



# WATER SUPPLY AND SANITATION IN LOW-INCOME URBAN AREAS

GOOD PRACTICE PAPER

2006

# **Water Supply and Sanitation for Low-income Urban Areas**

## **Good Practice Paper**

**Technical Advisory Service  
Danida**

**March 2006**

## Abbreviations

BOD	Biological Oxygen Demand
CBO	Community-based Organisation
CU	Commercial Utility
Danida	Danish International Development Assistance
DKK	Danish Kroner
DTF	Devolution Trust Fund
DWD	Directorate for Water Development
GPP	Good Practice Paper
IBT	Increasing Block Tariff
MDG	Millennium Development Goal
MLGH	Ministry of Local Government and Housing
MTEF	Medium Term Expenditure Framework
NGO	Non-Governmental Organisation
PER	Public Expenditure Review
PRSP	Poverty Reduction Strategy Paper
SARS	Severe Acute Respiratory Syndrome
SIWI	Stockholm International Water Institute
SPS	Sector Programme Support
SWAp	Sector Wide Approach
WHO	World Health Organisation
WSS	Water Supply and Sanitation
WWTP	Waste Water Treatment Plant

## **Table of contents**

### **ABBREVIATIONS**

<b>PREFACE</b>	<b>1</b>
<b>1 RECOMMENDATIONS</b>	<b>2</b>
<b>2 INTRODUCTION</b>	<b>4</b>
<b>3 CONTEXT AND ANALYSIS</b>	<b>5</b>
3.1 Urban water supply and sanitation within the poverty debate	5
3.2 Urbanisation, the growth of slums and the depth of urban poverty	5
3.3 Shifting approaches to development assistance	6
3.4 Danida development assistance and priorities	8
<b>4 LESSONS LEARNED</b>	<b>9</b>
4.1 The Benefits of Water supply, sanitation, hygiene	9
4.2 Integration	10
4.3 Pro-poor interventions	11
4.4 Urban Water and Sanitation Sector Reforms	13
4.5 Cost recovery	16
4.6 General Issues	17
4.7 Urban Sanitation and Hygiene	18
4.8 Capacity Building	18
<b>5 SOLUTIONS TO LOW-INCOME WATER SUPPLY AND SANITATION</b>	<b>19</b>

## **Preface**

This good practice paper has been prepared by the Technical Advisory Services (BFT) with assistance from Barbara Evans, Consultant. The Danish Embassies and Water Sector Programmes in Zambia, Vietnam, Bangladesh, Uganda, Burkina Faso and Ghana have provided valuable inputs to the paper.

This paper is based on a review of relevant recent literature, Danida and other documentation and interviews with a selection of Danida staff, advisers and consultants. The Technical Advisory Services (BFT) would like to thank in particular the following people for their time and assistance: Mogens Mehta, Jens Fugl, Peter Sievers and Sam Mutono, all of Danida, James Corning of Carl Bro, and Vagn Rehøj and his team at COWI, for providing valuable inputs to the paper. Comments to the paper have also been obtained from other persons from the Danish resource base.

Comments to this Good Practice Paper can be sent to the contact person in Danida's Technical Advisory Services: Senior Adviser Jan Møller Hansen (janmha@um.dk)

# 1 Recommendations

In summary, to be effective in scaling up water supply and sanitation access for low-income urban communities, Danish assistance to national WSS sector programmes needs to:

## 1. Change incentives and locate water, sanitation and urban poverty centrally within national planning and budgeting priorities

- provide support for ensuring priority and inclusion of water and sanitation for low income urban communities in national development and sector plans, policies, strategies and legislation;
- ensure a strong poverty alleviation focus and promote empowerment of the least-advantaged communities particularly the urban poor, within national development discourse;
- find effective ways of creating cooperation between ministries of finance and planning, health, water and environment;
- find effective ways of establishing cooperation with other donors, and thereby promote harmonisation and alignment in the urban water sector within emphasis on low-income WSS; and
- proactively “make the case” for investments in low-income water supplies and sanitation both by highlighting the social and economic benefits and the scale of urban poverty both within and beyond the sector.

## 2. Link pro-poor approaches with the overall urban water and sanitation sector reform process

- support the development and rolling out of specific pro-poor approaches coupled with wider urban water and sanitation sector reform;
- ensure that assistance to pro-poor WSS interventions are linked with effective city-wide, small-town or national reform programmes;
- promote sound economic planning and considerations of financial viability in all investments and in operation and maintenance planning;
- ensure that private sector skills and capacity is used effectively to increase the reach and quality of service delivery to the urban poor; and
- provide support to building partnerships between authorities responsible for urban planning, water and sanitation service provision, NGOs and civil society partners.

## 3. Support decentralised local authorities and local communities

- where appropriate provide support to decentralised planning, management, execution and monitoring of pro-poor service provision in cooperation with local authorities and local partners;
- find targeted ways of working with local authorities and local partners involved in water and sanitation service provision;
- support partnerships between local intermediaries (NGOs, local advocacy groups etc.) and the water and sanitation utilities; and
- support community-based management models where the communities and users are organised in community/user groups formed in connection with public stand

posts, public latrines or other communal facilities. The local community should be involved in planning and be responsible for management, operation and maintenance of the facilities. It is often necessary to make agreements between the local community and the local authorities or utility/service provider.

**4. Promote and support well-designed pro-poor interventions that can be brought to scale**

- ensure that particular attention and priority is given to sanitation and hygiene promotion;
- promote pro-poor interventions with a strong emphasis on building the capacity of local communities;
- promote effective, appropriate and gendered approaches to community management; and
- promote the development and appropriate use of technologies that work, provide the services which people need and which are cost effective.

## 2 Introduction

The general purpose of Danida's Good Practice Papers (GPPs) is to provide operational and technical guidance for use within Danish development assistance programmes. As such, GPPs are based on available knowledge and experience. The Government of Denmark places high importance on the continuous updating of its development assistance, based on both Danish and international experiences. GPPs form a framework for the collection and analysis of this experience; dialogue based on the GPPs serves a dynamic purpose in continuously updating and building technical advisory capacity and thinking.

The specific purpose of this GPP is to collate and analyse current thinking on the sustained delivery of water supply, sanitation and changes in hygienic behaviours in low-income urban areas (households and communities) (**Box 1**). Clearly a short paper such as this cannot cover the entire spectrum of experience; while it briefly summarises key lessons learned its aim is rather to place these within the framework of Danida's current development assistance and to propose a few key ideas and new directions for thinking within the sector.

Supplying adequate water and access to sanitation services to urban areas also needs to be viewed within the wider context of overall urban environmental services including solid waste management, urban drainage, housing and urban planning. This paper is predicated on the assumption that these issues are inter-related, but does not deal specifically with these additional topics.

