ALLOCATING WATER FOR HOME-BASED PRODUCTIVE ACTIVITIES IN BUSHBUCKRIDGE, SOUTH AFRICA

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1. Introduction and Background

This case study gives an overview of the findings of two surveys[5] into the productive uses of domestic water undertaken by the Association for Water and Rural Development (AWARD) with rural communities in Bushbuckridge District in eastern South Africa. The surveys were undertaken in relation to AWARD's work to improve the access of poor people to water resources in the Sand River Catchment. The second survey was part of the DFID-funded Water, Households and Rural Livelihoods (WHiRL) project. This paper has been prepared as a contribution to the Water and Poverty Initiative that has been launched to raise awareness of the potential role of water in poverty reduction. As we shall see, this is certainly the case in the Bushbuckridge area, with water-depended activities vital to the livelihoods of many poor people and improvements in access to reliable water services having the potential to make a major contribution to poverty reduction.

Any discussion of water issues in contemporary South Africa must be set within the context of the existing dynamic changes to water laws, policies and institutional responsibilities. This is discussed more fully below. Key aspects of the reform process are defining mechanisms to improve existing services and to allocate water to different stakeholders based on assessments of their minimum needs. For the domestic sphere, this reflects a definition of basic needs that assumes domestic water is only about health and hygiene: water for drinking, cooking, sanitation and washing. Productive uses of domestic water are recognised in the water use category known as Schedule 1, for which no licence is required, but the productive activities that take place in the household have yet to be recognised in planning and allocation processes. As we shall see, these are a key element of the livelihoods of rural people in the Bushbuckridge area and are particularly important for many poor people, including female-headed households that are common in the area.

This leads to a re-assessment of the concept of water for basic needs. This has traditionally been seen as being about health and hygiene only, but for the residents of Bushbuckridge, as for people in other parts of South Africa and across the developing world, the definition should be extended to include water needs for livelihoods activities. This is more than a semantic point where many of these activities take place in or around the home, as the systems through which domestic water is provided have tended not to recognise these essential needs and can

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consequently jeopardise the livelihoods of the poor. There are two key implications of this, points developed further throughout this paper:

- Levels of domestic water needs are likely to be far higher than those assumed by conventional approaches to basic needs.

- Different households will have different needs, as the scale and nature of use of domestic water for productive activities varies greatly within any community. This means that norms-based allocation systems (so many litres per person per day) will not be sufficient for many poor people.

This is a very real issue for organisations such as AWARD, who are working at the grassroots level to assist communities to develop and manage their water supply systems. In this, they work within a framework set by government policies and norms. A particular challenge is to create greater awareness of the importance of the productive use of domestic water at, in particular, the operational levels in DWAF and local government. If these do not recognise the key role that domestic water plays in many livelihood activities of poor rural households then poverty reduction opportunities will be missed.

2. The Policy and Institutional Context

Contemporary South Africa is in the middle of a dynamic and fundamental reform of its water laws, policies and institutional processes. These have rightly been recognised as innovative and of international significance, but the current phase is one where the basic structure set by new laws and policies is being worked through into institutional mechanisms to implement them. There are many uncertainties and tensions in this process. The livelihoods of many rural people will be seriously affected if the on-going process of change does not recognise the need to ensure that water is allocated to the productive uses of domestic water.

The process of change derives from the provisions of the Water Services Act (1997) and the National Water Act (1998). The Water Services Act gives substance to constitutional requirements with respect to rights of access to water supplies, establishes national norms and standards and defines the institutional framework for the provision of water and sanitation services. The Act delegated authority for water services to local municipalities. This has focused on the district level, with district municipalities charged to develop water service development plans within the framework of district-level integrated development plans that covered a wide range of service provision. A structure below the district level has been developed, with local municipalities, ward committees and, at the village level, water committees (which are part of the community development forum) established. These are linked to elected representatives at each level (see Box 1).

The National Water Act established the ways that water resources are to be protected, used, developed, managed and controlled, based on principles of equity, sustainability, efficiency and accessibility. The Act created a new set of imperatives to govern water management based on three key elements of the Act:

- Water is established as a public good with no private ownership permitted.

