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Introduction

World Water Week is an annual conference that is organized by the Stockholm International Water Institute. The 2008 conference was held in Stockholm, Sweden from August 17 – 23 and this year's conference reviewed progress in the efforts to build a clean and healthy world. Abstracts of presentations, press releases and additional information can be found on the World Water Week 2008 website at: <http://www.worldwaterweek.org>.

As 2008 is the International Year of Sanitation, many events in Stockholm this year focused on efforts to achieve the Millennium Development Goal target on sanitation. In support of this focus, a workshop was organized on "**The Sustainable City**". This issue of the Urban Health Bulletin includes summaries of 5 presentations from the Sustainable City workshop. These include:

- [Planning for Sustainable Environmental Sanitation Infrastructure and Services in Cities](#), Roland Schertenleib - Eawag/SANDEC, Switzerland
- [Sustainability of Local Sanitation and Water Supply in Urban Areas – Examples from Eastern Botswana and Periurban Dhaka](#), Gunnar Jacks et al. - Abo Akademi University, Finland
- [Towards Cleaner Environment for the Poor in Ranchi Slums: A Case from India](#), Anjal Prakash - WaterAid, India
- [Social Issues in the Provision & Pricing of Water Services](#) – Maharashtra, India, Suresh Sodal - Maharashtra Water Regulatory Authority, India
- [Lessons Learnt of a National Community Based Sanitation Program Facilitated in over 100 Cities in Indonesia](#), Andreas Ulrich et al. - BORDA, Indonesia

We welcome comments and contributions to the *Urban Health Bulletin*. Please contact **Anthony Kolb, USAID Urban Health Advisor** at akolb@usaid.gov if you have suggestions for the Bulletin.

Planning for Sustainable Environmental Sanitation Infrastructure and Services in Cities, Roland Schertenleib - Eawag/SANDEC, Switzerland

Good sanitation and hygiene, together with safe drinking water are essential to keeping people healthy and for success in the fight against poverty, hunger, child deaths and gender inequality. They are also central to the human rights and personal dignity of every woman, man and child on earth. Therefore, reliable water supply

and environmental sanitation services are one of the important requirements for a sustainable city.

At the United Nations Millennium Summit in September 2000, all 189 heads-of-state adopted the Millennium Development Goals (MDGs), which set clear, numerical, time-bound targets for making real progress, by 2015, in tackling the most pressing issues developing countries face. Among those targets is the Millennium Development Target 10 (as expanded by the 2002 World Summit on Sustainable Development): to cut in half, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation. Yet today, 2.6 billion people do not have access to basic sanitation, whereby many of these people live in urban areas of Asia, Latin America and Africa. Inadequate sanitation have not only huge consequences on human health, the impacts on the environment, education and economic activities are also enormous. Due to the special challenges, increased focus will have to be given to the urban and peri-urban population. According to the most recent estimates, over 900 million people can be classified as slum dwellers – that is, lacking one or more of the following conditions: access to improved water, access to improved sanitation facilities, sufficient living space, dwellings of sufficient durability and structural quality, security of tenure. In today's world, almost one out of three urban dwellers already lives in a slum. It is such urban poor, living in "slums" that suffer most from deficient environmental sanitation infrastructure and services.

This unacceptable situation and recent experiences provide strong evidence that conventional approaches to planning and implementation of environmental sanitation services in urban areas are unable to make a significant dent in the service backlog which still exists. The typical conventional approach addressing the problems related to urban environmental sanitation has been one in which planners and engineers define the needs of the population, including the poor, and then decide what type of infrastructure and service will be provided. In most cases sector professionals then translate hypothetical demand into project designs based on sewerage and treatment technologies commonly used in industrial cities of Europe and the United States. Such top-down and supply-driven approaches have seldom been appropriate in the developing country context as many examples illustrate.

The main objective of a sanitation system is to protect and promote human health by providing a clean environment and breaking the cycle of disease. In order to be sustainable a sanitation system has to be not only economically viable, socially acceptable, and technically and institutionally appropriate, it should also protect the environment and the natural resources. When improving an existing and/or designing a new sanitation system, sustainability criteria should be considered related to all of the following aspects: (a) health and hygiene, (b) environment and natural resources, (c) technology and operation, (d) financial and economic issues and (e) socio-cultural and institutional aspects.