### **BOX 1: Where do low-income urban households reside?**

Low-income households can be found in a range of urban situations, all of which demand slightly different strategies and approaches. In general low-income households experience disproportionate exclusion from basic urban services including water and sanitation. They may reside in large and small urban slums, the mega-slums of South Asia and Latin America, shanty-towns, informal and illegal settlements scattered around the periphery of the urban space, areas of illegal or temporary housing within the city and formal low-income housing areas which lack access to basic urban services including water supply and sanitation.

The general target audience for GPPs are staff at the Danish Ministry of Foreign Affairs, and Danish Embassies, national cooperation partners, advisers, other donors and external consultants. This GPP is specifically targeted at those practitioners dealing with water supply, sanitation and hygiene in low-income urban areas and small towns, those working on urban development in general, and those dealing with national programmes of budget support or basket-funding - arrangements which impact on the water and health sectors.



## 3 Context and Analysis

### 3.1 *Urban water supply and sanitation within the poverty debate*

Danida has been in the forefront of the poverty debate for the last 20 years and has been instrumental in ensuring that sustainable poverty alleviation remains the central theme of all development assistance while the cross-cutting themes of gender equality, environmental sustainability and respect for human rights and democracy are mainstreamed. Danida, in common with other donors, has long recognized the fundamental importance of participation (by the full range of stakeholders) and empowerment for disadvantaged groups. Water and sanitation interventions in low-income areas can be placed within this context, playing a vital role in the very process of tackling poverty, improving living conditions, contributing to economic growth and increasing participation, inclusion and empowerment with particular emphasis on gender and the environment.

It is not the purpose of this paper to deal in detail with the gendered nature of water and sanitation. However, it is critical to emphasise that no interventions can be effective unless they take into account the need for nuanced approaches both to the effective participation by children, women and men in planning, implementation and management of services, and the need to pay close attention to the potential for inequities in benefits to different social groups arising from poor programme design.

### 3.2 *Urbanisation, the growth of slums and the depth of urban poverty*

Interventions to improve the situation of people living in low-income areas are gaining importance within the development arena particularly in the context of the Millennium Development Goals (MDGs). There is no doubt that one of the defining characteristics of the late 20th and early 21st centuries has been the rapid rate of urbanisation. During the 20th century, the world's urban population increased more than tenfold. Today, nearly half the world's population lives in urban centres, compared to less than 15 percent in 1900 (see **Figure 1**)<sup>1</sup>.

While the average size of the world's largest cities has increased dramatically the numbers of people living in rural settlements with urban characteristics or small urban settlements has also grown significantly. These "small towns" are frequently neglected; truly rural programmes offer inappropriate services while urban utilities lack the mandate and skills to serve them.

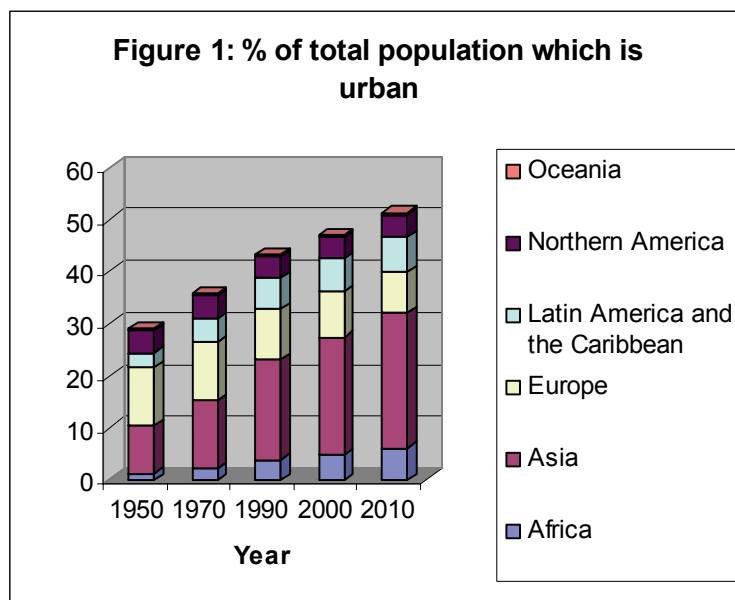
Within cities themselves exclusion and marginalization of the poorest appears not only to be deepening (the gaps between rich and poor widening) but also spreading, so that an

---

<sup>1</sup> Data in Figure 1 derive from United Nations 2004 and cited in World Water Development Report (forthcoming). Figures for rural and urban populations for 1900 are drawn from Graumann, John V. (1977) pp. 16-33. Data for 2000 are aggregate national statistics, many of which draw on national censuses held in 1999, 2000 or 2001 – but some are based on estimates or projections from statistics drawn from censuses held around 1990. There is also a group of countries (mostly in Africa) for which there are no census data since the 1970s or early 1980s so all figures for their urban (and rural) populations are based on estimates and projections.

increasing percentage of the urban population is living “outside” the systems of formal service provision. UN-HABITAT estimates indicate that in 2001, 924 million people, or 31.6% of the world’s urban population, lived in slums. By 2030, half of humanity will be slum dwellers. In other words, in many regions, the formal city is in a process of marginalisation, while the slum is becoming normality. What these data show us is that the needs of the urban poor should be a central element of national programmes of poverty reduction<sup>2</sup>. At the same time increasing demands on the water cycle from both urban populations and rural agriculture are raising the spectre of local water disputes and forcing governments to take difficult decisions about water allocations and environmental management.

Planning water and sanitation services for low-income urban households can no longer take place in a vacuum away from the broader issues of urban water management and integrated basin-wide planning.



### 3.3 *Shifting approaches to development assistance*

While the pressures on water resources are increasing and the development challenge is becoming both more urban and less formal, new thinking is developing about the best ways to deliver international support. In addition to conventional projects many donors, including Danida, are now promoting the concept of sector-wide approaches. A sector-wide approach is often characterised as support to and integration with national programmes, institutions and financing mechanisms, i.e. earmarked sector budget support, pooled or basket funding

<sup>2</sup> There is often heated debate about the relative weight and importance of rural and urban poverty. One of the challenges is that the available data are of poor quality but many observers argue that urban poverty is systematically underestimated. This is because of: (a) the use of generalized poverty lines which fail to take into account the higher costs of living and more monetized economy in urban areas; (b) the use of arbitrary definitions to define “urban” areas; (c) geographical aggregation which masks pockets of urban poverty; and (d) the use of long time-series data which masks periodic crises in the urban economy. For a lengthier discussion of this issue see Satterthwaite, D. (2003)

or other financial arrangements, where donors collectively support a single national development programme and investment plan for a given sector.

