into both the sewered sanitation and onsite sanitation services, in order to re-use resources and generate extra revenue for the concessionaire.

NAME OF STUDY CITY: **Bogota, Capital District, Colombia**

DATA AND CHARACTERISTICS OF THE COUNTRY AND CITY

Colombia has a population of 49 million people of whom 77% live in urban areas. It has a unitary constitutional structure with three levels of government (national, departmental, local) each with their own mandates and powers. In sanitation, the national government sets policies and the local governments (in urban areas: the municipalities) provide the services. Urban sanitation coverage is said to be about 93%. The government's policy on sanitation financing is that both capital expenditure and operational expenditure should be financed by the municipalities through tariffs. Those tariffs must recognise the human right to sanitation, so basic sanitation services are free to the householder and the national government can pay the municipality an extra recurrent grant to cover that cost. The national government has the intention to promote the concept of the circular sanitation economy but has not yet made incentives to encourage it, so there are very few examples of it in operation.

Bogota is the capital city of Colombia with a population of 8.1 million people. It is governed by a Municipal Council led by a directly-elected Mayor. The water and sanitation service provider is the Water Service, Sewerage and Sanitation Company of Bogota (EAB) which is owned by the municipality. The city has an extensive sewerage system which covers about 96% of households. However only 16% of sewerage is safely managed, the balance being discharged straight into a river. So the coverage figure has dropped dramatically with the change from MDG statistics to SDG statistics.

FINANCIAL MECHANISMS USED IN THIS CITY

EAB collects separate tariffs for water and for sanitation; they are almost the same cost per cubic metre. The accounts of both the water service and the sanitation service are ring fenced and audited separately. The tariffs rose significantly in the late 1990s due to strong leadership by the Mayor.

For capital expenditure on its regular sanitation infrastructure, EAB obtains all the funds either directly from the tariffs or from commercial loans repaid from the tariffs – EAB has a good credit rating and hence pays low interest rates on these loans. In the particular case of building new sewage treatment plants to improve the river water quality, the national government contributes about 40% of the cost in recognition of the environmental improvement.

For operational expenditure on sanitation, EAB has an annual budget of about $140 million, which is financed 95% from tariffs and 5% from government grants to cover the free basic sanitation provision.

INNOVATIONS USED OR PLANNED IN THIS CITY

The main financial innovation is a transparent and nationally-mandated cross-subsidy achieved by charging different tariffs to people living in houses of different values: thus property values are used as a proxy for householders' wealth.

The city of Medellin (the second-largest city in Colombia) has pioneered payment of tariffs by smart cards which are more convenient to customers and more efficient for the service provider. Bogota is considering adopting this system.

EAB is open to trying out innovations in sanitation financing in order to improve its quality of service and financial performance.

MESSAGES TO DECISION-MAKERS SPECIFIC TO THIS CITY

Universal sewered sanitation has already been achieved here – so the emphasis must be on the treatment and re-use of the toilet resources. EAB could generate revenues from selling the products of its sewage treatment plants, specifically fertiliser, biodiesel, chemicals and biomass for feed. All of these come within the concept of the circular sanitation economy. Toilet resources should be seen as a source of plant nutrients and energy and not as waste to be disposed of.

EAB could issues contracts to private sector companies for specific parts of its operations, for example running sewage treatment plants, meter reading, call centres.

NAME OF STUDY CITY: **Dakar, Dakar Region, Senegal**

DATA AND CHARACTERISTICS OF THE COUNTRY AND CITY

Senegal has a population of 15 million people of whom 44% live in urban areas. It has a unitary structure with government powers shared between the national and regional governments. In sanitation the national government is dominant, setting policies and regulations and also implementing work programmes through public sector bodies: in urban sanitation these are done through the National Office for Sanitation in Senegal (ONAS). Urban sanitation coverage is estimated between 62% and 82% depending on definitions. The government's policy on sanitation financing is that capital expenditure for urban sanitation comes mainly from concessionary and commercial loans, while operational expenditure should be financed through tariffs. The concept of the circular sanitation economy is officially recognised in Senegal but is very little practised to date.

