

**Enterprise Development Impact Assessment Information Service
(EDIAIS)**

**WATER AND ENTERPRISE DEVELOPMENT
The contribution of enterprise development to DFID's Target Strategy
Paper: "Addressing the Water Crisis"**

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SUMMARY:

This Briefing Paper is written for DFID's Enterprise Development Advisers and others concerned with enterprise development in the water sector. Section 1 reviews DFID's Target Strategy Paper "Addressing the Water Crisis". Section 2 examines the possible contribution of enterprise development to meeting the international water targets. Section 3 discusses issues in relation to impact assessment of enterprise development initiatives in the water sector. The paper was prepared in August/September 2001.

1. WHAT WATER CRISIS?

The [Target Strategy Paper “Addressing the Water Crisis”](#) sets out DFID’s targets in relation to the water sector. The TSP is divided into six parts. The first, and longest part, sets the scene, describing the present situation in regard to water availability and use, and assessing the main challenges facing water resource management globally. Part 2 defines the targets for the water sector, set both by the international development community and by DFID. Part 3 describes experience to date with water development, whilst part 4 discusses the role that different sections of the development community can play in meeting the targets. The last two parts focus specifically on the role that DFID can play, firstly by looking at DFID’s priorities and activities in support of the overall strategy for water, and secondly by discussing approaches to monitoring.

The water crisis arises because of the increasing demands being placed on the planet’s fresh water resources. The main driving force for this increasing demand is increasing population, especially in middle income and developing countries, coupled with rising per capita demand. This demand arises in three main sectors:

- water for domestic use (demand per capita rises with increasing income)
- water for industrial use
- water for food and agriculture.

There is also a growing emphasis on the importance of water for the environment, in maintaining ecosystems such as wetlands.

The result is an increasing number of people living in countries with significant water stress. (Significant water stress is defined as withdrawals greater than 20% of the available freshwater resources in a country. Although this may seem a small percentage, availability is strongly affected by seasonality, particularly in developing countries.) It is calculated that the proportion of the world’s population living in countries with significant water stress will rise from 34% in 1995 to 63% in 2025. The poor particularly suffer from these changes, since they spend a proportionately greater part of their time and income on gaining access to water, and are often more seriously affected by changes in its availability.

Challenges to addressing the water crisis, as perceived by DFID, include the need for integrated water resources management, mechanisms for allocating water between different sectors (although domestic water is essential for life, agriculture is by far the biggest user), procedures for avoiding conflicts over water, delivering water services sustainably, and improving co-ordination between different agencies.

Part 2 of the TSP introduces DFID’s goals and targets in relation to the water sector.

Box 1 DFID's goal in the water sector

To enable poor people to lead healthier and more productive lives through improved management of water resources and increased and sustainable access to safe drinking water and appropriate sanitation.

Water is seen as contributing to the elimination of poverty in three ways. Firstly, it contributes to **economic well-being** through its uses in agriculture, industry and transport. Secondly it supports **human development** through improved health arising from the provision of safe water supplies, appropriate sanitation and improved hygiene. Thirdly it assists **environmental sustainability** through fresh water provision for ecosystems and reduced levels of pollution.

Three targets to achieving the overall goal are defined in the TSP. The first, arising from the 6th session of the Commission for Sustainable Development in 1998, relates to integrated water resources management, which supplies the framework for allocating water to its various sectors.

Box 2 The target for water resources management

To have comprehensive policies and strategies for integrated water resources management in the process of implementation in all countries by 2005

The second target is the target for water supply, adopted at the UN Millennium Summit in September 2000. At present some 1.1 billion of the planet's 6.1 billion people lack access to safe water (18%). Of those without water, some 300 million live in Africa and 690 million live in Asia.

Box 3 The target for water

To reduce by half the proportion of people who are unable to reach, or to afford, safe drinking water by 2015.

The third target relates to sanitation. The number of people without access to sanitation is much greater than that for water. In total, some 2.4 billion lack sanitation, making 40% of the world's population. 320 million of these people live in Africa, and 1.9 billion live in Asia. There is at present no internationally agreed target for sanitation. The second World Water Forum in the Hague (March 2000) agreed the following target statement, which DFID hopes to promote within the UN system.

Box 4 The target for sanitation

To reduce by half the proportion of people not having access to hygienic sanitation facilities by 2015.

Other targets in relation to water have been defined. Perhaps the most significant of these is that related to water for food, since agriculture is by far the largest user of water. This target is to increase water productivity for food production from rainfed and irrigated farming ("crop per drop") by 30% by 2015. Targets are also defined in relation to reduction of floodrisk, and maintenance of freshwater ecosystems. Whilst acknowledging the importance

of these, DFID places highest priority on integrated water resources management, drinking water and sanitation.

