WSP SANITATION FINANCING STUDY

METHODOLOGICAL NOTE, AUGUST 2007

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1. INTRODUCTION

The Water and Sanitation Program (WSP) has initiated a global study of project and program financing policies and practices for reaching the poor with improved sanitation and hygiene interventions. The present note aims to set out a methodological framework for this study, which will form the basis for gathering experiences and data from six to eight case studies to be initiated in September 2007.

The objectives of the study are as follows:

- To gain more in-depth understanding of current hygiene and sanitation project financing practices and policies and their effectiveness in helping to reach the poor;
- To provide guidance to WSP technical staff, World Bank Task Team Leaders , and Government clients for the development of sanitation related project financing policies and practices – in the design and preparation of sanitation projects (or project components).

1.1 Scope of the study

Defining financing - The study focuses on how increased access to sanitation infrastructure can be financed, with a mix of user finance and subsidies. This includes the financing of the initial access via capital investments as well as the financing of operations and maintenance costs to ensure the ongoing use of the facilities. This study examines both the financing sources (i.e. where the funds come from) and the financing mechanisms used to provide the funds (i.e. how the funds are transferred to pay for the costs).

Defining sanitation - The proposed study defines sanitation in a relatively narrow way, as the methods for the safe and sustainable management of human excreta, including the collection, storage, treatment and disposal of faeces and urine. We consider two main types of facilities for collecting human excreta: through on-site sanitation systems (such as latrines, cesspits, septic tanks) or through a connection to a sewerage network, with or without treatment of the sewage thereby collected. For sanitation practices to be sustained over the long term, providing a technical solution is often not sufficient and needs to be accompanied by activities to promote hygienic behaviours and trigger demand for sanitation. These activities are included in the scope of the study, as the necessary "software" to be provided alongside the "hardware".

Although safe disposal and treatment are necessary interventions to reduce the impact of human excreta disposal on the environment and health of surrounding populations, the financing of treatment activities is not considered as such, particularly if such treatment is carried out through large sewage treatment plants. This reflects the fact that wastewater treatment is not part of the UN targets for providing basic access. Besides, whereas it is commonly accepted that the public sector should finance investments in sewage collection and treatment due to the external effects on health and the environment, household facilities have traditionally been regarded as an area for household investment.

However, the financing of household facilities, particularly for the poor, remains a difficult area. Amongst practitioners in the field, there is a broad range of opinions as to how sanitation can best be financed at project level, ranging from the traditional (but increasingly criticised) approach of

providing a subsidy only for hardware (e.g. a latrine) to placing emphasis on creating demand and providing no subsidies for sanitation facilities.

Specifically, many questions remain unanswered, such as:

- How much do household facilities really cost, i.e. when both hardware and software costs are taken into consideration? What types of costs are typically included in the financial analysis?
- Should the public sector support household investment in sanitation facilities? If yes, what should such public support entail? Does it entail providing subsidies or facilitating access to finance via the establishment of credit schemes for example?
- Should hardware subsidies be provided or should subsidies be entirely focused on promoting demand for the facilities or supporting the supply side of the market? If hardware subsidies are provided, what is the most appropriate rate of subsidy depending on the circumstances?

The proposed study aims to provide concrete facts and figures to try and answer some of the above questions, by developing a series of case studies within a common methodological framework.

The study is to be carried out in two phases:

- ***Phase 1*** focuses on the financing of ***on-site sanitation solutions in rural and peri-urban areas.*** Although the on-site technical solutions may be comparable, there are key differences between urban and rural settings that we will draw out during the course of the study. In a rural setting, a household can build an on-site sanitation facility in isolation from the rest of the community. By contrast, in dense urban areas, higher population and housing density introduces significant externalities and make the provision of downstream infrastructure (such as collection and discharge points) and support services essential to enable households to access working sanitation services.

- ***Phase 2*** will examine the provision of ***access via sewerage networks, mostly in urban settings***, either through community toilets (which are themselves connected to a network), through small bore networks or traditional sewerage networks.

1.2. Objectives and structure of this note

The purpose of this note is to set out a methodological framework for the proposed study and set out the basis for developing case studies. Comments are invited on the content of this note to ensure that the methodological framework reflects current thinking in the area.

This note should also provide the basis for identifying six to eight case studies for the study's first phase, to be initiated in September 2007. Comments and suggestions are also invited for the selection of a representative set of case studies for Phase 1.

The rest of this note is structured as follows:

- ***Section 2*** proposes a ***typology of sanitation and hygiene interventions*** that can be put in place at project level, ranging from low-cost simple pit latrines to a connection to a conventional sewer. In addition, we outline the types of facilities (e.g. a sink or a shower) which may be offered as part of the sanitation package;

- ***Section 3*** examines the ***costs of these sanitation interventions***, including the costs of both the hardware (i.e. the infrastructure) and the software (i.e. the training and technical assistance activities that are undertaken in order to increase the chances of success of the project);

- ***Section 4*** looks into the ***sources of finance for sanitation interventions*** at the household level;

- ***Section 5*** sets out the ***types of financing mechanisms*** that can be used to cover the costs of these sanitation interventions. In most circumstances, a combination of financing mechanisms would be used for a given sanitation project rather than a single one;

- ***Section 6*** draws the analysis from the previous sections together to establish a ***typology of hygiene and sanitation project financing approaches*** based on typical combinations of financing mechanisms. This will form the basis for selecting case studies that are most representative of the different types of financing approaches;

- ***Section 7*** sets out criteria for evaluating the ***effectiveness of these financing approaches***, particularly in reaching the poor. These criteria form the basis for the case study methodology.

In addition, Annexes contain material that will form the basis for developing the study further:

- ***Annex A*** sets out a proposed methodology for the case studies, including selection criteria;

- ***Annex B*** includes a proposed format for the case studies, with an accompanying spreadsheet to help gather data in a normalised and comparable manner ;

- ***Annex C*** includes a glossary, focusing on technical and financial terms;

- ***Annex D*** contains a bibliography of relevant sources on financing sanitation.

2. A TYPOLOGY OF SANITATION AND HYGIENE INTERVENTIONS

Sanitation and hygiene interventions can take various forms, depending on the type of technical solution that is provided and on the support activities that are carried out in order to promote the uptake of sanitation solutions by communities and their sustainable use over the long-term.

2.2. Technical sanitation and hygiene solutions

From the technical point of view, we can distinguish between on-site sanitation and network-based sanitation solutions.[1] On-site solutions are likely to remain the most prevalent and accessible solution for years to come in many developing countries. However, in dense urban environments or where pits cannot easily be dug (due to a rocky terrain), sewerage networks may need to be built. The following provides a brief summary of the main technical solutions for sanitation.