Dakar is the capital and largest city in Senegal with a population of 3.3 million people. The municipal government has no involvement in sanitation, which is the responsibility of ONAS. The city has a small sewerage system which covers the historic city centre. About 78% of households have improved sanitation; of these two-thirds are served by onsite sanitation and only one third by sewered sanitation. ONAS places just as much emphasis on onsite sanitation as on sewered sanitation, and its future plans for Dakar cover both.

FINANCIAL MECHANISMS USED IN THIS CITY

ONAS does not keep separate accounts for Dakar, only for its overall work: figures for Dakar can be obtained by estimating that the city accounts for 80% of ONAS's work and hence money.

For capital expenditure on sanitation infrastructure, ONAS relies on concessionary and commercial loans.

ONAS collects a sanitation tariff that is calculated as a percentage of the water tariff. For operational expenditure on sanitation, ONAS recover 73% of the cost from that tariff and the remaining 27% from grants from the national government to make up the shortfall.

INNOVATIONS USED OR PLANNED IN THIS CITY

ONAS, with support from the Gates Foundation, has innovated considerably in faecal sludge management through the PSFSM programme. ONAS licences and regulates the pit emptying contractors and also leases the faecal sludge treatment plants to a contractor. These changes have significantly improved the financial performance of the service.

Within the PSFSM programme, ONAS has set up a guarantee fund to enable the pit emptying contractors to obtain bank loans to buy their equipment. This guarantee has enabled the commercial banks to reduce their interest rates from 12% to 7.5%. About 8% of the loans are not being correctly repaid by the contractors, so the contractors' trade association is trying to reduce this figure.

ONAS is upgrading the faecal sludge treatment plants to generate commercial products notably treated water, fertiliser and energy. At the scale of the whole city, this would be a significant circular economy innovation.

ONAS has expressed an interest to try out more innovations in sanitation financing in order to improve its coverage and its quality of service.

MESSAGES TO DECISION-MAKERS SPECIFIC TO THIS CITY

Continue to plan using a city-wide inclusive approach that gives equal importance to onsite sanitation and to sewered sanitation.

Increase sanitation tariffs to fully cover the operational expenditure.

Increase revenues from product sales.

Continue contracting more sanitation services to private sector operators, to increase efficiency and financial sustainability.

Improve the legal and regulatory environment to encourage commercial investors.

NAME OF STUDY CITY: **eThekwini (Durban), KwaZulu Natal Province, South Africa**

DATA AND CHARACTERISTICS OF THE COUNTRY AND CITY

South Africa has a population of 55 million people of whom 65% live in urban areas. It has a unitary constitutional structure with three spheres of government (national, provincial, local) each with their own mandates and powers. In sanitation, the national government sets policies and the local governments (in urban areas: the municipalities) provide the services. Urban sanitation coverage is about 76%. Legislation, regulations and institutional roles are all set out in detail. The government's policy on sanitation financing is that capital expenditure for urban sanitation comes mainly in precisely-calculated grants from national government funded out of taxation revenue, while operational expenditure should be financed by the municipalities through tariffs. Those tariffs must recognise the public health benefits of sanitation, so basic sanitation services are free to the householder and the national government pays the municipality an extra recurrent grant to cover that cost. The concept of the circular sanitation economy is well understood in South Africa and there are some examples of it in operation.

eThekwini municipality (also referred to as Durban) is the third-largest city in South Africa with a population of 3.7 million people. It is governed by the eThekwini Municipal Council. The water and sanitation service provider is eThekwini Water and Sanitation (EWS) which is owned by the municipality. The city has an extensive sewerage system which covers about 50% of households, while another 26% are served by improved onsite sanitation. EWS uses a city-wide inclusive sanitation approach to manage all types of sanitation services, and its future plans include both sewered sanitation and onsite sanitation.