Part 3 of the TSP reviews experience to date. International consensus in the water sector is enshrined in the “Dublin Principles”, arising from the 1992 Dublin Water Conference.

Box 5 The Dublin Principles

- Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment
- Water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels
- Women play a central role in the provision, management and safeguarding of water
- Water has an economic value in all its competing uses, and should be recognised as an economic good

This part of the paper goes on to summarise experience to date by focussing on three approaches:

- Putting people at the centre, reflecting DFID’s emphasis on livelihoods approaches to development
- Responding to demand, leading to sustainable provision of services
- Treating water as a scarce resource, as well as a social good.

Here the TSP notes that there is disagreement over the notion of water as an economic good, and emphasises the role of the private sector in establishing the true cost of water.

Part 4 discusses the role of the various agents involved in meeting the strategy targets. These agents include people themselves (consumers) and their communities, civil society, government, the private sector, and the international community. For the private sector, the paper notes the importance of public/private partnerships. The state has a continuing responsibility for stewardship of the nation’s water resources, and the definition of the relationship between the state and the private sector will be an on-going theme.

Part 5 of the TSP provides more details of DFID’s priorities in relation to the water targets, and the main features of its future work.

Box 6 DFID’s overall strategy in water

- We will seek to focus international policy making in water resources, irrigation, water supply and sanitation on the elimination of poverty
- As a means to eliminate poverty we will concentrate our efforts in improving the management and allocation of water resources and access to water and sanitation on achieving improved health and sustainable livelihoods for the poor
- We will endeavour to obtain agreement through the UN system to an appropriate interim sanitation target and support action to achieve agreed water supply and water resources targets

- We will encourage strong leadership at all levels to address the water crisis
- We will support a range of activities from field-level projects and programmes through to knowledge dissemination, advocacy and research
- We will ensure that our activities in water contribute to, and are guided by, Poverty Reduction Strategies (PRSPs)

In pursuit of this strategy, a range of activities will be undertaken, including:

1. activities to transform institutions, including, in particular, the effective involvement of the private sector
2. activities to promote best practice in the water sector
3. activities to generate and share knowledge. This is based, amongst others, on DFID's Knowledge and Research Programme (KaR), which is discussed later in this briefing paper.

The final part of the TSP is concerned with monitoring progress, including the definition of indicators and monitoring systems.

2. ENTERPRISE DEVELOPMENT AND THE WATER SECTOR

2.1 Who are the stakeholders?

Consumers

The primary stakeholders in the water crisis are consumers. Water is essential to life for all, and therefore consumers comprise the entire range of the planet's population, from rich urban dwellers in first world countries to the rural poor in developing countries. In all cases their interest is to have easy access to safe drinking water and hygienic sanitation facilities, at affordable prices. However the key stakeholders are the poor, in particular poor women, in both urban and rural communities, since they are less likely than the rich to be able to accommodate and respond to the changes imposed by the increasing water crisis.

Figures show that some 10% of urban populations are without access to water, and 20% without access to sanitation. Many of these will be in peri-urban settlements, beyond the reach of formal schemes but perhaps much affected by them. This situation causes particular problems which are likely to increase as urban populations increase in the future.

In rural areas some 30% lack access to safe water, and 70% are without sanitation. Whilst rural populations will not increase as much as urban populations, they face problems with coverage, access, and human and financial resources.

Users

Water for domestic consumption is the priority. However, people also use water, as well as consume it. They use water for industrial purposes, for agriculture, and for environmental maintenance. Water allocated for one of these uses is often entirely used and is then not available for other uses, or for downstream users. Alternatively, it may be so changed by the process, with respect to quantity or quality, that it is no longer fit for other purposes.

The poor have a stake in all the sectors which use water. They use water themselves in small-scale industrial production. They are also often the downstream users of water which has been changed or polluted as a result of its use in upstream industrial processes. Water is also used in a number of other ways which support the livelihoods of the poor, for example washing services, water transport, and water tourism.

The poor are major users of water for agriculture, in rainfed or irrigated production. Irrigated agriculture currently produces 40% of the world's food. In some countries, such as Pakistan and Egypt, virtually all food is produced with irrigation. The poor therefore have an interest in using water for agriculture, as part of their overall search for food security.

Water for environmental maintenance is also of concern to poor people, where they make use of the resources supported by freshwater ecosystems. For example, the Usangu Basin in SW Tanzania contains a wetland which supports a flourishing artisanal fishing industry. Those involved with this industry (fishermen, and the supply and marketing chains associated with them) have a continuing interest in the allocation of part of the scarce water of the basin to the maintenance of the wetland.