Typical on-site sanitation solutions include:

- ***Simple pit latrine***: this is the most common type of technology, as it is simple and quick to build. It usually consists of a pit (at least 2 meters deep, which can be lined on part of the walls), a slab (with lid) and a superstructure, which can be made of various materials, such as wood, mud and grass or brick and mortars, depending on local material available. The slab can be made from concrete or wood, or from a prefabricated plastic material (which is much lighter and cheaper to transport).

- ***Ventilated improved pit latrine (VIP)***: an improvement on the simple pit latrine consists of adding a vent pipe covered with a gauze mesh or fly-proof netting in order to remove smell and preventing flies entering the pit to fly away. This is a more expensive solution (mostly due to the addition of a PVC pipe) and more difficult to build, as the design is often not fully understood. In

[1] The description of the alternative sanitation solutions is based on Harvey, Peter (2007).

addition, the interior of the latrine must be kept dark, which makes it less acceptable by local populations and more difficult to use, particularly for children and the elderly.

- ***Pour-flush or flush latrine***: these latrines rely on water to act as a hygienic seal and to help remove excreta to a wet or dry disposal system. They require access to a source of water nearby and are more expensive to build than pit latrines as a sealed pan and piping to the pit must be added.

- ***Latrine connected to a septic tank***.[2] A septic tank is designed to collect and treat toilet wastewater and other grey water. Such solution is used when the volume of wastewater produced is too large for disposal in pit latrines and when water-borne sewerage is uneconomic or unaffordable. They are best suited for single households, schools or health centres. All septic tanks require a system for removing the sludge and disposing of it hygienically.

Other types of latrines also exist, such as a ***borehole latrine***. This is a latrine that sits on a deep borehole of roughly 5 metres rather than a 2 metre pit. However, such solution is relatively rare as it requires specialist drilling equipment and can only be considered in extreme conditions when pit excavation is not possible.[3]

Another solution which has been actively promoted by some international donors is the ***Eco-San latrine.*** This is based on ecological sanitation principles, which consists of recycling nutrients from human excreta for agricultural production. This requires separating faeces from urine through the use of a special slab and in some cases, the addition of ash, carbon or sawdust to the content of the latrine. A common example of this is the Arbaloo: once the latrine has filled up, it is used as a site for planting a tree (hence the name) and moved to a different location.

Network-based sanitation solutions include:

- ***Connection to a community-based septic tank:*** communal latrines can be connected to a single septic tank via a small sewerage pipe. Such facilities require access to water but are more efficient to empty than a series of individual latrines.

- ***Connection to a small bore sewer (also referred to as a condominial sewer):*** small bore sewers are based on an innovative engineering design which aims at reducing the length, diameter and depth of the network required by routing the distribution pipes across pavements and/or backyards.[4] In some cases, community participation is sought to build the sewerage networks at the local level but this is by no means an integral part of the design.

- ***Connection to a conventional sewer***: convention sewers collect household grey water (and storm run-off in the case of combined sewers). They are expensive to build and operate, as they require excavating trenches (which can be particularly costly in dense urban areas), they need to be maintained and in some cases require pumping for proper operation.

Additional fixtures may be added within the framework of a publicly-funded program or project, with basic sanitation units that integrate a shower, a sink or a toilet. In the rest of this note, we refer to the package provided as the "level of service", which can vary substantially from one project to another. It may include only the latrine or some additional fixtures, which may be a key trigger for demand.

[2] Some latrines connected to a cesspit or soakaway are sometimes wrongly referred to as a being connected to a septic tank. The key difference between those solutions is that septic tanks treat sewage whereas cesspits are only used to store it. Septic tanks require more careful and therefore more expensive maintenance but are more effective in stemming contamination.
[3] See Harvey, Peter (2007).
[4] See Foster, Vivien (non dated).

The definition of "improved access"

The Joint Monitoring Program (run by WHO and UNICEF), which is the most reliable source of information on access to water and sanitation services in developing countries and used as a key source for measuring progress towards the Millennium Development Goals (MDGs), distinguishes between "improved" and "not improved" sanitation solutions. An improved facility is defined as a facility constructed in such a way that it hygienically separates human excreta from human contact. For evaluating progress towards meeting the Millennium Development Goals (MDGs), users of an improved toilet facility are considered to have access to sanitation, while those using a facility defined as "not improved," or having no facility at all, are considered not to have access to sanitation.

Table 1 – Definition of access for sanitation

Improved sanitation facilities	Not improved sanitation facilities
Simple pit latrine with slab	Public or shared latrine
Composting toilet	Open pit latrine
Flush or pour-flush latrine	Bucket latrines
Ventilated improved pit latrine	No facilities
Connection to a septic system	
Connection to a public sewer	

Source: http://www.wssinfo.org

Only private facilities, i.e. that are used by the household only, are considered to be improved. Shared facilities (where use is restricted to some neighbouring households or those living in a compound or apartment building) or public facilities (i.e. used by a wide range of persons) are not considered to be improved. However, within the framework of the present study, we will consider shared latrines as an acceptable level of service, particularly in slum areas where spatial and affordability constraints mean that shared latrines may be the only practical form of access to sanitation for slum-dwellers. These will be analysed during Phase 2 of the project, as they are usually connected to a sewer or a communal septic tank via a network.

2.3. Additional interventions

On top of the sanitation facility (also referred to as the "hardware"), it is usually necessary to conduct additional activities in order to stimulate demand for sanitation and hygiene or organise community mobilization (also referred to as "software"). Experience has shown that if such activities are not adequately conducted, sanitation facilities that are built with public money may end up never being used or may fall into disrepair for lack of maintenance a couple of years down the line.

These additional interventions may consist of the following:

- Training of local staff for project management or all activities below;
- Community mobilization, i.e. activities that help communities get together and manage part or totality of sanitation services;
- Sanitation promotion, i.e. activities that help create or reveal latent demand for sanitation, e.g. total sanitation approach, sanitation marketing, etc;
- Hygiene promotion, i.e. activities that promote changes in key hygiene behaviour to maximize health benefits of water and sanitation facilities. Such "key hygiene behaviours" can be placed into three groups: hand washing with soaps at critical moments, proper management of child excreta, proper storage of household drinking water

3. COST COMPONENTS OF SANITATION AND HYGIENE INTERVENTIONS

Sanitation and hygiene interventions generate a series of costs related to the "hardware" (i.e. the technical solution), including investment costs, operating and maintenance costs. The associated software costs must also be taken into consideration to generate a comprehensive estimate of the unit

costs of providing access to sanitation under a given project or programme. Different sanitation technologies will generate different types of costs, which must all be recovered through either user charges or external financing in order to achieve cost recovery. All too often, the "software" costs are not properly taken into account, which means that a project or programme runs the risk of failure once the source of finance for those software costs is interrupted.