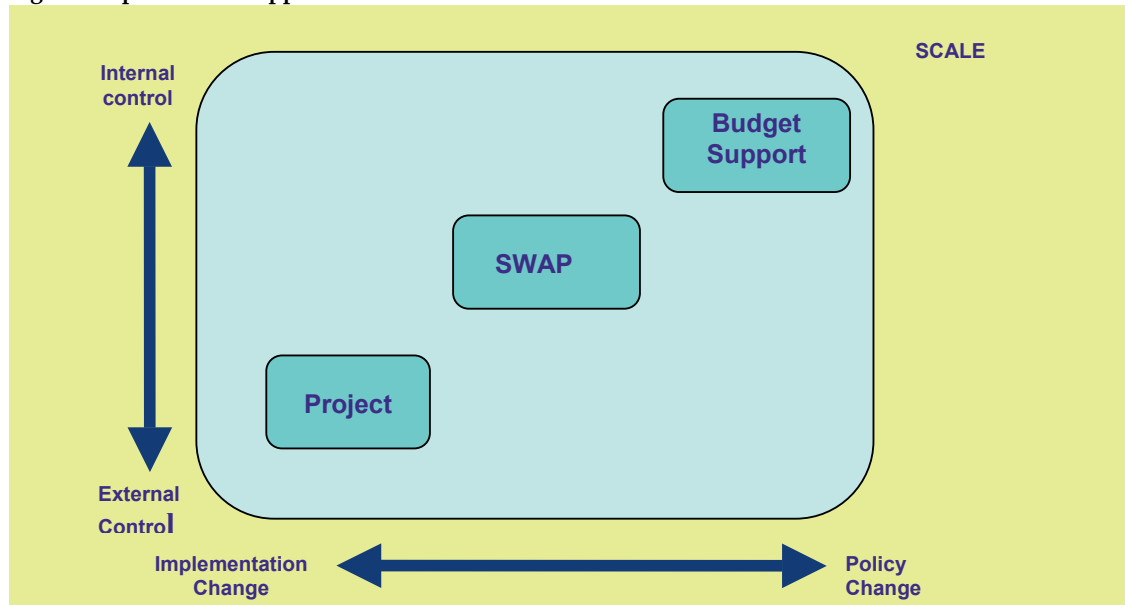
As a further development of this idea, and growing out of the debt relief process and associated poverty reduction strategies, some donors are delivering an increasingly percentage of their support directly to national budgets for a full range of development activities. Budget support, which is usually tied to a small number of ex-ante policy-level conditions, and is delivered as a series of one-year operations, has the advantage that it enables the “pool” of external funds to drive cross-cutting reforms in a way which single-sector project or basket funding has rarely been able to.

**Figure 2** illustrates schematically how the range of development instruments achieves a balance of service delivery against policy influence.

At one end of the spectrum, “projects” with a specific design and implementation arrangement can offer good opportunities to innovate, test and demonstrate new implementation approaches and create localised high impact. Projects are however often implemented with a high level of external control and management. At the other end of the spectrum, SWAp and budget support enable external funds to be used to drive cross-cutting policy change and support internally and government-controlled programmes, which operate at scale. SWAp and budget support also enables increasing harmonisation and alignment between government and multiple donors.

Thus new aid modality instruments represent an opportunity to address a wider range of sector-constraints through a blend of approaches, financing mechanisms and activities. In the shifting development approaches and instruments in the water sector it will be of particular importance that both pro-poor approaches and fundamental sector reforms assign priority and importance to low-income water supply and sanitation.

Figure 2: Spectrum of support instruments



Adapted from Iyer et al. 2005.

These instruments are now increasingly deployed in decentralising environments giving rise to greater requirements support in institutional development and capacity building at the local level while the influence of central departments and ministries is on the wane.

### 3.4 *Danida development assistance and priorities*

The overall objective of Danida's assistance to the water sector is sustainable poverty alleviation with the aim of:

- Improving health;
- Reducing time and drudgery associated with poor levels of service;
- Increasing the involvement of poor people in development;
- Supporting coordination between water, sanitation and health;
- Building capacity; and
- Striving for financial viability.

As the developing world becomes more urbanized, and as increasing percentages of the urban poor are excluded from existing systems of water and sanitation service provision, the low-income sub-sector will become an increasingly prominent part of meeting these objectives and aims. In recent years, Danish assistance to the water sector at country level has been designed with an increased focus and assistance towards improving water and sanitation services for urban poor. The support delivered to the urban poor in Danida-supported programme countries, through a range of development instruments, can have a significant impact on meeting the MDGs and addressing poverty.

Danida is a strong position to play a leading role in promoting solutions to low-income WSS in a number of countries, where it has a long track record in the urban and rural sub-sectors. Such key water and sanitation programmes or projects include (but are not of course limited to) Bangladesh, Benin, Bhutan, Burkina Faso, Ghana, Kenya, Sri Lanka, Uganda, Vietnam and Zambia.

## 4 Lessons Learned

### 4.1 *The Benefits of Water supply, sanitation, hygiene*

The first and most important lesson of relevance is that investments in water supply, sanitation and hygiene have substantial tangible benefits both economic and social but that often, particularly in the arena of low-income communities, these benefits are poorly expressed by line ministries and/or underestimated by ministries of planning and finance.

The relationship between water, sanitation and poverty works in two directions; poverty constrains increases in access while improved access is a cornerstone of poverty alleviation (Ministry of Foreign Affairs 2000).

The primary and best-documented benefit of increased access to safe water, sanitation and the means of hygienic behaviours arises from a significant reduction in the incidence of water-related disease including diarrhoeal disease, trachoma, schistosomiasis, and hookworm infections. There is also growing evidence that improved hygiene, in particular handwashing, may have a significant positive impact on reducing transmission of upper-respiratory tract infections including Tuberculosis and Severe Acute Respiratory Syndrome (SARS). These last two, along with reduced incidence of diarrhoeal disease, are of particular importance in congested urban environments.

Additional benefits to improved urban and low-income water supply, sanitation and hygiene include:

- improved attendance at school, particularly for girls;
- improved educational attainment (due largely to reductions in worm infestations);
- increased time and reduced drudgery associated with collecting water, open defecation, caring for sick family members and sickness itself;
- increased life-expectancy and therefore productive life-expectancy;
- increased worker productivity;
- opportunities for small-scale industry and market gardening;
- a reduction in expenditures on coping-costs at the household level (paying high rates for low-quality services for example); and
- reduced expenditures on curative health.

These gains are known to “stimulate a chain reaction of economic growth and poverty alleviation (Brocklehurst, C. (2004)). A recent exercise to assess the benefit-cost ratios of investments to meet the water and sanitation Millennium Development Goals (MDGs)

showed how effective such investments can be. Summary calculations for Africa are shown in Table 1, which neatly illustrates the point.