Enterprises

There is a range of enterprises with a stake in the water sector. At one end of the scale are the large metropolitan and municipal undertakings, supplying millions of people, and which require commensurate budgets and resources. Their activities are of interest to international companies, who have experience of these undertakings in developed countries, and see opportunities for business development in middle income and developing countries.

Of more concern to DFID's Enterprise Development Division are smaller enterprises with the potential for activities in the water sector. These include:

- the formal Small and Medium Enterprise (SMEs) sector, typically organisations such as petty construction or supply companies employing a small number of people and delivering limited services over a small area,
- the Informal Micro-Enterprise sector, typically a person selling water or providing other services to individuals or households.

Some enterprises are users and polluters of water as part of their enterprise processes. In this case, the impact of enterprise development on the water cycle and other water users must be assessed using the normal procedures of environmental impact assessment. The emphasis here will be on the use of clean technologies, minimising waste, quality assessment and other technological and related social issues.

The remainder of this paper is concerned with enterprises in the private sector which see opportunities for business development in the water sector, and focusses particularly on SMEs and the informal micro-sector. The involvement of large enterprises in large-scale water sector development is a specialist undertaking, and some different principles apply.

2.2 What contribution can enterprise make?

The water sector provides considerable opportunities for the involvement and development of enterprises, at a range of scales.

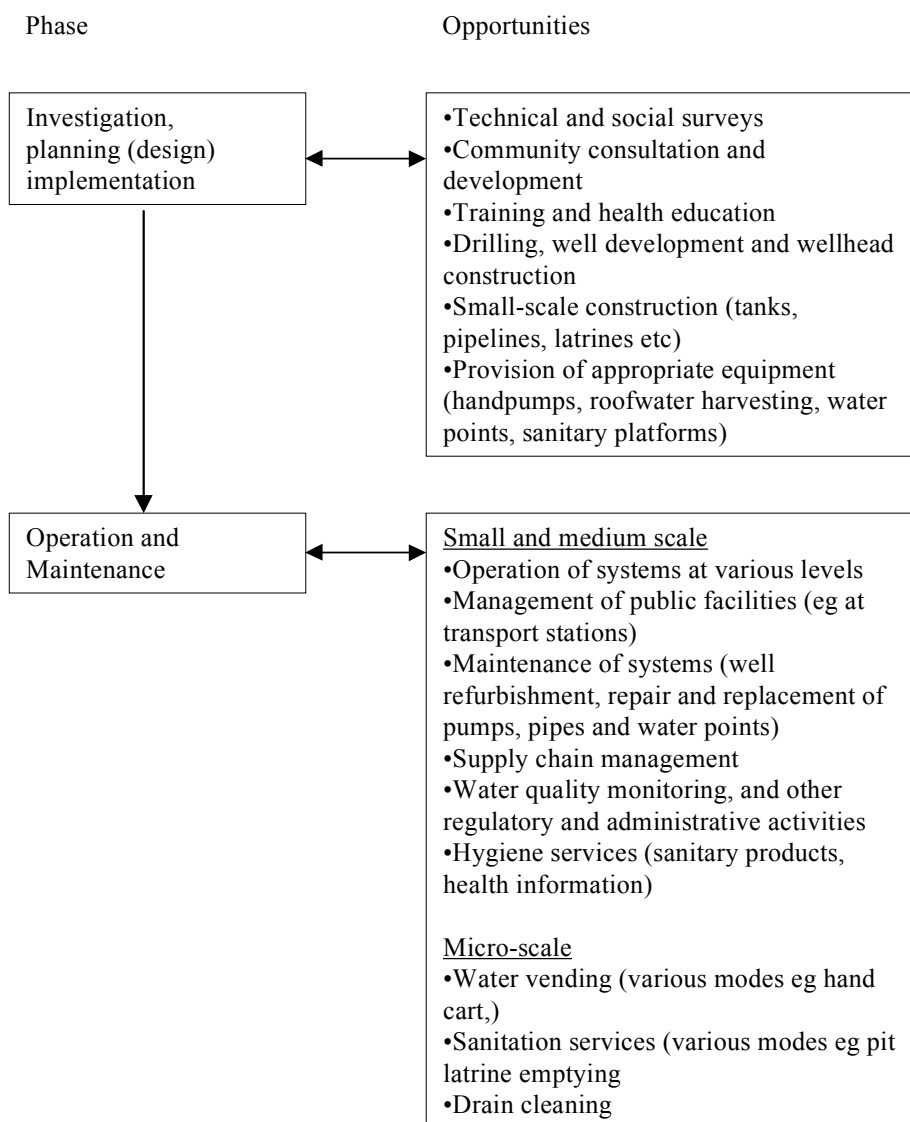
In relation to the specific targets of the TSP, opportunities are relatively limited in connection with the formulation of policies and strategies for integrated water resource management, since this tends to be a one-off, political

process. Nevertheless, there is of course scope for private sector involvement, both as stakeholders, and as providers of expertise.

