

PEOPLE-CENTRED APPROACHES TO WATER AND ENVIRONMENTAL SANITATION

## The role of non-governmental organizations in decentralised wastewater management in Bangladesh

*M. Hasan, Bangladesh, Md. N. Uddin, Scotland and J. Parkinson, UK*

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*This paper focuses on the role of NGO's in the provision of infrastructure and wastewater management services in Bangladesh in relation to the context of decentralisation. Using two examples of decentralised waster management, the paper describes the way in which decentralised approaches may be more responsive to local needs and demands involving local community in the decision-making process. Although these are seen to be successful at the local level, the lack of higher lever institutional support and a policy framework to promote an enabling environment means that these projects remain as isolated cases. Within the existing context in Bangladesh, the paper concludes with proposed capacity building requirements that are envisaged to be necessary to overcome these constraints and to enable wider replication of these examples of decentralised wastewater management.*

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### Introduction

Increasing urbanisation and demands for water have resulted in a spread of waterborne sanitation throughout Bangladesh, which has created enormous wastewater disposal problems. These cause pollution of the aquatic environment and deterioration in environmental health conditions.

Between 1990 and 2000, Dhaka's population has swelled by 40 % - faster than any other city of the world. The city now accommodates more than 10 million people, who generate about 0.3 million m<sup>3</sup> of human waste, which stagnates in the choked drains and ultimately find its way into lakes and rivers. About 80 % of the effluents of the city, which are mostly untreated, drain out into the river Buriganga and Shitalakhya and on to the lakes and wetlands in and around the metropolis. These rivers are now threatened by increasing flows of sewage, industrial wastes and toxic effluents. About 70% of Dhaka city's population has no access to sanitation services, and around 60% of its population (the poorest group) lives in slums, squatter settlements without safe water and toilet facilities.

On the other hand, Khulna is the third largest city of Bangladesh situated in the south-western part of the country and lies in the delta of the river Ganges. The city is around 47 square kilometres in area (within Khulna City Corporation boundary) having a population of about 1.3 million. Wastewater management system on the periphery of Khulna City has not been improved substantially over the last few years. Most of these areas have neither piped water supply nor any permanent drain. There is no sewerage system in Khulna City. Around 29% percent people of Khulna City use comparatively safe sanitary latrines (having septic tank and soak pit), about 82% use slightly unsafe ring latrines, but 9 percent of the population are using temporary (kutcha)

or hanging latrines, which are generally perceived to be unsafe and unhygienic (ERMP, 2001).

To alleviate this situation, improvements in wastewater management in the country is essential for the livelihoods of urban and suburban communities. Poor management of wastewater in urban and urban fringe areas has major implications on environmental health with a particular impact on poorer communities.

### Planning and development of wastewater infrastructure in Bangladesh

The Government of Bangladesh (GoB) started its initial interventions in the water supply and sanitation sector via the establishment of the Department of Public Health Engineering (DPHE) in 1992. The objective of DPHE is to build an effective service delivery mechanism for water supply and sanitation facilities in the rural areas, upazila (sub-district) towns, municipalities and Rajshahi and Khulna City Corporations under the Ministry of Local Government, Rural Development and Cooperatives (MLGRD&C)

Water and Sewerage Authorities (WASAs) are responsible for water supply and sanitation (WSS) in Dhaka and Chittagong. Dhaka WASA develops and manages water supply, sub-surface drainage and water borne sewerage. Chittagong WASA deals only with piped water supply (Rashid, 2000). In addition to DPHE and the WASAs, the Local Government Engineering Department (LGED) is another government agency responsible for infrastructure development throughout the country. Although LGED is not formally responsible for WSS, the Bangladesh - National Policy for Safe Water Supply & Sanitation 1998 recognizes its role in urban water supply and sanitation. It implements urban WSS activities as components of infrastructure development projects and

subsequently hands over responsibility for operation and maintenance to local authorities.

At the urban local level, the city corporations and municipalities manage water supply and sanitation. WASA is responsible for water supply and sanitation in Dhaka and Chittagong cities of Bangladesh. In other larger cities, (Sylhet, Khulna, Barisal and Rajshahi), the City Corporations develop and maintain drainage; solid waste management and hand pump water supply. Except for Dhaka and Chittagong, the other four city corporations maintain and operate water supply and wastewater infrastructure that DPHE or LGED installs. In the smaller cities, the 273 pourashavas (municipalities) are responsible for development and maintenance of physical infrastructure and services in municipal areas.