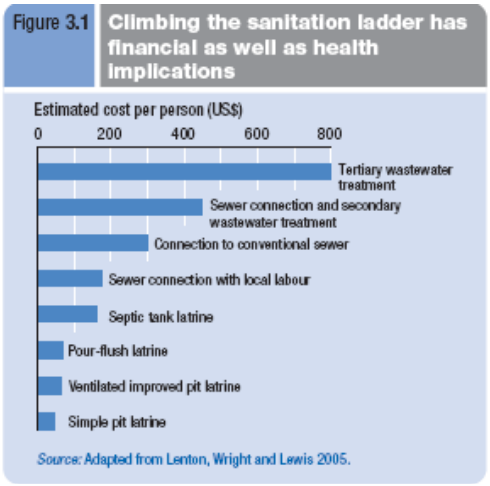
Table 2 below outlines the type of costs that may be considered for each technical solution, with a preliminary assessment of whether such costs are likely to be comparatively high or low. This is based on what *should* be spent in order to remain the sanitation facility in operation, rather than what is actually spent in practice: in many cases, operating expenses are kept artificially low and the facilities fall into disrepair only a few years down the line.

Existing cost information shows great variations

Existing information shows that there are great variations in costs between those sanitation solutions, although on the whole, on-site sanitation solutions are much cheaper to build and operate. However, the data for comparing such costs is often patchy and software costs rarely included. A key objective of this study is to obtain more detailed cost information so as to be able to compare the overall costs of alternative technologies in different country settings.

An attempt at quantifying those cost differences was also made for a recent Human Development Report, as shown on Graph 1 below.

Graph 1 – Costs of sanitation solutions: climbing the sanitation ladder



A previous analysis by the WSP estimated that the investment cost for latrines are typically between USD 30 and 60 per capita, with annual operating costs of USD 3 to 10 per capita per year whereas capital investment costs for a sewer would be in the range of USD 120 to 160 per capita, with annual operating costs of USD 5 to 15 per capita. For poor households, which are typically on less than USD 1 per day, the cost of a latrine can represent around a fifth of their annual income (which is very significant as it competes with other non-avoidable expenses, such as food or health) whereas the cost of a sewer connection (if all the costs were recovered via the connection charge) would amount to almost half of their annual income.

A recent study for the Bill and Melinda Gates Foundation by the IRC, which sought to quantify the cost of delivering safe water, sanitation and hygiene services, reviewed published material with cost data for a range of projects around the world. They found that the cost of a simple pit latrine varied from USD 11 to 54 in PPP adjusted terms with 2004 exchange rates, whereas a VIP latrine ranged

from USD 10 to 172 and an Ecosan from USD 187 to 911. Based on a similar methodology, they found that the cost of a sewer connection varied from USD 24 to 260.

Possible explanations for cost variations – on-site solutions

Various factors may affect the "hardware" costs as well as the balance between capital expenditure (referred to as "capex") and operating expenditure (referred to as opex).

For on-site sanitation solutions, for example, a key factor to consider is the size of the pit. A larger pit is more expensive to build but reduces the need for regular pit emptying (higher capex, lower opex). A key difference between urban and rural settings is that in low-density areas (typically rural areas), it is possible to build larger latrines (i.e. excavating a larger pit) so that it fills up over a longer period. When full, the latrine can be moved to another site, which would generate additional capital costs.[5]

By contrast, in high-density areas (typically peri-urban and urban areas), space is a rare commodity: there is a limit to how large a pit can be and the latrine need to be emptied on a regular basis to ensure safe sanitation. However, this would depend on several factors being combined:

- Pit emptying services must be available and affordable. The "low-cost" alternatives, i.e. self-emptying or manual emptying, do not usually meet the standards to guarantee safe sanitation and can create more health hazards for the community as a whole. Such pit emptying services are usually provided by the local private sector, which must have access to the right type of equipment for accessing poor areas that are usually more difficult to reach (for example, the streets may not be wide enough to allow a standard sludge removal truck to go through).

- Facilities to safely dispose of the sludge once collected. Such facilities would need to be built and maintained by the public agency in charge of sanitation.

Another critical factor is the cost of transporting the specialized equipment to the site, such as the slab (in the case of a simple pit latrine) or the vent pipe (for a VIP latrine). Such transport costs can be particularly significant in rural areas with low population density. These costs can negatively affect the profitability of local businesses specializing in the installation of latrines, especially if the population is too dispersed to develop a sustainable client base and transport is costly and time-consuming.

The software costs would also vary depending on the acceptability of the sanitation solution that is proposed. For example, a VIP latrine requires that the interior of the superstructure be kept dark and that is not always acceptable. The intensity of software activities to be conducted would also depend on prevalent hygiene practices in the region or country and the extent to which the proposed technical solution can be easily related to existing practices.

[5] When subsidies are provided for the first latrine to be built, it is not always the case that subsidies are provided for moving the latrine a few years down the line. If the household cannot afford moving the latrine, they may loose access to a sustainable sanitation solution that they had obtained through a publicly-funded project.

Table 2 - Estimated relative costs of sanitation solutions

Sanitation solution	CAPEX		OPEX		Software costs	
On-site sanitation	**Low/medium/high**	**Cost elements**	**Low/medium/high**	**Cost elements**	**Low/medium/high**	**Cost elements**
Simple pit latrine	Low	Pit digging and lining, slab, superstructure Manual labour	Low	Emptying services Minimal maintenance	Low	Hygiene promotion
Ventilated improved pit latrine (VIP)	Low / Medium	Pit digging and lining, slab, superstructure, vent pipe Manual and skilled labour	Low/medium	Emptying services Minimal maintenance	Low/Medium	Hygiene promotion Overcome cultural resistance Training of masons
Pour-flush or flush latrine	Low / Medium	Pit digging and lining, slab, superstructure Access to water Manual and skilled labour	Low/medium	Emptying services Minimal maintenance	Low/Medium	Hygiene promotion
Latrine connected to a septic tank	Low / Medium	Excavation, foundations and superstructure, septic tank and soakage pit, PVC pipes Access to water Manual and skilled labour	Medium/High	Regular emptying and maintenance	Low/Medium	Hygiene promotion Training of masons
Network-based	**Low/medium/high**	**Cost elements**	**Low/medium/high**	**Cost elements**	**Low/medium/high**	**Cost elements**
Connection to a community-based septic tank	Medium	Excavation, foundations and superstructure, septic tank and soakage pit, PVC pipes Access to water Manual and skilled labour	Medium / High	Regular emptying and maintenance	Low/Medium	Hygiene promotion Training of masons Community organisation
Connection to a small-bore sewer	Medium	Sewerage network (lower specs than conventional) Treatment facilities Manual and skilled labour	High	Commercial costs Sewage collection (inc. pumping) and treatment	Medium	Hygiene promotion Community organisation in some cases
Connection to a conventional sewer	High	Sewerage network Treatment plant (in some cases only) Manual and skilled labour	High	Commercial costs Sewage collection (inc. pumping) and treatment	Medium	Hygiene promotion

4. SOURCES OF FUNDS

Funds for sanitation and hygiene can come from various sources. In a very schematic way, at the level of a given project, funds may come from three main sources:

- Users of the service;
- Taxpayers via the government budget;[6]
- External sources (such as international lending institutions, NGOs, INGOs, and philanthropic organisations) providing "free" money in the form of grants or subsidized loans.

