



The productive use of domestic water supplies

How water supplies can play a wider role in
livelihood improvement and poverty reduction

Thematic Overview Paper

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Please note that the TOPs are a web-based series. However, we feel that those who don't have access to the Internet should be able to benefit from the TOPs as well. This is why we have also made them available as paper versions.

The structure of the TOP web pages is different from that of the paper documents. We have tried to accommodate that by placing the links in footnotes of this document and also by placing information that is not part of the running text of the web version, in the annexes of this paper version.

However, you may still come across some sentences or paragraphs that seem a little strange in this paper version. If you do, then please keep in mind that the TOPs are primarily intended to be web pages.

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Contents of each TOP

Each TOP consists of:

- An Overview Paper with all the latest thinking
- Case studies of best practice
- TOP Resources:
 - links to books, papers, articles
 - links to web sites with additional information
 - links to contact details for resource centres, information networks or individual experts in your region
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IRC's Thematic Overview Papers (TOPs) aim to give their readers two kinds of help:

- Easy access to the main principles of the topic — in this case productive uses of water — based on worldwide experiences and views of leading practitioners
- Direct links to more detailed explanations and documented experiences of critical aspects of the topic on the world wide web

To find out what this TOP is about, you may read the Summary.

You'll find the main components of this TOP in the menu on the left. If you want to read the TOP from start to finish go to the Introduction and click on 'continue' or 'read on' at the bottom of every page. This will take you through the whole TOP. If you wish to short-circuit the full read, the menu on the left allows you to hop to any special area of interest you may have within the TOP.

As you read, you will find various temptations to link to other documents with useful and more detailed advice or experiences. In most cases, the underlined link will take you first to an abstract on this website telling you more about the linked document. You may then decide whether to let your browser take you to the full reference for reading, printing or downloading.

Introduction

Contrary to the fondly held beliefs of many planners and engineers, large quantities of any 'domestic' water supply are used for 'non-domestic' productive purposes. People do not just drink water, or use it to wash or cook. They use it also to grow crops and water livestock and to produce goods and provide services in and around the household. Traditionally the water and sanitation (WATSAN) sector has occupied itself with the former small subset of activities described as 'domestic'. The sector's aim has been to supply people with a clean, reliable, and safe supply of water with the primary goal of improving their health. More recently the goal has been extended to include the need to reduce the drudgery involved when people (usually women) have to walk long distances to collect water.

This model of domestic service provision born in and developed from the unhealthy environment of Victorian cities in Europe has been exported worldwide. It has had huge positive impacts on the wellbeing of people everywhere but some of the assumptions underlying the model are beginning to be called into question. Particularly that the water supplied to people's homes should be solely or primarily for domestic use. Yes, of course, access to safe water is crucial for health and well-being. Yes, of course this should continue to be a driving force behind the development of infrastructure. But there is potential to make even better use of water in contributing to people's wider wellbeing and livelihoods.

What this TOP is about

This Thematic Overview Paper (TOP) looks at this broader range of uses which people allocate to their water supplies. It looks in particular at productive activities and micro-enterprises within households in villages, towns and cities in developing countries.

It examines how domestic water supplies can become productive and how this can contribute to peoples' livelihoods, particularly those of women and the poor, thus increasing the impact of an intervention. This approach challenges the traditional assumption that water delivered to people's homes should be for domestic purposes alone. At its heart lies the belief - supported by a rapidly increasing body of empirical evidence – that by adopting a broader perspective the WATSAN sector can more effectively contribute to tackling rural and urban poverty and at the same time better address perennial WATSAN problems such as sustainability and cost recovery.

Neither the TOP, nor the practitioners on whose experiences it builds, would advocate that water supply and sanitation projects attempt to start taking on large irrigation schemes. The focus is rather on those typically small-scale agricultural (or industrial) activities which exist at the intersection with the domestic water sub-sector (Figure 1).

Because these activities are small-scale and often informal they risk dropping through the gaps - forever destined to be 'somebody else's problem'. But, despite their typically diverse and fragmented nature, they are absolutely critical to the health and wellbeing of the people who engage in them.

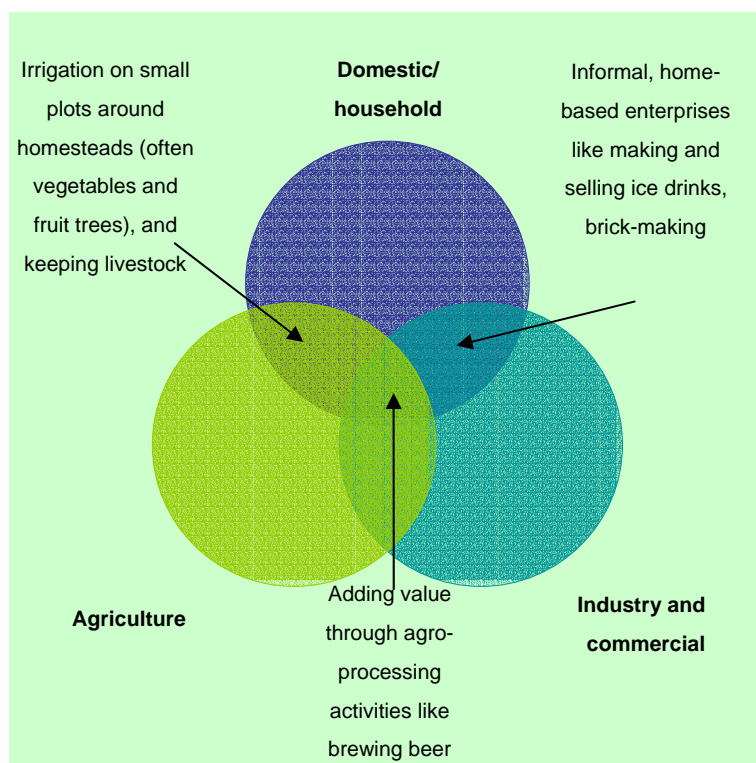


Figure 1: Where to look for productive uses of water: at the sectoral interface

In common with many others, we suggest adopting a 'livelihoods centred approach' as a framework for addressing these overlooked issues. We see that as a useful means of developing and applying methods and tools to address the multiple roles of water supply. In so doing we seek to align ourselves with a much broader movement in development and natural resource management which seeks to deal more holistically with development issues, reaching across traditional 'sectoral' boundaries and putting people and their livelihood strategies firmly at the centre of the developmental process.

While this paper focuses on the application of livelihoods concepts to productive water uses at the household level, a similar approach is applicable in many other areas of water supply. We hope this paper will encourage readers to consider these wider possibilities.

Contents

This document is divided into six sections. Readers may wish to follow the whole document, or dip into the sections of greatest interest by following the links below.

Section 1, Rethinking basic needs: expands the arguments of the introduction and provides some conceptual background to the multiple roles and benefits of domestic water supplies.

Section 2, Enhancing productivity: some practical examples of mixed use of water supplies and some of the key issues that need to be dealt with in this approach. The section provides more evidence from cases around the world to support the contention that water plays a wide role in people's livelihoods.

Section 3, Taking a livelihoods centred approach to domestic water supply: The 'what and why' of using the livelihoods approach to domestic water supply projects. The section briefly introduces the concepts behind the livelihoods approach and examines some of the benefits to be gained from adopting it.

Section 4, How it can be used: ideas for 'how' to adopt a livelihoods-centred approach to WATSAN. A framework of principles and guiding questions is provided, as well as suggestions for tools and methods to answer them. Answering the questions will ensure that the main aspects of a livelihoods approach are captured. A worked example is included.

Section 5: Summary and conclusions

Section 6: TOP resources: TOP books, articles and manuals (annotated) and references, TOP websites, and TOP contacts.

1. Rethinking basic needs: the multiple roles and benefits of WATSAN

Beyond domestic

Safe and secure water is essential to poor people's survival and health, but meeting basic needs is not just about health and hygiene, nor do people always see clean water as their most pressing need. Providing water security can play a wider role in poverty reduction and improving livelihoods. Improved domestic water supplies and improved institutions¹ surrounding them bring multiple benefits: they reduce sickness, save time, generate income, enhance food security, strengthen local organisations and build cooperation between people.

"Before the construction of the water project, the women hauled water to the houses from waterfalls or from small springs. It was used for food preparation, drinking and bathing the young children, as well as for the family gardens close to the house and for the domestic animals: horses, cows, chickens and pigs. To wash the clothes, the women had to go to the river. The older children, adolescents and adults would go to the river to bathe, or else use the waterfalls. After the construction of the system, the water from the system was used for drinking but also for washing and bathing, for the family gardens, domestic animals and sometimes for coffee processing." (Schouten and Moriarty, 2003)

Until recently, the multiple benefits of domestic water supplies had not received as much attention as they deserved. The traditional view of domestic water as largely a 'public health' benefit persisted even beyond the 1980s when international agencies continued to focus on 'clean drinking water and adequate sanitation' as a key right and development goal.

Now a broader range of non-health benefits have started to be recognised and targeted in an increasing number of studies and reports. Linkages between water and livelihoods have been explored in a series of meetings and initiatives (Box 1). A recent evaluation by WaterAid – an NGO specialising in domestic water supply and sanitation (WATSAN) – of some of their older water supply projects, found that a much wider range of benefits were reported by beneficiaries than had been expected or targeted at inception.

¹ Institutions are referred to in this paper in a broad sense to include both organisations and other wider institutions such as the law

Box 1 Some milestones in thinking on water and livelihoods

An increasing number of meetings and workshops since the late -1990s have developed thinking on relationships between water and livelihoods. Some of these included:

- the 'water and livelihoods' workshop in Harare in 1997 organised by Save-the-Children (Nicol, 1998)
- DFID water and livelihoods seminar in 2001 (reported in Waterlines special issue)
- A workshop on 'livelihoods, water resources and WATSAN' at the 27th WEDC Conference, in Lusaka in 2001 (Moriarty, 2001)
- The 'Water and Livelihoods: the linkages between access and livelihood outcomes' seminar in 2002 organised by DFID in London (Allen & Sattaur, 2002)
- An international symposium held in Johannesburg in 2003 on 'water, poverty and productive uses of water at the household level' (Moriarty *et al.*, 2003)

Some of these wider benefits are captured in Box 2. As well as the productive benefits, the impacts of water supplies on socio-psychological aspects of people's lives, like stress and safety, and indirectly on nutrition, have also often been neglected.

Of course, water projects can also be associated with negative changes. Better water supplies may result in loss of income for water vendors, and sellers of drugs and treatments are affected when health improves. In the case of reliable domestic water supplies it is clear that the good of the many who benefit from improved health outweighs the loss to the few. Nevertheless these negative impacts should not be ignored. Saved time for women in collecting water may be replaced with other equally arduous tasks. It is important to identify losers as well as winners and to weigh up the balance of costs and benefits for different people.