**Table 1: Summary of the Benefits and Costs of Improved Access to Water Supply and Sanitation in Africa**

	Meeting MDGs	Providing access to basic water and sanitation for all
<b>Impact of Improved Access to Water Supply and Sanitation</b>		
Cases of diarrhoea avoided annually	173 million cases	245 million cases
Productive days gained annually	456 million days	647 million days
Value of productive days gained annually*	\$116 million	\$168 million
Treatment costs averted annually*	\$1695 million	\$2410 million
Schooldays gained annually	99 000 million	140 700 million
<b>Economic Benefit Cost Analysis</b>		
Cost of interventions per year*	\$2,020 million	\$4,040 million
Total Economic Benefits per year (including value of time saved)*	\$22, 910 million	\$44,040 million
Benefit Cost Ratio	11	11

From: Hutton and Haller (2004). \* All costs and benefits in constant year 2000 US dollars

Specifically in congested urban areas, the environmental aspects of safe water and sanitation are of particular importance. Danida's sector policy on water supply and sanitation states that negative environmental and health impacts are most pronounced in the urban areas, which is also confirmed by many other organisations, professionals and practitioners in the sector (Ministry of Foreign Affairs (2000)).

Perhaps even more significantly, access to safe water and the means of safe disposal of excreta and hygienic behaviours confer dignity and reduce the burden and drudgery associated with income-poverty, insecure living and working environments and poor housing conditions and these benefits too are particularly significant for disadvantaged urban households. Water, sanitation and hygiene are thus central to poverty alleviation, equity and empowerment of otherwise disadvantaged urban communities.

## **4.2 Integration**

An important message of the benefit analysis, which has been carried out, is that the health benefits are much more significant if there is a focus on improved hygiene practices and sanitation; water supply alone has much less impact on many water-related diseases. This important finding has been long understood and is incorporated for example into Danida's sector policy paper on water supply and sanitation, which states that "water supply, hygiene promotion and sanitation are seen as mutually important". Most water sector programmes supported by Danida include significant sanitation and hygiene promotion components.

Nevertheless, there are two important caveats to the call for integration of sanitation, hygiene promotion and water supply:

Firstly that integration of *outputs* and *outcomes* does not necessarily imply a uniform approach to delivery of *inputs* (in other words, institutional arrangements which result in sustained access to water supply may vary considerably from those which impact on hygiene behaviours or access to sanitation). This point is particularly important in the urban arena where the delivery of tandem “networked” services (piped water and networked sewerage) is often taken as a “norm” with little debate. However for many marginalized urban and smaller-town communities, a range of solutions to both services may be appropriate which may call for coordinated *but separate* mechanisms for delivery<sup>3</sup>. This implies involving a number of different partners, i.e. central and local authorities, institutions and service providers, local partner organisations, NGOs, advocacy groups and others working with urban development challenges.

Secondly that in urban areas in particular water, sanitation and hygiene may themselves need to be integrated into a broader developmental programme if they are to be effective. Many people, who live in peripheral urban settlements, do indeed lack access to water and sanitation but they may also face other challenges including low levels of employment, lack of tenure security, high incidence of HIV/Aids, lack of engagement with civic processes, high levels of crime etc. Solutions to water and sanitation may need to be designed within the context of this range of needs, and may in some cases be better delivered as part of a broader urban-development approach.

### 4.3 *Pro-poor interventions*

Over the years Danida has played a significant role in the development of specific low-income or pro-poor urban WSS interventions. Successful interventions tend to have some or all of the following characteristics:

- **A strong focus on building the capacity of the local “community”** to act and manage jointly. The effort needed to achieve “community-participation” in urban interventions may outstrip that needed in rural areas because community cohesion is sometimes very weak and exposure to risk (i.e. low level of employment, insecure housing, health hazards, high level of crimes etc.) is significant. A few strategies have been successful (see **Box 2**);
- **The use of community-based management models** where the communities and users are organised in community/user groups formed in connection with public stand posts, public latrines or other communal facilities. The local community is involved in planning and responsible for management, operation and maintenance of the facilities;
- **The use (and often development) of alternative technologies** which reduce the costs of delivering services – examples include condominal sewers, various types of

---

<sup>3</sup> For a discussion of the institutional constraints which arise from this assumption of “linked” urban services see SIWI, WHO, Government of Norway (2005)

- on-site or shared sanitation, privately-managed sanitation blocks, water kiosks, community and yard taps, and low-cost water networks<sup>4</sup>;
- **The development of an alternative relationship with the utility company** to overcome barriers relating to land tenure, financial insecurity and perceived risk (as for example in Dhaka Bangladesh, where a local NGO DSK, acted as the guarantor to enable the utility to install community water and bathing points);
- **A strong reliance on partnerships** with local intermediaries including civil society.

**BOX 2: Community Management of Urban Water Supply and Sanitation**

Approaches to community management at the local level vary greatly depending on local conditions and the nature of the services to be delivered. In general successful community management takes place in a supportive environment where careful upfront planning to identify suitable approaches is supplemented with access to long-term external support. Robust financial strategies and professionalism seem also to play an important role in ensuring that community-managed services are sustained in the long term. Examples include professionally-managed pay-to-use community toilets, water kiosks and commercial septic-tank and pit-emptying services. Even where services are to be delivered through an existing utility or municipal service provider, the community can play a crucial role in effective up-front planning and in monitoring performance. For many poor urban communities an effective intermediary in the form of a community association or CBO can be vital in providing the necessary assurance that payments or other contributions made to formal service providers will result in services being delivered. At the same time, such intermediaries can play a vital role in reducing the risks perceived by the service provider when entering informal or low-income communities.

Stand-alone pro-poor interventions may often be effective in delivering services at the local level (and indeed have been known to influence national policy) but commonly suffer two significant shortcomings:

- where they are dependent on “networked utility” services (bulk water or networked sewers) they are vulnerable when those networked services fail; and
- where they work, they may have limited impact beyond the immediate neighbourhood because they rely on a localized source (groundwater, local disposal point etc), which is not replicable throughout the town or city on a sustainable basis.

Furthermore, when viewed within the context of the cross-cutting constraints which face the sector (such as weak or inappropriate institutions, ineffective procurement rules, skewed incentives for service delivery to the poor, weak capacity etc) such interventions, while representing “islands of excellence” may be less than effective at making changes which impact at the national level. Thus ultimately, external development partners may conclude that to have a sustained impact at scale, support to local pro-poor interventions has to be linked to an effective city-wide, small town or national reform programme.

---

<sup>4</sup> The term “alternative” here implies that technologies are alternatives to conventional approaches provided by the utility company/ operator. The key to technology choice is the appropriate use of technologies, which work in the given circumstances and which are affordable.



**Box 3** contains an example from the Danida supported water sector programme in Vietnam, which demonstrates some of the above-mentioned characteristics and which is widely acknowledged to have had a significant impact on national thinking about serving low-income urban communities in Vietnam. **Box 4** contains another example from Vietnam where the focus on the needs of local poor communities has resulted in the development of a sustainable and appropriate technical approach to wastewater treatment. Vietnam also illustrates the value of good knowledge management; cooperation between innovative and well performing urban sanitation interventions in cities and the national water supply and sewerage association has resulted in documentation and dissemination of innovative and successful approaches, which have then had the potential to be replicated in the urban water and sanitation sector.