Most of these sustainability criteria can only be taken into full consideration if the planning for environmental sanitation services is based on a model which involves all stakeholders from the beginning of the planning process. The "Household-Centred Environmental Sanitation" (HCES) approach is such a model where decisions are reached through consultation with all stakeholders affected by the decision, according to their spatial attribution. The HCES approach places the household at the core of the planning process and, therefore, responds directly to the needs and demand of the user, nevertheless retaining coordination with the local authority. Individual households determine what sanitation facility they want and can afford;

together with other households, they decide on the piped water system they want for their community; together with other communities, they determine how the city might treat and dispose of its waste. On the other hand sanitation policies and regulations, critical for an enabling environment are determined by central government, but their implementation is delegated to the appropriate levels, as close to the household as possible and reasonable.

A further component of the HCES approach is that problems should be solved as close to their source as possible with an emphasis on recovery of waste as a resource. Only if the affected zone is unable to solve the problem, should the problem be "exported", that is, referred to the next spatial or administrative level.

The successful application and implementation of the HCES planning approach requires an enabling environment including (a) the necessary support by the central and local government, (b) a flexible legal framework, (c) arrangements for small credits, (d) appropriate institutional arrangements, and (e) required skills.

Sustainability of Local Sanitation and Water Supply in Urban Areas – Examples from Eastern Botswana and Periurban Dhaka, Gunnar Jacks* et al. - Åbo Akademi University, Finland

Two examples of local sanitation and water supply have been studied, one in Botswana and the other in suburban Dhaka. Pit latrines and local wells is a common way of solving sanitation and water supply problems in for fast growing urban areas. In some cases this is not at all a sustainable solution but has to be replaced by water from well-fields outside the habitation and eventually by imported water from surface water sources. Largely this depends on the local geology.

In Eastern Botswana so called "villages" like Ramotswa and Mochudi have populations of 40-50,000 inhabitants. However, the habitations are rather village-like in the sense that the population density is rather low. The villages in Botswana are built on soils formed by weathering of the under-laying hard rocks and the initial solution for water and sanitation was based on pit latrines and drilled wells within the habitation supplying a sizeable number of standpipes. Problems both with bacterial and nitrate pollution have been encountered. The mean value of wells a large number of wells inside urban areas in Eastern Botswana exceeded 50 mg/l which has forced the municipalities to drill new well-fields outside the habitations. This is a common development during urbanisation. The nitrate content in the wells is clearly related to the soil texture. 1-50 % of the nitrogen is lost in deep leaching while 30-80 % is denitrified. Bacterial pollution may in coarser soils travel from a latrine to a well within days. An example of a transit time of 24 hours is observed which caused an epidemic of diarrhoea. A transit time of at least 25 days is needed to eliminate the risk of bacterial pollution.

Suburban Dhaka has fast growing habitations and there is no possibility for the municipality to supply piped water supply and sewage. Instead NGOs have helped in the installation of household wells supplied with handpumps and pit latrines. Two suburban areas have been investigated, Dattapara, north of Central Dhaka and Keraniganj south of the Buriganga river. Especially Dattapara is housing a very dense population and the horizontal distance between latrines and wells may be no more than 10 m. Contrary to the situation in Botswana this seems to function well

due to the geological conditions with a thick clay layer covering the sand into which wells are installed. Neither is there any bacterial pollution nor are there elevated nitrate contents in the groundwater. In rare cases where bacterial pollution has been encountered it has been found that the pump installations are not well done allowing leakage of surface water into the well. The habitations are very dense and the nitrogen load on the areas is in the order of 1500 kg/ha, about ten times the application in intensive agriculture. Most of this is denitrified and only about 30 kg/ha are lost in deep leaching resulting in 10 mg/l of nitrate, far below the permissible limit. One effect of the dense habitation is an elevated chloride content exceeding 500 mg/L.

This is however a minor problem even though it affects the taste of the water. What may still be a sustainability problem is the accumulation of ammonium in the soils. In the case of prolonged dry-spells this could be nitrified and leached to the groundwater. The local geology plays an important role for the sustainability of the first hand solution of sanitation and water supply in emerging urban areas in the form of local wells and pit latrines. Ecological sanitation may improve the sustainability as it leads to less leaching and removes by urine separation a large portion of the nitrogen from deep leaching. In Kerala, which with a very high population density, is more or less continuous village, ecological urine separating latrines protects the very shallow groundwater from pollution. The important suburban agriculture may as well be benefited from the nutrient supply. Ecological sanitation is also growing steadily in West Africa and the use of the collected urine in periurban agriculture has been well accepted in for instance Bamako in Mali and Ouagadougou in Burkina Faso.