For the water supply and sanitation targets, the scope for enterprise involvement is much greater. These opportunities are best seen in relation to the programme cycle, as shown in Figure 1. Naturally, those opportunities related to the development phase (investigation, planning and design, implementation) are limited in time and therefore possibly in scale, though they may offer good potential for SMEs to develop skills which are transportable and applicable in other sectors. Opportunities in the operation and maintenance phases, by contrast, may occur over the long-term, allowing businesses to become settled and established. It should also be emphasised that Figure 1 summarises the business opportunities. There are, in reality, a very great variety of mechanisms by which enterprises become involved in, for example, water vending. These can range from selling by the bucket, to use of various types of vehicle, and from selling water at a wellhead, to operating a small distribution network.

Whilst the TSP focusses on water and sanitation targets, there are also opportunities for enterprises in other parts of the water sector. Water has an important role to play in power production. Although most of this takes place at the large scale involving major hydro-electric undertakings (and is also currently the subject of intensive debate in development circles) nevertheless there is a significant role for micro-hydel plants. This forms a suitable entry point for medium-scale enterprises which can develop and support the appropriate level of technology.

Fig. 1. Opportunities for Enterprise Development in Water and Sanitation



Water for food also provides many important opportunities for enterprise. These range from supplying water (in Bangladesh, operators of small mechanical pumps can move from well to well, selling water to a number of different farmers) to agents in the marketing and distribution networks, both for inputs (supplies of seed, fertiliser and pesticide) and for outputs (crops, crop processing, and crop residues). It should, however, be noted that crop prices are at historically low levels, and that there are therefore limited business opportunities related to crop production by itself. All of these enterprises add value to water, and can have a significant impact on water availability and use for agriculture.

Many smallholders face production constraints caused by lack of credit or access to markets. This may mean that they have to use water for irrigation at a time when it is scarce (for example, at the end of the dry season). Reducing such constraints may make scarce water available for other users. A recent study on markets for irrigated horticultural crops in Zimbabwe revealed a dearth of marketing opportunities, even including a lack of weekly village markets. Enterprise development has a potential role in assisting in the development of a marketing system in such a situation. By comparison, Nigeria has a very sophisticated indigenous marketing infrastructure, so that such assistance would be irrelevant in that case.

2.3 Case Studies and Reference Material

A large amount of sources, case studies and reference material is available, on the web and in documentary form. This section focuses primarily on web-based material as being most immediately accessible to the majority of users of this briefing paper. A few of the most important sites only can be mentioned here. The reader is referred to them for access to the wealth of other material available.

Key sites

The Water and Sanitation Program is a partnership between several of the leading development agencies, and its website has correspondingly wide coverage. The main sections of the site www.wsp.org cover the world by geographical region, and by focus areas (services for the urban poor, rural and small towns water and sanitation services, participation and gender, health and hygiene). Other parts of the site detail partnerships, activities of the programme and publications and videos. A very useful basic reference which can be downloaded from the publications section is Independent Water and Sanitation Providers in African Cities: A 10-country Study by Bernard Collignon and Marc Vezina. This gives a good review of the range of services in the water sector that can be provided by private enterprise. <http://www.wsp.org/english/pubs/pubs.asp?sort=author>

The World Bank, besides supporting this programme and several of the other initiatives described in this section, is also active in water and sanitation on its own account. The key site is <http://www.worldbank.org/watsan>. Part of this

site deals with private sector participation and private sector providers, with further links to supply chains, SME development and independent providers. An example is given in box 7.

These are two of the key sites dealing with water and sanitation, but there are many others. For example, <http://www.wupafrika.org/> focuses on the sector specifically in the context of African utilities.

Box 7 The role of SMEs in water

Small and Medium Enterprises (SMEs) are increasingly attracting attention for their key role in delivering water supply and sanitation services in rural areas. Typically, SMEs work on the sector as suppliers of spare parts, hand dug well contractors, area mechanics, latrine artisans, community development specialists and technical service providers. In delivering services, however, many SMEs face different constraints and opportunities than large firms. In particular, they lack access to the formal financial system, lack information regarding market opportunities, and face significant transaction costs due to the small scale of community works. As a result, project planners are finding that they must tailor private sector capacity building strategies to the particular needs of SMEs.