**BOX 3: Innovations in Vietnam (On-site Sanitation)**

In Vietnam, Danida has played a significant, long-term role in supporting and developing innovative thinking for poor urban communities. The Buon Ma Thuot Sanitation Sub-Component is a good example of this type of activity, with its implementation of a multi-dimensional programme of support to the poor, including private latrines to households, public latrines to primary and secondary schools and public latrines to City health stations. Based upon a relatively modest initial DKK 2 million (USD 350,000) Danida-funded investment, an estimated 44,500 poor people in the low-income areas received benefit from improved sanitation.

The key to the success of the programme component was its demand-driven nature, based on both financial contributions and the establishment of workable management arrangements for all facilities. In addition, recipients were closely involved in the development of appropriate technical solutions for on-site school sanitation, with an education campaign central to the public school latrine programme. The health and hygiene education of the children does not end in the schools. The students themselves become “teachers” in their own right, bringing the message of appropriate health and hygiene back to their families at home.

Success in the initial on-site programme has led to a subsequent Minor Project grant by the Danish Embassy in the amount of DKK 3 million (USD 500,000). Expansion of the original grant funding allowed the on-site sanitation programme to provide increased support to the poor by means of improved sanitation. In addition to capitalizing on the proven methodology for private and public latrines used in the initial programme phase, the next phase expanded the scope of improved sanitation with the construction of 30 public latrines in the ethnic Ede minority villages, which are all located within the City’s low-income area.

In summary, the overall on-site programme has provided access to improved sanitation facilities to over 110,000 people within the City’s urban and low-income areas, at an overall cost of just DKK 5 million (USD 850,000). With a per capita implementation cost of less than DKK 50 (USD 8) per person, this programme demonstrates an efficient and effective use of Danida funds. Most importantly, the low cost of implementation creates long-term sustainability for the programme, by demonstrating good practice for future cost-effective expansion of the programme.

(Buon Ma Thuot Sanitation Sub-Component, October 2005)

#### **4.4 Urban Water and Sanitation Sector Reforms**

In contrast to pro-poor project-type interventions, national reform programmes and processes may be more effective at removing structural and institutional constraints to

progress but may fail to deliver pro-poor benefits. Years of experience have shown that sanitation is often completely neglected in the process.

Despite slow progress, many observers acknowledge that a fundamental overhaul of urban water and sanitation services is often required. Some countries have approached the task by engaging with large-scale private sector participation but for the vast majority, the shift can only take place when domestic capacity grows to fill the service delivery gap. Furthermore, many countries have found that reforms have not resulted in significant service delivery improvements even where service providers have stepped in, often because the reform instruments (such as service delivery agreements, contracts, legal instruments and parliamentary acts) were not well designed for the circumstances.

**BOX 4: Innovations in Vietnam (Reclamation of Treated Wastewater for Agricultural Reuse)**

In Vietnam, Danida has been instrumental in its support of innovative ideas to help the poor. By providing the poor with the means to help themselves, they can achieve a sustainable improvement in their standard of living. The Buon Ma Thuot Sanitation Sub-Component has provided such means, with its conception and implementation of a reclamation system for reuse of treated wastewater for agricultural purposes. Reclamation of treated wastewater is the natural evolution of the sanitation project, which has been developed to collect and treat wastewater. The DKK 8.5 million (USD 1.4 million) additional grant has facilitated the development of a sustainable water source to serve the agricultural water needs for poor, subsistence farmers, by recycling 4,000 cubic meters per day of reclaimed water to serve the water requirements for over 100 hectares of agricultural land. With availability of water comes opportunity for sustainable economic development.

From a technical standpoint, the wastewater reclamation system can be described in three steps; enhanced treatment, conveyance and the final delivery of reclaimed water to the farmers' fields. Enhanced treatment is provided in the form of increased maturation pond capacity, which allows improved sedimentation and greater removal of Biological Oxygen Demand (BOD), but more importantly from the substantial reduction in coliform organisms through enhanced disinfection. This is extremely important when considering the health and safety of the farm workers handling the reclaimed water. A reclaimed water pumping station, constructed at the Waste Water Treatment Plant (WWTP) outlet, conveys the treated wastewater to four holding reservoirs located on the two slopes of the adjacent hillside, intended for use as day storage to supply the final gravity delivery pipes, which provide the reclaimed water to the farmers. The gravity pipes are "finely tuned" hydraulically, to allow equal distribution of flow to all farmers using the system, regardless of topographic conditions or location. The system will be managed and maintained by an irrigation district established to sustain this reclamation works for long-term benefit.

In summary, the wastewater reclamation project will provide renewable and sustainable water resources to serve the agricultural needs of poor, subsistence farmers in the project area. No longer will the farmers be dependent upon rains, which may not come, thus threatening the livelihood and security of their families. With water security comes social and economic security. Treated wastewater is a valuable resource, which should be recycled for maximum benefit, and not wasted. This project demonstrates what can be achieved by simply realizing the inherent benefit in the treated wastewater and providing the necessary treatment and delivery systems to utilize this benefit.

(Buon Ma Thuot Sanitation Sub-Component, October 2005)

Three key aspects of these instruments are often weak:

- institutional change is not accompanied by tough (political) decision making (the usual stumbling blocks revolve around investment priorities, tariffs and cost-recovery);
- reform instruments are not explicitly pro-poor - often based on a “western” concept of the water business, which does not reflect the reality of developing country cities and towns where large proportions of the population are not connected to the network, they lack the needed focus on innovation and service expansion in informal settlements;
- lack of adequate consultation and participation means that the interests of the poor are under-represented and that resistance to change is strong based on faulty information and vested interests and priorities.

All three points have an enormous impact on the poor; the vast majority of the unconnected are poor, and the vast majority of the poor are unconnected (to either water and/or sanitation services). Thus, new service providers who have neither the incentives nor the funds to increase access do little to improve the living conditions of the poor. This is not to say that pro-poor reform instruments do not exist (see **Box 5**), but that they may not always be used. Despite these constraints, where support for reform programmes is well-targeted and contains explicit pro-poor provisions it can impact positively on the poor.

**BOX 5: Pro-poor Reform Instruments**

Pro-poor arrangements for urban WSS are generally those which:

**Promote expansion** – through coverage targets, skilled targeting for the poor, designing tariff policies, which make poor consumers attractive and profitable to operators and the delivery (to operators or consumers) of targeted connection subsidies. Good examples can be found in West Africa. For example in Cote d’Ivoire and Senegal operators offer “social connections” – targeted connections which have lower levels of service but which are subsidized either through a levy on the water tariff (Cote d’Ivoire) or through a subsidy (Senegal). A similar approach in Burkina Faso was used to finance sanitation services through a levy on the water tariff.