EWS is an exceptionally well-managed utility. Many other municipalities in South Africa perform much worse than EWS in terms of tariff collection, use of capital grants, asset management and customer relations.

FINANCIAL MECHANISMS USED IN THIS CITY

For capital expenditure on sanitation infrastructure, EWS obtains approximately half the funds from national government grants and approximately half from commercial loans, repaid from operating revenues – EWS has a good credit rating and hence pays low interest rates on these loans.

For operational expenditure on sanitation, EWS has an annual budget of about $140 million, which is financed 84% from tariffs and 16% from government grants.

EWS collects separate tariffs for water and for sanitation; tariff collection rate is 100%. The accounts of both the water service and the sanitation service are ring fenced and audited separately from the other municipal accounts.

INNOVATIONS USED OR PLANNED IN THIS CITY

EWS has pioneered many policies in South Africa and has a managerial mindset open to innovation. It is keen to try out innovations in sanitation financing in order to improve its quality of service and financial performance.

EWS has started to generate revenues from selling the produce of its sewage treatment plants, specifically fertiliser, biodiesel, chemicals and biomass for feed. All of these come within the concept of the circular sanitation economy.

EWS issues contracts to private sector companies for specific parts of its operations, for example running sewage treatment plants, meter reading, call centres, toilet emptying.

MESSAGES TO DECISION-MAKERS SPECIFIC TO THIS CITY

The choice of sanitation technology determines the affordability of the option to both the utility and the customers. In any economic analysis, the externalities should be included when determining affordability for the utility.

Universal sewered sanitation would not be affordable here - or indeed in most developing country cities - and is impractical in dense urban slums.

Developments in onsite and container-based sanitation technology have the potential to make sewered sanitation systems redundant in the medium term, with a resultant overinvestment sunk into that infrastructure.

Tariffs must be designed to recognise the human right to sanitation and to be affordable to the poor. This involves an overt internal cross-subsidy from rich people to poor people.

Recognise toilet resources as a source of plant nutrients, chemicals and energy and not as waste to be disposed of.

NAME OF STUDY CITY: **Jodhpur, Rajasthan State, India**

DATA AND CHARACTERISTICS OF THE COUNTRY AND CITY

India has a population of 1,311 million people of whom 33% live in urban areas. 18% of the urban population live in slums. India has a federal structure with government powers shared among the national government, state government, and the municipalities. Sanitation is nominally a state responsibility, and the national government is very active in giving policies, guidance and implementing some centrally sponsored programmes notably the Swachh Bharat Mission, the Atal Mission for Rejuvenation and Urban Transformation, and the Smart Cities Mission. In urban areas improved sanitation coverage is about 65% and about 21% access shared sanitation facilities. Only about 32% of the toilets are connected to sewerage systems and, at best, only about 30% of faecal sludge is treated. The government's policy on sanitation financing is that capital expenditure for urban sanitation comes mainly in grants from national government and state governments, funded out of taxation revenue, while operational expenditure should be financed by the municipalities through tariffs. On average across India the tariffs collect only about 30-40% of the operational expenditure for water and even less for sanitation. The concept of the circular sanitation economy is still new in India and is hardly practised in any of the government programmes: their main focus is still on infrastructure building.

Jodhpur is the 45th largest city in India with a population of 1.1 million people. It is governed by the Jodhpur Municipal Corporation (JMC) which has responsibility for sanitation while the Rajasthan Public Health Engineering Department (PHED) is responsible for water supply. The city has an old sewerage system which covers about 70% of the city area although its treatment capacity is far less. About 65% of households have improved toilets. The city does not collect a separate tariff for sewerage; instead about 30% of the water charges collected by PHED are passed over to JMC for sanitation, although that money is not ring-fenced within JMC. JMC only has 5 staff for sanitation plus contractors for all construction and maintenance work; it has no system for capital asset management.