Whereas comparatively "rich" households may be able to pay for the service as users, poor households may need to receive subsidized funds either from domestic sources (i.e. tax payer money) or external sources. These three categories can be broken down further as in Table 3 below.

Table 3 - Financing sources

Source of funds	Type of financing mechanisms using those funds
Users of the service (private)	• (in case of on-site solution): household invests in its own facilities and pays directly for operating and maintenance costs • (in case of network-based solution): tariffs (connection charges, volumetric tariff) paid to service provider. This may include some cross-subsidies between rich and poor users or existing and new customers.
Tax payers (public)	• % public subsidy for hardware or software • Subsidized credit to households for investment in their own facilities • Subsidized loans to service providers (public or private) • Community-level rewards (e.g. grants to local govt, TSA?)
External sources (NGOs, INGOs, philanthropic organisations)	• Grants to government (central or local) to merge with public funds (with use of financing mechanisms as above) • Grants directly to users or service providers (e.g. OBA) • Subsidized credit to government, users or service providers

In practice, households are a main source of investment, particularly for on-site sanitation facilities, outside of donor programmes. According to a recent DFID paper,[7] the investment ratio is typically 10 to 1 for household investment versus publicly supported investments. Most households rely on small scale providers, such as local masons or pit emptiers to build latrines or dispose of the waste. As DFID strategy makes clear, this does not imply that existing markets are perfect. Many of the sanitation facilities that are constructed in that way do not meet any public health or environment standards. They may even not be adequate to protect household's health. Public sector support may be needed to change incentives and improve the services on offer, or to create incentives for proper disposal of pit waste in urban areas. Public interventions may also be needed to create the right environment for small providers to develop and grow their businesses.

The use of public funds for sanitation services is usually justified by the fact that adequate sanitation at a community level has external benefits for the general health of the population (by reducing the prevalence of diarrhoeal diseases and epidemics) and for the environment. There is an abundant literature on the benefits of sanitation that justify the allocation of public funds to the sector.[8]

[6] Note that these funds may be transferred to the sector via a variety of channels depending on the degree of decentralization and levels of government in the country. Although we will note this distinction in our analysis (i.e. whether funds are coming from municipal, Provincial or central government budgets), we will not be able to carry out a full analysis of these factors as the administrative organization is very specific to each country.
[7] DFID (2007)
[8] See for example: Pearson, Joanna and Kate McPhedran (2007).

However, there are conflicting views within the sanitation community as to what sources of finance should be tapped to cover the costs of the different components of the sanitation service, and in particular, regarding the opportunity of using public funds for these services. These discussions are often confounded with questions of *how* such funds are applied.

For **on-site sanitation**, a traditional view is that on-site sanitation facilities are home improvement investments that should be financed by households. This is a popular view with resource-starved governments, although many governments would also engage in massive programmes to provide subsidies for latrines (or even the latrines themselves) as they see this as the most straightforward "technical fix" to the sanitation problem. A more pragmatic approach consists of saying that subsidies should be used to create demand for sanitation rather than to pay for sanitation facilities. This is because, partly for cultural reasons, demand for sanitation is not as well expressed as the demand for water or health services. However, given that the costs of sanitation facilities can be substantial, particularly for poor households, subsidies for the facilities themselves may also be needed in order to reach the very poor. Willingness-to-pay and affordability analysis should be conducted in order to assess the level of financial support that is necessary to improve the affordability of the latrine.

For **network-based solutions**, there are conflicting economic theories to support the allocation of responsibilities for financing sanitation. The strict application of the "polluter pays principle" would mean that the household should pay for all components of the service, since they are generating the pollution that needs to be dealt with. However, this would clearly not be affordable for poor households, which are usually struggling to pay even for getting access to the service.

The alternative principle is the "incidence of benefit" argument, which states that the party which benefits from the service should be paying for it. With that logic, householders should pay for a household connection, the local government should pay for the sewage collection network and the national government should pay for treatment. This is because users are usually willing to pay for those benefits that they perceive and are able to internalize, such as household improvements, whereas they may be unwilling or unable to pay for the full costs of the system, including trunk sewers and wastewater treatment.[9] Such model for financing sanitation improvements is set out in Box 1 below.

Box 1 - A model for financing sanitation improvements

- Households pay the bulk of the costs incurred in providing on-site facilities such as bathrooms, toilets, septic tanks, and on-site sewer connections.
- Residents of a block collectively pay the additional cost incurred in collecting the wastes from individual houses and transporting these to the boundary of the block.
- Residents of a neighbourhood collectively pay the additional cost incurred in collecting the wastes from blocks and transporting these to the boundary of the neighbourhood (or in treating the neighbourhood wastes).
- Residents of a city collectively pay the additional cost incurred in collecting the wastes from blocks and neighbourhoods and transporting these to the boundary of the city (or in treating the city's wastes).
- The stakeholders in a river basin or groundwater source—cities, farmers, industries, and environmentalists— collectively assess the value of different levels of water quality they wish to pay for, and agree on the assignment of financial responsibility for treatment and water quality management costs.

Source: Wright, Albert (1997)

[9] The use of public funds to encourage the take-up of sanitation at household level can be referred to as a subsidy as funds are provided to influence household behaviors to meet a public objective. On the other hand, the use of public funds for financing sewers and wastewater treatment plants more plainly falls under the category of public investment, as these have public goods characteristics.

These financing principles are now being closely followed and selectively implemented in a number of countries. Examples of such investment programs for service provision and for broader river basin management of water quality are in place in Brazil, Ghana, Pakistan, the Ruhr River Basin in Germany, and in all major river basins in France.

Whatever principle is adopted, the main issue remains that whereas public funds can usually be found to finance sewage collection and treatment, public financing for facilities at the household level is more difficult to justify and to mobilize. Domestic governments are usually interested in taking up loans for heavy infrastructure such as sewerage networks or wastewater treatment plants but are reluctant to repay loans for household facilities, and so will only accept external support for this in the form of a grant.

While some subsidies may be required to meet the MDG targets, it is both unrealistic and inefficient to rely exclusively on grants provided by international organisations to governments, local NGOs or to households exclusively. Financing mechanisms that leverage private funds via the most efficient use of public funds must therefore be considered. In the next section, we set out a more detailed typology of existing financing mechanisms for household facilities, distinguishing between mechanisms for on-site and network-based sanitation solutions.