**Promote and support multiple service providers** – so that in the absence of universal piped coverage alternative service providers (including small-network operators, vendors and sanitation service providers) can operate legally under a light regulatory regime that ensures fair prices and a viable business environment. While the role of small-scale service providers remains controversial they are vital to millions of urban households, particularly in Africa, who cannot access services through the formal network.

**Recognise and support multiple levels of service** – so that households in areas where conventional technologies cannot be used or those who will not be served for many years can access services, which provide basic minimum quality services. The use of output-based technical standards, rather than rigidly enforced input-controls can greatly enhance the ability of operators to innovate to reach poor consumers. Mechanisms such as output-based aid can also enhance this type of innovation – with operators attracting financial rewards for reaching additional consumers.

**Box 6** illustrates how Danish support to the overall reform process is linked to pro-poor service delivery in small towns in Uganda.

#### *4.5 Cost recovery*

Poor levels of cost recovery are often cited as the reason that utilities and municipal service providers do not deliver services in low-income urban communities. Many utility operators say they fear that low-income households will consume low quantities of water and will therefore not be financially attractive to serve or that they will simply not be able to pay at all. Most of the available evidence refutes this position; the value of a reliable water supply and access to basic sanitation is particularly high in households who live in precarious urban environments. Access to reliable services can have a significant positive impact on such households because it frees them from the high costs of purchasing services from alternative less reliable sources and simultaneously frees up time spent queuing for water and attending to sick family members for more productive activities.

Ironically many governments' pro-poor tariff policies may mitigate against low-income households due to the common practice of cross-subsidising consumption through use of an increasing block tariff (IBT). Such tariff practices, often coupled with high connection costs, serve only to increase the perceived risk to the operator of connecting low-income households who may consume only in the lowest, subsidised, block of the tariff. Most households by contrast express relatively high willingness to pay for reliable services suggesting that a uniform consumption tariff would be a more economically rational approach. Mitigating or removing connection fee may often be an even better and more pro-poor tariff strategy since the poor are overwhelmingly represented amongst the unconnected and given that high one-off connection fees often present an insurmountable financial barrier to accessing a reliable service.

Finally, since many unconnected poor households must rely on alternative sources such as vendors, tankers and sales from neighbours, governments could intervene effectively by legalising and regulating such service providers as an interim measure. This would bring down costs as providers would not then be operating in such risky environments and could afford to invest in improving efficiency.

**BOX 6: Danida Support to Small Towns in Uganda**

As part of its ongoing support to the water sector in Uganda Danida has supported an innovative programme of support to small towns water supplies. The objective is to attract local entrepreneurs, consultants and contractors to act as operators of water systems in small towns. The lack of a pre-existing private sector meant that capacity had to be built while contracts were being let; through a combination of targeted training and experience gained on the job. Simultaneously support was provided to the small towns' councils to engage with the new operators.

Danida's support to the overall reform process is strongly linked to the pro-poor strategy for service delivery in small towns which is being developed and rolled out by the Directorate of Water Development (DWD). The strategy has two key elements:

**Pro-Poor Tariff:** Most of the poorer population in small towns cannot afford house/compound connections and rely instead of water from managed standpost kiosks. Ironically, the price of water taken from a standpost tends to be higher than the price for water through house connections because of the operating costs of the kiosk<sup>5</sup>. The ministry has recently set a new tariff, which lowers the volumetric charge for water delivered at standposts relative to water delivered through house connections. Users now face the same cost of water irrespective of whether the source is a house connection or standpost.

**Network intensification to poor areas:** The next step is to extend the piped network to poor low-income areas and unserved poor households within the network to improve their access to the piped supply. Normally the overall water supply system is designed with sufficient capacity for the whole town but the initial piped network is often limited to the core and areas, which are regarded by the utility as more profitable. It was always assumed that the network extensions would gradually be introduced by the Water Authorities, but the new policy makes it clear that these extensions should cover poorer areas and not just the more profitable areas. This policy recognizes that any customer is an attractive customer provided that the tariff is structured correctly; network intensification encourages more customers to use the piped supply irrespective of their financial status.

For more information see [www.danida-networks.dk](http://www.danida-networks.dk) (water and sanitation)

#### 4.6 General Issues

Even where appropriate pro-poor approaches have been developed and urban water/sanitation sector reform is underway there may still be constraints to rolling out low-income WSS at scale. Such "cross cutting" constraints go beyond the boundaries of the sector and may include inter alia:

- **legal/ tenure issues** which constrain the ability of operators to deliver services in low-income and informal areas;
- **legal constraints which link payment to services to the formal banking system** or which prohibit utilities from implementing a frequent payment system (such as is

---

<sup>5</sup> This is a common problem faced by poor households who rely on shared connections (either managed standposts, or house connections shared between neighbours), particularly where an increasing block tariff (IBT) is used. With an IBT the total volume of water used at the shared connection attracts a higher unit rate fee resulting in higher volumetric charges to these families when compared to families who use an individual house connection.

- needed in kiosks for example) which may be appropriate for household reliant on daily wages;
- **capacity constraints** related to lack of decentralised governance and administration;
  - **overall budgeting constraints** which prohibit the design and implementation of a workable subsidy regime;
  - **policy/legal constraints to the operations of small-scale service providers** and alternative operators;
  - **legal/ regulatory constraints to private sector participation** (which may impact on small community-base schemes); and
  - **lack of a reliable national monitoring and evaluation platform**, which results in the development of isolated and costly local sector-specific systems.

#### ***4.7 Urban Sanitation and Hygiene***

Having discussed the general principle that reform and pro-poor approaches are both needed for low-income WSS, it is also important to reiterate that special attention is required for sanitation and hygiene promotion. Key actors in the sanitation arena may be small-scale entrepreneurs, masons, plumbers, retailers and NGOs, who can influence demand for sanitation goods and services along with government and civil society staff working on health and education issues. Where on-site sanitation is appropriate, investments in sanitation and changes in hygiene behaviour are focused on the household (where decisions are made) and the community (where benefits accrue). A marketing approach, which engages with local businesses rather than the utility company, may be more effective in changing behaviours at this level; subsidized inputs may be appropriate either for market assessments and the design of communications programmes or through the delivery of targeted subsidies to households for the purchase of sanitation hardware. Where networked sanitation is more appropriate it is vital to ensure that costs are kept to a minimum (conventional sanitation is often prohibitively expensive to construct and to operate). Condominial-type arrangements, which place an emphasis on collective community decision-making, may be appropriate in some cases. Once again however, it is important not to neglect the need for changes in hygienic practices; few utility service providers have expertise, incentives or comparative advantage in delivering hygiene behaviour change programmes – these need separate funding and institutional arrangements which can be linked but not necessarily embedded in water and sanitation investment programmes.