Box 2 Potential impacts of better domestic water supplies

- **Better health** – it has been widely established and accepted that more and better quality water, and improved hygiene, reduces disease. Healthy people are able to work and live more productive lives.
- **Time savings** – time and effort spent collecting water can be reduced by improved water supplies. Especially for women and children who shoulder the burden of water collection. Given opportunities for employment (and access to other requisite assets) this saved time can be turned into money by poor people.
- **Expenditure savings** – improved water supplies lead to reduced expenditure on the generally expensive water provided by water vendors, and less money is spent on drugs to treat illness.
- **Well-being** – better water supplies reduce pressure on people, especially women. As well as time saved, there is less stress, anxiety, and improved safety when water supplies are available close to home. There is less scope for conflicts over access to scarce or infrequent water supplies.
- **Education** – with more time and improved health, children are able to attend and perform better at school. Adult learning can also be facilitated through water projects.
- **Environmental sanitation** – good drainage at waterpoints can improve the local environment, and reduce the risks of diseases transmitted by water-based vectors like malaria.
- **Empowerment** - ensuring that the powerless are given a voice and increasing their capacity to participate in community decision-making can help empower marginalised women, the poor and other groups.
- **Community capacity** – well designed, planned and implemented water projects can strengthen and extend the capacity of local organisations in areas like decision-making, financial management, and ability to carry out operation and maintenance. Political capital can also be developed.
- **Productivity and income** – more opportunities for home-based activities lead to improved employment, productivity and incomes. Non-water based livelihood activities are possible because of time savings, better health, and opportunities to invest expenditure savings. Water-based livelihood activities are improved because they can utilise improved supplies. Improved incomes lead to improved status: for example, of women when their economic contribution to the household is visibly improved.
- **Investment** - expenditure savings and improved incomes associated with water supplies have a multiplier effect. Money can be invested in other activities leading to greater returns. Over time this may lead to improved markets for goods and services.
- **Food security/ nutrition** – is enhanced when improved water supplies make backyard irrigation or keeping livestock easier. Home-based production may be small in amount, but is often nutritious e.g. vegetables, milk, eggs and meat.

Rediscovering utilities

Ensuring water security for health *and* productive activities is one of the most effective ways of improving equity and reducing poverty through water management. Rural non-farm incomes are increasingly recognised as being a key component in the livelihoods of poor people. In many sub-Saharan African countries there is evidence of a shift in rural livelihoods away from agriculture. Water needs in rural areas are then not just for a bucket to wash, clean and cook at home after a hard day in the fields; the supply is required to fit in with changing and sometimes new roles.

In this vein, a recent study in Nicaragua found that access to drinking water and electricity strongly influences earnings from non-farm self-employment, and along with at least a passable dirt road, appear to be prerequisites for successful rural business (Corral & Reardon, 2001). This result, which rediscovers the importance of 'the utilities' to peoples lives should not be as surprising as, perhaps, it is!

Traditional approaches to 'basic' needs

The traditional definition of basic needs (for drinking, sanitation, bathing and cooking – see Box 3) means that design norms are often insufficient to provide for home-based activities (see Box 4 for examples of activities), limiting the livelihood choices of poor people. These informal sector activities can be invisible to formal planning processes – even though the

Box 3 Basic needs: a traditional approach

The traditional approach to 'basic needs' excludes water for productive activities within the household. Gleick (1996) for example proposed 50 litres per person per day as a recommended minimum based on the following figures.

Purpose	Recommended minimum (litres per person per day)
Drinking water	5
Sanitation services	20
Bathing	15
Cooking and kitchen	10
Total	50

In different countries there are different 'basic needs' targets. Sometimes these are as low as 25 litres per person per day (e.g. rural South Africa), or as high as 55 litres (India's recently revised target). Targets are best reviewed and revised to suit circumstances. For example, South Africa proposed short, medium and long-term targets to pragmatically address water supply backlogs.

importance of the informal sector to employment in developing countries has long been recognised.

A supply-focused approach based upon norms that do not take account of productive water uses has been dominant in WATSAN over recent decades. When, as is the case everywhere in the North and in many urban areas and cities in the South, these norms are set to very high levels, this does not cause a

problem. However when extremely low 'survival' norms are set, such as South Africa's

benchmark short-term target of 25 l/p/d, opportunities to engage in productive activities are severely constrained.

Responding to poverty

The ground is shifting. In particular the widespread advocacy of demand responsive approaches within the WATSAN sector should lead to the voice of productive users of domestic water becoming more generally heard and recognised. For example South Africa's recent draft white paper explicitly recognises these needs (Box 5). Embracing productive uses of water will also enable the WATSAN sector to strengthen its contribution to achieving the Millennium Development Goals. While the main 'water' goal is rather unhelpfully (for the purposes of this paper) focused solely on 'drinking water', supporting productive uses of water will help in achieving the wider goal to halve poverty by 2015.

Box 4 Some productive uses of household water supplies

- Cultivation: vegetables, fruit trees
- Livestock: poultry, goats and sheep, stall-fed cattle
- Agro-processing
- Cottage industries
- Brickmaking, building and construction
- Services: hair salons, tea shops

The actual impacts on poverty that might be achieved by promoting productive uses of water will clearly depend on the other constraints faced by poor people and on the targeting of water supply improvements. Growing vegetables in the backyard requires land as well as water, and lack of markets for produce or limited access to credit may be equally or more constraining than poor water supplies. Better water supplies may also often benefit elites rather than the poor. These key issues are expanded on in section 3.

New approaches and paradigms

The water and sanitation sector is undergoing a process of rapid transformation, with a number of new approaches and paradigms being implemented around the world. Addressing the productive uses of domestic water and adopting a livelihoods based approach to these supplies is both compatible with and can add value to many of these approaches. What the approaches are, and how they relate to the topic of this TOP are briefly examined below, and in more detail in the next section.

Decentralisation: Decentralisation is one of the most important driving forces behind change in the development world. It is not specific to WATSAN of course, but within this sector it is radically changing the institutional arrangements to plan, operate and maintain infrastructure, raise finance, and regulate service delivery. Livelihoods-based approaches can be useful in this context. They explicitly take into account the different levels at which policies are formulated and applied, and at which institutional processes operate. And they draw out linkages between institutions at different levels.

Decentralisation also helps to break down the narrow sectoral approach produced by centralised line ministries working on nationally defined programmes. With the correct tools

in place it becomes possible to work together at a district level to come up with tailored multi-sectoral responses to the specific needs of local people

Community management: Community management is, in rural areas at least, the driving paradigm for the WATSAN sector. Community management is all about putting communities in charge of developing systems that respond to *their* needs. Water for productive uses is high on this list – frequently even higher than is treated water for domestic use. On the downside, not taking likely productive use into account can lead to system under-design and, in turn, to failure. Livelihoods approaches, which emphasise the capabilities as well as the needs of people and take into consideration the complex nature of communities and intra-community relationships, can help optimise the community involvement in system design and implementation.

Demand responsive approaches: Similarly to community management (with which they are frequently linked), demand responsive approaches are all about matching systems to people with the primary goal of achieving sustainability. As noted above, livelihoods approaches can help to identify needs.

Cost recovery: Productive uses of water have a crucial role to play in turning water into the cash with which to buy spare parts and pay for routine maintenance. Clearly establishing the link between water supply and economic benefits also seems to increase people's willingness to pay for their water in the first place.

Integrated water resources management (IWRM) and rights based approaches: The link between our topic and IWRM is covered in more detail later in the document. Productive uses of domestic water and a livelihoods-centred approach to domestic supply both answer directly the call of IWRM for a more holistic approach to water resource development and the breaking down of sub-sectoral barriers within the water sector. In addition, and perhaps more importantly, an analysis that recognises the crucial role of productive water in the livelihoods of the poor will inevitably lead to the need for 'non-domestic' water to be covered in the rights based approaches that are currently limited to domestic supplies alone.

The productive users we talk about are small scale, scattered, poorly represented and largely ignored in the 'catchment' level decision making that is currently the most visible aspect of IWRM. Ensuring that their voice is heard and that their right to a fair share of the total resource is recognised are two of the greatest challenges to those implementing IWRM. At the same time developing the local water

Box 5 Policy recognising productive water uses

In the recent draft white paper on water services in South Africa, economic activities are explicitly recognised:

'Municipalities do not, and should not, only provide water services necessary for basic health and hygiene. It is important that municipalities undertake health education, facilitate the provision of higher levels of services for domestic users and provide services which support the economic development and well-being of communities.'

management structures necessary to support widespread productive uses offers a genuine potential for bottom up IWRM of the type advocated in the Dublin principles (WMO, 1992).

Gender and equity: Gender and equity issues (also encompassing wealth, age, disability etc) are core to both IWRM and traditional WATSAN. The livelihoods approach is specifically suited to examining these issues. To do this, it needs to be used on a disaggregated basis within communities (and even within households) to identify the impacts of interventions on vulnerable groups such as women and children from poorer households, women headed households, widows, and other marginalised individuals and households.

2. Enhancing productivity: practical approaches, key issues and problems

In this section we briefly present a number of cases where productive uses of what are primarily domestic water supplies have been built into projects and programmes from the start. The case study from Zimbabwe in Box 6 illustrates how, by designing explicitly for mixed use from the outset, livelihoods can be greatly enhanced without compromising the quality or availability of water for domestic needs. It shows how such mixed uses of water support diversification of livelihoods and help reduce risk - both key needs and objectives of people living in semi-arid areas. The systems provided a safety net for food security during a major drought in 1992 and continued to do so in 2002.