5. FINANCING MECHANISMS FOR HOUSEHOLD FACILITIES

A range of financing mechanisms can be used for household facilities (i.e. latrines or connections). Alternative financing mechanisms for on-site sanitation solutions and network-based ones are shown on Tables 4 and 5 below, ranging from financing purely through private funds (user finance) to financing purely with public funds. These tables are effectively a development of the broad categories presented in Table 3 above and allocates the financing mechanisms between on-site sanitation and network-based solutions.

The main advantages and risks of each of those financing mechanisms are set out in the tables, in as much as can be inferred from the existing practice. One objective of the study is to analyse those advantages and risks in more detail, so as to be able to provide guidance on the use of the most appropriate financing mechanism for each project or programme. Examples of each of these financing mechanisms are provided in the right hand column, which could serve as a basis for identifying case studies. Feedback is requested from reviewers to provide more specific details on examples of each type of financing mechanisms.

As mentioned above, purely private financing is the most common financing mechanism for on-site sanitation facilities and takes place outside of any government or donor-funded programmes. However, there are concerns that sanitation facilities developed in that way do not reach the very poor or are not developed to standards that ensure safe and sustainable management of human excreta.

At the other end of the spectrum, although full public financing was a very common approach in previous years (particularly during the water and sanitation decade in the 1990s), this approach is progressively being abandoned in order to develop, insofar as possible, a sustainable sanitation industry, rather than an unsustainable government funded supply-driven approach that does not reflect or respond to demand.

The largest category of financing mechanisms therefore entails combining private (user charges) and public funds (tax payer monies and external sources). In the tables below, these are shown with an increasing level of public sector investment. Each category can potentially be broken down into sub-categories, depending on where exactly the funds are coming from, i.e. from either municipal, regional or central governments, international donors or non-governmental organisations (national and international).

Table 4 – Financing mechanisms for on site sanitation solutions

Financing mechanism	Advantages	Risks	Examples
Financing sources: purely private (users of the service)			
Self-financing: households invest in their own facilities and pay for sludge-emptying services – No subsidy	• Majority of latrines are currently financed privately in that way, outside of publicly-funded programmes • Reflects existing demand • Maximum leverage of household resources	• Risk of poor quality infrastructure • Does not fully consider environmental impact • Suppliers not providing adequate service • Unaffordable for the very poor	Numerous, including India, Lesotho, Vietnam, Bangladesh, Pakistan, Burkina Faso, Benin In Vietnam, the utility works with a Vietnamese NGO to provide credit for on-site sanitation facilities and the utility provides emptying services (paid for via the tariff)
Sanitation surcharge: cross-subsidy to finance on-site sanitation	• Use of cross-subsidies with limited drag on taxpayer money	• Available funds are limited, because the cross-subsidy basis is limited and there are affordability constraints to increasing the charge	Burkina Faso (Ouagadougou): subsidy for hardware (25%) and supervision of trained masons
Financing sources: combination of private and public funds (tax payer monies and external sources)			
Subsidy for software, mainly for the hygiene and sanitation promotion component with low/ no subsidy for hardware	• Subsidy linked to outcome (achieving "open defecation free status") • Focuses subsidies on creating demand • Based at community level, relies on community cohesiveness	• May result in unaffordable solution for the very poor • Sustainability at risk once the initial attention / champion or other motivating factor disappears	Total sanitation in Bangladesh (no reward for communities) Total sanitation in India (with a small reward to communities for achieving open defecation free status) Benin
Loans to households, including micro-credit for sanitation or home improvement (subsidized or market-rate)		• Demand for sanitation needs to be stimulated	Honduras, showing positive repayments – difficulties in Ghana
Revolving funds (as a specific type of household credit)	• Particularly useful in cohesive communities aiming at 100% sanitation	• Requires transparent management at community level, maybe most suited to rural communities • Requires previous experience in managing funds	Nepal: revolving funds that communities can keep if they achieve 100% coverage China, Anhui Province with community leaders involved
Loans to private sector providers	• Lift constraint for SSIPs to expand	• Services may not reach the very	Orangi Pilot Project in Pakistan, with loans to family businesses

Financing mechanism	Advantages	Risks	Examples
	their services	poor • Not sufficient demand to keep the business running if not combined with hygiene & sanitation promotion	Grameen projects (micro-lending for infrastructure)
Non-financial support to SSIPs (training, demand creation) – support to private supply of latrine parts and construction, sale of soap	• Boost private sector development so that supply can meet demand for sanitation facilities	• Services may not reach the very poor	Bangladesh, Burkina Faso, Ghana, Peru and Senegal
Output-based aid: grants to households or to SSIPs based on outputs delivered	• Subsidy linked to actual outputs delivered	• Requires private sector pre-financing which may not be forthcoming	SSIPs for on-site sanitation in Dakar; Punjab
Partial hardware subsidy: users contribute in kind or in cash.	• Enhances ownership of facility • Improves affordability • Subsidy allocation needs to be based on Participatory Poverty Mapping to create consensus within a community on who should be subsidized and for how much	• May be unaffordable for the very poor • The latrine may not be completed or used for the intended purpose	
Financing source: purely public (tax payer monies and external sources)			
Full subsidy: households receive facilities as a gift from the government or an NGO	• Removes affordability constraint for the very poor, as long as they are able to capture the subsidy	• Can ignore or "crowd out" household resources • Facilities often not used as does not meet existing demand • Unsustainable drag on public resources	Masibambane in South Africa

Table 2 – Financing mechanisms for networked-based solutions

Financing mechanism	Advantages	Risks	Examples
Financing sources: purely private (users of the service)			
Pay and use toilets / public bathroom	• Good approach if facilities kept clean, especially in urban slums where land/property ownership and space for latrine are critical issues and where sewer networks are at the time impossible to build • Quick way to increase coverage, especially if use a franchise approach • Can provide other community services and promote hygienic practices (e.g. showers, water, etc.) • Useful for transient population (bus stops)	• Does not qualify as "improved sanitation" according to WHO-UNICEF definition • Transitory solution?	**India:** Sulabh has developed 4000 pay and use toilets **India:** community toilets in Mumbai slums
CAPEX: Connection charges reflecting full connection cost, with connection being optional	• Guarantees cost-recovery	• Low take-up rates, if users are reluctant to pay • Affordability constraint for the poor	Find examples
CAPEX: Cross-subsidies for connection: new connections paid via a surcharge on existing customers	• Meets cost-recovery objectives whilst alleviating affordability constraint	• Risk of inclusion / exclusion depending on criteria for receiving cross-subsidy	**Argentina** (Buenos Aires concession)
OPEX: Wastewater tariff reflecting full O&M costs	• Based on sound cost-recovery and PP principles • Applicable to large or small community systems	• Affordability constraint for the very poor	Nairobi (communal facilities)
OPEX: Cross-subsidies for wastewater tariff: differential tariffs, charging below cost for poor users and above cost for others	• Alleviates affordability constraint for the very poor • Source for cross-subsidy funds can include water tariffs	• Need to ensure that overall costs are recovered, which is often not the case • Prone to errors of inclusion/exclusion	Find examples – check whether this system applies in Colombia as it does for water
Mostly CAPEX: private investment in	• Reduces the burden on public	• Can be more expensive over the	**China, Malaysia**