## Why decentralisation in wastewater management?

The conventional centralised management paradigm for wastewater infrastructure and service is widely recognised to be unaffordable for poorer sectors of society in Bangladesh and the institutions lack the resources to operate and maintain these systems effectively. For example, a household survey undertaken by Khulna City Master Plan Project revealed that only about 15 % of the city households have access to drainage facilities (KDA, 2000).

As a result of the inability of the centralized agencies to provide services – a number of NGOs have stepped in to

provide services for managing wastewater and faecal sludge (see Boxes 1 and 2). Both examples illustrate example of how wastewater management operations may involve local stakeholders in planning and day-to-day operational management activities.

Decentralisation means transferring power to people and institutions in the periphery of urban hierarchy that otherwise would not have much influence on decision making at local or national levels. Both examples demonstrate how the poorer stakeholder groups in the local communities are targeted as beneficiaries. The wastewater management activities provide direct and tangible livelihood opportunities via their involvement in economic generating activities.

The GoB National Policy on WSS recognises the importance of participation of users in planning, development, operation and maintenance through local government and community-based organizations. The same policy highlights the role of the private sector and in service delivery at the local level. These political objectives are very relevant to DWWM. Also in line the same policy, decentralised approaches also offer more flexibility in the design and may use the locally available technologies as well as the resources from local communities. Thus DWWM also provides the opportunity for wastewater reuse, which can facilitate growth in agriculture, pisciculture, horticulture and livestock sector.

### Box 1. Faecal sludge collection services in Dhaka

The NGO Dushtha Shasthya Kendra (DSK) with assistance from WaterAid-Bangladesh an international NGO, has developed urban sanitation programmes in Dhaka with the aim to provide sanitation facilities for the urban poor in slums and informal settlements. The sanitation facilities include the provision of single pit latrines and communal latrines with septic tanks. Realizing the importance of operation and maintenance for the sustainability of the sanitation programmes, DSK has been experimenting with a number of different technologies for removing and transporting the septage from the latrines. Initially DSK used an imported machine (Vac-u-tug), which has been used in the slums of Nairobi in Kenya. However, due to the density of housing in the Dhaka slums and the difficulties of access in the narrow lanes, DSK developed a smaller machine which is locally manufactured to use as a 'satellite' to the main Vacutug machine. This enables the collection system to maintain flexibility and mobility without losing the capacity to collect a substantial volume of septage within one operation.

DSK maintains the responsibility for management of the faecal sludge collection service and is responsible for the agreement with Dhaka WASA for the discharge of the collected faecal sludge into main sewer line. DSK employs local staff to operate the system and most of these come from the sweepers class, who traditionally empty the latrines manually. In the pilot programme, there are four members of staff in the team to operate the service consisting of one head operator, two assistant operators and a supervisor employed by DSK. The main benefit of the project is that local residents, including low-income slum dwellers, living in congested areas are provided with a service to empty on-plot sanitation facilities at an affordable cost. The cost per load (each 500 litre disposal) has been fixed at Tk. 150 for the slum dwellers and Tk.200 for the other users. It has been shown that this is sufficient to operate the service on a financially sustainable basis, but due to the high initial investment in the latrine emptying machine, recovery of full capital cost is not expected to be viable. In terms of technical problems, disposal of sludge into the main sewer line can sometimes be problematic because the pipes are often blocked. Therefore, there is a need to strengthen the process of obtaining WASA clearance to use the sewerage line for the discharge of sludge.

DSK aims to continue to operate the machines in such a way that it can recover full operational and maintenance costs, but also to transfer operational responsibilities to local community based private entrepreneurs who may take up the business and operate it on a profit-orientated basis. Under a micro-credit lending system, which provides credit facilities for these private sector operators to purchase latrine-emptying machines, there are opportunities for a decentralised system of servicing for the latrine emptying to be instigated on a financially sustainable basis, which employs some of the poorest members of society and provides them with a secure livelihood opportunity.