In that instance high-yielding community-managed water points and community gardens were appropriate to local circumstances. But different situations will require different approaches. There are many other examples spanning rural, peri-urban and urban contexts in a wide range of countries where mixed supplies have been developed in different ways:

- In **the Chilean coastal desert** fog collectors in the village of Chungungo have provided on average 33 litres of water/person/day – sufficient for domestic needs and maintenance of four hectares of community vegetable gardens, trees and a public park. Vegetables are grown for local use and sale. (IDRC, 1998)
- Boreholes meant business for the women of **Diass in Senegal**. Sales of water from community boreholes to households and herders raised revenue that was partly loaned to women's groups. This was utilised in enterprises like selling fruit, vegetables and groundnuts. Money from water sales and interest on loans was re-invested in the network. In this example, water finances business which finances water. (Touré, 1998)
- In **Clare, Bushbuckridge, South Africa** a combination of piped water schemes (communal or yard taps), community gardens and now rainwater harvesting, have led to improved water supplies for domestic and productive use. These water supply improvements make use of a mix of different infrastructure types that are suited to the needs of the community and promoted by a local NGO AWARD.
- Family wells in **Zimbabwe** have been protected and rope and washer pumps installed to pump enough water for both 'domestic' needs and garden irrigation by NGOs like Mvuramanzi Trust (Proudfoot, 2003) and PumpAid.
- In **Sudan** a project supported by ITDG decided the best way to address water shortages for brick-making was not to drill new boreholes (they tried and failed) but rather to make collecting the water easier through improving the transport by donkey cart of water from existing sources located away from the brick-making areas (Lowe & Schilderman, 2001)

- Rather than supplying more water, drip irrigation systems suited for backyard and small-scale irrigation can potentially save water and labour. Water is stored in a bucket or drum and fed through pipes to vegetables or trees. (Proudfoot, 2003)
- In **South Africa**, the Mvula Trust and CARE piloted a 'better-than-basic' service level of water supply that focused on providing individual household connections rather than communal standposts using a low-pressure supply to household 'trickle tanks' which store the water for later use, and productive uses of water was promoted (<http://www.researchafrica.co.za>)
- The Ikhwelo Project, piloted in the rural areas of **South Africa's** two poorest provinces, the Eastern Cape and Limpopo, showed that a combination of services like a good water supply and adult education were crucial ingredients of success. They concluded that unless the water sector broadens its infrastructure provision to include an adult education focus the impact and potential productive uses of water will remain limited (www.projectliteracy.org.za).
- The **Andhra Pradesh Rural Livelihoods Project** is supporting backyard crop and tree production as part of watershed development projects. They provide seeds and seedlings suitable for very small plots around houses to families on a subsidised basis and promote the use of bucket-fed drip irrigation kits that cost less than US\$5 (www.aplivelihoods.org).

Box 6 How 'domestic' water fits into productive livelihoods: a case-study from Zimbabwe

In rural Zimbabwe the cultivation of vegetables, fruits and other crops in family gardens has a long tradition. Gardens support food security and improve nutrition of course. But in a place where there are few sources of cash income for rural families, the relatively small but regular sums of cash that can be earned from sale of vegetables from gardens are also important.

Not everyone has access to land and a garden in a suitable place close to a water source, and many of the water sources are not very reliable. They dry up during the winter season and after years of poor rainfall. A water supply project – 'the collector wells project' - aimed to develop reliable community sources that could meet the needs for safe, domestic water but also provide enough water to irrigate a community garden.

These productive water points needed to yield more water than most conventional boreholes - 15m³/day. This was achieved by digging large diameter wells, and drilling horizontal boreholes to exploit the shallow groundwater table caused by local geology. In these hard rock areas, it was decided that deep boreholes would not provide enough water.

In other places and situations, higher yields for multi-purpose supplies can be achieved in alternative ways (and cheaper conventional boreholes with lower per capita costs have proved easier to scale-up). Reliability of the sources is a key factor though. During a severe drought in 1992, garden members at the first scheme were able to benefit from higher prices for irrigated vegetables

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(although they reduced the area cropped to save water), as well as having sufficient domestic water supplies, because the water supply was highly reliable.

The community gardens developed are typically around 0.5 hectare in size, and each of up to 50 member families has several small vegetable beds. Crops are cultivated and watered individually by members, but some decisions are taken collectively: for example, which crops to grow, how to manage limited water supplies and how to tackle pest problems. Crops grown include leafy vegetables, tomatoes, onions and often an early crop of green maize to catch good prices at the start of the season.

Waughray *et al.* (1998) showed how money earned is often invested in saving schemes or other ventures, such as dryland cropping or petty businesses like buying and selling clothes. Household or community-managed gardens therefore contribute significantly to the overall local economy.

For more information see: Lovell, 2000; Lovell *et al.*, 1988; Waughray *et al.*, 1998; Moriarty, 2002

Direct and indirect impacts

Improved water supplies lead to both direct and indirect opportunities for improved productivity. More water, of better quality and provided more reliably, can provide the water needed for productive activities like irrigation of a backyard or community vegetable garden or for micro-enterprises like hair salons or tea shops. These direct benefits are what most of the experiences identified in this TOP seek to capture. But indirect gains may be even more important in that they can apply to both water-based and non-water-based activities. Saved time and money can be invested in activities that bring positive returns to capital or labour.

An intriguing and important study in Gujarat, India (James *et al.*, 1992), showed how significant improvements in incomes were achieved when an improved water supply that saved women's time was combined with promotion of handicraft-based rural enterprises. These enterprises did not significantly depend upon making productive use of domestic water but the better supply enhanced productivity through time savings. This project illustrates the utility benefit of water but the important message is that just providing the utility was on its own less effective than doing so in conjunction with a programme that supported the women in making use of the time saved. It demonstrates a livelihoods based approach which realised that time and timely access to other key assets is a prerequisite to making money. In order to maximise the benefits of the improved water supply it was necessary to address constraints associated with these other assets.

Costs and benefits of mixed supplies: equity is a key issue

All the cases above demonstrate the benefits of using domestic water supplies for productive purposes. But how do the costs compare with the benefits? Providing domestic water can be expensive especially when treatment, pumping or piping is required. Additional infrastructure to provide higher levels of service is the most obvious extra cost

although savings are often possible by utilising local groundwater sources or low cost technologies like roofwater harvesting. Do these extra costs justify the benefits? Clearly the costs and benefits will be different in each circumstance; local decisions will need to be made but this section offers some guidance and examples.

Findings from South Africa

Box 7 gives some estimated costs of providing different levels of water supply in South Africa. The extra capital cost implied in designing a system to supply 60 l/p/d from roof tanks compared to 25 l/p/d from yard tanks is €80 per household. The extra O&M costs over 20 years would be €96. For these extra costs an additional 35 l/p/d is available, equivalent to over 1,500 m³ over twenty years! The combined additional cost per m³ is therefore €0.11.

How does this compare with possible benefits? A study in the Bushbuckridge area, South Africa (Perez de Mendiguren and Mabelane, 2001) showed that economic returns from productive uses of domestic water were relatively high. Even in this 'rural' area (being a former homeland it still has fairly high population densities), benefits ranged from €1-2 per m³ for vegetable gardens and fruit trees (the most common use of 'extra' water) to €120-160 per m³ for beer brewing and ice block making!

Box 7 Incremental costs of providing domestic water supplies

Service level	Rural - hand pump	Rural/ peri-urban - communal standpost	Urban - yard tank (low pressure)	Urban - roof tank (medium pressure)	Urban - piped water and house connection (full pressure)
Typical consumption (l/p/d)	15-25	15-25	25	60	120
Capital cost in (€/household)	25	305	390	470	530
O&M costs (€/household/month)	0.4	1.4	2	2.4	3.8

Note – Figures compiled from 2 studies carried out for DWAF (Vermeulen, *pers. comm.*). O&M costs exclude capital repayment

Findings from Zimbabwe

The average cost of the collector-well fitted with two handpumps and the setting up of a garden (mainly fencing) in the case study we considered earlier from Zimbabwe was US\$10,600. This compares to an estimated US\$4,700 for a standard borehole with handpump that would have been sufficient for purely domestic water needs. According to a standard financial analysis of domestic water supply systems these additional costs would not be justified (although in terms of cost for reliable water supply, the collector well at US\$294/m³ compares very favourably with the conventional borehole at US\$429/m³).

However, an economic analysis that captured the additional benefits – including the benefits that are very tricky to value like the sustainability of supplies during a drought and the multiplier benefits associated with investments of returns in petty businesses like buying and selling clothes – suggested that these extra costs were a sound investment (Lovell, 2000; Waughray et al. 1998).

Mixed or multiple systems

It is important to realise that taking into account the need for productive as well as domestic water supplies does NOT necessarily mean providing water for both sets of needs from a single tap (or borehole). In many situations providing for productive water uses separately from domestic water supply makes more sense. There are places, for example, where community gardens with dedicated sources, or small dams for livestock to drink, will be the best choice. Or where vegetable gardening needs can most easily be met by rooftop rainwater harvesting while domestic water comes from a standpipe.

Nevertheless, the above economic analysis does suggest that in many cases it is more cost effective to pay the incremental costs related to one higher yielding system. This applies particularly when the high sunk costs of investing in reticulation are taken into consideration.

There is no 'right' answer to this - the financial and economic 'balance-point' will be different depending on system size and, for example, the degree to which treatment may be necessary. Apart from these engineering related issues there are important social advantages to utilising domestic water supplies for productive uses. It is now almost universally accepted that domestic supplies should serve everyone including the poor. Usually they do have access but there are exceptions, as in some parts of India where caste rules can raise problems at water points. Elsewhere powerful individuals or elites can make access more difficult by exerting pressure to site infrastructure like handpumps and taps closer to their own homes. When separate supply systems are used to service productive uses these problems can become more pronounced; community gardens or irrigation schemes served in that way can often be purely the preserve of the elite. Including productive uses under the umbrella of the domestic service provision is therefore a key channel to reaching the poorest and most marginalised.

Maximising benefits

Sometimes improved water supplies alone may be sufficient to stimulate productivity through the opportunities to do new things with more water and to save time and money. More often there will be other constraints that limit opportunities and productivity, especially for the poor. Credit is an obvious example. Money is required to set up and run micro-enterprises like brewing beer. Ingredients need to be bought and extra labour hired. In the example cited from Gujarat, credit and skill constraints were overcome by setting up revolving funds to make credit available and by training groups of women in the manufacture of handicrafts.

Some of the other possible constraints to putting better water supplies and time and money savings to best use include:

- availability of labour,
- skills;
- infrastructure;
- equipment;
- presence and knowledge of markets for products and services;
- transport;
- quality control standards.

The assets in question are often those held in common by the community. Equity considerations would require analysis at community, group, household and individual levels. These are all aspects that application of a livelihoods-based planning approach will identify.

Water supply projects can and should broaden their focus to address *some* of these other constraints. But no one can be an expert at everything so increased co-ordination and co-operation with other sectors and actors is essential. Sometimes this may only mean putting water supply beneficiaries in touch with other schemes and initiatives, for example, providing beneficiaries with information about micro-credit schemes operating in the area. In other cases more strategic action may be needed, as with the development of integrated District Development Plans in South Africa.

Either way, by focussing on the assets and strategies available to people, on the factors that facilitate or constrain access and choice respectively and on determining how water might contribute to their livelihoods, impact can be greatly increased.

Demand management and cost recovery

Productive use of domestic water may not always be positive or desirable. An example is the irrigation of low value crops like cassava on some relatively large plots (up to an acre) around houses in villages and towns in the Nkomati area of South Africa close to the Mozambique border. While it does provide food for some relatively poor families it does not produce that much income compared to the cost of piped water supplies. And this additional demand causes problems for domestic water users at the tail-end of the system and in the higher parts of the towns.

Clearly there are limits to what is desirable. Demand for water for productive uses needs to be managed and the uses themselves must be assessed. The following example illustrates a situation where demand needs to be managed.