- The Act makes provision for a Reserve that defined water to protect ecological functions and to meet minimum basic needs (known as the basic human needs reserve or BHNR). The basic need has subsequently been established as 25

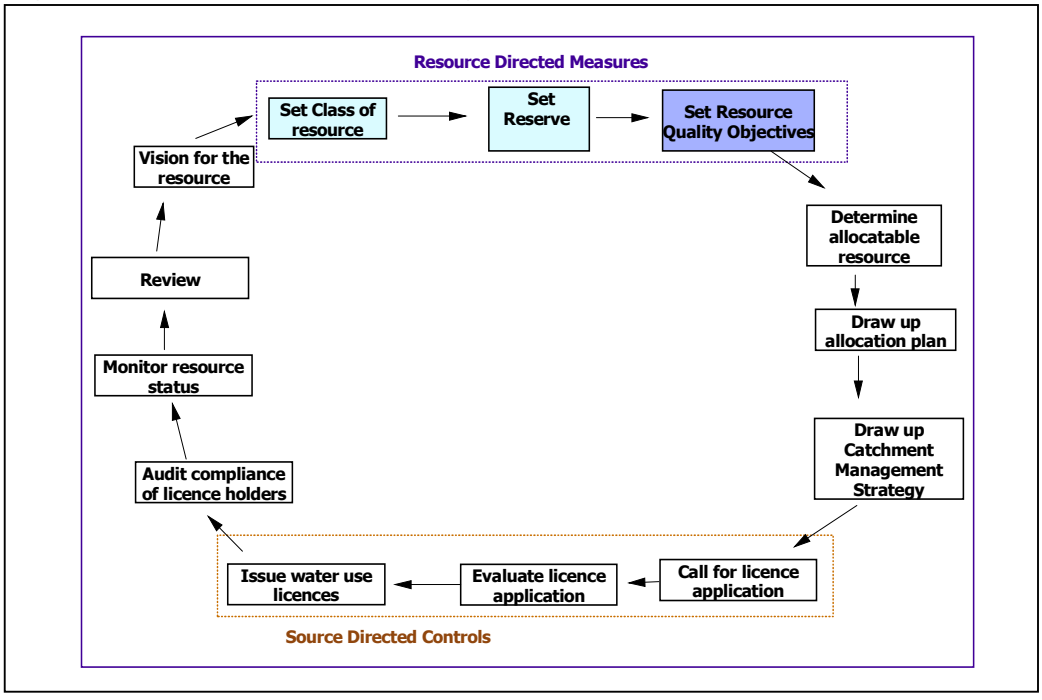
litres per person per day (the so-called RDP minimum standard: Pollard *et al* 2002) and water is defined as a basic right.

- The Act recognises the catchment as the basic unit for water resources management.

Under the National Water Act, South Africa is divided into 19 Water Management Areas that correspond to river catchments. It seeks to sustainably manage water resources for the benefit of all and to reverse past racial and gender discrimination. The act seeks to set up structures for integrated water resources management based on participatory processes. This will be achieved through the development of Catchment Management Agencies (CMAs) in each of the 19 hydrological areas. The CMAs will be responsible for preparing catchment management strategies that allocate available water resources to all stakeholders to meet their needs on a sustainable basis. Within each catchment a multi-tiered set of stakeholder forums are to be set up through which different needs can be established and water management problems identified and resolved.

The National Water Act also establishes a system for licensing all water users other than minor domestic and subsistence (Schedule 1) users, for a monitoring and regulatory system (including water quality and waste disposal) and a framework for the financial aspects of water management (including water charges). The Act also recognises the importance of ensuring that water management within South Africa does not negatively affect its neighbours, including provisions to regulate trans-boundary water flows. Taken together, these two key pieces of regulation represent a radical and innovative framework that is intended to set water management in South Africa in a new direction. This is represented diagramatically in Figure 1, which shows the links between different stages in the water management cycle.

Figure 1. The water resource management process in South Africa



Source: DWAF (2001)

The establishment of this legislative and policy framework has not solved water problems overnight, however, as there are formidable challenges in establishing the institutional mechanisms through which the different provisions could be implemented. There are also areas of uncertainty in the overlap of the two pieces of legislation. In particular, the Water Services Act establishes the management of water services through the structures of local government, which do not coincide spatially with the hydrological divisions made for water resources management in the National Water Act. There are also considerable problems of uncertainties over responsibilities and limitations to capacities at all levels (and especially within local government) that will take concerted efforts and a considerable time to resolve.