Financing mechanism	Advantages	Risks	Examples
sewer network or treatment facility (e.g. BOT)	finances • Accelerate investment	long-term • Only available for countries perceived as less risky • Does not finance access per se	
Commercial lending to sanitation service providers	• Expands access to capital finance for service providers, particularly useful for SSIPs	• Financial markets not sufficiently developed to support this type of lending	Potential avenue for development but no example identified so far
Financing sources: combination of private (user charges), tax payer monies and external sources			
Credit to users for connection	• Credit can be provided by external donors, commercial bank or service provider itself • Enhances ownership of sewer connection • Spread out connection cost to alleviate affordability constraint	• May not be accessible for the very poor	Find examples
Partial subsidy for connection charge	• Boosts demand for connections, reduces the risk of sewers and wastewater treatment plants not being fully utilized	• Risk of inclusion/ exclusion depending on criteria for awarding subsidy	**Senegal** , via the social connection programme
Partial subsidy to SSIPs, for service for network construction	• Boost supply-side of the market, especially if main utility struggling to expand services (due to financial or institutional constraints)	• May be difficult to put in place if SSIPs primarily operate in the informal sector	Find examples
Loans to municipalities, especially for large scale investments (can be in the form of dedicated grants or block grants – i.e. for any use)	• Lifts financial constraints for municipal providers	• Not financially sustainable if not paid back out of tariff receipts	PRAGUAS in Ecuador
Financing source: purely public			
Grants from external sources or central governments for sewerage treatment plants and/or sewage networks built at municipal level	• Reduces total system costs and affordability constraint	• Limited funds available: cannot be used on a large scale • Not focused on access: treatment capacity may never be used	Many examples in traditional financing schemes, especially with bilateral donors

Public subsidies are an important component of any financing strategy carried out by a public sector agency (a domestic government, an international agency or even an NGO when it is acting in the sector of delivering public goods). There are various rationales for subsidising sanitation schemes:

- ***Sanitation as a public good:*** given that sanitation is generally seen as a public good (private consumption has an external effect on the rest of society), subsidies are sometimes used to encourage consumption beyond the level that would be consumed based on private benefits only. That rationale can be used irrespective of the income levels of subsidy recipients.

- ***Lifting the affordability constraint:*** another common reason is that sanitation needs to be subsidised because it is too costly for poor population. Such rationale requires evaluating what the real affordability constraint is. This needs to be looked at on a case by case basis depending on the relative poverty thresholds and costs of sanitation solutions in each country.

Subsidies can be designed in many different ways, which might impact their effectiveness. The main dimensions of subsidy design are outlined in Table 6 below. A recent paper by Steven Sugden reviews those dimensions in more details.[10]

Table 6 - Types of subsidies for sanitation and hygiene

Key characteristics	Alternative options
What is subsidized?	**Inputs** Raw material: slabs, SanPlats, cement, pipes, aggregates Transport **Outputs: e.g.** Latrines, at different levels of service Septic tanks/cesspits Bathrooms Sewer connections Sewage collection systems Septic tank/cesspit desludging and/or disposal and treatment Wastewater treatment plants **Outcomes** Hygiene behaviour change Sanitation demand generation (Note: that may take the form of a one-off subsidy, provided as a grant in order to carry out certain activities, such as conducting a marketing survey or purchasing a pit emptying tanker)
How much is subsidized?	• Subsidy only for a basic level of service, to achieve basic benefits • Subsidy going towards the cost of a facility, which can be of a higher level of service – percentage of the cost that is subsidised varies from project to project
How is the subsidy provided?	Supply raw materials (pipe, cement) Supply/subsidize specific materials (SanPlats) Below market rate credit schemes Sell vouchers at discount, reimburse masons at full cost Reimburse households upon certified completion Deliver built latrine (South Africa) Reduced connection charges or tariffs (in the case of sewerage networks)

[10] Sugden, Steven (2006).

An innovative way of providing subsidies that has been developed in recent years is based on principles of "output-based aid", which consists of providing a subsidy for a pre-specified output (such as a latrine or a sewerage connection) once this output has effectively been delivered rather than up-front on a total budget basis as it is commonly done in traditional project-based finance. The underlying philosophy is that this type of subsidies gives more incentives to the service provider to deliver the service, as the subsidy is not paid unless the service is effectively provided.

Traditionally, the most common approach consisted of providing high levels of subsidies to rural households for improved latrines in order to reach the poor, on the assumption that poor households cannot afford this type of investment, even if it may be their responsibility, or do not have an explicit demand for this type of facilities. This approach has been heavily criticised by proponents of the "no subsidy" approach, on the assumption that subsidies are "bad" or counter-productive as they crowd out household resources.[11] Critics have argued that "free" schemes have usually resulted in facilities being built and never used because they were not the "right type" or did not meet household demand, whereas they would deter households from making an alternative investment in facilities that suit their needs better. Another frequent criticism is that subsidies tend to be captured by higher-income people who are better equipped to take advantage of them.[12] The consensus has emerged that if subsidies are deemed necessary, and in order to be effective, the subsidies should be closely targeted, demand-based and temporary.[13] A key objective of this study is to contribute to the debate on how "smart subsidies" can be designed in the areas of sanitation and hygiene.

[11] Mehta and Knapp (2004), p11.
[12] See Wright, Albert (1997).
[13] See Wright, Albert (1997).

6. TYPOLOGY OF FINANCING APPROACHES FOR SANITATION AND HYGIENE PROJECTS

Sanitation and hygiene programmes or projects are usually developed on the basis of a few types of financing approaches, which combine several financing mechanisms with funds from different sources. For example, a sanitation scheme may be financed with part user finance, and part credit. For the purpose of selecting case studies, we have therefore defined a reduced number of financing approaches to sanitation and hygiene projects, with different combinations of financing mechanisms, that would be worth analysing in more details during Phase 1 of the study.

Whether the mix of financing mechanisms retained is a factor of success or failure of the approach taken will need to be considered on a case-by-case basis, based on the criteria set out in the next section and the information gathered in each case study (see Annex A for initial specifications of the type of information to be gathered). We will also need to examine carefully whether such conclusions can be extrapolated to assess the relevance of these financial approaches in a variety of contexts.