FINANCIAL MECHANISMS USED IN THIS CITY

For capital expenditure on sanitation infrastructure (mainly sewers and treatment plants), JMC relies on national and state government grants, which average about $5m per year.

For operational expenditure on sanitation, JMC has an annual revenue (almost all from its share of PHED's water tariffs) of $0.8m, an expenditure of $1.2m and it covers the shortfall of $0.4m from its other internal financial resources (ultimately from local tax). JMC is aware that its expenditure is very low, and wishes to spend a target expenditure, which it calculates as 5% of the capital value of its assets, of $7m. The Government of Rajasthan's state sanitation policy encourages cities to recover the full cost of operational expenditure through tariffs, and to generate revenue by selling treated wastewater for irrigation, but JMC has not yet been able to do either.

INNOVATIONS USED OR PLANNED IN THIS CITY

JMC has tried to generate revenues from selling the produce of its sewage treatment plants, specifically treated wastewater, biogas and compost, but the revenue was negligible. The main problems were that the products were seen by JMC as uneconomic in terms of the cost of producing them versus their market value, and that JMC experienced strong customer resistance stemming from the perception that public sector organisations' products should be free.

JMC has expressed a strong interest to try out innovations in sanitation financing in order to improve its coverage and its quality of service.

MESSAGES TO DECISION-MAKERS SPECIFIC TO THIS CITY

Improve JMC's tax collection in order to increase its general revenue.

Transfer authority to set and collect sanitation tariffs from PHED to JMC.

Ring-fence sanitation accounting in JMC's budget so that the decision-makers can see the true financial picture and make decisions based on that evidence.

Incentivise large institutions such as hospitals, hotels, education institutions etc to build their own wastewater treatment plants. These plants could be run by private sector contractors who would apply circular economy concepts and sell the products.

NAME OF STUDY CITY: **Marrakech, Marrakech-Safi Region, Morocco**

DATA AND CHARACTERISTICS OF THE COUNTRY AND CITY

Morocco has a population of 34 million people of whom 60% live in urban areas. It has a federal structure with government powers being increasingly decentralised from the national government to the regional and local governments. Sanitation is a responsibility of local government, while the national government sets policies and guidance. Urban sanitation coverage is about 90%. The government's policy on sanitation financing is that both capital and operational expenditure for urban sanitation should be financed by the municipalities through tariffs. The concept of the circular sanitation economy is still new in Morocco and is hardly practiced in any of the government programmes: their main focus is still on building sewered sanitation infrastructure.

Marrakech is the second-largest city in Morocco with a population of 1.3 million people. The public sector utility Régie Autonome de Distribution d'Eau et d'Electricité de Marrakech (RADEEMA) supplies electricity and water and sanitation services. The city has a large sewerage system which currently covers about 90% of households and is still being extended: RADEEMA plans to achieve 100% sewered sanitation coverage by 2030. The other 10% of households currently have onsite sanitation. About 90% of the sewage is adequately treated.

FINANCIAL MECHANISMS USED IN THIS CITY

For capital expenditure on sanitation infrastructure (mainly sewers and treatment plants), RADEEMA relies mainly on a cross-subsidy from the electricity part of the utility, augmented by some loans from commercial banks.

RADEEMA covers 59% of its operational expenditure on sanitation from the tariff that it charges for sanitation, with the balance being funded by a cross-subsidy from the electricity part of the utility.

INNOVATIONS USED OR PLANNED IN THIS CITY

RADEEMA's main unusual characteristic is that the electricity side of its business, which is profitable, subsidises the sanitation part, which is not.

RADEEMA generates about 10% of its total sanitation customer revenue through the sale of treated wastewater to golf courses.

RADEEMA is open to suggestions for innovations in sanitation financing that could help to make its sanitation service self-financing.

MESSAGES TO DECISION-MAKERS SPECIFIC TO THIS CITY

Revise the tariff policy and increase the actual sanitation tariff.