Towards Cleaner Environment for the Poor in Ranchi Slums: A Case from India, Anjal Prakash - WaterAid, India

Geeta, a young mother of two, lives in Mission Lane slum of Ranchi. Till recently, she and her family used to go to the nearby fields to answer nature's call. However, slowly, the open space in her surrounding started shrinking due to new houses being constructed around the area and so it was increasingly becoming difficult for Geeta and her family to defecate in the open. They did not have a household latrine nor anyone else in her locality. So, why did Geeta's family not build the toilet then? Geeta and her husband always believed that constructing a toilet will cost a lot and as a daily wage labourer, her husband earned just to feed the family. A toilet was considered as a luxury. With this earning, Geeta could not build a proper house, leave apart having a toilet of her own. "Due to open defecation in the area, the locality was dirty and used to stink a lot" says Geeta. Apart from this, there was no proper place to throw garbage and all the families in her area used to dump it in a common place nearby. "We were used to flies and mosquitoes in our area and never thought that we would start living in a much cleaner environment", said Rony, her neighbour in the slum. "It was the intervention of Nav Bharat Gagruti Kendra (NBJK) that made all the difference" she informs.

NBJK started in 1971 by socially sensitive individuals who were moved by the condition of poverty stricken families in undivided Bihar. NBJK was formed with the vision of establishing a progressive, peaceful and just society that has values of equality, fraternity and mutual help. In Ranchi, NBJK is working in 19 wards out of 37, where several activities have been undertaken. They range from waste

management and cleanliness including door to door waste collection, street sweeping and cleaning of drains to development and maintenance of civic infrastructure, cleaning of drains and sewerage and planning for social and economic development such as employment generation and poverty alleviation programmes for the people living in slums. Apart from these, water supply and public health programmes have also been an integral part of NBJK's slum development programmes. "We started with the need assessment survey in slums of Ranchi and found out that some of the slums have problem in water, sanitation and hygiene" informs Rajesh Kumar Das, Branch Head of NBJK. After identification of the slums, the strategy was to inform the community through awareness programmes, to create demand for safe sanitation and hygiene. The process involved organising the inhabitants of the slum through development of slum development committee (SDC). The committee is made with representation from all the quarters of the slums. SDC of Mission lane has around 10-12 members. Under the SDC, a watsan committee was made with the mandate of looking into water and sanitation issues.

After formation of SDC, NBJK started capacity building programmes for Mission Lane SDC with number of community mobilization trainings and exposure visits to areas where successful committees are implementing water and sanitation programmes. Intensive leadership training given to these leaders helped in creating a cadre of community members who in turned mobilized households to build toilets. An important aspect of this was demystifying toilet technology that was understood as expensive by the households living in slums. NBJK promoted the construction of toilet with people's contribution of Rs 1000 while Rs 500 came from the support from WaterAid, the funding organization that is supporting the project for water and sanitation. Once the households were convinced that toilet construction can be done at an affordable price, it was easy for NBJK to convert Mission Lane to an open defecation free slum of Ranchi. An important part of slum development programme was to link it with the provision of access to safe water. For this, identification of water points was done and hand-pumps were installed leveraging from the budget of Ranchi Municipal Corporation (RMC). Apart from this, soak pits were also constructed to check the waste water flows. Other programmes included the promotion of kitchen garden and vermi-composting.

Apart from providing water and sanitation access to the poorest in Ranchi, NBJK is involved in door to door collection of household waste in 19 wards of Ranchi Municipal Corporation. Feeding to the point to point collection (as against household collection) of daily waste by the RMC, NBJK launched the door to door collection of household waste and other solid waste management activities in the year 2002 through a project called 'Clean Jharkhand'. Based on a business model, the solid waste management programme covers 37,875 households in Ranchi through a cadre of workers called Safai Mitra. 300 Safai Mitras collect garbage from households (from rich, middle and poor localities) and feed the municipal garbage collection trucks that carry waste from point locations. NBJK also manages the dumping yard which is around 13.5 kilometers away from Ranchi town where the organic waste is used for making manure. The project has given livelihood to over 300 Safai Mitras and 500 rag pickers and is considered a successful GO-NGO-Community partnership project in eastern India. Initially supported by India Canada Environmental Facility (ICEF) grants, the project is financially sustainable with a monthly collection of more than Rs 6.94 lakhs as user fees. Apart from this, the RMC provides a grant of Rs. 40,000 per month for collecting household garbage from three wards where slums are located and Rs. 45,000 per month for managing the dumping yard.