### Box 2. Integrated wastewater treatment and resource recovery in Khulna

Integrated wastewater treatment and resource recovery is an initiative in decentralised wastewater management implemented by the NGO PRISM-Bangladesh with support from UNDP. This involves the use of wastewater stabilisation ponds in Khulna which are used for treatment of wastewater and production of duckweed which is then used to feed fish. Through a process of community mobilisation, PRISM has been encouraging members of the local communities in the areas where they work to be more actively involved with environmental management activities – including both solid waste and wastewater management. Both initiatives are based upon the principle of use of waste for resource recovery to produce a marketable produce, which can then support local livelihoods. In addition to this, are health benefits and environmental improvements from improved waste management. In addition to the harvest of duckweed for fish production, the plant operators use the land on the side of the lagoons to produce vegetables and fruits which they sell in the local markets

Variations in wastewater flow during the year affects the hydraulic and waste loading considerably, especially during the dry season when local farmers use wastewater from the main collection drain for irrigation. The reduced loading has significant implications on the operational performance of the treatment system – both in terms of quality of effluent and production of duckweed. Other factors which affect the sustainability of the system relate to the concentration of other pollutants (e.g detergents) in the raw wastewater. In terms of replication, the main constraints are financial capital for initial investment for the treatment facilities and cost of land acquisition. The availability of sufficient land is particularly problematic and for this reason, PRISM is seeking ways to reduce the land requirements of the treatment facility, which involves the development of a wastewater filter for pre-treatment of the wastewater.

The overall management responsibilities of the wastewater treatment plant lies with PRISM and the Project Management Unit (PMU), which is responsible for operation and maintenance of the treatment plant. The main members of the PMU are PRISM staff with community committees representatives from the ward level. THE PMU receives support from a Project Advisory Committee (PAC), which provides project direction and coordination to improve the implementation and sustainability of project. As well as members from PRISM, the members of the PAC include representatives from Khulna City Council (KCC) and Agricultural Training Institute (ATI) and the chairperson is the City Mayor.

The revenue collected from the project is kept in a joint bank account of management committee and PRISM. According to the PRISM staff, 80% recovery of the O & M cost has been achieved. PRISM plans to hand the treatment system over the community with an expected revenue collection from the project, which would make it financially sustainable. In relation to sustainability, one of the main problems envisaged is the committee's strength to manage the treatment system and technical soundness of the community to operate and maintain the system. However, prior to this is the need to increase awareness amongst the local community about the potential benefits of improved wastewater management. In general, PRISM has found that community members are more responsive to solid waste and small-scale composting initiatives. The challenge is therefore to motivate people to be more involved in wastewater management activities. One possibility is to combine the wastewater treatment facility with a faecal sludge treatment in order to increase the organic loading to increase the production of duckweed, which would make the treatment system less land intensive.

### Constraints and opportunities for DWWM

Both examples demonstrate how NGOs may engage in the provision of services for wastewater management at the local level. Both are dependent upon higher order facilities provided by centralised agencies – in the DSK case, for the removal of locally collected faecal sludges, and in the PRISM case, for the collection of wastewater.

The benefits of these decentralised operations are not widely recognised due to a general lack of awareness of the problems caused by wastewater and a lack of understanding and skills to tackle the problems. Nevertheless, decentralised system may not be appropriate for all contexts of Bangladesh and the following are recognised to be potential constraints to the implementation of DWWM.

However, both could work without the need for large-scale centralised infrastructure. Although in the case of the duckweed wastewater treatment system, some form of collection system is required, PRISM have already demonstrated in Mirzapur that this type of treatment may be employed at the local, decentralised level. The DSK model could easily be adopted elsewhere, provided that there is access to a facility for treating and disposing or reusing the faecal sludge.

### Availability and ownership of land

In high-density urban areas, land is scarce to construct land-intensive systems, but in peri-urban areas where the housing is less dense, decentralised systems can be more appropriate. However, the availability and ownership of land is a primary constraint.

### Contamination with industrial wastes

Another constraint which is particularly problematic for wastewater reuse relates to the contamination from industrial wastes. In order to facilitate the process of wastewater reuse and recycle, domestic wastewater must be separated from industrial wastewater that can contaminate this resource

### Financial constraints

Although, there is potential for cost recovery to cover for operational costs in both examples, capital finance remains a problem (both being dependent on external sources of funding) for capital expenditure to pay for the infrastructure to initiate the project. However, it can be shown that there is potential for cost recovery in the long term, the challenge remains to identify the most appropriate lending mechanisms. Thus, involvement of the private sector in these activities

needs to be explored and examined. The key question is how to identify and measure the economic benefits of improved wastewater management into a incentive framework and how can this be implemented in practice.