During this process, a key challenge is to ensure that the needs and interests of poor people are catered for in the water allocation mechanisms that are established as new institutional processes are developed. The BHNR gives a clear basis for this in relation to domestic consumption needs for health and hygiene purposes, and indeed the mechanisms of a per capita norm is appropriate for this purpose. What it does not do is ensure that domestic water needed for key productive activities that are essential to the livelihoods of poor people are catered for, and indeed the reserve mechanism is not appropriate for this as the amount of water needed is different from household to household and region to region.

The BHNR consequently needs to be complemented by an allocation mechanism in which these productive activities are recognised as a key demand in terms of their contribution to the livelihoods of poor people and the economic development of the areas in which the poor live. This means that priority should be given to Schedule 1 activities over and above those catered for by the BHNR. These mechanisms need to be built into the emerging institutional structures through which water resources are allocated and water services managed. This issue is explained further in Box 1, which summarises AWARD's experiences in the Sand River catchment. This issue is further developed below, but before doing so the next section provides a summary of the survey findings that will help to give a clearer picture of the role of productive uses of domestic water in the livelihoods of poor people in the Bushbuckridge area.

3. Productive Uses of Domestic Water in Bushbuckridge

The two surveys studied water use in a total of 19 villages that had a combined population of over 26,700 people. Five villages were included in both surveys. A range of data collection methods was used, including household interviews, key informant interviews, group discussions and observations. The villages surveyed represented a range of water supply conditions, from very good connections to extremely bad water supply conditions. For analytical purposes, the villages were divided into 'best case' villages, where supply conditions were good, and 'worst case' villages where there were major problems in accessing water supplies. All aspects of water supply and use in the villages were examined.

All households, of course, use water for their basic consumption needs: for drinking, cooking, bathing and washing clothes and utensils. The amounts used varied somewhat according to the quality and proximity of the water supply and the size and wealth of households, but in almost all villages the average use for these purposes was close to or below the minimum 'basic needs' figure of 25 litres per capita per day. In many cases, people could access the water they needed, but this often meant women spending a long time fetching water from distant sources, queuing for

Box 1: Institutional arrangements for water resources management and supply in the Sand River Catchment

An overview of the proposed governance structures for water resource management and supply in the Sand River Catchment is given in Figure 2. Although still in the early stages of implementation, water supply governance is more advanced than water resources management. The diagram illustrates the need for institutional links between the provisions of the National Water Act and the Water Services Act. The development of these links is a critical challenge for the future of water management in South Africa. The Sand River Catchment forms part of the Inkomati water management area which will be governed by a CMA although this is not yet operative. Sub-catchments are likely to be represented by catchment management fora, comprising representatives of stakeholder fora or water user associations. These fora will, in effect, make representations to the CMA for sectoral water allocations, including water demands for rural communities. The district municipalities represent the water services authority which function to 'allocate' water to the local municipalities, which acts as the water service provider. The ward councillors will, in effect, make representations to the local municipalities regarding water demands for their villages of jurisdiction and water supply constraints. They rely heavily therefore, on inputs from the village water committees. Municipalities articulate these needs through the water services development plans (WSDPs). The Sand River Catchment falls under the remit of the Bohlabela district municipality and the Bushbuckridge local municipality. The key points where local people's interests are represented are at the village and ward levels and the development of the capacities of the elected representatives at these two levels is critical for ensuring the needs of the poor are reflected in water investments and allocations.