Financing approach 1 – No hardware subsidy (but 100% software subsidy) in rural areas

Urban or Rural?	Rural
HH/community contribution	All initial hardware costs
External contribution	All software costs
Credit facilitation?	None
Potential case studies?	Total Sanitation in Bangladesh Medinipur Intensive Sanitation Project (West Bengal, India)

Financing approach 2 – Partial hardware subsidy in rural areas

Urban or Rural?	Rural
HH contribution	In kind or cash contribution to some percent of hardware costs
External contribution	All software costs, some hardware costs
Credit facilitation?	None
Potential case studies?	PRONASAR (Peru) PROAGUAS (Ecuador)

Financing approach 3 – Partial hardware subsidy for on site sanitation in urban areas

Urban or Rural?	Urban
HH contribution	In kind or cash contribution to some percent of hardware costs
External contribution	All software costs, some hardware costs
Credit facilitation?	None
Potential case studies?	Dakar, Senegal (hardware subsidy of 75%) Ouagadougou, Burkina Faso – use of the sanitation surcharge and lower hardware subsidy (25%)

Financing approach 4 – Urban on site sanitation with microcredit

Urban or Rural?	Urban
HH contribution	Cash (and/or in kind) contribution to hardware, via credit
External contribution	All software costs, some hardware costs
Credit facilitation?	**Yes**
Good case studies?	Micro-finance for infrastructure sanitation (Ahmedabad, India) Vietnam onsite sanitation in urban areas

Financing approach 5 – Total sanitation with reward linked to output or outcome

Urban or Rural?	Rural
HH/community contribution	All initial hardware cost
External contribution	All software cost and community reward (cash or kind?)
Credit facilitation?	None
Good case studies?	Total Sanitation in India (Maharashtra?)

7. CRITERIA FOR EVALUATING FINANCING APPROACHES

The chances of success of these alternative financing approaches to sanitation and hygiene projects vary greatly, depending on local circumstances, implementation methods or the choice of financing mechanisms. In the proposed case studies, we propose to analyse the impact of the choice of financing mechanisms on triggering investment in sustainable sanitation solutions.[14] Below, we propose simple performance indicators which are going to be used and tested in the case studies.

Table 7 - Proposed performance indicators by criteria

Efficacy (did the financing mechanism trigger investment?)
• Total number of sanitation facilities built (e.g. latrine, sewer connection, etc…) • Number of people receiving "adequate" sanitation services • Number of villages with the "total sanitation" approach (if applicable) • Percentage of sanitation facilities built that are still operating 5 years down the line • Indicators of household satisfaction: are they using the facilities and are they satisfied that they have improved their existence?
Efficiency (was investment carried out at a reasonable cost?)
• Average total costs / household served • Average total costs / households in the served community (even if the household itself is not served, in order to capture potential externalities) • Average hardware costs / household served • Average "software" cost / household served • Total capital investment costs as a percentage of average income and as a percentage of poor household annual income • Operating costs as a percentage of average monthly income and of poor monthly income
Equity (effectiveness in reaching the poor)
• Average income of population reached by the project vs. average income of overall population • Qualitative assessment of: o Errors of inclusion (what percentage of the poor population did not obtain the subsidy?) o Errors of exclusion (what percentage of the population obtained the subsidy even though they are above the poverty threshold?) • Size of household contribution vs. average income of poor household (as an indicator of affordability for the poor) • Size of household contribution vs. average income of median household (as an indicator of affordability for median households)
Financial sustainability
• Cost recovery indicators: operating cost recovery, capital cost recovery and total project cost recovery (estimated as the percentage of non-subsidised funds covering actual costs)
Scalability
• Number of unserved population (or household) vs. financing availability: how much would it cost to serve all unserved households/population with this sanitation solution? Compare this to the annual sanitation budget in the country, and to the annual public sector budget (give percentages) • Any evidence of spontaneous uptake or demand for expansion?

[14] It was deemed beyond the scope of this project to examine whether the investment actually led to an improved outcome, such as a reduction in the number of diarrhoea cases or an overall improvement in health conditions. Such causality links tend to be difficult to establish and would require extensive monitoring and evaluation data.

ANNEX A: PROPOSED APPROACH FOR THE CASE STUDIES

In Phase 1 of the project, we are planning to carry out between six and eight case studies that would span a range of financial approaches, as set out in Section 6 above.

The objectives of the case studies are:

- To gather reliable information on the total costs of sanitation programmes (including hardware and software);
- To analyse where financing is coming from (financing sources) and how financing is provided (financing mechanisms);
- To evaluate the performance of alternative financing approaches against a set of criteria (defined in Section 7 above).

A.1. Criteria for selection

The case studies will be selected along the following lines:

Included	**Excluded**
Large projects (in investment and beneficiaries terms)	Pilots
Project with enough life time (4-5 years)	Project driven mainly by an individual
Focus is on access to latrines/bathroom and collection	Treatment
Project with a project management unit still in place15	

The existence of a project management unit would be important so as to be able to access enough comparative data on items including technical assistance and overheads, which can often account for a significant part of the project total costs. To the extent possible, we might try to identify several projects representing a variety of approaches in the same country in order to enhance the ability to conduct meaningful comparisons between cases

A.2. Approach

The case studies will be carried out by local consultants on the basis of the present methodological framework and under the supervision of the Principal Investigator. The proposed level of input is likely to vary depending on the quality of the information readily available but we anticipate that it would fall within the following range:

	Days	
Case study 1	**Mini**	**Maxi**
Gathering/analysing project information in project office	10	15
Focus groups on customer satisfaction/ project visits	5	10
Case study write-up	5	10
Finalisation / availability to answer questions	2	5
Total	22	40

As the case studies are to be selected so that there is reasonable information available, we do not envisage that extensive surveys or new data gathering exercises should be undertaken within the scope of this project. However, an essential element of the analysis would be to verify on the ground (via project visits and focus groups with customers) that the sanitation facilities are effectively used and that they have had an impact on hygiene and health outcomes in the project / programme area.

ANNEX B: PROPOSED CASE STUDY FORMAT

The following table and attached spreadsheet will be used as a basis for drafting Terms of Reference for the local consultants in charge of conducting the case studies. This table should be used as a guide for structuring the case study write-up rather than asking consultants to only fill in the boxes. The local consultants will be asked to fill in the attached spreadsheet, to gather data on a uniform basis and help identify any gaps in the information provided.

COUNTRY AND SANITATION POLICY OVERVIEW

- Access to sanitation in urban and rural areas: discuss current coverage and trends (has it been increasing/decreasing?)
- Institutional set-up for sanitation:
  - Responsibilities for supervision (i.e. ensuring that the service is delivered)
  - Responsibilities for service delivery
  - Responsibilities for monitoring (if defined)
- What initiatives have been undertaken to increase coverage? How does the program/project under review fit within broader policies to increase coverage?