### **Institutional constraints**

Although these initiatives are seen to be successful at the local level, the lack of higher lever institutional support and a policy framework to promote an enabling environment means that these projects tend to remain as isolated cases in Bangladesh.

Decentralisation of wastewater management and consequent new responsibilities is major challenges for local authorities, particularly City corporations and municipalities who have relatively little experience with participatory planning.

### **Capacity building requirements for DWW**

#### **Awareness raising**

Awareness building is an important component to promote wastewater management system. Motivation and awareness for wastewater treatment is still inadequate in Bangladesh and the citizens of the county should be made aware of the danger of the harmful effects of polluted wastewater and the need for its treatment. The government and NGO's could take up awareness building programme in the field for wastewater management.

Decentralised wastewater management systems in Bangladesh are still in the very preliminary stage. If there were more demonstration systems that runs effectively and makes profit, then it would be easier to attract other sectors including the private entrepreneurs to be involved. Pilot projects may be used to demonstrate how the systems operate in practice to show the potential environmental and health benefits

#### **Policy**

The absence of any comprehensive policy framework for wastewater management in Bangladesh is a critical issue. It is therefore necessary to consider the development of an effective and needs responsive policy towards the issue of wastewater management. A strong government initiative is required to take necessary policy measures, formulate projects and their proper implementation under a transparent and strict regulatory framework.

#### **Institutional strengthening**

Institutional strengthening is required to promote the ability of existing organisations working in the sector to plan more effectively and develop efficient management and accounting systems. Due to existing resource constraints, the role of the private sector could help overcome many of the existing problems in service provision by government agencies at the local level. If shown to be appropriate, the public-private partnership model in wastewater management

may be replicated in other cities and towns.

### **Co-ordination**

Any attempt to treat wastewater needs the co-ordination of different agencies and a multi disciplinary approach along with the involvement of local communities and NGOs. The government organisations and autonomous agencies like the Department of Environment (DoE), the Department Public Health Engineering (DPHE), Khulna City Corporation (KCC), Local Government Engineering Department (LGED) should work in close collaboration with NGOs and CBOs working at the local level . NGOs with clear lines of responsibility, open decision making processes, and direct accountability to the community are recognised to make more effective use of resources for improved service provision. Strengthening of the linkages between NGOs and the formal institutions is a critical area of investment for decentralised wastewater management.

### **Human resource development**

Both NGOs, city corporations and municipalities may benefit from capacity building activities including training for improved planning, design, and management of wastewater systems. The National Policy on WSS 1988 highlights the need for capacity building at the local/community level to deal effectively with local water and sanitation problems and states that decentralisation of decision making, training at the local level and local initiatives for resource planning are essential for success.

At present, there are few institutions with the capacity to provide appropriate training in the DWW sector and thus greater emphasis on disseminating training materials and promoting courses is recommended to increase the number of technically competent practitioners working at the local level. In relation to this, the National Policy on WSS 1988 makes specific reference to the objective that DPHE, WASA and Bangladesh University of Engineering and Technology (BUET) will formulate an appropriate training program and impart the same in a decentralised manner.

Capacity building takes place by training local personnel and giving them more access to national and international experience; increasing the exchange of information among international, national, local organisations, and communities; direct experience; and by better management of information.

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## Notes

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## Contact address

Dr. Mahmudul Hasan  
Associate Professor  
Urban and Rural Planning Discipline  
Khulna University, Khulna, Bangladesh  
Tel: +88-041-722594; Fax: +88-041-731066  
Email: drmhasan@khulna.bangla.net, bchwsd@khulna.bangla.net

Md. Nasir Uddin  
Civil Engineer, Halcrow Group Ltd  
Nevis House, Beechwood Business Park  
Inverness IV2 3BW  
Scotland  
Tel: +44 01463231707  
Email: uddinn@halcrow.com

Dr. Jonathan Parkinson  
Environmental Engineer, GHK International.  
Address: 526 Fulham Road, London SW6 5NR, UK.  
Tel: +44 20 7471 8000; Fax: +44 20 7471 8050  
E-mail: parkinsonj@bigfoot.com

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