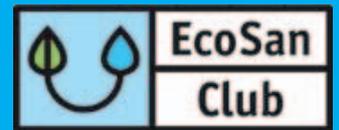


Sustainable Sanitation Practice



Issue 5, 10/2010



- Mushroom Production in Bolivia
- Community human-waste management
- Austria vs. East Africa - Analysis of Solid Waste and Wastewater sector
- Financing the invisible entrepreneur
- Establishing a World Trade Hub for the Poor

Sanitation as a business

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Publisher: EcoSan Club, Schopenhauerstr. 15/8, A-1180 Vienna, Austria • chairperson: Günter Langergraber • website: <http://www.ecosan.at/> • scope: EcoSan Club was funded as a non profit association in 2002 by a group of people active in research and development as well as planning and consultancy in the field of sanitation. The underlying aim is the realisation of ecological concepts to close material cycles in settlements.

Medieninhaber: EcoSan Club, Schopenhauerstr. 15/8, A-1180 Vienna, Austria • Obmann: Günter Langergraber • Gegenstand des Vereins: Der EcoSan Club wurde 2002 als gemeinnütziger Verein von einer Gruppe von Personen gegründet, die in Forschung, Entwicklung, Planung und Beratung in der Siedlungshygiene - Sammlung, Behandlung oder Beseitigung flüssiger und fester Abfälle aus Siedlungen - tätig waren und sind. Das Ziel des EcoSan Clubs ist die Umsetzung kreislauforientierter Siedlungshygienekonzepte (EcoSan Konzepte) zu fördern, um einen Beitrag zum Schutz der Umwelt zu leisten.

Cover Photo / *Titelbild*

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Editorial

Pecunia non olet („money does not smell“) is a Latin saying related to the urine tax levied by the Roman emperors Nero and Vespasian in the 1st century upon the collection of urine. The lower classes of Roman society urinated into pots which were emptied into cesspools. The liquid was then collected from public latrines, where it was sold and served as the valuable raw material for a number of chemical processes: it was used in tanning, and also by launderers as a source of ammonia to clean and whiten woollen togas. The buyers of the urine paid the tax. (Source: Wikipedia).

Already during the Roman times the value of human urine was known. It is generally accepted now, that a main issue for sustainable implementation of sanitation systems is creating a market for sanitation products, i.e. liquid and solid fertilizers from human urine and faeces, respectively. Additionally, the involvement of small businesses carrying out services in sanitation systems is key.

With „**Sanitation as a business**“ as thematic topic of issue 5 of **Sustainable Sanitation Practice** (SSP) we focus on this important topic. Several examples are shown how values can be created and how entrepreneurs can be interested to provide services in sanitation systems.

The thematic topic of the next issue (issue 6, January 2011) is „Toilets“. Contributions are due to 1 November 2010. Information on future issues is available from the journal homepage (www.ecosan.at/SSP) and will be regularly updated. Please feel free to suggest further topics for issues of the journal to the SSP editorial office (ssp@ecosan.at). Also, we would like to invite you to contact the editorial office if you volunteer to act as a reviewer for the journal.

SSP is available online from the journal homepage at the EcoSan Club website (www.ecosan.at/SSP) from free. We do hope that SSP will be frequently downloaded and further distributed to interested people.

With best regards,
Günter Langergraber, Markus Lechner, Elke Müllegger
EcoSan Club Austria (www.ecosan.at/ssp)

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From excrement to pines to mushrooms to money in Bolivia

This paper describes the idea of using urine and dried feces from UDDTs to fertilize pine plantations where commercially valuable mushrooms grow, to generate income for Bolivian villagers.

Authors: Kate Fogelberg, Julia Montes, Betty Soto

Abstract

Ecological sanitation has been promoted by many institutions in Bolivia for the last decade, but the country has yet to make a dent in the millions of Bolivians who continue to practice open defecation. While the high percentage of unattended rural Bolivians should serve as a call to action, what is more disturbing are the results from post-implementation evaluations that show that 50% of toilets are not used as intended. But there is a silver lining to the problems of sustaining sanitation investments, if organizations are willing to think outside the box. Experience from the field has shown that people are often equally, if not more, interested in improving their income, not just their health. This paper will describe the experience of an emerging rural sanitation business in Bolivia that uses composts from ecological toilets to produce pine trees, under which grow a highly marketable form of mushroom.

Introduction

The benefits of ecological sanitation are well-known: it does not need water to function; it protects the environment; and allows the nutrients in human feces and urine to be returned to the soil as fertilizer (Winblad and Simpson-Hébert, 2004). Ecological sanitation has been promoted by many institutions in Bolivia for the last decade, but the country has yet to make a dent in the millions of Bolivians who continue to practice open defecation or some other form of unimproved sanitation. In Latin America, just Bolivia and Haiti have sanitation coverage of less than 50%, and unsurprisingly, Bolivia is also not on track to meet the 2015 Millennium Development Goal for sanitation (WHO/UNICEF, 2010). Only 9% of rural Bolivians have safe, private toilets to take care of their needs, a number similar to many countries in sub-Saharan Africa (WHO/UNICEF, 2010). While the high percentage of rural

Bolivians who still practice open defecation (50%) or continue to use an unimproved facility (25%) should serve as a call to action, what is more disturbing are the results from post-implementation evaluations that show toilets are not used as intended in over 50% of the samples (WSP, 1999; UNICEF, 2006; WFP, 2009; WHO/UNICEF, 2010).

While post-implementation evaluations and/or sustainability monitoring are notoriously weak in the water and sanitation sector, the studies that have been conducted in Bolivia highlight the challenges of maintaining an Urine-Diverting Dry Toilet (UDDT) long after the inauguration has ended. An evaluation by UNICEF of a multi-year ecological sanitation program (approximately 6,000 UDDTs constructed in over 400 communities) showed that only 21% of the beneficiaries were using the toilets frequently and correctly (UNICEF, 2006). An ethnographic study of

Key Messages:

- It is time for a paradigm shift in the sanitation sector from project-based charity towards sustainable sanitation services
- Inclusive business strategies potentially include the local private sector in sanitation services
- A rural Bolivian cooperative is experimenting how to increase their incomes by applying fertilizers from UDDTs to pine trees, under which highly valuable mushrooms grow
- The potential to make money by marketing the fertilizers is driving innovation in ecological toilet design
- Economic incentives to use sanitation facilities end up meeting multiple goals: public goal of improved health, personal goal of improved incomes, the environmental goal of increased forestation and protected groundwater; and the sustainability goal of indefinite toilet use

peri-urban areas in Bolivia's largest cities showed the most common advantage eco-san users found in their toilet was that it had been free to acquire (SNV, 2009). Water For People's own internal mid-term evaluation of a multi-community ecological sanitation program found that approximately half of the toilets were being used and optimally maintained, and that the re-use of excreta and urine was the last reason people cited as an advantage of having an ecological sanitation toilet (WFP, 2009).

But there is a silver lining to the problems of sustaining sanitation investments, if organizations are willing to think outside the box. Experience from the field has shown that people are often equally, if not more, interested in improving their monetary income, not just their health. Because of the challenges of behavior change by adopting sanitation practices and maintaining a toilet indefinitely, Water For People—Bolivia and its partners have decided to stop marketing toilets as a health solution, and look for innovative ways for people to make money off of their 'wastes.' In a small, rural municipality several hours outside of the city of Cochabamba, a team of players is determining if we can, in fact, close the loop, by making money from poop.

Inclusive Sanitation Business in Theory

An inclusive business strategy looks for economic opportunities in a variety of non-traditional income-generating sectors, such as sanitation, that can improve human development by including poor people in the value chain as consumers, producers, business owners or employees (UNDP, 2010). There is a small, but growing movement in the sanitation sector calling for a more entrepreneurial approach to sanitation,



Figure 1: Map of Bolivia within South America

recognizing that 'business as usual' is not resulting in significant numbers of people accessing improved sanitation (Cairncross, 2004; SDC, 2004; Lane, 2008; Bramley and Breslin, 2010; Doné, 2010).

Inclusive business strategies are a marked change from conventional social development programs, especially when it comes to sanitation programming. The norm in the sanitation sector has been for an implementing agency (government, NGO, etc.) to design a toilet program (However, this is starting to change with methodologies like community-led total sanitation in certain parts of the world). The donors or implementing agency assume people want toilets for health, typically design a single toilet option, and the number of beneficiaries depends directly on their budget. Toilets are completely or heavily subsidized by the implementing agency. Little consideration is given to long-term maintenance or how new community members will be able to build toilets, thus limiting the long-term sustainability of these interventions.

In the case of sanitation, an inclusive business strategy starts by looking at the problem of lack of sanitation by viewing people as potential clients and customers, not passive beneficiaries who simply wait for development to happen to them. There are potential business opportunities all along the sanitation chain: from the purchasing of products and services to construct a toilet, to on-going maintenance (i.e. pit-emptying services, cleaning, etc), to re-use of final products. Inclusive sanitation businesses aim to work with consumers, providers, and local authorities to co-create a win-win situation.

The Growing Inclusive Markets Initiative of the United Nations Development Program (UNDP, 2010) is based on five main principles, and provides a useful framework for analyzing the Bolivian example:

- Core business emphasis
- Developing world focus
- Human development framework
- Locally-led agenda
- Partnership and multi-stakeholder agenda.

Inclusive Business in Practice

Located about one and a half hours from the state capital of Cochabamba, Cuchumuela is like many small, rural, Bolivian municipalities (Figures 1 and 2). About 3,000 people in 14 communities live off subsistence farming and the cultivation of cash crops like potatoes, peaches and prickly pears. Some women have taken advantage of microenterprise ventures to purchase livestock and specialty fowl. The remote location and lack of development also contribute to

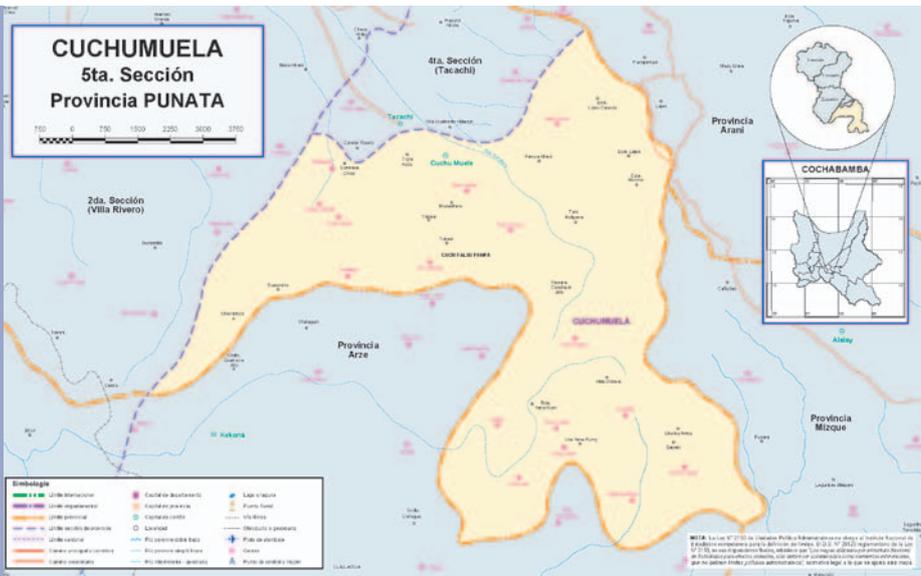


Figure 2. Map of Cuchumuela’s location in Cochabamba (SNV, 2010).

the marginalization of these communities and Bolivia is one of the least densely populated countries in the world (6 people per square kilometer), making per capita investments quite high. Cuchumuela thus provides a useful case study for the potential for a rural sanitation business. Although it would be easier to carry out an inclusive sanitation pilot project in densely populated areas, the fact is that seven out of ten people who lack improved sanitation call the rural areas home (WHO/UNICEF, 2010). Innovative models for sanitation business development in rural areas are thus timely and necessary.