<http://www.worldbank.org/watsan/topics/psproviders.html>

Part of NRI's site focusses on rural enterprises. This gives some guidance on support of enterprises which use water for food <http://www.nri.org/work/ruralenterprise.htm>.

Knowledge Networks

The TSP makes reference to knowledge networks concerning the involvement of the enterprise sector in water. The sources referenced focus on partnerships between the public and private sectors to extend coverage of water services, and tend to relate to large-scale interventions and enterprises. Nevertheless, some interesting and relevant material is available.

For example the Public-Private Infrastructure Facility (PPIAF) is a multi-donor technical facility aimed at helping developing countries improve the quality of their infrastructure through private sector involvement. A joint initiative of DFID and the Government of Japan, working closely with the World Bank, the PPIAF aims are to channel technical assistance to governments in developing countries on strategies to support private involvement in infrastructure, and to disseminate best practice. A range of financing and support mechanisms are available. For example, in Malawi it supported a study of the options for private involvement in the water sector in two urban centres, Blantyre and Lilongwe. In South Africa it assisted the City of Johannesburg in defining structural, regulatory and institutional reforms in support of private involvement in its water and electricity utilities. <http://www.ppiaf.org/>

A similar range of services is offered by the Public Private Partnership for the Urban Environment <http://www.undp.org/undp/ppp/> . The current UNDP facility supports activities and projects focussing on some of the most urgent environmental problems, including, amongst others, inadequate water supply and sanitation infrastructure. It aims to bring together government, private business and civil society to pool resources and skills to improve basic services at local levels.

Business Partners for Development (BPD) is also studying the potential for partnerships to address the developmental needs of poor communities around the world. BPD works through five “clusters”, one of which is the Water and Sanitation Cluster. This aims to improve access to safe water and effective sanitation for the rising number of urban poor in developing countries. By working in partnership it is presumed that governments can ensure the health of their citizens with safe water and effective sanitation while apportioning the financial and technical burden, the private sector can effectively meet their contractual obligations while ensuring financial sustainability over the long term, and communities can gain a real voice in their development. The cluster works with eight focus projects round the world (box 8).

(www.bpd-waterandsanitation.org)

Box 8 BPD Project Focus – BoTT, South Africa

BoTT (Build, Operate, Train, Transfer) is a public-private partnership. Scheme funding is from the public sector while private partners undertake project implementation. BoTT is primarily targeted at poor communities and small, largely poorer, towns. One of the key principles is that sustainability can only be achieved by actively involving communities and local government in all stages of the project life cycle. BoTT thus attempts to build up capacity within institutions, communities and councils in order to pursue an integrated and participatory project development approach. A ‘one-stop shop’ capacity is created via a consortium of service providers with expertise in five key disciplines: design, construction, operation and maintenance (O&M), on-site sanitation, and Institutional and Social Development (ISD).

DFID’s Knowledge and Research Programme (KaR)

DFID’s Knowledge and Research Programme provides a range of relevant material from on-going or recently completed projects (<http://www.hrwallingford.co.uk/projects/dfid-kar-water.html>) Three such projects are described below.

A project Public Private Partnerships and the Poor in Water and Sanitation is based at WEDC, Loughborough University. This project focuses on defining workable processes and relationships between organisations which are qualitatively different, e.g. municipalities, private firms, local user associations, and vendors. Like BPD, it works through case studies, two of which are in South Africa. A useful basic text, Interim Review of Documents, can be found in a pdf file on the site. <http://www.wedc.ac.uk/projects/ppp-poor/index.html>

Cranfield University has recently completed a project Private Sector Participation in Low Cost Water Well Drilling. This project therefore focusses on the development phase of water services, looking at how contractors can respond to the opportunities offered. Further details are available at <http://www.silsoe.cranfield.ac.uk/iwe/projects/lcdrilling/> but this site does not yet include copies of the reports.

The KaR programme works through themes (water resources development, water resource protection, water supply and sanitation, and water for food). Under the Water for Food theme, HRWallingford are undertaking a project Creating Sustainable Smallholder Irrigated Farm Businesses. Part of it will look at the external environment for smallholders, examining the marketing and input supply chains, and studying how smallholders can secure information and services..

2.4 What more can be done – constraints and opportunities

Previous sections have outlined the range of opportunities for enterprise development, and some of the work already done or on-going. There is no doubt that there is great potential in the contribution that enterprise can make, not just to achieving the water targets but also to other international development targets, for example by creating employment and empowering women (Box 9).