“The water committee in Belén, Guatemala, faces multiple simultaneous problems..... The population grows as people migrate into the area due to the violence in the country. New taps are connected without taking into account the capacity of the source. In addition, more

and more water from the system is being used for productive purposes such as watering cattle and coffee production.” (Schouten and Moriarty, 2003)

What uses should be prioritised? And when is productive use of water at the household level one of the priorities? Clearly higher value uses that produce the greatest economic benefits are to be preferred. But the distribution of benefits is also important. On social grounds the beneficial use of water by poor people, who may not be served by other systems and for whom any diversification of livelihoods is critical, should be encouraged.

By explicitly recognising that productive uses are inevitable it is possible to take account of them structurally and to include them in demand management strategies.

The most obvious measure to manage demand (and to finance investment in better services) is charging for water. In South Africa the recent draft water policy proposes that productive activities should utilise water services on a full cost recovery basis while water for basic domestic needs (up to the equivalent of roughly 25 l/p/d) is free. In practice it is likely to be very difficult in some circumstances to charge for water used for informal home-based activities, especially where cost recovery systems are not already in place for domestic water. By their very nature these activities may be occasional, irregular, or seasonal. Enterprises with their own premises and operating formally and more regularly can be much more easily charged for water. There is a strong case therefore, on both equity and practical grounds, for tariff-based subsidies to facilitate productive water use by the poor – and the South African policy recognises this.

Providing a means to pay

But there is another story with regard to cost recovery and productive water use: these uses may be part of the solution. At least partial cost recovery is now common to most community-management approaches, particularly those that follow the World Bank’s Demand Responsive model. Such schemes rely to a greater or lesser extent on the willingness and ability of users to pay. One worrying indication here is that willingness is often not supported by ability to pay, resulting in an overall reduction in water consumption and a reversion to ‘traditional’ and less-safe sources.

The issue of ability to pay is a serious one with the potential to undermine the development of sustainable water supply systems. By explicitly dealing with the productive and domestic aspects of a water supply project at inception, it is much easier to convince communities both of the need to pay and to provide them with a means to do so (see the SecureWater website for more discussion on this theme).

What can go wrong? Potential problems and negative impacts

Like anything else, productive uses of domestic water have potential risks as well as benefits. As they become more formally and widely adopted, new problems will undoubtedly emerge. A number that can already be identified are briefly discussed here.

Overloading systems – who's fault is it?

Perhaps the most obvious risk is that of overloading either the system or the available water resource. This issue was largely dealt with in the discussion on demand management and will also be mentioned in the final part of this section on water resource management.

It is of course a real problem, but caused more by the failure to take productive uses into account during system design than by the productive uses themselves. And it begs the question 'who is to blame'? The poor who 'spoil' the system through 'illegal' use – or the designers who provide systems that are not geared to the livelihoods needs of the poor?

Unequal benefits

Another significant difficulty is that of competing interests in society and inequitable distribution of benefits. There is potential for these gains to be captured by elites at the expense of poorer or less powerful people. This is of course a familiar and fundamental issue. It should be addressed by developing a good understanding of the power relationships between the different constituencies (e.g. elites and poor groups) and the source of any derived powers (e.g. patronage systems, caste, corruption) before an intervention is made. Livelihood approaches can provide for this.

Interventions might then be modified or based on certain ground rules or conditions that need to be willingly adopted by communities before engagement takes place. Where interventions have been tempted to ignore this dilemma in the hope that it would 'come out in the wash' they - or the powerless - have usually been disappointed. Once acceptable agreements have been established, a design and planning process expressly incorporating productive uses, as argued earlier, can go a long way to ensuring an equitable distribution system.

Environmental sanitation

Several environmental sanitation problems arise if wastewater associated with greater water use is not disposed of properly although many of the uses like backyard irrigation are likely to be consumptive with little wastewater generated.

Also an holistic approach to promoting productive uses of water can make provision to use wastewater for irrigation; but note that health risks associated with growing crops and keeping livestock in built-up areas are acknowledged as some of the most important constraints in promoting urban agriculture (for further information on urban agriculture and links on wastewater use see the RUAF website).

Monitoring unforeseen impacts

As productive use of water becomes more formally recognised, adequate monitoring is essential to pick up on these and new problems before they become serious. Awareness-raising activities will be particularly important, ensuring that farmers take measures to

reduce exposure to polluted water and helping people to understand the need for demand management etc.

Taking productive uses to scale: a more holistic approach

Many of the cases we have presented came from projects implemented by NGOs who have been leading the field in adopting more flexible and livelihoods-focused approaches. CARE, ITDG, Oxfam, Save-the-Children, PLAN and many others have adapted these approaches in their programmes. In this they have the advantage of working largely outside government frameworks, particularly those represented by 'line ministries' with their narrow sectoral remits. One down side is that their successes tend to remain limited to the projects and communities where they are active– and even these can fail once the agencies hand over and move on.

Taking livelihoods approaches to scale therefore requires governments and responsible ministries to change their approach. Much of that change is already underway through decentralisation and deconcentration of responsibilities. Policy and legislation such as that from South Africa shows the way, with devolved decision making and legislative encouragement to break down sector barriers. Probably the single most crucial legislative change is the acknowledgement of productive uses in national domestic water supply legislation and in related domestic water supply norms. Without this, those working in line ministries will continue to find it difficult to take up the challenge of incorporating productive uses into the mainstream.

But this will just be a start. To take advantage of the opportunities offered by changes in legislation it will be necessary to incorporate designing for productive uses of domestic water into training programmes and curricula. For this to happen, a wider range of experiences and models will be needed. This paper has identified some, and more can be found in a recent symposium proceedings. In addition there remains a need for larger, more detailed case studies to underpin the redesign of norms, tariff structures and economic models, and for tools to support system designs that incorporate productive uses. A first step towards such a tool – based on a Sustainable Livelihoods Framework – is presented in section 5.

Implications for water resources management

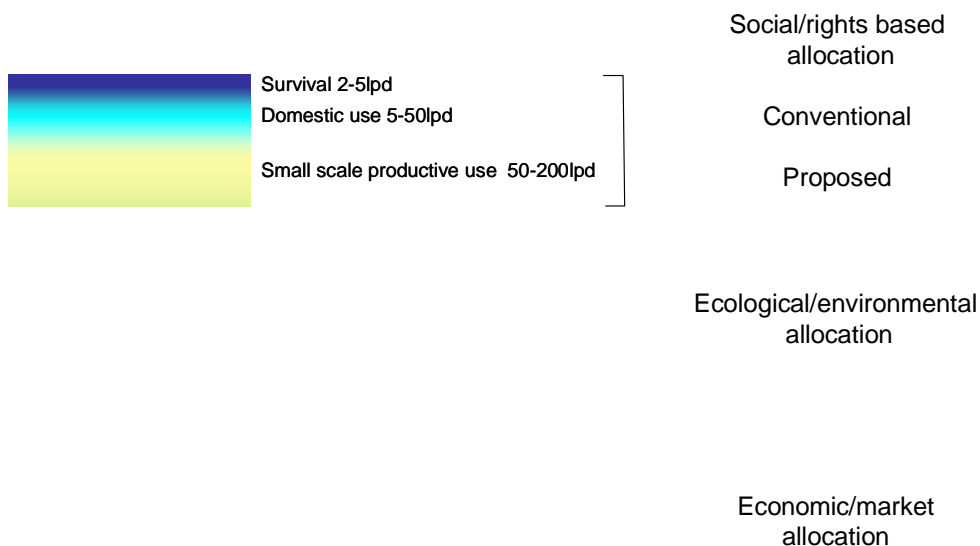
The final paragraphs of this section are devoted to Integrated Water Resource Management and the related issue of rights based approaches, both of which are strongly linked to productive uses of domestic water.

What then are the IWRM implications of promoting more productive use of domestic water supplies?

The right to a fair share of available water resources for productive use

First, and most importantly, accepting the potential for productive uses of domestic water clearly means a need for more water for small-scale users even if sound principles of demand management are employed. As well as imposing demands on infrastructure to supply water and management systems, it is likely to mean greater abstractions from aquifers, rivers or reservoirs, or more contentiously, a need to reallocate existing abstractions. These issues need to be considered within an IWRM framework that also

To deal with this problem we would argue that productive uses of water of the sort described in this TOP should be included in and therefore given the same priority as domestic uses. They should not normally be subject to the same allocation processes as water for 'commercial' use – provided of course that appropriate demand management and



water saving measures are in place. A proportion of water for productive use should therefore be included in rights based allocations (see Figure 2). This argument is based primarily on principles of equity but it is also underpinned by the hypothesis that a proper economic evaluation of water use will – as is already acknowledged to be the case with clean drinking water – show that small scale productive uses are far more economically important than other uses.

Figure 2 Priorities in allocating water resources

Breaking down sector boundaries and developing water in a holistic manner

Secondly, an integrated approach to the needs of those using water, possibly including some domestic water, for multiple purposes, is very much in line with the integrated and holistic aspects of IWRM. This applies especially to poorer groups and households. The boundaries between water supply projects providing water for drinking and other domestic uses, agricultural departments supporting community gardens, and departments of autonomous parastatals supporting larger scale irrigation schemes, are becoming increasingly blurred and that is a good thing. In some cases it will make sense for rural and urban water supply projects to support productive activities in the household or provide water for community gardens at the same time as improving piped water supplies to homes and communal taps. In other cases, it will make sense for irrigation projects to provide resources and infrastructure for domestic needs and other productive activities in and around the household.

The blurring of the irrigation/water supply interface is coming from both directions. The multiple roles of irrigation systems are now recognised in providing water for livestock, gardens and other domestic micro-enterprises. Water is often diverted from irrigation canals for such purposes. These smaller-scale activities, often controlled by women, have traditionally been overlooked in the same way as the productive use of domestic water. The International Water Management Institute now has several research projects focused on such multiple uses of 'irrigation' water.

Responding to productive needs in a holistic way, including the use of domestic water, will help contribute to the development of genuinely bottom-up water management

3. Taking a livelihood-centred approach to domestic water supply

'A livelihood is ...the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base' (Chambers & Conway, 1992).

This section first introduces and then looks at the implications of taking a livelihoods-based approach to domestic water supply. The following section provides guidelines and tools for applying a livelihoods approach to project appraisal, design and implementation.

Perhaps the greatest value of a livelihoods approach to water supply is that the inherent analytical framework will provide an understanding of the complex ways in which supply improvements *have the potential* to affect lives. Building on the strengths of poorer groups and households, the facilitation and prioritisation of actions aligned with people's needs are more likely to achieve real impacts on poverty.

The livelihood framework provides a means for stakeholders to engage in constructive debate with development practitioners from diverse backgrounds about the many factors that affect livelihoods, their relative importance and the way they interact. As noted earlier, while we focus on the issue of productive use, there are several other possible implications of taking a livelihoods approach to WATSAN. Users may find that livelihoods analysis has other benefits and takes them in different directions. It may for example reveal strengths and weaknesses in social capital related to conventional system management, or help to identify areas where the performance of external agencies or inhibiting policies need to be changed to improve the sustainability of water supply schemes.