While millions of Bolivians grow potatoes, quinoa, and corn, thus saturating the markets for these products, the municipality of Cuchumuela has a comparative advantage with its mushroom production. Fifteen years ago, a state government program reforested part of the rural municipality with *pinus radiata* pine trees (Los Tiempos, 2007). An unintended consequence of this partial reforestation program was the seasonal production of boletus mushrooms. Once a year, this cash

crop brings people from near and far to purchase the mushrooms. Their value is such that middlemen will come to the municipality and go house to house, selecting the best quality product for internal and external markets. The idea for the inclusive sanitation business is to capitalize on this market and the logic is simple: composting toilets produce fertilizers; the fertilizers can be used to increase pine production; more pines means more mushrooms; more mushrooms means more cash in the pockets of Cuchumueleños (Figure 3).

Core Business Emphasis

The business in this case is the use of urine and decomposed feces to create a highly valuable product. The current price for an arroba (25 kg) of unprocessed mushrooms is between 40 and 45 USD (280 to 320 Bolivianos). According to the ex-mayor of Cuchumuela, last year, each family that participated in the mushroom process sold, on average, 20 arrobas at 280 Bolivianos, which is equivalent to 800 USD, a significant amount for a rural Bolivian (SNV, 2010). Each year, approximately fourteen tons of mushrooms are collected, but it is expected that this amount would grow with increased pine production. The mushrooms do not require any type of chemical fertilizer and can thus be promoted as an organic product in both Bolivian and foreign markets. 80% of the families currently participate in the mushroom collection, processing, and sales (SNV, 2010). The majority of people benefiting from the production are women, thus increasing and improving production will directly benefit women in the region.

The initiative grew out of local communities and leaders seeking a way to maximize mushroom production,

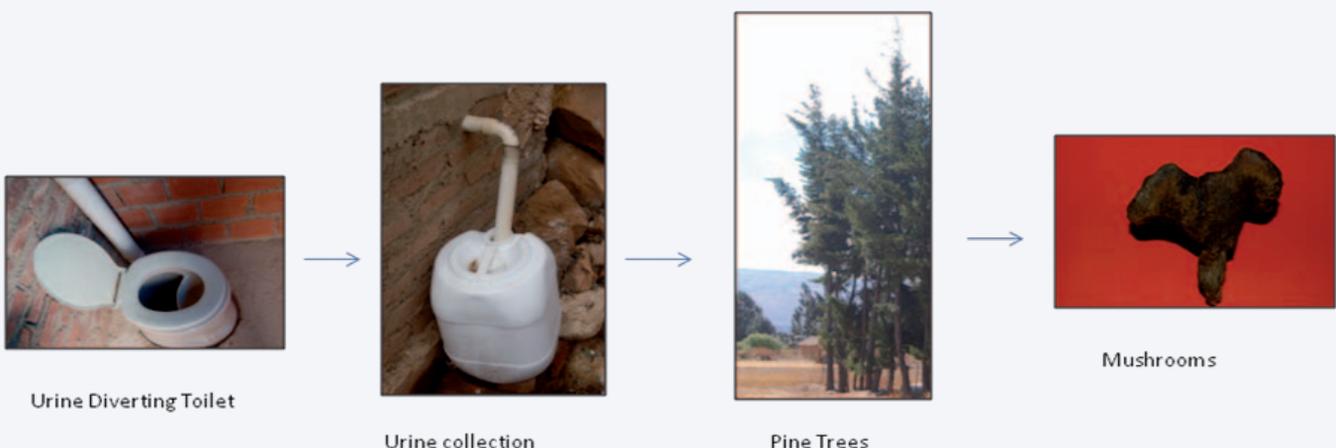


Figure 3: Visual Representation of Business Scheme

not to increase toilet construction or use. While mushroom production is the main potential product, additional products, such as the wood from the pine trees and organic fertilizers, are also being explored. The process for establishing the business is underway: the partner organization SNV is completing a market analysis, which includes both a feasibility analysis of a small, rural business to be self-sustaining and evaluating the potential internal and external markets for mushroom products. PROINPA FOUNDATION, a well-respected non-governmental agricultural investigation organization, is experimenting with



Figure 4: Single chamber toilet built with recycled PET bottles

Figure 5. Doña Margarita displays the bottle technique used in her toilet

ecological compost application and improving mushroom production. Water For People-Bolivia and the local government are supporting creative, women-led innovations that have the dual advantage of reducing toilet costs and re-using another waste product: plastic bottles. Single chambered toilets built with recycled PET bottles are being piloted, as there now exists a collection business (Figure 4). Two liter PET bottles were cut at the neck, filled with dirt, and woven closed with the plastic (Figure 5). Cement is placed between each bottle, which are used to replace adobe or brick walls. The cost savings of re-using bottles was approximately 20% of a similar toilet built with bricks. The goal is to develop a toilet model that can be built with household and government finance, thus reducing the dependency on outside organizations to fund toilets indefinitely. Promotion messages have already changed from positive health impacts to mushrooms and more and more residents are building composting toilets over water based ones. Currently, the program is in the middle of the implementation process.



Figure 6. Interior of bathroom with urine diverting toilet

- The first phase of this endeavor was the construction of UDDTs in the communities that compose the SubCentral (political unit of multiple communities) of Ura Yana Rumi, Cuchumuela. This phase has been completed.
- The second phase of the process includes several steps: understanding the market for mushrooms, and other potential products in their region; developing a sustainable business model; and testing the fertilizer applications on the pine trees. The program is currently in this second phase.
- The third phase will be planting the pine trees, harvesting the mushrooms, and improving mushroom production, which is expected to take place in late 2011.

Enterprising Cuchumueleños are actively driving the process. As the technology implemented in this area was urine-diverting, double chamber toilets (Figure6), urine collection has begun while the solid wastes continue to compost in situ until the construction of the vermicomposting site is completed later this year.

Urine is currently being diverted into 20 liter containers, which are collected by point people in each community (Figure 7) and stored in larger tanks

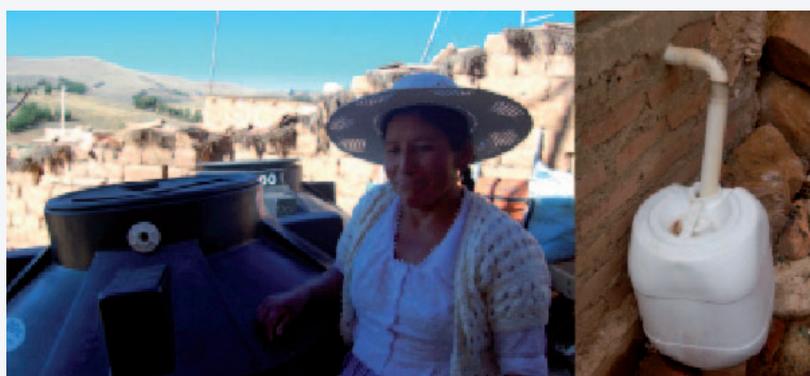


Figure 7. Urine collection containers.

for fermentation. The first round of urine collection involved going to each individual home, but this is expected to be too expensive, as homes are dispersed, and time consuming to be sustainable. The next round will include a centralized storage contained in each community, so that the transport to the fermentation site and nursery can be as efficient as possible. Community members are collaborating with the local government in the construction of the pine nursery and collection/treatment site, which will test vermicomposting as a secondary composting process for the dried feces. Experiments with urine application are underway to determine where the application of the diluted product provides the best results in the pine trees.

Next we will analyze the different aspects of Inclusive Market Strategy with respect to this excrement-to-pine-to mushroom endeavor”.

Developing World Focus

This factor of the UNDP's Inclusive Markets Strategy does not merit much discussion, as it is taking place in Bolivia, one of the poorest countries in Latin America. Poverty is widespread in the rural Bolivian countryside, especially amongst indigenous communities, where the majority live on less than US\$2 a day.

Human Development Framework

An inclusive sanitation business marries the goals of improved human development through access to toilets and improved economic development through increased incomes. Moreover, the job of mushroom collection has historically been a woman's job in Cuchumuela. Formalizing and increasing women's income is expected to have positive impacts on many other human development indicators.

Locally-led Agenda

The idea to close the loop by making money from poop emerged from rural communities and the local government of Cuchumuela. In its role as facilitator, Water For People has brought together key partners to participate in the pilot project. Cuchumuela has already made a national name for its mushroom production, as they have hosted an annual Mushroom Fair for the last five years, where merchants from La Paz and Peru come to purchase the product.

Partnerships and Multi-stakeholder Agenda

Partnerships are essential for Water For People's work, and perhaps even more so when trying a new methodology that requires the institution to seek new types of partners. Inclusive business strategies also require new business models that demand a multi-partner approach (Prahalad, 2006). The first step in the process was to work with the current actors involved in sanitation and agricultural production

in the municipality. This initially included the local government, Water For People, communities, the Embassy of Belgium, SNV. Since then, another key partner, the PROINPA Foundation, which specializes in agricultural investigation, has also joined the working group.

Conclusion: Towards Sustainable Sanitation?

Sustainable sanitation refers to sanitation that protects human and environmental health, and is affordable, acceptable, and technologically appropriate (Winblad and Simpson-Hébert, 2004). One of the limits of current sanitation programming is its project-based approach; rather than looking at sanitation as a system. Short-term projects are often implemented that do little to reform the systematic challenges around sanitation in developing countries. But investigating the business opportunities around sanitation could provide a more sustainable approach to the global sanitation crisis, in which people can continue to replicate the system without dependence on outside intervention.

Economic incentives can be quite powerful, and in the case of sanitation promotion, could serve to meet multiple objectives:

- the *public* goal of improved health, as users are economically motivated to use and maintain their toilets;
- the *personal* goal of improved incomes, as the end products are not lost but captured in a productive manner
- the *environmental* goal of protecting the natural areas through increased forestation
- the *sustainability* goal of indefinite use of toilet facilities by economically motivated users and the adoption of safe sanitation practices and systems by others

This Bolivian example provides one case in which the end products of ecological sanitation may provide higher incomes for users. There are key obstacles to be overcome in this specific case, including weak distribution channels and high transportation costs, characteristic of dispersed, rural areas. Potential for replication in Bolivia and other agricultural-dependent areas is possible, and one of the key lessons learned at Water For People is to start new sanitation programs by identifying business opportunities along the sanitation chain, as opposed to waiting until toilet construction is completed. It is time for a paradigm shift in the sanitation sector, and not only in densely populated urban areas. This example shows that creative, innovative, inclusive business opportunities exist in rural areas, as well.