So, what are the needs, and what can those working in enterprise development do to increase their contribution and impact? These can be seen under two broad headings:

- making things work, where they are not working
- providing the appropriate business services and environment.

Box 9 WaterAid's experience: Sanitation in TamilNadu

The commercial marketing technique of providing informed and affordable choice helped trigger latrine construction. Project activities could be labelled in conventional retail marketing terms: design, pricing, promotion, production, delivery and credit. Supplying safe sanitation became a thriving cottage industry. Training local institutions and people to exploit this business opportunity provided the efficient delivery of goods, and expanded local employment opportunities. By contrast, earlier government attempts to promote sanitation involved impersonal, unreliable and expensive outside interventions.

<http://www.wateraid.org.uk/research/index.html>

Making things work, where they are not working

Much of the thrust of the activities described in this briefing paper is related to exploring the relationship between the public and private sectors. Government

must retain the stewardship of a nation's water resources, and the ultimate responsibility to see that its citizens can live in dignity, with good access to basic services such as water and sanitation. However it is increasingly being realised that Government need not, and indeed can not, be responsible for comprehensive provision of these services. Private sector providers offer a good way to reach sections of the community which are often neglected by state provision, such as the poor and the marginalised, for example in peri-urban areas and small towns. Moreover, private sector providers can operate at a range of scales. SMEs and micro-enterprises can supply individual services and reach individual consumers who would often be overlooked or unreachable through state provision. Nevertheless, incentives for small-scale providers can, in some instances, become too good, and they then become part of the problem, rather than part of the solution. There is therefore a need for regulatory frameworks to protect consumers, as discussed in the next section.

Enterprise development should be looking for opportunities at the entry points, where the state is unable to provide effective services, and where the private sector can respond in a flexible way to meet consumers' needs (Box 10). At the same time, there is a need to assess how the public and private providers can work in partnership, complementing rather than competing with one another. Another need is to ensure that, as the private sector enters into construction and supply activities, clients (central and local government, and perhaps local communities) have the capacity and experience to supervise adequately. With the emphasis in many places on decentralisation, this capacity can not be taken for granted.

Box 10	Supply Chain Management
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The long-term success of rural water supply and sanitation schemes is, in part, dependent on an effective supply of goods and services, such as spare parts, repair services and facility management. These goods and services are provided to consumers through supply chains – from manufacturers, importers and service providers through a network of distributors, to retailers and local artisans. Payments, in whatever form, are made through the supply chains in the opposite direction. See <http://www.wsp.org/english/activities/supply-chains.html>

Although in many cases the main opportunities for SMEs will be with the smaller rural and peri-urban water schemes, there are also possible opportunities in the larger urban setting. For example, in Ukraine commercialisation of public sector water companies resulted in a reduction of the numbers of public sector employees, but it was at the same time linked to the hiving-off of non-core businesses to the private sector for competition. This created new opportunities for private enterprise.

Providing the appropriate business services and environment

SMEs and micro-enterprises in the water sector are similar to other such businesses, and benefit from the same range of support mechanisms and interventions (Box 11). These can range through:

- business development services – such as market assessments and assistance with identifying and quantifying business opportunities
- training – ranging from business skills such as book-keeping to technical skills such as pump maintenance
- credit – SMEs in particular often suffer from a lack of credit at the levels which are needed to sustain their business, whereas under present conditions, micro-enterprises may find this somewhat easier.

Box 11 Private Sector Participation in Low Cost Water Well Drilling – Key Findings

- Small water sector businesses suffer from major conceptual, financial, organisational and technical weaknesses. Nevertheless they welcome and respond to training and capacity-building in all these areas, when carried out with understanding and in a spirit of mutual trust between trainer and trainee
- Small businesses suffer from a range of external constraints, ranging from access to credit, technology and training, to the need for “contacts” and “brown envelopes” in order to win contracts.

<http://www.silsoe.cranfield.ac.uk/iwe/projects/lcdrilling/>

There is also a need to establish the appropriate business and regulatory environment. Regulation is needed to protect consumers, and to ensure that the private sector is providing safe and reliable services. This extends from maintenance of construction standards, to ensure that structures are soundly built and do not pose a potential hazard, to regular monitoring of water quality, to avoid health risks. Such regulation, however, needs to be applied in such a way that it does not pose a barrier to entry for private enterprise. There is also a need for business regulation, to prevent exploitation, or the development of monopolistic structures which deter competition and reduce access by raising prices.