The case shows the classic case of partnership with the municipality and the communities to bridge the critical link between the government and the people. The results are clearly visible – a cleaner environment for Geeta and Rony and her children of Mission Lane says it all.

Social Issues in the Provision & Pricing of Water Services – Maharashtra, India, Suresh Sodal - Maharashtra Water Regulatory Authority, India

Water scarcity is an ever-growing global problem. Increased population pressures, improved living standards, & growing demand for environmental quality have all prompted governments to find better ways to manage their available water resources. In declaration at the Bonn 2001 International Fresh Water Conference & again at the 2002 World Summit on Sustainable Development (WSSD) in Johannesburg, ministries expressed concerned at the 1.1 billion people in the world who, at the beginning of 21st Century, live without access to safe drinking water, & 2.4 billion without access to proper sanitation. The Millennium Development Goals expressed in the UN General Assembly's Millennium Declaration, call for halving the population of people without access to safe drinking water by 2015.

Maharashtra State, which is 3rd largest state in India. However, the water sector has been affected badly by various problems viz. conflict within various categories of users & unsatisfactory levels of water use efficiency & cost recovery. There was thus a pressing need to tackle the situation from consideration of productivity, equity & sustainability.

A holistic approach has there, been adopted by the state involving policy reforms, legal enactment, capacity building & stakeholder participation. Subsequent to framing of a State Water Policy in 1993, an important legal measure was taken in 2005 by enacting the Water Resources Regulatory Authority Act.

Maharashtra among the first state in India to have framed water policy keeping in view the problems in the water sector & the challenges to be faced in 21st century because of the growing population & increasing demand from various categories of users & to lay down the road map comprises strategies & approaches to face the challenges.

A social issue in the provision of water services has to be considered from the perspective of impact of policies on different income & consumer groups. Water pricing policies can contribute to environmental & economic goals but may face social resistance. However social concepts in water service provision include access & affordability. "Affordability" is social aspect of water service provision that is most clearly & closely linked to pricing policies. Affordability of water services may not be distributed equally across income groups or neighborhoods – a lower income household will inevitably pay a higher proportion of their income for water services than a higher income household does.

Charging water pricing structures to better reflect environmental externalities & resource cost will always entail social acceptability issues. Social water pricing can often contribute simultaneously to economic efficiency, resources conservation, & equity goals. Improving access to water services & filling water infrastructure investment gaps have cost implication, & the distribution of these costs is important

for policy implementation. Institutional frameworks for water governance also determine how (and by whom) water pricing is set and regulated, as well as how environmental & social concerns are dealt with.

Appropriate water pricing is an important incentive for water conservation & a disincentive for water pollution. Also, optimal levels of service in water supply & sanitation have both human health & environmental implications. Lack of access to good water is a key element of poverty, but pricing water in a way that reflects environmental & efficiency concerns can sometimes be controversial due to social consideration (especially affordability for low – income households). The question is often framed as one of efficiency versus equity. However, these two approaches do not necessarily have to result in conflicting policy options. Under certain conditions, water pricing systems can promote efficiency while addressing equity goals. One such approach would define the basic needs part of water demand, access to which should be guaranteed for all (especially low-income) households, & beyond which the prices for water services should reflect economic & environmental policy objectives.

With above background, household water charging system has to be designed, keeping in view,

- economic efficiency
- equity & affordability among the various consumers for essential needs
- generation of revenue sufficient to meet service providers O & M / Financial requirement
- environmental effectiveness to ensure sustainable use of water resource

To establish water charging system with above objectives in mind, there is a need for regulation in water sector as a whole in protecting against abuse of monopoly power. Economic regulation in particular seeks to address conditions of supply, access & prices. Customer service, water quality, investment, profit & return on capital are also subject to regulation.

Maharashtra has already established Regulatory Authority in water sector aiming to ensure efficient performance, adherence to standards & fair, affordable user charge with sustainable development of water sector. Authority in the initial year is making tariff regulation for deciding tariff structure. Authority will come with it's 1st tariff order in June 2009.

The policy & the legal measures were introduced in Maharashtra by following full consultative process with civil societies / NGOs / stake holders & expert in the field.