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Community-based, resources-oriented management of separated human waste in peri-urban areas in Nakuru, Kenya

This paper describes how a community-based resources-oriented human waste management business in peri-urban areas can be operated profitable.

Author: Franziska Grambauer

Abstract

This article presents the main points of a business plan developed for a community-based resources-oriented human waste management system in Nakuru, Kenya. In this system a community-based organisation (CBO) is working as a small business engaged in the collection, transportation and treatment of separated excreta from Urine Diverting Dry Toilets (UDDTs). To verify the potential profitability of the system a projected income statement, included in a detailed business plan, was developed. In order to identify the related costs a case study was conducted in Nakuru in November 2009. The detailed financial projections indicate that profitability can be reached by year four of operation.

Introduction

The project „Resource Oriented Sanitation concepts for periurban areas in Africa“ (ROSA, Langergraber et al., 2010) identified Urine Diverting Dry Toilets (UDDTs) as an appropriate alternative to pit latrines in low-income areas in Nakuru, which are characterized by inadequate water supply and unfavourable soil structure for pit latrines (Mosesti, 2010).

Menengai Waste Recyclers Management (MEWAREMA) is a community-based organisation (CBO) based in Nakuru. Since 2002 MEWAREMA became the largest compost manufacturer and a licensed operator of solid waste collection in the two of Nakuru's peri-urban estates, Hilton and London. The experiences in these two fields of operation present an advantage in the management of separated human waste from UDDTs. Additionally MEWAREMA's work is already highly appreciated by the community. Within the ROSA project MEWAREMA widened its activities and is now also offering a collection,

transport and treatment service for excreta from UDDTs. It is widely acknowledged that sustainability of a human waste management system depends to a large extent on effective and efficient operation and maintenance (Sohail et al.; 2005, Brikké, 2000). The potential cost effectiveness of an operation and maintenance concept is one factor that determines its sustainability. The potential profitability of the presented community-based human waste management system has been calculated within a business plan. A business plan is a strategic planning document to develop ideas on how to conduct business by examining the company from all perspectives, such as marketing, finance and operations (Ford et al., 2007).

The paper is based on the main points of the business plan for MEWAREMA that was developed in the master thesis „Profitability of a community-based resources-oriented human waste management system in Nakuru, Kenya“ (Grambauer, 2010). All financial data are given in Kenyan Shillings (KES) whereby 1 EUR equals ca. 100 KES.

Key facts of the human waste management system in Nakuru:

- In two peri-urban areas in Nakuru UDDTs have been introduced by the ROSA project.
- Most inhabitants are interested to use UDDTs if they are not responsible for O&M.
- A CBO currently involved in solid waste collection and market waste composting is willing to operate the human waste management system.
- The service charge for a UDDT owner is 100 KES per emptying of one 50 litre faecal matter container
- Cost effectiveness of the system depends on the price obtained for the sale of compost
- Under current conditions the break-even point can be reached after 4 years of operation. Temporary subsidy might be required to cover the loss in the first three years of operation.

Main points of MEWAREMA's Business Plan

The company

MEWAREMA wants to diversify its operation by offering a faecal matter collection and transport service to UDDT owners. Furthermore MEWAREMA operates a treatment plant to co-compost organic waste with the faecal matter collected into hygienically safe, high quality compost. MEWAREMA is therefore functioning as a service and manufacturing business. The organisation aims to improve the quality of life of disadvantaged inhabitants and to contribute to resource recovery through efficient organic and human waste management. Based on the detailed financial projections, it is estimated that 10'000 KES are required to start these two operations successfully. The funds received will be used to build a urine storage tank and to finance the operating loss during the first three years of operation.

Product and Service

The product MEWAREMA offers is high quality compost made out of faecal matter and organic waste. Co-composed excreta are rich in nutrients (nitrogen, phosphorous, and potassium) and organic material and thus enhance sustainably the fertility of topsoil. This compost will be further processed by an organic fertiliser manufacturer and than offered at half the price of chemical fertilizer. Treatment facilities are already available and the operators are being trained to guarantee the required high level of management.

The service of collecting and transporting faecal matter from households to the treatment plant will be done professionally, reliably and customer oriented. Depending on the number of households of each compound (using one or more UDDTs) the collection and transportation service will be carried out in regular intervals. The transportation will be done with a purpose-made donkey cart and two trained workers. The purpose-made cart is under construction and the operators are being trained in the safe handling of faecal matter. If required the operators perform repair work (blocked pipes, etc.) thus ensuring the durability of UDDTs.

Market Potential

Market research conducted in the course of the ROSA project shows that there is a demand of resources-oriented sanitation technologies like UDDTs in Nakuru. Especially in low-income areas, characterized by inadequate water supply and unfavourable soil structure for pit latrines, UDDTs represent an appropriate alternative (Moseti, 2010). Thus, a remarkable up scaling of UDDTs can be observed since the first implementation of UDDTs by the ROSA project in 2008. During the year 2009 a total of 20 UDDTs have been

build in the target area privately financed by Landlords/ladies. This development will increase the demand for MEWAREMA's collection and transport service of faecal matter since over 70 percent of UDDT owners require and are willing to pay for the faecal matter collection service. The second target market is compost buyers. Since there is a demand of organic fertilizer in the region NAWACOM (the leading organic fertilizer seller in Nakuru) is disposed to pay 5 KES for 1 kg compost. The compost will be further processed by NAWACOM and sold as organic fertilizer. Researches indicate that virtually all farmers in the region use fertilizer and that the globally rising price of chemical fertilizer leads to an increased demand for the less expensive organic fertilizer. Furthermore it could be observed that small-scale farmers tend to prefer organic fertilizer due to its slower release of nutrient, which is advantageous in the rainy season (Bräustetter, 2007). Additionally, the ongoing research by Jomo Kenyatta University on production of eco fertilizer from urine, could lead to a profitable market for urine as well.

Marketing Strategy

MEWAREMA plans to limit its service to the area of two estates which are not supplied by a sewerage system, have favourable features for UDDT implementations, and are in short distance to the co-composting plant. The plant workers will sell the produced compost to the bulk buyer NAWACOM or if there is a demand directly to other compost buyers.

Pricing strategy

The price for the service of collecting and transporting 50 litre of faecal matter is 100 KES. The price was derived from discussions with potential customers and is set as low as possible to convince UDDT owners to use the service. An increase in price for economic reasons is not planned to avoid a loss of costumers. Depending on the number of household and UDDTs per plot an average payment of 50 KES per month and UDDT is assumed. Compared to the price paid for water in the area (10 KES per 20 litre, i.e. 400 KES to 3000 KES per month per household) the costs for the faecal matter collection service can be considered as affordable. The selling price of the compost sold to NAWACOM is still under negotiation. At present NAWACOM buys 1 kg of compost for 5 KES.

Advertising , Public relation and Promotion

To convince UDDT owners to use MEWAREMA's collection and transport service they will receive 10 kg of compost per UDDT per year (amount increases with an increase in profit). (Costs: 50 KES per year per UDDT.) This incentive is furthermore a kind of sales promotion since the UDDT owner test the free compost samples in their own garden; transmit or sell it to relatives or neighbours.

To potential customers of the collection and transport-service branch (Landlords/landladies interested in investing in a UDDT) an advisory service is offered by the ROSA and Practical Action office that provides information on how to build and maintain an UDDT.

To promote the organic fertiliser, in and around Nakuru several demonstration sites, showing plant growth enhancement, were established by NAWACOM. Promotional price of 1750 KES for 150 kg organic fertiliser (which is the same price of 50 kg chemical fertilizer) tries to attract more customers. To further promote the use of compost to potential customers (horticulture, gardening, landscaping, plant nurseries, farming) an organic demonstration farm, could as well be installed and operated by MEWARMA. The produced crop could then be used by members of the organisation or sold. To rise the demand for the high quality compost the awareness rising campaign (started by NAWACOM and the ROSA project) have to be expanded.

Operational concept

The operational concept developed can be described as: Community-based, resources-oriented management of separated human waste. A depiction of the concept is provided in Figure 1. The operation of UDDTs in this case is a system consisting of excreta separation, containment, collection, transportation, treatment and re-use of urine and faeces as compost. The CBO MEWARMA is working as a small business engaged in the collection, transportation and treatment of faecal matter via co-composting additionally it sells

the compost to re-user. The transportation is carried out by means of a donkey cart and the treatment is accomplished by co-composting at a community-based facility. The underlying assumptions of the concept are:

Community-based organisation:

- Is licensed by the municipality to offer solid waste management in two estates;
- Operates without financial government intervention;
- Operates in two estates where the ownership structure of the built-up plots is legally recognized.
- Receives a fee for the service of collection of faecal matter from UDDT owners.

UDDT-owner (Landlord/ladies):

- Receives a loan from the Family Bank to cover the capital investment cost of one or more UDDTs (equipped with three faecal matter collection containers).
- Will be charged with an emptying fee of 100 KES per 50 litre container of faecal matter or urine
- Receives 10 kg of compost per UDDT per year as an incentive to use the collection service and the UDDT appropriately. (Amount can be increased with an increase in profit.)