A brief introduction to the concepts and terminology

The livelihoods approach is centred on an analysis, at the level of the individual or household, of the assets (sometimes known as 'capitals') available to people. From this it broadens out to look at the strategies by which people use their assets, the institutions and policies that can help or hinder them, and the external shocks and trends that can undermine them. An explanation of these concepts is given in Box 8.

It recognises that most people do many things to secure the income, food and other things they desire, and that they have clear strategies to achieve these aims. The focus on assets is closely related to a vision of poverty as a multi-dimensional situation: that you're poor not just because you have no money, but because you have no access to education, or natural resources, or political representation.

Box 8 Key livelihoods concepts explained

Assets are usually broken down into five categories: human capital, natural capital, financial capital, social capital, and physical capital. Political capital is sometimes included under social, sometimes explicitly added as a sixth capital.

- **Human capital** relates to skills, knowledge, capacity to work, and health of individuals available within the household (labour).
- **Natural Capital** is the resource stock (e.g. trees, land, water, clean air) upon which people rely and benefit, both directly and indirectly.
- **Financial capital** includes savings (cash, bank deposits or liquid assets such as livestock and jewellery), access to credit, and regular inflows of money including earned income, pensions, and remittances.
- **Social capital** is a more difficult concept to define and grasp. It is the social resources upon which people draw in pursuit of their livelihood objectives. These are developed through
 - 1) *networks and connectedness*, either vertical (patron/client e.g. landlord/tenant farmer) or horizontal (between individuals with shared interests e.g. caste group etc.) that increase people's trust and ability to work together and expand their access to wider institutions, such as political or civic bodies;
 - 2) *membership of more formalised groups* which often entails adherence to mutually-agreed or commonly accepted rules, norms and sanctions (e.g. self-help group); and
 - 3) *relationships of trust, reciprocity and exchanges* that facilitate co-operation, reduce transaction costs and may provide the basis for informal safety nets amongst the poor (e.g. extended families).
- **Physical capital** comprises basic infrastructure like water supply and sanitation (of adequate quantity and quality), energy (that is both clean and affordable), affordable transport systems, good communications and access to information, shelter (of adequate quality and durability) and physical goods like bicycles, sewing machines, agricultural equipment, and household goods

Shocks, trends and seasonality (or the **vulnerability context**)

- **Shocks** are sudden events, usually with negative impacts, and include things like natural disasters, civil conflict, losing one's job, a collapse in crop prices for farmers etc.

Categories include:

human shocks (e.g. illness like HIV/Aids, accidents); natural shocks (e.g. floods, earthquakes);

economic shocks (e.g. job losses, sudden price changes);

conflicts (e.g. war, violent disputes); and

crop/livestock (i.e. pest and disease)

- **Trends** emerge over a longer period of time and examples include increasing population pressure, deforestation, declining commodity prices, increasing accountability of government and technological trends
- **Seasonal** changes are important in relation to the value, availability, and productivity of natural capital and human capital (through sickness, hunger etc).

Policy, Institutions and Processes

Policies, Institutions and Processes embrace a complex range of issues associated with power, authority, governance, laws, policies, public service delivery, social relations – gender, caste, ethnicity – institutions – laws, markets, land tenure arrangements – and organisations – NGOs, government agencies, private sector. These effectively determine access to various types of capital, and to decision-making bodies and sources of power, which influence the livelihood strategies adopted by individuals and households, and ultimately the returns to the pattern of livelihoods adopted.

Livelihood activities include all the activities that people engage in as part of making their living. They include farming crops and livestock, selling forest products, waged labour work etc.

Livelihood strategies are the full portfolio of livelihood activities, but linked to an understanding of the choices and decisions underlying them. They include: how people combine their income generating activities; the way in which they use their assets; which assets they chose to invest in; and how they manage to preserve existing assets and income. Strategies may reflect underlying priorities, such as diversifying to minimise exposure to risk. They are diverse at every level. For example, members of a household may live and work in different places, engaging in various activities, either temporarily or permanently. Individuals themselves may rely on a range of different income-generating activities at the same time, and are likely to be pursuing a variety of goals. There are different ways of categorising livelihood strategies e.g: between agricultural intensification and extensification, livelihood diversification and migration (Scoones, 1998; Swift, 1998); between natural resource and non-NR based activities (Ellis, 2000); between survival, coping, adaptive and accumulative strategies (Devereaux, 1993; Davies, 1996). Perhaps most important is whether people are responding out of choice or necessity.

Livelihood outcomes are the achievements – the results – of livelihood strategies. These may include more income, increased well-being, reduced vulnerability, improved food security, more sustainable use of the natural resource base, improved social relations and status, and more dignity and (self)respect.

Sources: modified from DFID sustainable livelihoods guidance sheets available at <http://www.livelihoods.org/>, and Morris *et al.* (2002)

A tour round the diagram

Livelihoods approaches are typically represented in one or other versions of (rather complicated looking) diagrams such as that presented below (See Figure 3). All these diagrams aim to place the individual or household at the centre of development planning.

The key to understanding the diagrams is to realise that the framework starts from the premise that it is access (or lack of it) to a range of key capitals that lies behind much decision making. These capitals (physical, natural, financial, human, social) include things like labour, water supplies, ownership of water resources, membership of a self-help group or extended family, access to markets, and availability of credit.

The approach captures well how different livelihood activities, based upon the range of assets available, are transformed as part of wider livelihood strategies into livelihood outcomes. Usually people, and poor people in particular, are engaged in several activities, and depend upon a wide mix of assets. The framework draws attention both to the range of factors that influence poor people's livelihoods, and to the complexity and diversity of people's livelihood strategies in a particular place or context. It also captures the vital influences from outside a household, such as the services received from institutions like the law or government departments, the constraints imposed by bureaucracies or corruption, and the impact of shocks, trends and seasonality like drought or macro-economic decline. Droughts may be crucial for example, because at these times the demands on water supply systems are higher due to the additional needs for livestock that cannot find water elsewhere.

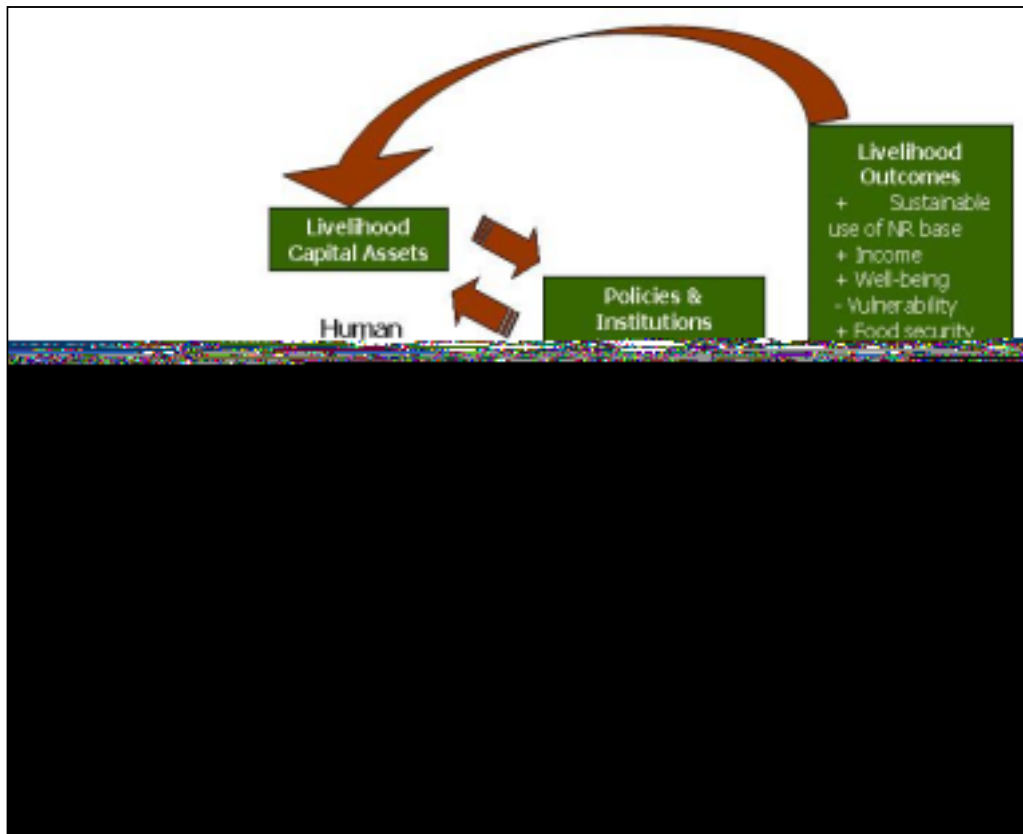


Figure 3 Livelihoods framework (Source: DFID Sustainable Livelihoods Presentation, <http://www.livelihoods.org/info/Tools/SL-Proj1b.ppt>)

Key strengths

Livelihoods approaches strive to be holistic, people-centred and based upon participation. They recognise that situations are never static and they attempt to take account of situational dynamics and shocks. They try to identify and build on strengths, while also identifying and removing obstacles and weaknesses. They do not put artificial boundaries around people, or households, or communities, but try to build in key macro-micro links. Finally they see sustainability as a core objective, realising that vulnerability to change and shocks, and in the extreme the inability to recover from shocks, are key dimensions of poverty.

A key strength of livelihoods approaches is that they encourage broad thinking. They are based upon a comprehensive framework that simplifies, but avoids oversimplifying, the realities of the world in which people live. It is flexible and has been adapted to suit a wide range of situations by different agencies. For example, the NGO Care have adapted the approach to their needs and have developed a model called 'Household Livelihood Security' that has informed a number of water supply and multi-sector projects.

A livelihoods approach challenges the WATSAN sector to think about the wider context in which it works. Holistic thinking can help to reduce the risk of identifying narrow

interventions that ultimately fail because of factors that were not initially considered, as happened in the Guatemalan scheme (mentioned in the previous section due to non-foreseen productive uses). And it can help to identify realistic actions that would impact on poverty; perhaps small additional investments that would produce great benefits. How would more, better quality, or closer water, impact on livelihoods and help reduce poverty, the ultimate goal? What other actions and interventions are required to maximise impact on poverty?

The framework can be used for analysis at different levels – individual, household, community, village, district etc – but is most commonly used at the household level. At whatever level it is applied, links across these scales will need to be investigated. The framework can be used to investigate the needs of specific groups. For example, people living with HIV/AIDS have specific needs from water supply systems that span improving food security, raising, supplementing and diversifying income in order to maintain household expenditure and alleviating the loss of labour.