#### ***4.8 Capacity Building***

The idea that sustainable solutions to low-income WSS are to arise from a combination of effective pro-poor approaches coupled with urban water/sanitation sector reform is a natural extension of the idea of shifting institutional roles, which in turn grew out of the experiences of the International Decade of Water Supply and Sanitation. What has become apparent since the early 90s is that this process of change is itself challenging and requires specific and direct intervention to reduce political resistance and increase the quality of “technical” inputs. Specifically in any country/city situation, capacity building is vital to ensure that:

- governments can play a meaningful “facilitation” role and are supported through the process of reform;
- service providers come forward to support direct implementation;
- investments are sustained and reach the poorest people;
- technology is appropriately-used as cost-effectively as possible;
- prices are set and financial arrangements made to ensure availability of funds for investments and long-term operations and maintenance; and
- the process is participative and results in poverty alleviation and empowerment of the least-advantaged communities.

While it is a rather hackneyed term, partnership is often the key to successful capacity building and to the melding of pro-poor interventions and reform programmes. True partnerships, which bring together actors who mutually benefit on relatively equitable terms, have resulted both in innovation and impact at scale (see **Box 7**)

**BOX 7: Pro-poor urban water Partnerships<sup>6</sup>**

In its simplest form, a partnerships to support low-income WSS might bring together (a) a private company with a concession contract to provide water services throughout a city, (b) the municipal government agency, and (c) a local non profit organization with community ties.

The municipality might work with the company to map the communities and with the regulatory agency to experiment with different types of technology for affordable and sustainable water and sanitation services. A non-profit organisation (NGO/CBO) might work with the company to document the profile of poor households; with the municipality to design education and awareness campaigns on hygiene, drainage and other issues; and with the community to form water committees that can deal directly with the company. Though primarily outputs-oriented, the work of such a partnership has a number of policy implications.

## 5 Solutions to Low-income water supply and sanitation

The solutions to urban water supply and sanitation in low-income areas broadly lie in shifting the incentives so that service providers are encouraged to deliver appropriate services. Such incentives will arise from fiscal and financial policies which make low-income customers attractive to a utility or which incentivise municipal governments to recognise informal communities and link them to systems of formal service provision. The drive for change may come from within the sector, but often may need to come from an external source, particularly through national budgeting and planning process which can send strong signals that such investments are a valuable part of national development programs.

As mentioned above, new development programmes are moving towards the use of a blend of instruments for moving the sector forward. In a general framework, country and sector programmes may identify the need for a range of interventions including:

---

<sup>6</sup> For details of many partnerships in urban water see the work of Building Partnerships for Development on the web at [www.bpdws.org](http://www.bpdws.org). This box is developed from Evans, B et.al (2004)

- **Budget support** to deliver rapid, low-transactions support to the sector where it is “ready” as part of an untied programme of support to the national budget or to drive major policy change<sup>7</sup>;
- **National programmes, SWApS and basket funding** – to contribute to and fund a coordinated national water and sanitation sector programme;
- Urban (with emphasis on low-income/small towns) water and sanitation **sector reform programmes** – to build a national sector programme;
- Urban (with emphasis on low-income/small towns) water and sanitation **investment interventions** – to ensure adequate service delivery; and
- **Pro-poor pilots** – to maintain progress, test and demonstrate innovative approaches.

At any one time a blend of instruments may be used to contribute to an overall sector programme. Danida may often be well positioned to promote new aid modalities and implementation approaches, innovation and to support reforms and capacity building programmes. The key is in identifying the real sector constraints and then developing a programme of support, which helps to remove those constraints.

Where insufficient priority is given to water and sanitation for low-income areas in the national budget and programmes, donors can address this problem both through the use of targeted assistance and pilot activities (which maintain momentum and can demonstrate success). Further it might be appropriate to engage with other donors in a dialogue about SWAp and budget support modalities, which could bring the issue to the attention of the ministries of finance and planning and line ministries<sup>8</sup>.

In other situations, it may be that the implementation approaches are themselves not appropriate (for example there may be a need to develop new cost-sharing mechanisms, to introduce participatory planning or the use of innovative but appropriate technologies). In such cases there may be a stronger case for focusing on well-designed interventions, which can demonstrate new approaches (as for example in the case of urban sanitation and wastewater treatment in Vietnam). These can subsequently or simultaneously be linked to a long-term process of sector planning, possibly in the form of a SWAp.

Multi-donor basket funds and ear-marked sector budget support can be appropriate mechanisms for bringing needed coherence to the sector, particularly in countries which are heavily reliant on external donor support. Specific support for the development of a coherent water sector plan (which is formalized through a SWAp) is important as such a plan provides the framework for governments to coordinate investments and creates a roadmap for the long term reform which may be needed. The existence of a well-developed sector

---

<sup>7</sup> For a more in-depth discussion of budget support in the context of the water sector including the question of sector “preparedness” see Iyer et.al. (2005)

<sup>8</sup> While it is challenging to do so, the most effective approach is probably to work with governments in the development of their regular public expenditure reviews (PERs) and through providing support to the development of the Medium Term Expenditure Framework (MTEF) and the national budget. Only in this way can WSS issues be placed where they belong, within a broader social development planning framework.



plan, which includes investment plans and projected benefits also bolsters the case for increased budgetary allocations from national governments/ministries of finance. Some countries still lack a clear vision and a road map for institutional transformation and development of national programmes based on SWAp and other new aid modalities. Thus to be effective Danish supported sector programmes will have to continue to focus on and support institutional transformation, development of SWAps and basket-funding arrangements wherever possible.

SWAps, including basket funding, are nearly always an effective and important element in the approach to sector development. However, depending on the nature of sectoral constraints, indeed on the maturity of the sector as a whole, these may be coupled with targeted assistance (incl. maybe pilots) *or* they can more usefully be linked to wider budget support operations, which open the door to addressing some of the cross-cutting constraints that cannot be addressed within the sector alone.

For example the Danida-supported programme in Zambia demonstrates how a blend of investment support, capacity building and support to the overall reform process can be used to improve the sector environment and increase the effectiveness and scale of impact of Danish support while building on Danida's proven track record in pro-poor low-income WSS (see **Box 8**).

It is of course desirable that SWAps and sectoral budget support to the water sector specifically address aspects of low-income water and sanitation. It is also often the case that pro-poor and low-income issues may not be prioritised, either because the water sector as a whole is neglected or because rural programmes or urban water sector reform take priority. Funds allocated for low-income assistance may also be hard to track and impact hard to measure.

**BOX 8: Danida assistance to low-income water and sanitation in Zambia**

Zambia is a highly urbanised country where many urban settlements are characterised by high density unplanned low-cost housing. Evidence of the low quality of water and sanitation services is readily available alongside appalling health indicators and high levels of poverty. In recent years the Ministry of Local Government and Housing (MLGH), local authorities, the National Water Supply and Sanitation Council (NWASCO), the Commercial Water and Sanitation Utilities (CU), donors such as the World Bank, KFW, Africa Development Bank and Danida as well as NGOs such as CARE International and other stakeholders have come together to improve the focus on the plight of the urban poor and on low-income WSS in particular.