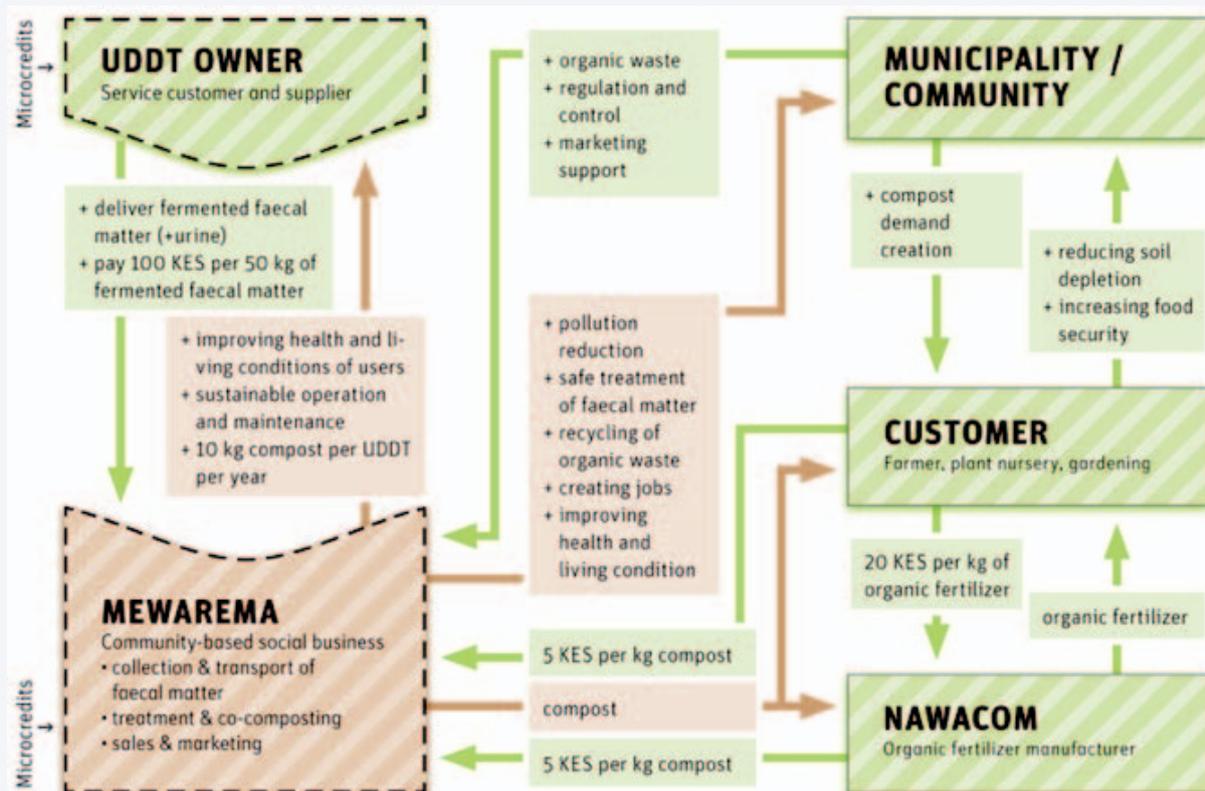


Figure 1: Scheme of the community-based resources-oriented management of separated human waste (100 KES= 1 EUR)

Collection, transportation and treatment:

- Faecal matter containers from UDDTs are emptied manually by two trained collection and transport operators after a minimum storage time of three month.
- Faecal matter will be transported with a purpose made donkey cart to the treatment plant.
- A community-based faecal matter secondary-treatment plant for co-composting. i.e. a drying shed and required equipment, is available to allow a hygienically safe production of compost. Responsible for this work are as well two trained labourers.
- The moisture content of the compost will be adjusted using urine, which saves water and enriches the compost with nutrients.
- The co-composting process will take about three month.
- 100 kg faecal matter can be converted into about 210 kg compost; the mixing ration of faecal matter and organic waste is 1:2; volume reduction of 30 % occurs during co-composting.
- NAWACOM, the only organic fertilizer manufacturer in Nakuru, will buy the compost at 5 KES/kg. The market price for organic fertilizer is 1000 KES per 50 kg bag

Financial Summary

The projected income statement reveals that MEWAREMA could operate profitable by year four, due to the revenues of the manufacturing branch (compost sold) even though the operation of the collection and transportation is not cost-effective. Based on the main assumptions that the number of UDDTs served rises from 24 UDDTs in the first year to 30 UDDTs in the fourth year and that the manufactured compost will be sold at 5 KES/kg, MEWAREMA expects to generate an overall operating profit of 7780 KES in the year four. Table 1 presents the projected income statement for year one to five of MEWAREMA's faecal matter collection, transport and treatment service.

Breakeven point:

The breakeven analysis provides information about the potential profitability. The breakeven analysis demonstrates the level of sales that must be attained in order to meet cash obligations. The contribution margin method was used for determining the breakeven point. The procedure to calculate the breakeven point is to separate all cash obligations into fixed or variable costs and to insert these figures in the following formula:

$$\text{Breakeven number of units} = \frac{\text{Fixed costs}}{\text{Unit contribution margin}}$$

Whereby the number of units is the output of compost in kg and the contribution margin is equal to the unit selling price minus the unit variable costs.

Table 1: Projected income statement for year one to five of MEWAREMA (in KES)

MEWAREMA Projected Income Statement					
	Year 1	Year 2	Year 3	Year 4	Year 5
Service-branch					
Revenues	18800	19200	21600	22800	22800
Costs					
wages	28800	29400	32400	33600	33600
depreciation (cart, equipment)	0	0	0	0	0
other costs (donkey food, water, maintenance)	4290	4300	4350	4370	4370
Operating Profit	-14290	-14500	-15150	-15170	-15170
Manufacturing-branch					
Revenues	48300	72450	80850	89250	91350
Cost of goods sold					
Opening finished goods	0	0	0	0	0
Cost of goods manufactured	62400	62400	62400	62400	62400
Cost of goods available for sale	0	0	0	0	0
closing finished goods	0	0	0	0	0
Gross margin	-14100	10050	18450	26850	28950
Operating costs:					
marketing (advertising per UDDT 10kg compost = 50 KES per UDDT)	1200	1200	1400	1500	1500
general and administrative	2400	2400	2400	2400	2400
Operating profit	-17700	6450	14650	22950	25050
Overall Profit (loss)					
	(-31990)	(-8050)	(-500)	7780	13780

In this case the wages of the treatment plant operator are regarded as fixed cost since their number of working days does not depend on the number of UDDTs served but on the co-composting process only. Furthermore in order to be able to calculate the breakeven point against the units (kg) of compost sold, the operating loss of the service branch (collection and transportation) was regarded as direct material cost used in the manufacturing branch (co-composting). The calculation allows the conclusion that under the given conditions a sale of 16300 kg per year would be necessary to breakeven.

Further breakeven points have been calculated to analyse the affect of different scenarios. An optimistic scenario would be an increase in the selling price for the produced compost. A selling price of 6 KES (instead of 5 KES) per kg compost would lead to a breakeven point of 13200 kg compost. Thus an operating profit of 7500 KES could already be reached in year 2 with 24 UDDTs served. A selling price of 7 KES per kg compost would result in a breakeven point of 11000 kg compost. Thus the operating loss of the first year could be reduced by 64 % to -11500 KES and in the second year an operating profit of 22000 KES could already be generated.

Risks

General risks that are specific to Kenya and might have negative influence on the performance of MEWAREMA are natural disasters and political risks. Whereby floods caused by heavy rainfall can affect the composting process since moisture content and temperature are the main influencing factors in the process. Droughts might lead to an increase in water price, which would have an influence on the indirect costs of MEWAREMA. According to the latest Kenya Business Leaders Confidence Index by Synovate, perceived political risks have been on an upward trend. The study, conducted in March 2010, reveals that most business leaders in Kenya (76 per cent) consider political instability to be the main risk to their businesses currently (Olouch and Kapchanga, 2010).

Risks that are specific to the business of MEWAREMA are the following:

Product risk:

The compost produced can fail to be hygienically safe due to failures within the composting process. Those malfunctions can be caused by neglect of the treatment work, vandalism or unexpected shortage of raw materials (organic waste). To avoid this a high

level of management and maintenance is necessary which the supervisor controls.

Compliance with safety regulations:

The risk that workers not wearing proper safety tools (gloves, protection masks and boots) have to be considered. Therefore the supervisor must be held accountable for violating such regulations.

Customer risk:

UDDT owners might empty the faecal matter containers by themselves into abandoned pit latrines to save the collection fee. To counteract this risk public awareness campaigns should be launched by the municipality (or NGOs) to clarify the relations between excreta disposal and diseases.

Market risk:

The organic fertilizer market can develop differently than expected (i.e. reduction of demand). This might occur if the government subsidise chemical fertilizer even more than presently. To counter this development described marketing strategies will not be disregarded.

Economic risk:

Payment policies have to be handled strictly enough to avoid getting behind the cash flow curve. Possible deficits could be financed through MEWAREMA's profit from its solid waste collection branch. Since the produced compost is exclusively sold to NAWACOM the operating profit highly depends on NAWACOM's performance. Thus further compost buyers have to be identified to counter the dependence on NAWACOM.

Political support of recourses-oriented sanitation:

There is the risk that capacity development at local, regional and national level concerning ecological sanitation has not yet taken place to an extent that would guaranty full support of the sanitation system and the work of MEWAREMA. Hereby the law actually prohibiting the use of excreta as fertilizer needs to be mentioned.

Competition

MEWAREMA has a monopoly position since no other company is offering this kind of collection and transport service. The risk of imitators in future is neglectable and the license obtained by the Nakuru Municipal Council guaranties the monopole in the two estates. It is assumed that the Municipality will never provide a sewerage system and that the integration of MEWAREMA as a CBO in the two estates will lead to wide acceptance, use and appreciation of the service.

Since NAWACOM is the only fertilizer manufacture in the region MEWAREMA highly depends on the sales of NAWACOM and the overall demand for organic fertilizer

in the region. Chemical fertilizer are subsidised by the government and therefore distort the competition. However the rising price of chemical fertilizer (driven by the increase in oil prices) is presumably contributing to a rethinking towards sustainable farming. This could already be observed at the end of 2007 when rising global fertilizer prices gave NAWACOM sales a significant boost, since farmers in the region opted for their cheaper organic fertilizer (Sprung and Stevens, 2009).

Conclusion

The major findings of MEWAREMA's business plan can be concluded as follows:

- The income statement projects that the operation of the community-based human waste management system is economically sustainable in year four. Thus MEWAREMA would need temporary subsidy to cover the operating loss in the first three years of operation. Furthermore it emerged that a urine storage tank is required in addition to the already implemented drying shed.
- A breakeven analysis revealed that an increase of 1 KES in the selling price of the produced compost (thus 6 KES instead of 5 KES per kg compost) would lead to profitability in year two already. Therefore MEWAREMA needs support in creating demand for the produced compost since current operating profit is insufficient to cover extensive promotion.

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Towards a sustainable strategy for implementing a waterless sanitation system with urine diversion in East Africa – Lessons learned from Austria

This paper aims to derive a strategy for sustainable implementation of a waterless sanitation system with urine diversion under East African conditions that is based on an analysis of the situation in Austria.

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Abstract

Waterless sanitation systems with urine diversion are considered as a suitable solution for East African cities. To successfully implement the sanitation system, functioning organisational structures and a sustainable financial strategy are needed. For waterless sanitation systems other institutional settings are needed than for sewer-based sanitation systems. In waterless sanitation systems the logistics and organisational structures needed to collect the sanitation products are similar to solid waste management. Based on an analysis of sanitation and solid waste management in Austria, organisational structure and a financial strategy for implementing a waterless sanitation system are developed. As part of the financial considerations also the possible value chain is described.

Introduction

For resources-oriented sanitation systems other institutional settings are needed than for sewer-based sanitation systems. Therefore, the idea is to learn from existing organisational and financial systems in Austria's solid waste and wastewater sector. Conventional sewer-based sanitation systems, as existent in Austria show shortcomings, especially, regarding financing. Subsidies are necessary for investments and even for maintenance. Learning from solid waste management (SWM) practices in Austria, however, can help to improve the operation of resources-oriented sanitation systems. Similar to SWM, they strongly rely on good organisation of collection, storage, treatment, transport, and reuse of material. For a waterless sanitation system with urine diversion, possibilities for applying best practices from solid waste and wastewater organisational structures in Austria are discussed. Furthermore, a value chain for sanitation

products and a possible financial strategy for a resources-oriented sanitation system under East African conditions are described.