Some possible pitfalls

A health warning! Like many other popular new approaches, livelihoods approaches suffer from a proliferation of jargon and over-reliance on concepts that are not universally understood. The terminology can be off putting. Alien language and concepts that have to be embraced by organisations and countries seeking donor support can be disempowering for some. If not appropriately simplified and well planned, livelihoods approaches can lead to the over-complication and overburdening of projects. Do not fall into the trap of trying to do everything and be all things to all people.

A further important caveat is that using a livelihoods approach is not equal to addressing poverty issues. A major concern and trap in applying a livelihoods framework is that, often due to very real constraints or limited understanding of its importance, disaggregation within places and communities can be forgotten. But identifying strengths and weaknesses of different people (men and women, rich and poor), and the importance of factors like wealth and social status in drawing upon services from institutions for example, is vital.

4. A guideline for implementing a livelihoods-based approach to WATSAN projects

As yet there is no livelihoods based ‘tool’ specifically designed to help WATSAN practitioners apply a sustainable livelihoods based approach (although there are a growing number of more general livelihoods tools that can be used and adapted– see the links section).

What follows is a flexible guide or framework that will help project and programme managers to ask the right questions and to identify the key indicators to allow them to take a more livelihoods sensitive approach to implementing WATSAN projects. The guide is based on DFID’s sustainable livelihoods framework and uses the “questioning mode” of the European Commission’s Guidelines on Integrated Water Resource Management.

The guide is based on a set of problem statements, key questions and suggested tools/activities that, taken together, will help to ensure the best fit between an investment in improved water supply and the livelihoods of the recipient community. It is divided into sections based on the livelihoods framework, each of which has a ‘problem statement’ related specifically to WATSAN projects.

Academic application of the livelihoods approach could mean an exhaustive assessment of the entire livelihoods framework of a complete community, from which decisions could be made as to the best combination of investments and other activities to reduce poverty. This is not the approach taken in this guideline, which assumes an agency with a limited range of WATSAN-based interventions whose impact is to be maximised. This is a crucial difference as it reduces the need to collect data and helps focus the exercise on a concrete goal: the sustainable improvement of peoples’ livelihoods through appropriate WATSAN interventions.

It is important to realise that the framework should not be applied ‘all at once’. It should be used within the context of an ‘organisations’ approach to project cycle management. This helps to identify *what* tools or activities can be used to answer *which* questions *when* necessary.

The guidelines are therefore designed to help decide:

1. Which of the available approaches (interventions) is best suited to improving the livelihoods of key target groups;
2. What is the likelihood of achieving a *sustainable* improvement in livelihoods in the group using this approach;
3. What are the key activities to ensure both sustainability and maximum impact;
4. What quantifiable improvements can be expected and monitored for.

The concept of achieving the best fit between peoples' livelihoods and possible WATSAN interventions requires a thorough understanding of both the complexity of peoples livelihoods and the demands of *the system* in the same livelihoods focussed terms.

What and whose existing livelihood activities would you expect your intervention to build on and strengthen? What assets and institutional structures are necessary to make it sustainable (particularly with regard to O&M)? What assets will be added to by the intervention and what will be the impact of shocks and trends on the system?

But also, what assumptions come packaged with the technology you intend to use, what level of skills is needed to maintain it, what are your assumptions about spare part availability, what physical setting is it most suited to, etc.?

Using the guide

The guide is intended to be used alongside existing approaches. It does therefore not deal with issues such as cost recovery or training for O&M as it is assumed these will already be covered. The guide gives no hints as to how much information is needed, or how much depth to go into in answering the questions. Nor, as was previously mentioned, does it give suggestions as to the timing of interventions –these must fit with your own approach to project cycle management. It is up to you to decide.

Because the livelihoods approach is open ended, applying it must be done using common sense, and must be proportionate to the size of your project and budget. There is no point spending 50% of your implementation budget on an overly detailed analysis.

The best approach is one based on "*optimal ignorance and appropriate imprecision*". Collect the bare minimum information to make an informed decision. Monitor your success with this approach. If you begin to see problems emerging and feel that with more information you could avoid these mistakes in the future, then collect more information.

Having said this, and as a very approximate guide only, we suggest that the total additional time expended should be no more than two to five days per community spread over the project cycle. Most of the tools suggested are commonly used in participative work with communities anyway and should therefore fit in with existing project activities.

The guide should be used in conjunction with existing participatory approaches to identifying and designing interventions with communities. A number of different tools and activities are suggested for each section of the livelihoods framework. Many of these draw on the output of five core activities that should therefore form the basis of the approach.

These are:

- Stakeholder² identification (to identify focus groups within the community);
- Wealth ranking (which can help inform the stakeholder identification);
- Community mapping (showing the location of houses, water supplies, natural resources, etc. Community mapping can also help inform stakeholder analysis. Who lives where? Who has best access to water?);
- Community histories or timelines (capturing key changes, shocks etc. in the life of the community, especially relating to water);
- Institutional mapping based on Venn Diagrams (to identify the key institutions both within and outside the community, and their relationship to each other);
(there are a great many references describing participatory tools; two that cover all these five activities with a specific focus on WATSAN projects are IRC, 2001 and Mukherjee and van Wijk, 2003).

A note on wealth (poverty) ranking

Wealth ranking is often seen as contentious, and if badly presented it can become so. Many people feel it is unnecessary as 'the entire community is poor'. This is a serious error that can lead to distortion of project aims, capture of benefits by elites, or complete failure. Every community has relative winners and losers. Local elites such as retired civil servants, teachers, and traditional leaders tend to be in the former category, female headed households in the latter. It is crucial to disaggregate the community so that the particular needs of different groups within it can be addressed. Participatory wealth (or poverty!) ranking is one (powerful) way to go about this.

Stakeholder identification – when to disaggregate ..., and when not to

A livelihoods approach can be applied at many levels: individual, household, community etc. WATSAN interventions typically deal with 'communities'. In line with our pragmatic approach we would not advocate the use of detailed household surveys unless particularly fine grained detail is essential (for example to monitor the impact of project impacts on a particular target group such as a sample of poor, or female headed households). But it is essential in some circumstances to disaggregate the community if the needs of key groups – women, the poor, lower castes – are to be addressed. We suggest then a judicious mix of whole community and focus group based activities. Begin by undertaking the four core activities with as representative a group of the whole community if possible, perhaps following an initial introductory meeting. This will allow 'the community' to present an image of itself, albeit skewed by group dynamics and social relationships.

Following this, and with the aid of wealth ranking, identify key sub-groups with whom to carry out focus group work. Because of the nature of the livelihoods based approach it is also important to identify distinct groups of water users (beer brewers, livestock minders, etc). Where these are not adequately represented in wealth and sex based focus groups

² Stakeholders are considered to include all those who affect and/or are affected by the policies, decisions and actions of a given system (Grimble et al, 1998).

work with them in separate groups. When working in focus groups continue to use the outputs of the whole community (maps, histories etc) as a basis. Once the analysis is finished the output of the community sessions (map, history) can be written up and returned to the community as a report.

Triangulation (cross checking) between results at community, focus group and household level can help to identify problems associated with data collection and can be used to improve the reliability of findings.

Towards a scalable approach

A final note on using the guideline relates to undertaking project implementation activities at scale. Here it may be useful to develop a more systematic ordinal scoring system based on key indicators for each question. This would allow systematic comparison and decision making across many communities. It is beyond the scope of this paper to go into more detail about such a system (which to our knowledge does not yet exist), but interested readers might look at the Method for Participatory Assessment of the WSP.

Key Questions	Suggested actions/tools
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STRATEGIES

<p><i>Poor people should be able to derive maximum benefit from the introduction of an improved water supply system. Therefore it should help offset constraints associated with existing activities, and provide options for new activities that are compatible with the preferred livelihood strategies of impoverished and other group. Therefore examine:</i></p>	
<ul style="list-style-type: none"> • What were and are peoples' principle livelihoods activities? How have these changed and why? What are the factors behind these trends? • Are they significantly reliant on water or the time savings brought by a water supply? How does this reliance manifest itself in terms of reliability, quantity, quality, sources? How does this vary seasonally and between years? • With reference to the planned intervention, what activities that might be made possible are missing and why? 	<ul style="list-style-type: none"> • Working in focus groups identify livelihood activities and their importance to different groups of people within the community (poverty, age, gender etc; for more intensive studies household surveys can also be used). Key tools/activities will include: <ul style="list-style-type: none"> • inventory and ranking of main activities (past and present) • assessment of food and income sources, and expenditure • mapping of migration patterns (past and present) • seasonal calendars of production, employment, income, and water use (inviting to note changes from previous periods)

Key Questions	Suggested actions/tools
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ASSETS

Poor people should benefit from the introduction of an improved water supply for productive use, or should be able to use their extra free time for other economic activities. For this they will need to draw upon other assets – labour, initial inputs, market places, transport etc. In addition, maintenance of an improved water supply will draw on assets such as labour and organisational skills for O&M. Finally, the intended impacts of a scheme on peoples assets should be clearly identified. Therefore examine:

<ul style="list-style-type: none"> • What is the existing water-related asset base of the different focus groups (see ‘using the guide comments) such as infrastructure, water resources, WATSAN committees, WATSAN committee funds, labour and skills related to systems maintenance? • Who has access to these assets, and in particular, who has limited access? • What other existing assets would be of importance to the success of the intervention? • What water resources are available to the community. How do these alter over time (see also vulnerability context)? 	<ul style="list-style-type: none"> • Working in focus groups (see ‘using the guide comments) identify key assets, particularly those either necessary for sustainability of, or likely to benefit from, the proposed system(s). Key tools/activities will include: <ul style="list-style-type: none"> • asset surveys and resource mapping, including: inventories of the quality of housing stock, access and entitlements to water resources; water supply and sanitation systems, labour availability, access to markets and transport, access to credit. • seasonal calendars of asset availability and quality. • social network and Venn diagrams (emphasis on representation in relevant committees etc).
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Key Questions	Suggested actions/tools
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POLICY, PROCESSES & INSTITUTIONS

Policy, processes and institutions both within and beyond the community will be critical to the sustainability of any new or improved water supply scheme. For the poor, in particular, to benefit from the scheme the policy, processes and institutions must be supportive and effective, and critically the poor must have an adequate voice in them. Finally, for complex water supply systems it is essential that community managers have adequate external support (technical, managerial, financial). Therefore examine:

<ul style="list-style-type: none"> • In the community what water related institutions already exist? Do they have the necessary skills to support the proposed interventions? Are they representative of all key groups? • What non-water related institutions exist in the community? Could they play a role in the proposed activities? Do they represent all existing target groups? • How do the above community institutions relate to key district and national level institutions? Do they receive effective support from these? With what non-water related institutions could increased collaboration lead to greater impacts and benefits? 	<ul style="list-style-type: none"> • Working in focus groups identify the main water and non-water based institutions within and outside the community (WATSAN committees, church groups, extension services etc.). How effective/accessible are they? Key tools/activities will include: <ul style="list-style-type: none"> • Venn diagrams • Actor network analysis and 'power network diagrams' • Cause-effect and flow diagrams • Market inventories • Working with key informants both within and outside the community identify: Narratives or institutional histories from key informants (including traditional rules, tenure law and practice, and/or markets); activities with which potential synergies exist (micro-credit, small scale irrigation, watershed management etc.)
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Key Questions	Suggested actions/tools
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VULNERABILITY CONTEXT

A key factor of poverty is exposure to risk. A key measure of the poverty impact of a new or improved water supply scheme is the extent to which the scheme contributes to reductions in peoples' vulnerability to trends and shocks, and increases in their resilience (i.e. when exposed). It is also critical to establish the extent to which the water supply itself will be susceptible to shocks such as drought, as a highly susceptible supply is unlikely to reduce the overall level of insecurity, and may actually increase it. Therefore examine:

- What are the major shocks and trends affecting the water resource upon which the source will rely? In what proportion of years can planned abstraction be met?
- What are the major trends affecting different community groups (population growth, in-out migration etc.). How are these likely to affect the sustainability of the scheme, and what impact is the scheme likely to have on them?
- What are the major shocks to which the community/region is prone (drought, economic, political). How are these likely to affect the sustainability of the scheme, and what impact is the scheme likely to have on them?
- During times of water scarcity, what are the likely impacts of the scheme? Will productive water uses impact negatively on water availability for more basic needs, or will income and nutrition gained help to mitigate the impacts of drought on livelihoods?