Increase RADEEMA's revenue from sales of products other than water. Find new customers (other than golf courses) for the treated wastewater.

Ring-fence sanitation accounting in RADEEMA's budget so that the decision-makers can see the true financial picture and make decisions based on that evidence. Then decide either to continue the current policy of cross-subsiding sanitation from electricity, or to find alternative revenue streams for sanitation.

RADEEMA could contract the business selling water, biogas and compost from the municipal sewage treatment plants to a private-sector entrepreneur which could operate it more effectively than RADEEMA can.

NAME OF STUDY CITY: **Nairobi, Nairobi County, Kenya**

DATA AND CHARACTERISTICS OF THE COUNTRY AND CITY

Kenya has a population of 49 million people of whom 25-30% live in urban areas. Kenya has a devolved governance system with governance powers and constitutional mandate shared between the national government and county governments. Sanitation is nominally a county responsibility while several different national government ministries set policies, guidance and regulations. Urban sanitation coverage is about 20% with sewerage and about 50% with on-site sanitation but neither are classified by the JMP as safely-managed; sanitation services are failing to keep up with rapid growth in urban populations. The government's policy on sanitation financing is that capital expenditure for urban sanitation comes partly from grants from national government funded out of taxation revenue and partly from tariffs, while operational expenditure should be financed completely through tariffs – the government acknowledges that tariffs are currently too low to achieve this. The concept of the circular sanitation economy is recognised in Kenya although there are few examples of it yet working.

Nairobi is the capital and largest city in Kenya with a rapidly-increasing population of 3.9 million people. The Athi Water Services Board (AWSB) is the asset holder while the County-government-owned Nairobi City Water and Sewerage Company (NCWSC) is the service provider, although there are overlaps and confusion about their roles. The city has a fairly extensive sewerage system serving about 45% of the households with the sanitation tariff set at 75% of the water tariff. Almost all the other households use on-site sanitation either solely-used or shared, with pits emptied by the small-scale private sector. The plan by 2030 is to expand waterborne sewerage but there is negligible money allocated or in prospect for this.

FINANCIAL MECHANISMS USED IN THIS CITY

For capital expenditure on water and sanitation, AWSB and NCWSC argue about ownership and responsibility and little progress is achieved: the finance is intended to come from a mixture of national government grants and commercial loans, to be repaid from tariff revenues. Sanitation budgets are small, not clearly ring-fenced, and distributed between county government, NCWSC and AWSB.

NCWSC's annual revenue from the combined water and sanitation tariffs is about $70 million which should cover its operating expenditure.

INNOVATIONS USED OR PLANNED IN THIS CITY

NCWSC, with World Bank technical support and a GPOBA grant, obtained a $6 million commercial loan for sanitation capital expenditure in 2016.

Several small-scale entrepreneurs and projects have started circular economy activities.

NCWSC has expressed interest to try out innovations in sanitation financing.

MESSAGES TO DECISION-MAKERS SPECIFIC TO THIS CITY

Clarify the roles of the different agencies responsible for sanitation and sort out the institutional conflicts between them.
Enforce regulations.

Ring-fence sanitation accounting in AWSB's and NCWSC's budgets so that the decision-makers can see the true financial picture and make decisions based on that evidence.

Recognise that expanding waterborne sewerage to the whole population is unaffordable, and instead use city-wide inclusive sanitation planning concepts to concentrate on improving the onsite and container-based sanitation services.

Develop and expand the remit of the Kenya Pooled Water Fund to finance sanitation also.

ANNEX 2: LIST OF PEOPLE CONSULTED FOR THIS WORK

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ANNEX 3: SELECTED BIBLIOGRAPHY STUDIED FOR THIS WORK

These publications collectively contain more detailed analysis and information about many aspects of sanitation finance than could fit into this one short report. Many of them refer to each other. Most of them are very recently published, which reflects the current upsurge of interest in sanitation financing.

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