The paper is based on the results from the master thesis „Solid Waste and Wastewater Management in Austria and its Possible Application in Resources-Oriented Sanitation Systems in East Africa“ (Kleemann, 2010).

Analysis of solid waste and wastewater management in Austria

In Austria solid waste and wastewater management are organised in different ways. Wastewater treatment is mainly sewer-based with wastewater treatment plants (WWTPs). Therefore, also the organisational structure in wastewater management is linked to the watershed. Solid waste management (SWM) that is based on collection from households is organised by the federal

Key Messages:

- Resources-oriented sanitation systems need an institutional setting closer to solid waste management than to conventional sewer-based sanitation
- The sewer-based sanitation and solid waste management systems in Austria are very effective but have been built with and can only be sustained with high financial subsidies
- For introducing new sanitation systems their financial sustainability is crucial.
- A certain number of facilities and users are needed in a sanitation system to become attractive for the private sector to be involved and to make profit.
- Demand for sanitation products and facilities are the driving forces for the development of sustainable sanitation systems.
- Education and legal regulations are needed to create a supportive environment.

states. Municipalities are responsible to provide a service but also engage private businesses. Both sectors are characterised by a strong interconnection with authorities and associations on different levels. The Austrian Water and Waste Association (ÖWAV) is acting on both sectors, and provides an important platform for all involved stakeholders for the exchange of knowledge and experiences. Another important part of the ÖWAV portfolio is the education and training program. Regularly, seminars, workshops and conferences on relevant topics are organised (ÖWAV, 2010). On lower levels (federal state, district, municipal) smaller networks and associations are common in the solid waste sector. Sanitation is usually organised in smaller associations and partnerships of neighbouring WWTP operators.

Waste Sector

SWM in Austria is based on thermal utilisation or mechanical biological pre-treatment (MBP) and subsequent final disposal. The organisational structures are influenced by nationwide and European legal regulations. However, there are differences in federal states and municipalities. Especially, concerning collection schemes and waste disposal fees municipalities are independent. Private companies play an important role in Austria's solid waste sector. Often alliances are built, involving companies for all stages of waste management.

Organisation:

Collection schemes can vary between municipalities and can be organised as bring or collection service for the households. Households are bound to use the provided service and have to pay for it. Public private partnerships (PPPs) are popular and some municipalities totally outsource SWM. To avoid the disadvantaging of areas lacking in infrastructure a predominance of public institutions in PPPs seems reasonable. The collection of recyclable material such as paper, plastic, metal, or glass is often done by the producer of secondary raw material itself or intermediary retailers. In Austria, the separate collection of organic waste is compulsory.

In most federal states of Austria waste management is organised in umbrella associations with smaller associations for districts and municipalities as members. The organisational structure follows strictly the political boundaries (i.e. municipalities, districts, federal states). In many cases, they cooperate with private companies, which are active in the field of waste recycling and disposal. In the capital city Vienna and the federal state Burgenland, waste management is centrally organised. The waste and recycling material is often brought to intermediate collection points for further transportation and end up either in production industries, incineration plants or MBP plants.

Finances:

Generally, collection, treatment and disposal of municipal waste are financed through the waste collection fees

paid by the users. Households pay to the municipality, which is responsible for the service. Companies can also contract private waste disposal businesses. In the last years outsourcing of SWM became popular amongst some municipalities. The responsibility, however, remains with the authorities. A study shows that waste collection fees varied between +/-40 % to +/- 70 % for the same service (AK, 2005). Main factors influencing the costs for waste treatment and disposal and therefore the waste collection fees are the service level (emptying frequency, collection or bring system, etc.) and the structure of the catchment area (topography, population density, etc.). The organisational structure such as the involvement of private companies and the cooperation with associations also influences the costs. However, the involvement of the private sector doesn't necessarily lead to lower costs at the same quality level. Cooperation and exchange with other stakeholders, however, can be beneficiary and reduce costs. Usually, the consideration of existing structures and the involvement of available facilities and free capacities lead to lower waste disposal fees.

Wastewater

Wastewater management in Austria is regulated by EU-directives and federal law. Compared to the waste sector federal states play a minor role. More than 90 % of the population is connected to a public sewer (UBA, 2010). A lot of financial effort is necessary to keep the systems running. Compared to the solid waste sector, the involvement of private companies is marginal. The sector is also more decentralised in its organisation.

Organisation:

Also within the Austrian wastewater sector people are obliged to use the system provided by the public sector. If no public system is available, decentralized systems have to be constructed according to legal guidelines. For the cesspits still in use suction trucks are used to de-sludge the cesspits and dispose the sludge to a nearby treatment plant for treatment. Sewage sludge is the link between the wastewater and the solid waste sector. Sewage sludge from municipal WWTPs is defined as a non-hazardous waste. After dewatering and drying sewage sludge is mainly incinerated and landfilled but only rarely used in agriculture.

In contrast to the waste sector, the federal states are not dominant in the organisational structures. WWTPs often work together and cooperate in form of so called "neighbourhoods", initiated by the ÖWAV. The consultation between neighbours and the mutual exchange of knowledge and experiences assures professional and economical handling (KAN, 2010). Small associations can be found where several municipalities, situated close to each other, share a WWTP and operate a sewer system together. Associations have often pollution abatement of waters as a collective target.

Finances:

In the last years, investments were primarily used for the extension of sewer systems and WWTPs as well as to construct new small sewer-based systems. Investments are considered not only to improve the water quality but also to give incentives to the economy and the labour market. Investments in infrastructure have been and are heavily subsidised.

The service, usually provided by the Austrian municipalities, includes wastewater drainage, treatment, and the discharge of purified water. The estimation of cost coverage in the wastewater sector is limited by varying accounting systems and the lack of information about what is considered in the balance. The fees for sanitation are differently calculated all around Austria and are set by the municipalities regarding to the legal situation of the federal state. The fees are split into one part for the connection and another for the running costs and are calculated either on the basis of freshwater use or the usable living area of a household. An average price for wastewater was calculated with € 1.69/m³ with ranges between € 1.29/m³ and € 2.33/m³. As shown before, most of the running costs are covered by the fees, additionally public grants are provided for investments relevant to the environment (BMLFUW, 2005). For 2002 cost coverage of 84 % was estimated. However, cost coverage varies widely mainly depending on the area (urban or sparsely populated rural area).

Situation in East Africa

A general lack of monetary resources is an omnipresent problem in African cities. The rapid increase of population in African cities is another severe problem, as demand for basic infrastructure is rising and cannot be provided. The most common facilities are pit latrines which are often manually emptied and the sludge disposed without treatment. Problems also exist with high water tables. Experiences from

practice underline problems with insufficient financing for sanitation and SWM and not the desired priority on political agendas. These facts could be also observed in the four pilot cities in the ROSA project (Langergraber et al, 2010).

Gacheiya and Mutua (2010) investigated school sanitation and stated that financing of construction by interested institutions is a challenge due to the priorities and budgetary allocation of the schools. Furthermore, they call for adequate monetary resources from the government to schools. Especially in schools, education about sanitation systems is important as the information is also brought to the families.

Operation and maintenance is a crucial part of a sanitation system. Especially, systems, constructed with external funding, have to become financially independent after the start-up phase. Müllegger and Freiberger (2010) state, that more than 70 % of the people in Arusha, Tanzania, indicated to be willing to pay the estimated costs for operation and maintenance required when using Urine-Diverting Dry Toilets (UDDTs). Also private companies showed interest in becoming involved in sanitation and SWM. However, to make profit, a certain number of facilities are necessary. That means initial investments are rather high, before a market can be established. In Arba Minch, products from urine and dried faeces are already used by compost producers, which sell the compost.

Development of a strategy for implementing a waterless sanitation system with urine diversion

Figure 1 and 2 show simplified waterless sanitation systems with urine diversion with double and single-vault UDDTs, respectively (according to Tilley et al., 2008). Based on the Austrian experience it is aimed to develop the operational and financial strategy for these two sanitation systems.

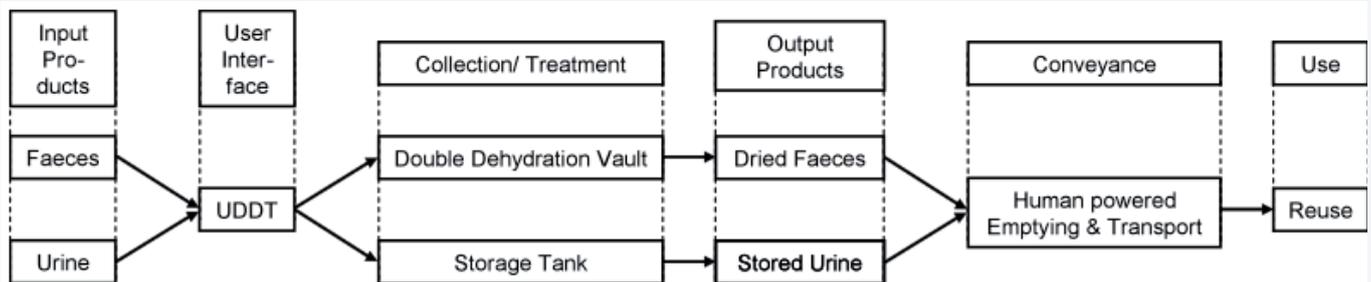


Figure 1: Simplified sanitation system with urine diversion toilet (double-vault)

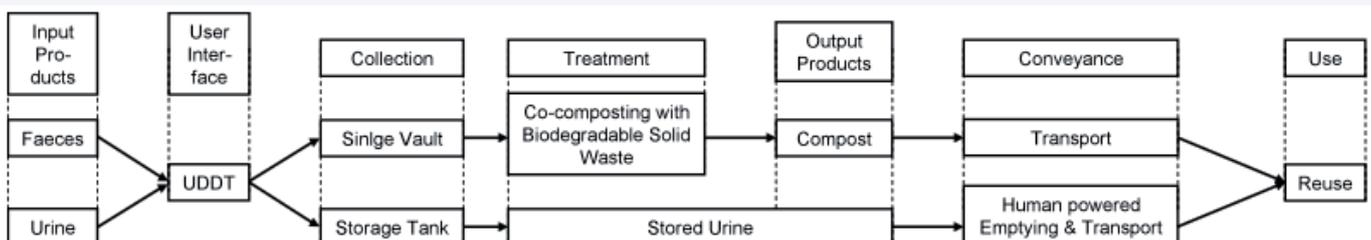


Figure 2: Simplified sanitation system with urine diversion toilet (single-vault)