- At a regional/district level use key informants or archives to research:
 - Study of meteorological and demographic data
 - Economic and political data (periods of unrest, economic turbulence etc.)
- Working with focus groups identify the major trends and shocks the community has experienced in the past through discussions based on the community timeline or history. Examine the impact that these shocks had on assets and strategies and identify coping strategies of different groups.

Key Questions	Suggested actions/tools
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OUTCOMES

<p><i>The impacts of a water supply scheme on people's livelihoods can be complex and difficult to predict in all its ramifications. To ensure that lessons learned from implementation experiences are built on by both communities and support agencies it is critical that a monitoring and evaluation framework, built on the identification of key livelihood indicators, is in place. Not only will this allow for valuable lesson learning it will also permit remedial actions or changes to the plan to be taken if and when necessary. Therefore examine:</i></p>	
<ul style="list-style-type: none"> • Is a monitoring & evaluation framework in place for both community and agency levels, which will capture the multiple impacts of the water supply scheme on people's access to assets, livelihood choices and outcomes? 	<ul style="list-style-type: none"> • Ensure that sufficient baseline data has been collected to allow for future comparison of impacts. This should largely come from the outputs of tools used in the previous sections. • Based on the above develop a list of key indicators that will be easy to monitor using participatory tools such as the MPA (Rekha <i>et al.</i>, 2000).

Worked example

The questions identified above should be used when assessing the feasibility of options to improve water supplies and could form an important component of a feasibility study for new projects or schemes. Equally the guide could be used when evaluating projects and interventions.

In this worked example the guidelines were used to structure a post-implementation evaluation. However, it illustrates how – with the necessary data – a livelihoods analysis could be structured and used at the appraisal stage or in pre-implementation planning. The worked example is based on the case study of collector well use in Zimbabwe (Box). The guide is used as an evaluation tool – looking at how and why the collector well intervention worked. The data for the evaluation comes from monitoring systems put in place during the pilot project, and reported in a number of publications cited in the annotated bibliography and reference list (Lovell, 2000; Lovell *et al.*, 1988; Waughray *et al.*, 1998; Moriarty, 2002).

As explained, the aim of the approach supported by the guidelines is to achieve a good match between the strengths and needs of communities and proposed or planned interventions. The example therefore starts with an assessment of the intervention in terms of the requirements to make it sustainable. This could be applied to any proposed intervention option. In this case it was to develop a community garden based upon the more reliable water supply available from a collector well.

Based upon the guide questions the answers below provide an assessment of the implications and assumptions associated with the chosen technology options, and the strengths and weaknesses of the community.

Community garden and collector well technology:

- *Livelihood strategies:*
The key assumption is that bucket-based irrigation of communally managed small-holder plots is compatible with/supportive of existing strategies. The community would be expected to adopt fund raising strategies to underpin O&M, for which training and more strategic capacity-building will be required.
- *Livelihood assets:*
The technology is relatively simple (hand-pumps). It relies on the occasional availability of a large labour force (to extract heavy pump rods), skills in pump maintenance, a good spare parts supply network (as the pumps are prone to frequent mechanical problems), and fund raising capabilities for O&M. The systems also rely on knowledge of gardening and on the availability of markets for garden produce. A large capital investment needs to be sourced either through communities themselves or an external donor (government, NGO etc) as the collector well is expensive. Finally a plot of 0.5ha reasonably close to the well must be made available.

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- *Policies, Processes and Institutions:*
To achieve optimum results the systems rely on a system of occasional back-up for larger scale O&M, and on good extension support for vegetable production and marketing, together with a receptive market.
 - *Vulnerability context:*
To meet design targets for mixed domestic/productive supply a sustainable groundwater yield of 15m³/day is required. Income from garden produce relies on uninterrupted access to markets and on reasonably predictable prices.
 - *Outcomes:*
The key assumptions are that irrigated small-holder gardening skills exist, that markets for produce exist, that labour and land are available, that skills for O&M can be developed and that these will remain in the community. Under these conditions collector well gardens have been shown to be sustainable in the medium term and to have an appreciable impact on livelihoods. However, studies have also shown that raising initial capital costs from the communities themselves is unrealistic in the light of the high costs and a complete absence of suitable credit mechanisms.

The community

Livelihood Strategies:

- Most people engaged in dryland agriculture, with small seasonally irrigated gardens from shallow hand dug wells. Women are particularly involved in vegetable gardening which is a key source of income for them, and which is used to meet household needs including education and medical fees. A number of better-off families exist with family members working in towns or cities or for the government.
- There is a marked generational divide, with many young people having very limited access to land for rainfed agriculture and therefore looking to non-agricultural activities (such as trading) to provide an income. There is strong migration pressure on young men in particular.
- In focus group discussions undertaken during the monitoring phase of the project, young people expressed a preference for projects that required little need for land or resources for land preparation (ploughs, oxen etc.). They identified irrigated gardening, zero grazing dairying, and pig production as possible activities. However they lacked practical experience in all except the first.

Assets:

- There is a reasonable skills base in irrigated gardening although this could be improved with better pest and disease control skills. People also tend to plant the same crops at the same time which leads to gluts. They would benefit from skills to produce early crops.
- There are good market locations both within the community and at a nearby trading centre on the main road

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- People have no access to formal credit facilities and raising the capital costs of a collector well would be impossible.
 - There is a large supply of well educated, technically competent young people without access to land, although the pressure to migrate is constant, leading to problems with maintaining trained capacity
 - Labour availability is good although migration can make it erratic. Many young people have little to do and few prospects. They are therefore open to most economic activities.

Policies, processes and institutions:

- The community received regular visits from the agricultural extension worker who was well respected and favourable to the project
- There were a number of existing traditional committees for managing natural resources but these were only partially supported by younger community members. Previous committees for cattle buying and other projects had met with mixed success. In addition there were a number of strong and active church related groups.
- Mixed use water supplies were not officially recognised by the district authorities and registering the collector well with them (a necessity to receive O&M support) proved impossible. As a result the community was left entirely responsible for O&M of the system.

Vulnerability context:

- The region is semi-arid and prone to low and erratic rainfall and drought. However pumping tests supported the use of the collector-well technology which should be able to meet requirements in all but the most extreme conditions. Other cheaper options would fail more often during droughts. The collector well did in fact weather the 1992 drought during which most other water points failed.
- Increasing demographic pressure (the communities population has doubled twice in the last 30 years) is the main driving force behind both migration and farming system intensification.

Outcome:

The collector well in the community upon which this example was based was a success and continued to function 10 years after being built. This despite never receiving support from the district WATSAN services. The community managed O&M and sold vegetables from the garden to bring a small but steady stream of income to 50 mainly poor families. On the negative side it is clear that the scheme could never have been built without external support and that at some stage (when O&M costs become too high) it will fail – unless another injection of external funding can be found to carry out large scale renovations.

5. Summary and conclusions

- Domestic water services have multiple benefits – it is the combination of these that add up to an appreciable impact on livelihoods and poverty.
- Narrow approaches to water supply, that neglect productive uses of domestic water, are an opportunity missed. Worse still, because in practice people will use water for productive activities, failure to account for this additional demand at the design stage may well lead to system failure. It is therefore much better to include small scale productive use in initial system planning and design.
- A major reason for neglecting these needs is that they slip between sectors. A sectoral approach where irrigation, industrial, and domestic water supplies are treated separately, frequently fails in rural areas. Projects implemented within these rigid boundaries usually don't recognise multiple benefits and therefore don't meet demands, particularly those of poor people.
- Low and inflexible norms-based 'basic needs' or rights based approaches can also be a handicap – they fail to provide for the very productive activities that could help people grow food, make money, and escape poverty. These uses should also be considered as basic. Norms are required for proper planning, but they should be based on at least some productive use, and should in any case act as benchmarks, not upper limits.
- Many positive examples are now emerging of how better water supplies do impact on livelihoods and poverty. This is good news, but they need to be supplemented and reported more widely. While research findings are now strong, there are no models or toolkits that build on the capabilities and address the wider needs of people for multi-purpose water supplies. In addition, examples reported tend to be project and location specific, and have not yet been taken to scale.
- Monitoring indicators in particular need to be expanded to capture the full range of benefits of improved water supplies to vulnerable women and children and other marginalised groups.
- Livelihood approaches provide a useful way forward for the WATSAN sector, supporting it in broadening its focus, addressing needs for productive water use, and improving its poverty reduction aims and potential. In addition they offer potential for better application of WATSAN specific initiatives such as demand responsive approaches and cost-recovery.

Regional Health and Development Centre (RHC) - Addis Ababa, Ethiopia (5258 TD) 060-7455 (Production office: 4 (re) Der) 027 (m) 0.3t)

is some convergence between sectors. In particular, the irrigation sector is starting to recognise multiple users of 'irrigation' water. These trends are encouraging evidence of a more integrated approach to water resource development and management.

- Livelihoods based approaches to developing water resources offer a potential justification of, and incentive to, genuinely bottom up Integrated Water Resource Management. They also provide a challenge to all those who claim to target or represent the largely poor and scattered small scale users of water: to include their demands within rights based approaches, to ensure that their voice is heard at the catchment management table, and to ensure that they get a fair share of the water pie.