Lessons Learnt of a National Community Based Sanitation Program Facilitated in over 100 Cities in Indonesia, Andreas Ulrich et al. - BORDA, Indonesia

The few centralized sewerage systems in Indonesia generally do not cover poor residential areas, many of which lack even the most basic sanitary infrastructure. Due to large investment costs, even if a few more centralized sewerage systems are to be constructed, large-scale sewerage programs are unlikely to improve sanitation significantly for the urban low-income areas.

This paper provides recommendations, based on the lessons learnt of a CBS mass-dissemination program of over 250 CBS systems in low-income communities in over 100 cities in Indonesia. Included are a number of “Best Practices” for sustainable program implementation such as the Multi-stakeholder framework between communities governmental and private sector organizations who coordinate and facilitate CBS, Quality Management to safeguard the effectiveness of the technical sanitation infrastructure options including wastewater treatment efficiency and effluent standards, Activity Based Cost Analysis to monitor the cost efficient implementation in a transparent manner and Health Impact Assessments (HIA) to objectively document achievements related to improved public health and livelihoods within disadvantaged communities.

SANIMAS, or Sanitation by Communities, is a national dissemination project that is funded and coordinated by the National Indonesian Planning Agency (BAPPENAS) the Ministry of Public Works (PU) demonstration project and Local District Governments (PEMDA). The aim of the project is to mainstream CBS as the leading option for providing improved sanitation.

A typical CBS project consists of a low-cost simple sewerage system consisting of household sanitation facilities linked by a network of small-bore feeder sewers to a local wastewater treatment plant which follows the DEWATS Quality standard. In areas where low-income people resided in rented settlements, public community sanitation centers (MCKs) were constructed, consisting of toilets and bathrooms connected to a wastewater treatment facility. Each of the developed CBS systems serves from 50 to 150 urban households, depending on the size of RTs and RWs (the two smallest administrative units in the Indonesian government).

The execution of 90% of the Indonesian SANIMAS program is currently facilitated by a network of non-for profit organizations including BORDA, LPTP, BEST and BALI FOKUS.

Since the adapting a Quality management system in 2004 the network of facilitation agencies have facilitated more than 250 community sanitation projects in more than 100 cities within 17 provinces of Indonesia. Basic and improved sanitation facilities have been provided for over 100.000 people, decentralized sewage treatment facilities provide efficient daily wastewater treatment for over 9000 cbm of domestic wastewater making SANIMAS one of the largest and most successful community sanitation programs in the developing world.

Per capita transaction costs for improved sanitation were reduced from € 160 eqv. in the demonstration phase to € 70 during the dissemination phase.

The results of a Health Impact Assessment revealed that open defecation was reduced by 100%, sanitation related diseases decreased by 60% in the intervention areas.

Best Practices

A. Multi-Stakeholder Framework

- A “buy-in” of all main stakeholders in community sanitation projects is necessary to ensure active participation during different phases of the implementation

- Responsibilities of stakeholders must be regulated and should reflect their mandate, competence and experience
- Multi-source financing schemes must be made transparent to all participating parties
- Open lines of communication need to be established between stakeholders to anticipate bottlenecks during implementation

B. Quality Management

- Best Practices and processes related to planning, infrastructure construction, operation & maintenance must be standardized at an early stage to provide solid tools for uniform capacity building in a “high-growth” program environment
- Standardized control mechanisms and criteria for technical sanitation options and infrastructure must be developed for a set of implementations options to ensure quality and performance of community
- Benchmarks for professionals involved in the implementation of community sanitation projects (e.g. community facilitators, supervisors, civil engineers) must be in place to ensure a uniform high quality facilitation.
- A database for key performance indicators needs to be established and maintained on the executing stakeholder level to allow for efficient monitoring and evaluation.

C. Activity Based Cost Analysis

- Multi-source financing requires detailed costing and, financial controlling of development activities as funds are allocated for a pre-determined number of sanitation interventions and regulated by contract agreements that govern the utilization of funds.
- Financial administration of sanitation projects should allow for analysis of expenditures on the basis of activities and individual sub-projects. In that way, cost of procurement of materials and efficiency of facilitating staff can be measured, compared and checked transparently.

D. Health Impact Assessment

- Standardized health impact assessments (HIA) that can be facilitated in a participative, time-efficient manner must be an integrated part of community sanitation programs to prove their desired outcome – improved public and environmental health as well as livelihoods of residents and communities
- In order to compare the impacts of a great number of sanitation community projects within a national dissemination program, structured interviews should be followed by pre-determined composition of gender and age groups, a set of questions that query the 4 levels of impact related to health & hygiene, infrastructure, community environment and general impact on the livelihood.