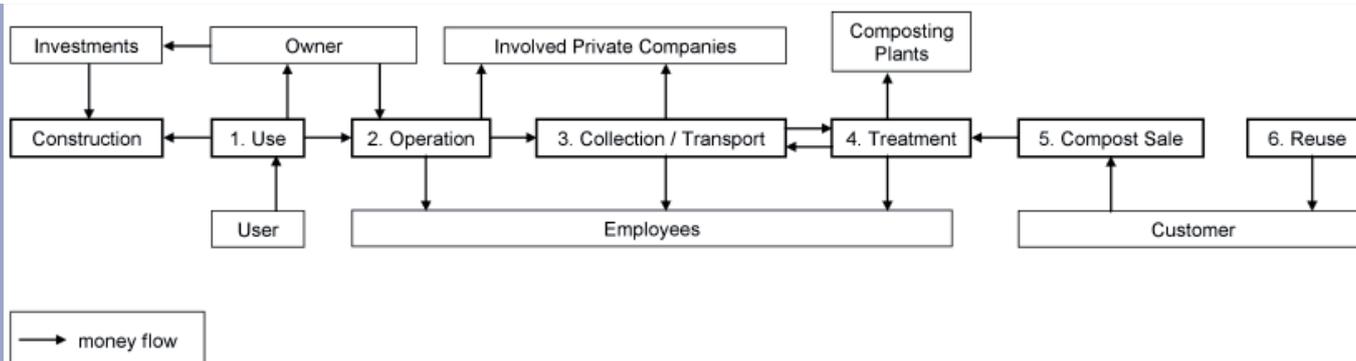


Figure 3: Possible money flow in a resources-oriented sanitation system

Development of a value chain

The possible money flow in a resources-oriented sanitation system is shown in Figure 3. Money flow can be generated by:

1. The fees for using the provided facilities. If landlords provide sanitation facilities for the residents, a higher rent can be charged to finance the service. For public facilities fees can be charged per use.
2. The operation of facilities (e.g. public toilets) creates income and employment for workers but at the same time expenses for the owners of the facility.
3. Private sector companies can be functionally involved in collection and transport. Fees can be charged for the emptying of the facilities. Depending on the market value of compost, the fees will vary.
4. For single vault facilities or where the acceptance of compost from faeces is low, further treatment is necessary. Through co-composting with biodegradable solid waste also the SWM sector can be involved. Composting plants can charge for the takeover of the raw material again depending on the market value of quality compost.
5. The selling of compost depends on the acceptance and the quality of the product. A functioning market for compost is essential for the introduction of a resources-oriented sanitation system.
6. Finally, the reuse of quality compost can yield in a rich harvest and an improved situation for farmers and the population.

Sustainable Financial Strategy

Ideally, resources-oriented sanitation systems are sustainable also by economical means and independent of financial support. A weaker approach is to “allow” financial aid in the start up phase of a project but to require self-financed operation and maintenance. However, as mentioned before, also in developed countries, subsidies are needed to provide the services.

Cost intensive concepts for both sanitation and SWM are not suitable for East Africa. Investments in more decentralised solutions with involvement of the private sector seem therefore more promising.

Assuming that improved sanitation positively influences the health of the population and healthier people can better contribute to strengthen the economy of a nation, investments into sanitation systems in general and resources-oriented sanitation systems in particular pay off. Some money for the construction and the start up phase of a system should therefore be provided by the authorities responsible for health issues. However, also the environment and urban development are positively influenced. Instead of shifting responsibilities and avoiding expenses, authorities would do well to contribute and allow the wise sharing of costs. Persuading policy makers seems to be the major challenge in this regard. Cooperation between experts from different fields and countries and policy makers could help here to scientifically emphasize the importance of SWM and sanitation, and also show that money is well invested in these sectors. Money can also be provided by international NGOs, private investors or donors. At the latest, after overcoming the high initial costs, the introduced system has to be financially self-running. Valuable recycling products such as liquid and solid fertilisers have the potential to be marketed and to make waste and wastewater management an affordable if not profitable business. At all stages of resources-oriented sanitation systems there is potential for generating income (Figure 3). After first profits are made, initial costs will become less significant. However, private businesses can only profit from resources-oriented sanitation if a certain number of facilities are available in an area.

In every case it is necessary to develop a market for the products of resources-oriented sanitation. In Austria, paper production strongly relies on recycling material, which is collected for free from the households. In former times, paper was simply deposited in landfills as it was seen as worthless. If there is demand for natural fertiliser, also production will be stimulated and all connected areas will follow. Demand for better sanitation and a cleaner and healthier environment can also be a driving factor for the development of sanitation systems. Fees for usage, operation, or maintenance and the marketing of fertilizer products are the basis for financing a resource-oriented sanitation system.

Organisational issues

Separate organisation of sanitation and SWM as in Austria does not seem suitable for resources-oriented sanitation systems. In fact it would be desirable if one organisation is responsible for both. Especially, transport of sanitation products and solid waste need similar logistical solutions. In this regard, it is important to utilise existing facilities and cooperate in networks to efficiently collect and transport sanitation products and solid waste. Strategic intermediate collection points as known from Austria SWM can be a good option here.

Networks and associations generally have the potential to improve the performance of sanitation and solid waste management as ideas, knowledge and experiences can be shared. Another advantage of cooperation is the possibility to share highly educated personnel and provide training to a wider range of stakeholders. For the management of solid waste and wastewater, cooperation in form of networks or associations means having the possibility to introduce strategies and optimise operating processes. Benchmarking or strength- and weaknesses-analysis can help to detect potentials for improvement. Cooperating partners orientate themselves on the current state of the art and examples for good or better practice (Strömer, 2006). Within a network, management means to have more resources available, but at the same time to share them with others. Therefore, communication is essential to efficiently use the advantages of cooperation.

The involvement of the private sector in form of Public Private Partnerships (PPPs) became popular in Austria in the last decades, especially in the solid waste sector. The main incentive for outsourcing is the chance to reduce costs. Under East African conditions an advantage of PPPs can be the sharing of investment costs between authorities and private companies. Further, private businesses often work more efficient. In this context it seems, however, important that authorities retain control to avoid the neglect of poor and underdeveloped regions.

Additionally, a very important condition for the profitability of sanitation and SMW is the creation of a market for reuse and recycling products. A supportive environment based on education, cooperation, and institutional support is required for this, including a supporting legal framework.

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Financing the Informal Entrepreneur: Recognizing Business Opportunities in Sanitation

This paper provides information about risks and opportunities of financing informal entrepreneurs in the sanitation sector, based on experiences from a workshop organized in Nairobi in February 2010.

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Abstract

Within the framework of the ROSA project a workshop about risks and opportunities of financing informal entrepreneurs in the sanitation sector was organized. The aim was to improve the situation of small businesses in this sector and to bridge the gap between the entrepreneurs and local money institutions. Three examples show that success is possible and people can sustain their living from working in the sanitation sector. In many cases informal entrepreneurs replace the work of local municipalities actually responsible for these issues. From a business perspective there is a need for better equipment to provide sufficient service, therefore money is needed. From an environmental point of view better disposal mechanisms need to be established as often faeces are dumped just outside the city boundaries. From a health perspective regulations and monitoring are most important.

The invisible entrepreneur

The idea for the workshop arose from the ROSA (Resource-Oriented Sanitation concepts for peri-urban areas in Africa; Langergraber et al., 2010), project, an EU-supported activity aiming to study sustainable resource-oriented (ecological) sanitation systems in four pilot-cities in Eastern Africa. The project took place in Arba-Minch (Ethiopia), Kitgum (Uganda), Nakuru (Kenya) and Arusha (Tanzania) between local municipal councils and institutes of higher learning, supported by a number of West European knowledge institutes. Studying locally sustainable financing of sanitation was an explicit part of the project.

The project proved once more that sanitation can provide an attractive source of income to many entrepreneurs, for example to masons or to cesspit emptiers. Most of these entrepreneurs have a one-man business or work with their families. Because usually their business is unregistered, it is not on the radar screen of municipalities. In fact, when asked often municipal staff even flatly deny the existence of such entrepreneurs. But they do exist and their existence is evidence that there is a demand: many, apparently, are willing to pay for their services. The question arose: How can we help these 'invisible entrepreneurs' to develop and expand their business?

Key messages:

- Informal entrepreneurs play an important role in the sanitation sector in peri-urban areas in Africa and often carry out the work for which the municipalities would be responsible
- To support small businesses in this sector new business opportunities have to be explored and informal entrepreneurs and local money institutions have to be brought together
- Examples show that entrepreneurs in the sanitation business can be successful and provide better living conditions to the communities
- The success of the entrepreneurs could be strongly enhanced by micro-loans given to informal entrepreneurs by local banks
- Up to now, only few banks see the sanitation sector as new and untapped market

What can local financing mean to them? As part of the ROSA project, in February 2010, a workshop was organized in Nairobi with the objective to explore 'Business Opportunities in Sanitation'. A less explicit objective was to encourage local bank to finance small initiatives in sanitation, including households and entrepreneurs. Stakeholders present were entrepreneurs in sanitation, local bankers, municipalities, and ROSA

partners. In the next sections some of their views are presented.



Photo: George Kasiano is watching one of his colleagues swiping the floor

"My name is George Kasiano, and I am a public toilet manager in Nairobi. For many years, we have had problems in this community, the public toilets were managed by the City Council and neglected. Community representatives decided to take over the management and we now have a group of 25 youngsters. They didn't have job and it gave them something to do. They get paid for what they do and the community benefits from it too: The community is happy and appreciates our work and it helped us to improve our lives".

"I am Michael Njoroge, and I provide exhauster services. People call me and I come with my truck to empty their sewage. Then I dump the sludge at the authorized draining point. I started this business in 2008, and my clients mostly come from the slums where they don't have an in-house sewer connection. "I am content with my life, I have gained a lot since I started this work. I have built my own house". The challenges remain in the transport of the sludge to the sludge disposal site, which is far. If we could get a slab fixed to a sewer at the closest sewer line, to empty the trucks, it would save us time and I could do more trips. If I could get a loan, I would buy another truck for my business".



Photo: Michael Njoroge at the back of his truck demonstrating the emptying of a pit latrine



Photo: Josephat Irungu (front) emptying the human waste he and his younger colleague (back) collected from their clients.

"My name is Josephat Irungu, and I have done my work of manual pit-emptying for more than 30 years, it has fed my family and many others'. When pit latrines overflow, people call us to empty their latrines: we scoop the shit into buckets and then into drums on a wheel-cart. We push the wheel-cart manually to the closest draining point, pour sludge in and go back to the clients for more. The people we meet in the street are rude, sometimes spitting at us. I wonder why they despise us while it is their shit that we are removing. The exhauster truck cannot empty like us, because we remove everything including solid stuff. I have many clients, my telephone is constantly ringing. If I could access a loan, I would buy a pump' to improve my working conditions and business opportunities".