Co-operation between the public and private sectors is also a possible entry point for support. For example, the efficiency and integrity of public systems can be subverted by people's private efforts to meet their water needs with illegal connections which have a high rate of leakage. This can be combated by a reasonably priced and speedily processed authorisation procedure for private connections.

Finally, although in general private sector providers offer a good way of reaching sections of the community which are often neglected by state provision, there may also be situations where the poor and marginalized can be difficult to reach even by the private sector also. In such situations, a pro-poor policy environment can assist, and can be an important facilitator/restrictor of enterprises.

Many of these approaches can be taken up within the concepts of [“making markets work for the poor”](#). Further discussion of this can be found on the [EDIAIS site](#).

3. ASSESSING THE IMPACT OF ED INTERVENTIONS

Assessment of the impact of ED interventions in the water sector is subject to the same broad framework as interventions in other sectors. For a general treatment of impact assessment, the reader is referred to the [EDIAIS core text \(Overview of IA and ED\)](#)

At policy level, there is a need for strategic impact assessment of policies and strategies. In the water sector, the increasing emphasis of private sector provision may have a range of impacts, from impacts on water resource availability to public health, employment and income impacts. These need to be assessed, and factored in to policy debates and policy-making.

At the project or intervention level, a distinction must be made between ex-ante assessment and ex post assessment. Ex-ante impact assessment is an input to appraisal and decision-making. It requires both the definition of the baseline situation and a method of forecasting changes resulting from the intervention. Ex-post impact assessment is the basis for monitoring, evaluation and feedback to the programme cycle. It requires the definition of monitoring systems and indicators.

This section of the briefing paper discusses, firstly, the key issues which must be considered in relation to assessing impacts in the water sector generally, and particularly the impact of enterprise interventions and, secondly, the types of indicators which may be appropriate for measuring those impacts.

3.1 Key issues

Water is a large and multi-dimensional sector, with impacts on many other human activities and natural processes. It is therefore inevitable that assessing the impacts of interventions in the water sector will be a complex undertaking, often involving many different stakeholders, and requiring extensive knowledge and judgemental skills. The following are some of the key issues which may need to be considered:

- Women play a key role in managing water resources, particularly for domestic consumption. There is a wealth of material available which discusses this (see for example <http://www.wsp.org/english/focus/png.html>) Whilst women should therefore often be the prime beneficiaries, particular care needs to be taken in assessing the impact of interventions on gender roles and balance, to ensure that new methods of delivery do not disadvantage or disempower women.
- Related to this, interventions in the water sector have a complex set of linkages with other human development sectors. The most obvious of these is probably the public health sector. Better water supply may reduce the incidence of water-borne diseases such as cholera, whilst interventions

in irrigation for market gardening may actually increase the possibilities for malaria by providing breeding sites for mosquitoes.

- In assessing impacts, it is often useful to make a distinction between consumptive and non-consumptive uses of water. Consumptive uses are all those such as irrigation which consume water and thereby make it unavailable for other users, through evaporation, transformation, contamination or other processes. Non-consumptive uses use water but return it in approximately the same quantity and quality, so that it can then be reused by others downstream. Many domestic uses are non-consumptive.
- Water is a natural resource with a subtle and important set of linkages with other natural resources (especially land). There is a need for a good understanding of these linkages to support a good assessment of impacts. For example, abstraction of water for domestic consumption from a stream or an aquifer (groundwater source) will affect the quantity and possible also the quality of the remaining resource. The hydrological cycle (www.und.nodak.edu/instruct/eng/fkarnar/pages/cycle.htm) is a useful unifying concept within which to consider these issues. The variation and change in quality over seasons must also be considered, along with sustainability and long-term impacts, such as saline intrusion into groundwater resulting from overabstraction.
- Water is a mobile resource. Changes in patterns of behaviour by upstream users can have significant impacts far downstream. It is therefore particularly important to assess impacts on down-stream users, and off-site. This may be made more difficult by the fact that water flows across administrative boundaries (hydrological boundaries rarely co-incide with administrative boundaries), presenting problems of data collection and consistency. One way in which the water community is trying to deal with this problem is to work with the concept of “river basins”, which looks at the whole unit from the upland catchment to the downstream drainage paths (see, for example, <http://home.vicnet.net.au/~rbms/>). Since there will often be competing uses, overall impact needs to be considered, and there should therefore be some means of planning, regulation and conflict resolution within the zone of influence. This can often be done within the river basin.
- With regard to water and enterprise, a number of specific issues may need to be considered:
 - Considerable emphasis is currently placed on the importance of valuing water (see, for example, the Dublin principles, Box 5). However, it is difficult to reach a valuation that everyone (politicians, consumers, environmentalists, companies etc) are happy with. The poor always pay more, both in real terms and certainly in proportion to income. There is also an increasing interest in valuing water for environmental maintenance, and in deciding how that water should be paid for.
 - Private sector involvement means profit. Regardless of the rights and wrongs of this, it adds a significant percentage to implementation costs.