PROGRAM / PROJECT DESIGN

Program/ project overview	• Overall introduction to the program/project: start date and end date (if applicable), lead institution,
	• Objectives and overall scope of the program project
	  ○ Is it solely focused on sanitation elements or broader: water and sanitation, slum improvement programme, sanitation and solid waste removal, rural development programme etc…
	  ○ Program approach: Total sanitation or component financing, etc…
	• Geographical scope and number of households targeted / reached
	• Population density in the program / project area
	• Average income of population in the program / project area
	• Type of service provided (*refer to the typology of sanitation solutions in Section 2: latrine, toilets, toilet + bathroom, etc*…)
	• Total project budget, % of funds allocated to sanitation

Institutional set-up	• Has the project been established by donors? If so, has a project management unit been set-up? • At what level is the project managed? (donor/national government/local government/ utility/ NGO) • Which organizations are in charge of providing services (government / utility / private / NGOs?) • At what level does monitoring and supervision take place? (donor/national government/local government/ utility)
Total Costs of sanitation components	• Hardware: capital investments • Software (include total project supervision costs and technical assistance) • Operating costs
Sources of finance	Give the shares of financing from each the following source, indicating which cost components they are providing finance for • Household finance (initial investment, tariff payment, tax payment) • Private sector financing (in the event of the private sector investing in initial infrastructure and getting its investment back through charges) • Domestic public sector financing: loans/ grants (indicate whether financing is coming from local / regional / central government) • Donor financing: loans / grants

Pro-poor focus in project design	• Did the program specifically seek to target the poor or was it designed to reach everybody, irrespective of income? • Has any poverty mapping exercise been carried out before implementing the program / project? • Has any willingness-to-pay study been carried out and how have the results been incorporated in the design of the program?
Subsidy design	If subsidies are provided: • Who is the subsidy awarded to: household, service provider? • Is the subsidy provided in kind or in cash? If in kind, what is provided? • What are the cost components covered by the subsidy? • Is the subsidy for a basic level of service? Who pays the complement if a higher level of service is sought? • What are the criteria and procedure to follow to obtain a subsidy? Do the criteria aim to target the poor in particular?

EVALUATION OF PERFORMANCE

Efficacy (did the financing mechanism trigger investment?)
• Total number of sanitation facilities built (e.g. latrine, sewer connection, etc…) • Number of people receiving "adequate" sanitation services • Number of villages with the "total sanitation" approach (if applicable) • Percentage of sanitation facilities built that are still operating 5 years down the line • Indicators of household satisfaction: are they using the facilities and are they satisfied that they have improved their existence?
Efficiency (was investment carried out at a reasonable cost?)
• Average total costs / household served • Average total costs / households in the served community (even if the household itself is not served, in order to capture potential externalities) • Average hardware costs / household served • Average "software" cost / household served • Total capital investment costs as a percentage of average income and as a percentage of poor household annual income • Operating costs as a percentage of average monthly income and of poor monthly income
Equity (did the poor benefit?)
• Average income of population reached by the project vs. average income of overall population • Qualitative assessment of: o Errors of inclusion (what percentage of the poor population did not obtain the subsidy?) o Errors of exclusion (what percentage of the population obtained the subsidy even though they are above the poverty threshold?) • Size of household contribution vs. average income of poor household (as an indicator of affordability for the poor) • Size of household contribution vs. average income of median household (as an indicator of affordability for median households)
Financial sustainability
• Cost recovery indicators: operating cost recovery, capital cost recovery and total project cost recovery (estimated as the percentage of non-subsidised funds covering actual costs)
Scalability
• Number of unserved population (or household) vs. financing availability: how much would it

cost to serve all unserved households/population with this sanitation solution? Compare this to the annual sanitation budget in the country, and to the annual public sector budget (give percentages)
- Any evidence of spontaneous uptake or demand for expansion?

OVERALL EVALUATION

- Was the project considered to be a success overall? Was the sanitation component considered to be a success? If not, why not?
- Based on a qualitative assessment, to which extent was the financing scheme a determinant of either success or failure of the particular program / project?
- Was the financing scheme seen as a good match for the level of service and additional interventions provided?
- Do you know of any parallel program that may have affected the results of the project / programme under consideration (for example, if an NGO-led program has been providing "free facilities" whereas the programme only provided credit)?

ANNEX C: GLOSSARY

[this will be completed as the study develops – we might want to add a glossary of financial terms as well]

Cesspit: A **cesspit**, or *cesspool*,(also known as "zesspit" or "zesspool") is a pit, conservancy tank, or covered cistern, which can be used for sewage or refuse. The term "septic" refers to the anaerobic bacterial environment that develops in the tank and which decomposes or mineralizes the waste discharged into the tank. Adding a supplemental bacterial agent to the tank will accelerate the digestion of solids in the tank. The alternative to a septic tank is to use an aerobic system involving artificial aeration.[1] Because it is sealed, the tank must be emptied frequently — in many cases as often as weekly. Because of the need for frequent emptying, the cost of maintenance of a cesspit can be very high.

Latrine: a structure (usually small; holding a single person) for defecation. Latrines allow for safer and more hygienic disposal of human waste than open defecation. There are several types of latrines:

- Pit toilets, or pit latrines, are the simplest and cheapest type, minimally defined as a hole in the ground. The most basic improvement is installation of a floor plate. A dry pit does not penetrate the water table, while a wet pit does.

- A Ventilated Improved Pit (VIP) Latrine is a latrine that reduces two of the most common problems with a simple pit latrine; odor and fly/mosquito breeding. Adding a ventilating pipe is the key improvement of the **ventilated improved pit latrine**. See Pit toilet.

- The Double-vault Ventilated Composting Latrine is the currently most advanced, free-standing latrine. Apart from offering significant reduction in risk from waterborne-diseases, this type of ecological sanitation provides the closing of some nutrient cycles by allowing the safe, composted waste to be used as a "free" soil treatment in agriculture.

- A water privy is a situation where a watertight tank receives the waste and sends it to an underground seepage pit or drainage area.

Septic tank: A **septic tank**, the key component of a **septic system**, is a small scale sewage treatment system common in areas with no connection to main sewerage pipes. Periodic preventive maintenance is required to remove the irreducible solids which settle and gradually fill the tank, reducing its efficiency. Those who ignore the requirement will eventually be faced with extremely costly repairs when solids escape the tank and destroy the clarified liquid effluent disposal means. A properly cared for system can last for decades and possibly a lifetime.

Soakaway: A soakaway is simply a hole in the ground filled with rubble and coarse stone with a drainage pipe laid to it removing surface (rain) water from other areas.

Subsidy: financial assistance, either through direct payments or through indirect means such as price cuts and favourable contracts, to a person or group in order to promote a public objective.

ANNEX D: BIBLIOGRAPHY

[this is only partial at this stage and will be completed as the study develops]

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