Meet the invisible entrepreneur

The informal entrepreneur in sanitation is mostly invisible to people not living in the areas where they offer their services, the slums (in development parlance: ,peri-urban' areas) Policymakers, civil servants, and bankers usually do not live in such ,peri-urban' areas. A workshop about informal entrepreneurs, without most of the participants have a basic understanding of their business, would have been like organizing a swimming lesson in the desert. Therefore informal entrepreneurs were invited and attended. Not in person, but through their video messages. A team consisting of a self-employed Kenian interviewer and cameraman found and interviewed the three entrepreneurs in Kibera, one of the largest peri-urban areas (slum) in Kenya. In the text boxes in this article, the informal entrepreneurs are introduced. Hear and see them yourself: ,These guys are extremely liquid' on:
<http://www.youtube.com/watch?v=bOOjQp6KgVI>

Informal entrepreneurs meet other participants

A vivid discussion started after the introduction of the three entrepreneurs. Participants widely acknowledged that informal entrepreneurs have a crucial role in sanitation management and often substitute the services that municipal councils and governments are supposed to offer, but fail to deliver. It was noted that these entrepreneurs spot the opportunities and take the initiative to meet a demand and that, despite their useful contribution, they face the crude reality of negative perceptions as powerfully phrased by the entrepreneur Mr Irungu: ,... people in the street are rude, sometimes spitting at us ...'.

The participants agreed that there is ample room to improve the activities of these entrepreneurs in sanitation. From a business perspective they have a need for better equipment, not only to serve more clients per day, but also to improve service. From an environmental perspective there is a need for better disposal mechanisms, as now often the waste is taken outside the community and then dumped. And from a health perspective there is a need for regulation (and monitoring) the handling of waste. Also entrepreneurs need protective gear to reduce their own health risk.

Invisible entrepreneur meets banker – risks and opportunities

Lack of visibility of informal entrepreneurs means that they are largely unnoticed by financing

institutions. At the same time entrepreneurs themselves are not aware of financing opportunities. The many financiers / bankers present during the workshop frankly expressed their first thoughts with respect to the financing of informal entrepreneurs in sanitation. And, not surprisingly for bankers, the first remarks addressed their perceived risks.

Registration: Financiers pointed out that informal entrepreneurs in sanitation are not registered. However, to obtain micro-loans registration often is not a prerequisite. On the other hand, especially in sanitation, registration may be even more important than for micro-entrepreneurs in other sectors. Many people look upon these sanitation entrepreneurs in disdain, and the municipality may consider them a health hazard rather than a contributor to their ,keep the city clean' activities. Entrepreneurs in sanitation that are not registered, risk to be chased away and thus lose their livelihood. Even more than in other sectors, registration is important as it symbolizes recognition by the municipality and provides confidence to financiers in the viability of the business..

Cashflow: Does the business generate sufficient funds, to allow for payment of interest and repayment of the borrowed sum? And, can the entrepreneur provide sufficient collateral in case of default?

Collateral: Lack of collateral is always a major challenge when providing loans. Some bankers pointed out that small businesses that join in groups often are not able to provide sufficient assets as security for the requested loans.

The bankers in the workshop were properly informed on the topic of the workshop beforehand, therefore it could be assumed that they were there because they were interested in the opportunities, rather than only in the risks. Representatives of Kenya's K-Rep and Family Bank point out that sanitation financing could offer them access to the otherwise ,unbankable propositions' Both banks noted that they already have developed programs for such groups and that sanitation may well fit in.

On one issue all bankers readily agreed: sanitation is a new and untapped market.

Mr Kiranga, SME / retail assistant manager of K-Rep Bank proposed Mr Irungu to deposit Ksh 1000 per week for a duration of 10 weeks as a proof of cash flow. After this initial deposit, K-rep bank will provide him with a loan of Ksh 50.000 (480 Euros) to cater for a sludge pump, while the initial deposit will be kept as a liquid collateral.



Photo: Mr Kiranga meets Mr Irungu to discuss a loan



Photo: Mr Irungu riding his barrel to the dumpsite

(Invisible) entrepreneur meets banker – the transaction

The objective of the workshop was not only to discuss the issues of the informal entrepreneurs, there was hope that the (video) meeting with the entrepreneurs would trigger banks to take concrete action.

K-Rep Bank took up the challenge. During the workshop Mr Hillary Wachinga, project manager, visited entrepreneur Mr Irungu. The discussion evolved in such a positive way that one week later a next visit followed.

What is next?

The relationship established between informal entrepreneur Mr Irungu and Mr Kiranga from K-Rep Bank is an indication of the success of the workshop. The transaction illustrates that the point was made: there are business opportunities in sanitation.

Obviously, as the participants came from various African countries, they were not in the position to demonstrate their enthusiasm as K-Rep did by closing a 'deal'. WASTE, a Dutch NGO working on the improvement of sanitation in southern countries, will follow up on the activities as initiated in the ROSA project. WASTE will continue to work with entrepreneurs, banks, and governments to further develop local ways of working such that citizens (governments), entrepreneurs and financial institutions take up the responsibility for a clean environment. Without WASTE.

The workshop was more than a success. K-Rep bank from Kenya felt challenged and already

during the workshop visited together with the camerateam one of the entrepreneurs, Mr Kiranga to discuss financing. As noted above a relationship was established.

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Making a Business of Sanitation: Establishing a World Trade Hub for the Poor

By seeing the poor as customers, the sanitation problem can be transformed into a profitable marketplace for all

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Abstract

This article describes a new initiative driven by Jack Sim, Founder of the World Toilet Organization (WTO) in Singapore. The new project, called the BOP Hub, addresses business options within the Base of the Pyramid (BOP), and seeks to be an integrated marketplace for corporate and non-profit organizations active in various sectors of human development. Sanitation has proven that it can be a profitable business when tailored to the base of the economic pyramid, a term that refers to the four billion poorest people in the world. The hope is that through bottom-up and horizontal information sharing to those people with annual incomes up to and including 3000 USD per capita via the BOP Hub, sanitation will be able to become more accessible and affordable in terms of delivery, and demand creation.

One core aim of the BOP Hub is the distribution of sanitation through a social franchise model: A franchisor trains franchisees who then deliver sanitation products and services to the BOP customers. This social franchise concept has the potential to transform the sanitation sector into a marketplace in which both entrepreneurs and customers profit from generating investments, jobs, and sustainable self-help in a profitable manner. With this innovative initiative, it is hoped to reduce the amount of people living within the BOP, which is the majority of the current world's population, and to provide them with affordable access to sanitation.

Introduction

The Base of the Pyramid (BOP) is the largest, but poorest socio-economic group representing in global terms, approximately 4 billion people who live on less than 2 USD per day. Four billion people, those with annual incomes below 3000 USD (in local purchasing power), form the base of the economic pyramid (BOP). Those below the poverty line carry the burden of poverty penalty, where they often pay more for lower quality goods and services such as water, sanitation, healthcare, education and food due to inefficiencies in distribution and local

intermediaries. Government subsidies, developmental aid and NGOs play an important role in supporting the BOP but there is still a widespread perception that the poor depend on handouts and are unable to help themselves. Therefore, large-scale entrepreneurship as a solution to poverty has not been taken off so far.

In the last few years, there have been a growing group of market practitioners; academics, citizen sector organizations and social entrepreneurs who have defied this perception and are determined to create 'inclusive

Key messages:

- Four billion people are living within the Base of the Pyramid (BOP) living on less than \$2 a day. Collectively, they represent the largest portion of the economy worldwide.
- The aid and donor model has not worked to pull people out of poverty. However, countries in both Asia and Latin America have shown that market-based approaches which spur economic growth can greatly reduce poverty.
- The goal of the BOP Hub initiative in Singapore is to rebrand goods and services so that they are affordable, desirable, and technologically relevant to the needs of the poor. The first project will focus on sanitation marketing in Asia.
- By creating this forum for organisations to share successes and failures of selling to the BOP the goal is to expedite best practice solutions and speed up economic development.
- The end result will be more efficient delivery of goods and services as well as increased leverage for each sector (sanitation, health, food, energy, housing, etc.).

capitalism’ (Prahalad 2004) for the poor. These groups have managed to mobilize the private sector to re-distribute their resources and investment capacity to co-create market based solutions at the BOP. It is becoming more widely accepted that the approach to helping the poor can be best optimized by partnering the BOP consumers with companies from the private sector that produce the products and services. This is an approach, in which both sides profit from revenues and job opportunities.

The Need for a Mind Shift

In Asia, approximately 2.86 billion people live within the Base of the Pyramid; they account for approximately 83% of the world’s BOP. These people live with less than 2 USD a day, and have to use this amount for all their human necessities: buying food and drinking water, housing, health care, energy etc. As research indicates, sanitation is often not taken as a priority for BOP customers although they sometimes save money for other items, such as mobile phones, radios and televisions.

Too often the private and public sector sees the consumers at the BOP as not being able to spend any money – however low income does not mean no income (Figure 1). Contrary to the general belief that “the poor” have no money to spend, the BOP makes up a significant proportion of a country’s consumer base. For example in India, almost half of the population, 563.7 million people, have a cell-phone while only 366 million Indians have access to sanitation (Cohen 2010).

So why do so many people think “the poor” have no money to spend? Unfortunately, international organizations, charities and foundations often show the poor as a pathetic, massive group of people that are helpless. However, this is not true and a superficial perspective. Empirical evidence and data available have proven that there is money to spend even among the poor.

The real question is why do the poor buy more cell-

phones than toilets? The reason lies in the poor marketing of toilets and sanitary products and services. The poor have the same human incentives as the rich; we are all triggered emotionally to buy, while we justify our action rationally only after we have bought something (Feig 2006).

This argument can easily be explained using the example of a cell-phone: A mobile is not just a communication tool; it is a status symbol, a fashion statement, and a lifestyle for an individual. Furthermore, mobiles allow customers to access markets and banking which makes phones seen as a way to make money as well.

A toilet can certainly have the same meaning of a status symbol if we adopt a new bold mindset. We have to sell toilets like we sell a “Prada” handbag – as an object of desire and a symbol for a healthy, sustainable and modern lifestyle.

In order to create a marketplace of sanitation, in which BOP customers are willing to invest money into sanitation products and services, and local entrepreneurs can generate a viable income, we need new business models and creative thinking.

It is becoming more widely accepted that the approach to helping the poor can be best optimized by partnering the BOP consumers with companies from the private sector who produce the products and services needed. The respective models that have proven successful in bringing innovative solutions to this market have regarded the BOP as a segment of consumers with varying priorities and needs. These models have recognized that serving low income populations is different to traditional markets, and have developed their models based on market driven strategies. The population at the BOP is an emerging consumer market that has the potential to be part of the international formal economy, thus expanding the marketplace by four billion additional consumers.

The development of a BOP Hub in Singapore is an initiative designed to play a major role in catalyzing this historic opportunity for making a change in human development. This article will present major aspects of the BOP Hub project, and will explain its main contributions to the BOP market.

Sanitation as a Business – Using the BOP Hub as facilitator of change

Why the need for a BOP Hub?