Private sector involvement may also mean more corruption, if there is wheeling and dealing to win consultancy, construction or supply contracts. Private sector involvement may also produce an attitude shift (as has happened in the UK) from water as a resource to be stewarded to a view of water as simply an economic commodity.

- Interventions involving private enterprise should be assessed for their possible impact on community participation. If the private sector constructs systems, or supplies services, what is the role for community groups? Again, the impact assessor must try to identify and understand these linkages in support of good policy-making and management.
- Finally, a common occurrence is that water and sanitation services are provided by more than one supplier, and using more than one source. It is important to ensure that this is fully taken into account. The assessment should therefore include, where appropriate, comparison of levels of service, and impact on other providers.

3.2 Indicators

Indicators are a basic requirement for impact assessment, both for identifying the baseline, and for monitoring and predicting future changes. The key indicator for water and sanitation is access. As described in the TSP, information on the numbers of people without access to both water and sanitation is collected on a 5-year cycle under the WHO/UNICEF Joint Monitoring Programme.

However reliance on simple ideas of access tends to hide some of the complexities of the sector. There is therefore a real need to monitor some of the more subtle concepts of livelihoods, and also to monitor aspects of enterprise in relation to water. The table below provides a structure for considering impacts related to water and enterprise, and suggests the types of indicators that might be useful for measuring these impacts.

Indicators for Water and Enterprise

Goal	Impact	Indicator (or proxy)
Water	Service Delivery <ul style="list-style-type: none"> ▪ quantity ▪ quality ▪ coverage 	Volume supplied Consumption per capita Quality at point of consumption Reliability (breakdowns and interruptions) Percentage of the population served Costs of services from different providers
	Livelihoods	Affordability (percentage of income spent on water) Time spent in collecting water Health (hygiene practices)
	The physical environment	Water and land quality Biodiversity Amenity values
Enterprise	Business	Volume and turnover Payment and debt levels Profitability
	The business Environment	Quality assurance (fines for non-compliance) Measures of corruption
	Social issues	Jobs created Skills developed

A considerable amount of work is being done, both in the water sector, and in enterprise. For the water sector, see for example:

<http://www.wupafrica.org/>

<http://www.wsp.org/english/focus/png-pla-chart.html>

<http://www.bpd-waterandsanitation.org/water/library/pubseceng.PDF>

All of these work with the general ideas incorporated in the table above, and develop them further in one way or another.

A more general treatment of indicators is contained in a paper to be posted on the EDIAIS site late 2001. Of particular importance in the water and sanitation sector is participatory monitoring, in which individuals and communities have a role in defining their own indicators and undertake their own monitoring, as part of the process of ownership of development. A significant debate is now going on about the need for indicators to be defined and measured by people (particularly the poor) for their own development, and the relationship that

these may have with indicators defined by others such as government, and financing agencies, involved with managing interventions.

Indicators for other components of the water sector are also briefly mentioned in the TSP. Enterprise development may become involved in interventions concerned with water for food, and here the key indicator is “crop per drop” (crop production per cubic meter of water). It is hoped that increasing efficiency of water use in agricultural production may have a significant impact in addressing the water crisis, and making more water available for other users. The poor stand to benefit from this as much and perhaps more than other consumers.

4. ENDNOTE

Enterprise development in water does work....

Box 12 The case for entrepreneurs

Small-scale operators (in water and sanitation) tend to be customer-driver, financially viable, and ready to apply innovative technologies and marketing methods. They provide appropriate solutions in appropriate places, assume all investment risks, and reach the poor. They charge market prices, cover costs, and respect willingness to pay.

Competition in Water and Sanitation: the Role of Small-Scale Entrepreneurs by Tova Maria Solo. <http://www.worldbank.org/html/fpd/notes/water.htm>

and it can have benefits beyond the water sector....

Box 13 The Women of Kamwezi

The project masons were effective in training two teams of women from Kamwezi (in constructing concrete water tanks) and their work is of at least the same quality as the trained and experienced masons. Men in the village have been amazed at the ability of their women-folk. They have started to assist the women with agricultural work in the fields (digging and planting). The status of women in Kamwezi has improved and the confidence and dignity of at least some of these women has increased. The income generating potential of these women has also increased.

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