The Danida-supported programme in Zambia neatly shows how donors and NGOs can work together and support government by using a blend of instruments to push the sector forward in a range of ways. The objective of the Danish assistance is to actively assist GRZ in its progress of working towards a sector wide approach (SWAp). The programme includes a blend of support for capacity building, investment support where these serve as an incentive for political support of sector reforms and support to the implementation of GRZ reforms. For the low-income sector specifically this entails support to the commercialisation of utilities coupled with specific infrastructure investments in poor areas.

Specific pro-poor initiatives include i) **Piloting water kiosks:** The National Water Supply and Sanitation Council through the Devolution Trust Fund (DTF) have developed and adopted a kiosk system for water service delivery. The kiosk system serves to entrench cost recovery and represents the fastest and most cost-effective strategy for Zambia to reach the Millennium Development Goals target for water supplies in urban areas. The approach is now under consideration for large-scale replication; and ii) **Basket funds for service extensions:** The DTF provides financing, technical and institutional support to CUs, who has a clear priority and strategy to extend water and sanitation services to low-income areas. The DTF is essentially a basket funding mechanisms with associated technical assistance, which enables donors to pool financial resources for use by eligible CUs. Danida uses the DTF to channel funds to CUs, who are expanding services to low-income communities.

Source: Water SPS, Zambia, and [www.danida-networks.dk](http://www.danida-networks.dk) (water and sanitation)

For these reasons where Danida's policy is shifting towards the use of more SWAps, basket funding or budget support, country and sector programmes, which aim to influence access to services in informal and low-income areas, need to do two key things. Firstly to position water, sanitation and hygiene for low-income areas centrally in the poverty reduction debate. This means:

- ensuring that there is strong empirical data and analysis to show that investments that delivery water and sanitation to these areas has a strong positive and substantial positive impact on poverty;
- carrying out reliable systematic impact assessments which demonstrate the effectiveness of pro-poor approaches (including for example independent assessments of Danida-supported pilots and investment programmes);
- working with the concerned ministries and departments to ensure that they are preparing coherent, well-designed sector plans including identifying key policy and implementation steps needed to improve the reach and sustainability of investments in low-income areas; and

- establishing links and dialogue with ministries of finance and planning as well as with other donors, to ensure that strategies, implementation plans and budgeting within relevant sector ministries are aligned with the national poverty reduction programme and also with annual cycles of national planning and budgeting across all development sectors.

Secondly, to contribute to a strong process of water sector monitoring and evaluation alongside a programme of capacity building at all levels of central and local governments and amongst other development partners. Without this, the impact of basket funds and budget support may be severely compromised.

## References

- Brocklehurst, C. (2004) *The Case for Water; and Sanitation in PRSPs and Government Budget Allocations: Better Water and Sanitation Make Good Fiscal and Economic Sense*. WSP-Africa Working Paper (mimeo)
- Chung, Do Thanh and Carl Bro a/s Consultant (2004) *Multi-dimensional on-site sanitation program serving the poor; a case study in Vietnam*. Paper prepared for the 30<sup>th</sup> WEDC International conference
- Evans, B., G. Hutton and L. Haller (2004) *Closing the Sanitation Gap – the Case for Better Public Funding of Sanitation and Hygiene*. OECD Round Table on Sustainable Development, Paris
- Evans, B., J. McMahon and K. Caplan (2004) *The Partnership Paper chase: Structuring Partnership Agreements in Water and Sanitation in Low-income Communities* Building Partnerships for Development
- Government of the Republic of Zambia, Ministry of Foreign Affairs, Royal Danish Embassy (2004) *Identification and Preparation Study of Water and Sanitation Sector Programme Support*
- Graumann, John V. (1977) *Orders of magnitude of the world's urban and rural population in history*, United Nations Population Bulletin 8, United Nations, New York
- Hutton, G. and L. Haller. (2004) *Evaluation of the Costs and Benefits of Water and Sanitation Improvements at the Global Level*. WHO
- Iyer, P, B. Evans, J. Cardosi and N. Hicks (2005) *Rural Water Supply, Sanitation and Budget Support – Guidelines for Task Teams* World Bank
- Ministry of Foreign Affairs, Danida, (September 2000) *Water Supply and Sanitation; Danida Sector Policies*.
- Satterthwaite, D. (2003) *The Millennium Development Goals and Urban Poverty: Great Expectations and Nonsense Statistics* Environment and Urbanisation Vol. 15 No 2 October 2003
- UN Habitat (2003) *Water and Sanitation in the World's Cities: Local Action for Global Goals* Earthscan Publications Ltd, London
- WHO, Government of Norway (2005) *Securing Sanitation; The Compelling Case to Address the Crisis* on the web at [www.siwi.org](http://www.siwi.org)
- World Water Development Report (forthcoming) *Water and Human Settlements*
- WSP, PPIAF (2002) *New Designs for Water and Sanitation Transactions: Making Private Sector Participation Work for the Poor*
- WSSCC and WHO (2005) *Sanitation and Hygiene Promotion: Programming Guidance* WHO Geneva

## **Resources on the web:**

Danida Water Network at [www.danida-networks.dk](http://www.danida-networks.dk) (water and sanitation)

Building Partnerships for Development at [www.bpdws.org](http://www.bpdws.org)

Cities Alliance at <http://www.citiesalliance.org/>

International Institute for Environment and Development at [www.iied.org](http://www.iied.org)

Environment and Urbanisation at [www.iied.org/human/eandu/eandu\\_details.html](http://www.iied.org/human/eandu/eandu_details.html)

London School of Hygiene and Tropical Medicine Hygiene Centre at

<http://www.lshtm.ac.uk/dcvbu/hygiencentre/>

Stockholm International Water Institute at [www.siwi.org](http://www.siwi.org)

WaterAID at [www.wateraid.org](http://www.wateraid.org)

Water and Sanitation Programme at [www.wsp.org](http://www.wsp.org)

PUBLISHED BY:

MINISTRY OF FOREIGN AFFAIRS OF DENMARK

TECHNICAL ADVISORY SERVICES

ASIATISK PLADS 2

1448 COPENHAGEN K

DENMARK

TELEFON: +45 33 92 00 00

TELEFAX: +45 33 92 07 90

E-MAIL: [BFT@UM.DK](mailto:BFT@UM.DK)

[WWW.UM.DK](http://WWW.UM.DK)

[WWW.DANIDA-NETWORKS.DK](http://WWW.DANIDA-NETWORKS.DK) ( WATER AND SANITATION )

UDENRIGSMINISTERIET, DANMARK, MARCH 2006