The BOP Hub is a project which has been developed by Jack Sim, Founder of the

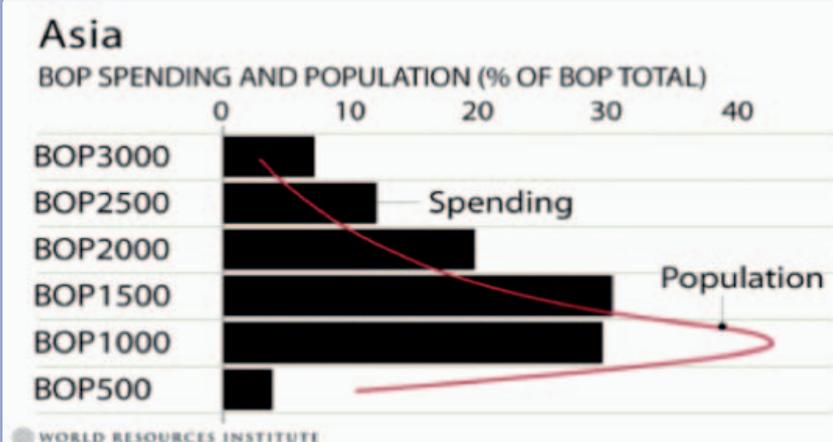


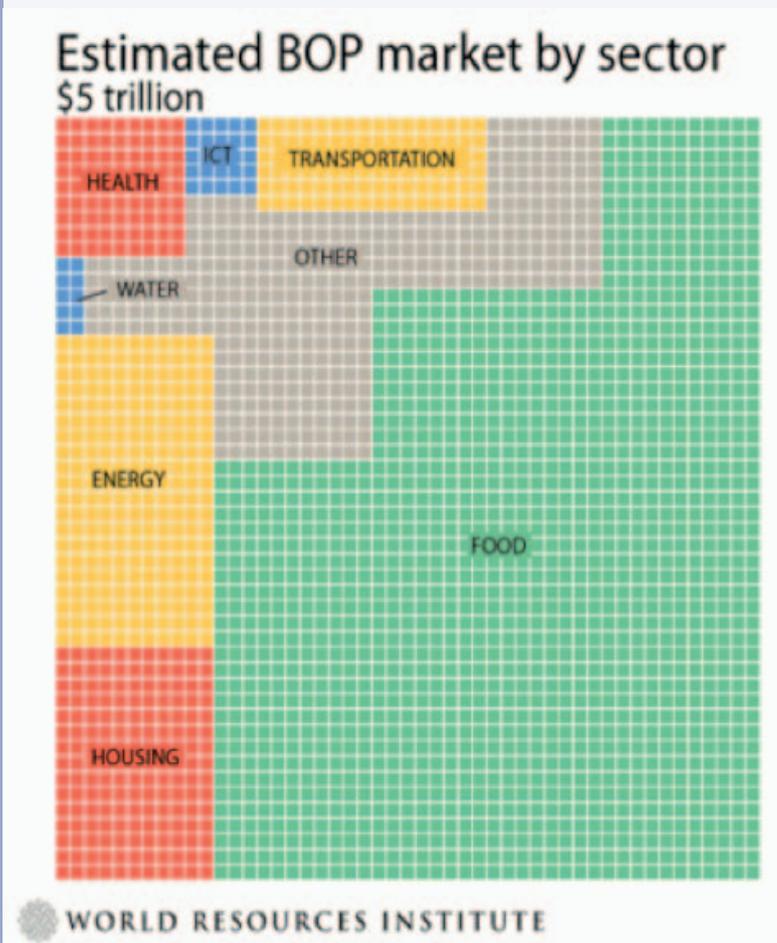
Figure 1: BOP in Asia - Consumer Spending and Population (WRI, 2010)

World Toilet Organization (WTO) in Singapore. His vision is inspired by the concept of “hubs”, an element of everyday life in Singapore, which combines shops, coffee places and food stalls at one particular place. This concept is transferred to development work, in which different for-profit and non-profit organizations active in the BOP market, work underneath one “roof”, and develop their strategies for innovative business-model solutions for the BOP customers. By using technology to connect these organizational units, it will help social entrepreneurs to overcome certain challenges they often face, such as scalability, lack of infrastructure support, capacity, capital and sufficient buy-in from private sector participants. The impetus for creating the BOP Hub is to develop an inclusive platform that can help accelerate scalable solutions to proven localized models that serve low income populations.

The various social innovation efforts currently being developed and employed by organisations in the BOP markets address customers with extreme diversity in the different levels of geographical opportunity, literacy, cultural biases, income levels, infrastructure support etc. In the past, organisations have looked at these various components and came up with a workable solution for their emerging consumer

market that is far from ‘one size fits all’. The goal of the BOP hub will bring together solutions which have been successfully implemented in one segment of the BOP market and could be used to solve a problem in a different segment of the market. So, for example, business driven models that work for making energy accessible for the BOP, could be adjusted for the sanitation market (for projects on access to energy see Ashoka/HYSTRA 2009). The BOP hub allows these “lessons learned” to be efficiently shared and make it easier to scale up current initiatives while at the same time allowing organisations to preserve resources by not trying methods which have failed in other areas. Even if this idea of transforming lessons learnt to other sectors seems to be easy and logical, it is still lacking from the development sector.

Figure 2 shows the different market segments the BOP customers tend to spend their money on: the biggest portion of money goes to food, after that it is energy and housing, as well as transportation, health, information and technology, and lastly water. Sanitation is counted in the ‘water’ segment here, which means that an even smaller square of money is devoted to sanitation specifically. The aim of one of the projects within the BOP Hub is to make sanitation a bigger concern to potential customers.



The BOP Hub will be a shared services platform for the organisations that currently address the BOP communities, which will enable integration of resources, social capital and synergies through cross sector services and shared collaborations. It is meant to be a global initiative that pro-actively serves and facilitates practical market based strategies for large-scale social solutions across all segments in the BOP communities, with the goal of bringing the four billion populations currently living below the poverty line into the formal global economy.

The Hub is integrating cross sector solutions to build on a collaborative network and integrate best practices across sectors that can harness resources and expertise from the private sector and empower the people at the BOP to alleviate poverty through entrepreneurship while using established methods. Further, the Hub is an information base, which connects groups, broadens networks, shares knowledge and captures learning points in order to bring in new participants who want to contribute to invigorating the BOP.

Unlike many business models which neglect the potential of the poor, the Hub seeks to actively engage the poor as entrepreneurs in localized

Figure 2: Market Segments for the BOP (WRI, 2010)

markets and to empower them to scale up their models by developing practical operating principles, synergies and alliances between the social and private/business sector. The aim is to attract investments to the BOP and help legitimize poor entrepreneurs in the same way that micro-financing has for many women throughout the developing world. Finally, the BOP hub will work to make individuals a credible source and agent for large scale social investments within their communities.

Scaling up social enterprises at the BOP

Sanitation will be the sector first addressed by the Hub. The reason for starting with sanitation as the first initiative is that it has tremendous potential for scaling-up any specific program. To scale up a program it is crucial to leverage on existing resources. The BOP Hub will therefore work alongside the Ashoka network, a global association of social entrepreneurs who are working on social innovation around the globe and in various sectors, such as health, energy, housing, disaster relief, water and sanitation, or labour rights. By combining expertise in various fields the goal is to come up with the best solution for a specific field. While a sanitation specialist may be aware of limitations in access to water, a disaster relief expert may have a variety of solutions that can be applied. By combining strengths, the outcome will be stronger and more sustainable. Jack Sim, an Ashoka Fellow himself, and his team believe strongly in leveraging on the existing connections and strong relationships within the network. At the moment, approximately 300 Ashoka Fellows operate at communities at the Base of the Pyramid, and consequently, it is from this platform that the BOP Hub will initiate its operations.

The BOP Hub will be actively reaching out to the Fellows who intend to scale up their social business models. The Ashoka Full Economic Citizenship initiative (FEC) has already carried out considerable work to map out successful frameworks for market-based solutions that could serve low-income communities (Budnich 2005). The BOP Hub intends to build on this knowledge base and act as a capacity provider to the FEC. It will also engage corporations into collaborative Corporate Social Responsibility strategies and for-profit programs.

Secondly, it is important to create the opportunity for the social entrepreneurs to develop potential integrated partnerships and alliances across various market participants that are relevant to their supply chain. This is achieved by developing synergies and integrating resources across various sectors, such as water and sanitation, housing, energy and health.

Based on the power of economies of scale, the BOP Hub will be able to offer collective negotiation strength to the individual entrepreneurs. This collective strength will also enable more access to social capital providers who are looking for scalable social solutions.

Lastly, the BOP Hub will be populated with passionate, dedicated and qualified individuals who represent various sector experts and bring different social entrepreneurial ideas together underneath the Hub's roof. It is through this three tiered approach that the BOP Hub will be most successful.

Sustainable sanitation has the potential for viable business opportunities, which is proven by numerous projects and programs around the world. Initiatives as from Sulabh International (India), Gram Vikas (India), EcoTact (Kenya), or Water for People's Sanitation as Business-Program (Malawi) show that sanitation generates jobs and profits for local entrepreneurs, while enhancing the sanitation situation in a given region. It has also been proven that sanitation can stimulate local economies such as in Vietnam, Bangladesh, and Bolivia (SDC, 2004). WTO, as another example, is currently developing a social franchise model, called SaniShop, which is meant to set up a franchisor that then provides fast replication-training modules for local entrepreneurs that want to become a SaniShop franchisee. WTO is hoping to guide 3,000 SaniShop franchisees in a project time frame of four years. WTO has already developed successful sanitation marketing in Cambodia in collaboration with Lien Aid, USAID, IDE and IDEO in the last 18 months. Lessons learnt will be fed back to the BOP Hub. In order to make lessons learned accessible to more organisations it is crucial to use The Hub as a platform available to all.

Recommendations

1. A virtual platform facilitated by technology:

If synergies and solutions for the BOP are more accessible to a wider group of people, all of whom share the goal of poverty alleviation, the result is a more efficient network of collaborative market forces. The best channel to do so is on a virtual scale. This requires the development of a technology platform ('Software for Action') that will be easily accessible and shared in a self organizing fashion. Again, technology will help here to make the project with business solution for sanitation successful.

2. Develop more effective collaboration and partnerships:

As mentioned before, forming strategic alliances with relevant areas of expertise skills and services from the private sector is a crucial element of a social enterprise: legal, financial, branding/marketing, and franchising expertise is needed. Secondly, there is the need for an on-going and pro-active collaboration with the private sector, such as manufacturers, as well as social capital providers and sponsors at the BOP level.

3. Core stakeholders in the BOP Hub ecosystem:

The BOP Hub brings together four main groups of stakeholders: the target emerging consumers; social

entrepreneurs; market suppliers and producers; and sponsors. The target emerging consumers refer to those customers in the BOP by segmentation (such as water and sanitation, housing, electricity etc.). Social entrepreneurs are social innovators who are creating new market based solutions at the BOP. The innovations produced by entrepreneurs can be driven both by the public and/or private sector. Market suppliers and producers are from the local private sector and from multinational businesses and work in partnership with the social entrepreneurs. Finally, sponsors are key individuals and organizations driving the whole initiative by financial, material, and visionary resources.

Having these different sources of expertise which are willing to work together, the BOP Hub will be a practical yet innovative project which combines business and sanitation, ultimately driving the BOP forward.

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Notes

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