TOP Resources

TOP Books, manuals, articles and papers

This section contains 14 annotated references to useful further reading on and around the issue of productive water use and livelihoods approaches. It is complemented by another annotated list of 12 useful web-sites that provide access to more information than it is possible to provide in this short document. A selected list of resource centres and contacts where further information can be accessed and enquiries made is also included. All these lists will be regularly updated. If you have or know of a document or site that has proved useful and should be included, please contact Patrick Moriarty (moriarty@irc.nl)

Butterworth, J.A., Moriarty, P.B., & van Koppen, B. (2003). Water, poverty, and productive uses of water at the household level: practical experiences, new research, and policy implications from innovative approaches to the provision and use of household water supplies. Proceedings of an international symposium held in Pretoria, South Africa, 21-23 January 2003. IRC, Delft

These proceedings present over 20 case studies related to the productive uses of (mainly) domestic water supplies in a variety of countries and settings.

For more information see <http://www.irc.nl/prodwat/>

Bakker, M., Barker, R., Meinzen-Dick, R., & Konradsen, F., eds. (1999). Multiple uses of water in irrigated areas: a case study from Sri Lanka.

SWIM Paper 8. International water management Institute, Colombo, Sri Lanka.

This paper argues that to ensure efficient, equitable, and sustainable water use, to reduce poverty and improve wellbeing of the community in a case study irrigation system in Sri Lanka, that irrigation and water resources policies need to take account of all uses and users of water within the irrigation system. The report can be downloaded from www.iwmi.org

EC. (1998). Towards sustainable water resources management: a strategic approach.

European Commission, Brussels.

These guidelines aim to facilitate implement of projects (with an EC project approach focus) that are consistent with integrated water resources management principles. They include a useful checklist-based approach to planning and assessing domestic water supply projects to ensure that they incorporate core IWRM principles.

Read online at

http://europa.eu.int/comm/development/publicat/water/en/frontpage_en.htm or order by E-mail from development@cec.eu.inet

Ellis, F., (2000). Rural Livelihoods and diversity in developing countries.

Oxford University Press, Oxford, UK.

This book provides a comprehensive resource on livelihoods-based approaches.

Although there is very little on water, it provides a readable guide to livelihoods concepts and their application with frequent examples. Throughout it emphasises the diversity of rural livelihoods: that in seeking to minimise risk people undertake a wide range of activities rather than focussing on one or two.

Global Water Partnership Technical Advisory Committee (2000). Integrated Water Resources Management. TAC Background Papers No.4.

GWP, Stockholm, Sweden.

This paper provides an overview of what integrated water resources management means from its main proponents: the Global Water Partnership. Among other things it contains the full version of the famous Dublin principles, and a vision of enhanced cross sectoral integration within the water sector.

Available at: <http://www.gwpforum.org/>

Lovell, C. (2000). Productive water points in dryland areas: guidelines on integrated planning for rural water supply.

ITDG, London.

Based on the experiences of implementing collector wells in Zimbabwe, but looking far beyond one particular technology, this 'how to' book provides a detailed step by step guide to implementing mixed-use water supplies in semi-arid rural areas. Of particular use to the project manager it contains detailed cost/benefit analyses of a range of options from hand-dug wells to small dams and decision support flow diagrams for technology selection. The book also serves as a useful primer on the hydrology and hydrogeology of semi-arid hard rock areas.

ISBN: 1853395161 Available from <http://www.itdgpublishing.org.uk/>

Nicol, A. (2000). Adopting a sustainable livelihoods approach to water projects: implications for policy and practice.

Working paper 133. Overseas Development Institute, London.

An early think-piece from the UK's Overseas Development Institute that sets out some of the implications for those involved in water related projects and programmes of adopting a livelihoods approach.

ISBN: 0850034663 Available online at <http://www.odi.org.uk/publications/wp133.pdf>

Perez de Mendiguren, J.C., & Mabelane, M. (2001). Economics of productive uses for domestic water in rural areas: a case study from Bushbuckridge, South Africa.

AWARD Research Report, Acornhoek, South Africa.

This report presents the results of a detailed study undertaken by the Association for Water and Rural Development (AWARD) with 13 communities in the Bushbuckridge District (part of former Gazankulu and Lebowa homelands), Limpopo Province, South Africa. It identifies the extent of productive uses for water at community level, the economic benefits and the current patterns of payment for water.

The report can be downloaded from www.nri.org/whirl/reports.htm

Thompson, J. et al. (2001). Drawers of water II: 30 years of change in domestic water use & environmental health in East Africa.

IIED, London.

This follow up study to the famous Drawers of Water study returned to the systems and communities involved in the original study to see how things had changed in the intervening 30 years. Unlike in the original study they identified widespread productive uses of water, particularly but not solely in rural areas. ISBN: 1904035981. Available via <http://www.drawersofwater.org>

Various, (2002). Water and Livelihoods, Waterlines, Vol. 20 No. 3.

This issue of the quarterly journal Waterlines, in January 2002, brought together a collection of articles on water and livelihoods. Waterlines is published by ITDG (<http://www.itdgpublishing.org.uk/waterlines.htm>)

Vincent, L. (2001). Water and rural livelihoods. Brief 5 of 14 in Overcoming water scarcity and quality constraints. A 2020 vision for food, agriculture and the environment, Focus 9. International Food Policy Research Institute, Washington DC, USA.

This two-page overview, part of a set of briefings, provides a useful summary of the part water plays in rural livelihoods. It argues that designers, planners and managers can support rural livelihoods when dealing with water scarcity by appreciating the many roles of water in rural livelihoods and giving rural users scope to negotiate and defend their livelihoods. Available from www.ifpri.org

WaterAid, (2001). Looking back: The long term impacts of water and sanitation projects. WaterAid, London, UK.

A condensed version of the WaterAid research report 'Looking back: participatory impact assessment of older projects'. This study in Ethiopia, Ghana, India and Tanzania found significant and often unexpected positive impacts of water supply and sanitation projects. It argues that access to WATSAN should be the cornerstone of any poverty reduction strategy and that maximising community involvement is key for projects to reach their full potential. Available from <http://www.wateraid.org.uk>

Moriarty, P.B., (2002). Integrated Catchment Management and Sustainable Water Resource Development in Semi-arid Zimbabwe.

IRC, Delft, the Netherlands.

This detailed study of groundwater availability and use in South Eastern Zimbabwe looks at how farming system intensification driven by demographic pressure led to a rapid increase in the use of groundwater for irrigated vegetable production.

Download from <http://www.irc.nl/products/publications/title.php?id=150>

IRC (2001). Keep it working – a field manual to support community management of rural water supplies, IRC Technical Paper Series 36,

IRC, Delft, the Netherlands

This popular guide book deals with a range of management issues related to operating and maintaining rural water supplies. It includes a 'tools' section with detailed descriptions of how to undertake a range of PRC type activities with a specific water focus.

Muckerhjee, N. and van Wijk, C., (eds) (2003). Sustainability Planning and Monitoring in community water supply and sanitation – a guide on the Methodology for Participatory Assessment (MPA) for community-driven development programs

Includes details of a wide range of participatory methods, adapted for use in conjunction with planning water supply projects such as village mapping, community histories, wealth ranking, institutional mapping and seasonal calendars.

Available at <http://www.wsp.org>

TOP Web sites

<http://www.irc.nl/prodwat/>

Home page of IRC's Livelihoods and IWRM focus area. Includes a range of advocacy materials based on the outcomes of the international symposium on 'Water, poverty, and productive uses of water at the household level' held in January 2003, as well as related papers, case-studies and links.

<http://www.livelihoods.org>

DFID-supported site for 'livelihood connect' initiatives to promote the use of livelihoods approaches in development. Content includes useful guidance sheets (section 7 includes discussion of water security and the application of livelihoods approaches), an evolving toolkit, many further links, and case studies where livelihood approaches have been employed – but not much on applications relating to water yet!

<http://www.nri.org/whirl>

Site for a research project (Water, Households and Rural Livelihoods – WhiRL) focused on addressing rural water supply needs within catchment management reforms in South Africa and watershed development approaches in India; and water supply-livelihood relationships that underpin these needs. Papers and reports can be downloaded.

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

Site for the SecureWater research project that draws on the Sustainable Livelihoods (SL) framework and the Household Economy approach (HEA) to understand the nature of water-livelihood changes at the household level and best practices for the elimination of poverty through water supply interventions. Includes case studies and reports.

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

A new site focused on the theme of water and livelihoods. The site aims to address the current division in the water sector between thinking on water resources management, and water supply and sanitation development, by encouraging better integration of the two under the common goal of poverty reduction through the promotion of sustainable livelihoods.

<http://www.livelihoodtechnology.org>

This Intermediate Technology Development group site on technology and sustainable livelihoods includes an overview paper on 'water sector technologies, sustainable livelihoods and poverty', and water case studies from Zimbabwe and Kenya following a livelihoods approach.

<http://www.worldbank.org/poverty/>

The PovertyNet site includes useful links to key areas of World bank supported work including Poverty Reduction Strategy Papers (PRSPs), the 'Voices of the Poor' participatory poverty assessment process that focuses on the multiple dimensions of poverty, useful work on social capital and much more.

<http://www.adb.org/Water/theme1.asp>

The website of the ADB-led Water and Poverty Initiative that aims to raise public awareness about poverty and its linkages to the management of water resources, the delivery of water services and the overall water security of poor people. Includes links to papers prepared for the 3rd World Water Forum held in Kyoto, Japan in 2003.

<http://www.undp.org/sl/index.htm>

The home page on sustainable livelihoods at the United Nations Development Programme provide links to papers on tools for assessment and planning of projects.

<http://www.eldis.org/index.htm>

A gateway to development information that includes resource guides on key themes including poverty and participation.

www.careinternational.org.uk/cares_work/what/livelihoods.shtml

Pages that provide examples of how the NGO CARE use a Household Livelihood Security model in their projects. Examples include water supply and sanitation.

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

Urban agriculture provides another entry point for finding information on productive uses of water at household and community level. This urban agriculture resource centre is a good place to start.

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

Site for the Global Water Partnership which includes an evolving toolbox for Integrated Water Resources Management.

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About IRC

IRC facilitates the sharing, promotion and use of knowledge so that governments, professionals and organisations can better support poor men, women and children in developing countries to obtain water and sanitation services they will use and maintain. It does this by improving the information and knowledge base of the sector and by strengthening sector resource centres in the South.

As a gateway to quality information, the IRC maintains a Documentation Unit and a web site with a weekly news service, and produces publications in English, French, Spanish and Portuguese both in print and electronically. It also offers training and experience-based learning activities, advisory and evaluation services, applied research and learning projects in Asia, Africa and Latin America; and conducts advocacy activities for the sector as a whole. Topics include community management, gender and equity, institutional development, integrated water resources management, school sanitation, and hygiene promotion.

IRC staff work as facilitators in helping people make their own decisions; are equal partners with sector professionals from the South; stimulate dialogue among all parties to create trust and promote change; and create a learning environment to develop better alternatives.

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