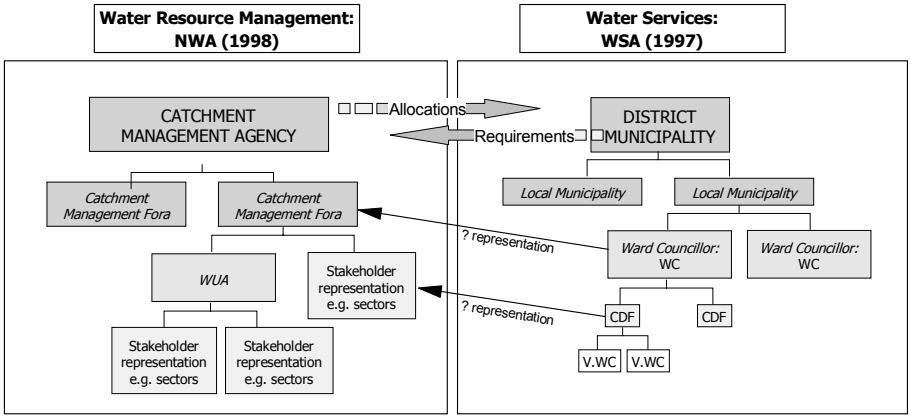


Figure 2: Schematic of the proposed institutional arrangements for water resource management and supply. The details of these institutional arrangements may vary in different regions of South Africa. This figure indicates that water supply issues should relate to wider catchment management issues in terms of water allocations and through representation. Abbreviations: VWC = village water committee; CDF = community development forum representing multiple village-based committees; WC = ward committee comprising CDFs from a number of villages; WUA = Water User Associations.

water at communal water points or buying water from vendors. There were also concerns about water quality in some cases. Interestingly there was no statistical difference in the quantities of water used for these purposes between villages with good water supplies and villages where supplies were poor. The main benefits of

improved water supplies were seen to be the time saved in fetching water rather than the increased amount that could be consumed. These time savings were extremely significant for women in particular, freeing up time for other livelihood activities or for leisure time.

The surveys focused on productive uses of domestic water, and in both cases found that this was substantial, with a wide range of water-dependent activities that constituted an important part of the livelihoods of participating families. A similar list of activities was found in both surveys, though the importance of different ones varies from village to village. The main water-dependent productive activities found in the surveys were vegetable gardens, fruit trees, beer brewing, brick making, hair dressing, livestock (cattle and goats) and ice block making. Many other activities were cited in one or two villages. These included grass mat weaving, smearing and plastering of walls and floors, medication and religious uses, baking, poultry, duck ponds and car washing.

Where adequate water is available the most common productive water use is vegetable gardens. These are generally small backyard gardens of a few square meters. Onions, tomatoes and leaf vegetables are typical crops. Many homestead plots also contain a number of fruit trees, which provide shade and have aesthetic value as well as giving fruits. This featured strongly both as an existing activity where it is possible and as an activity that is aspired to if there were more favourable conditions such as an improved water supply. Irrigation of vegetable gardens and fruit trees at the homestead is more widespread compared to irrigation of crops in community gardens. The latter needs more organisation at the community level, whereas a homestead plot is easily developed under individual initiative. Growing vegetables within the homestead is also more convenient and secure. Importantly, the entry costs to poor people of utilising domestic water for backyard irrigation are low: there are no committees to join and little equipment is needed.

Cattle are important ‘consumers’ of ‘domestic’ water. However the source of water for cattle is often not from a ‘domestic’ system, but outside the village. For instance, where there is a reticulated water supply system such as in Zoeknog or Shere and there are perennial rivers nearby, cattle drink water from the rivers. However where there is only one primary and reliable source of water (e.g. the river in Dumfries) humans and livestock share the source. In times of stress during droughts, competition for water between livestock and people is more important. When rivers and dams that are normally reserved for cattle and other animals dry up, they are often provided for from within the reticulated water supply system. This has resulted in damage to facilities and health hazards. On the other hand, where there is no reticulated or proper water supply for humans, the latter often share the source of water reserved for cattle, with again serious health implications.

There are differences in terms of the extent to which each of the activities that use water are engaged in within each village. Obviously, the most water-consuming activities are engaged in at a larger scale in communities where there is better access to an improved and reliable water supply. The best example in this regard is vegetable gardens, whereby all the villages with bad water supply system have consumption levels much lower than the villages with better water supply systems. The exceptions are watering cattle, where the livestock can be moved to more distant water sources and livestock rearing is not dependent on the ‘domestic’ water supply because there are alternative sources of water. Therefore, in villages where the water supply system is poor it is still possible to raise cattle.

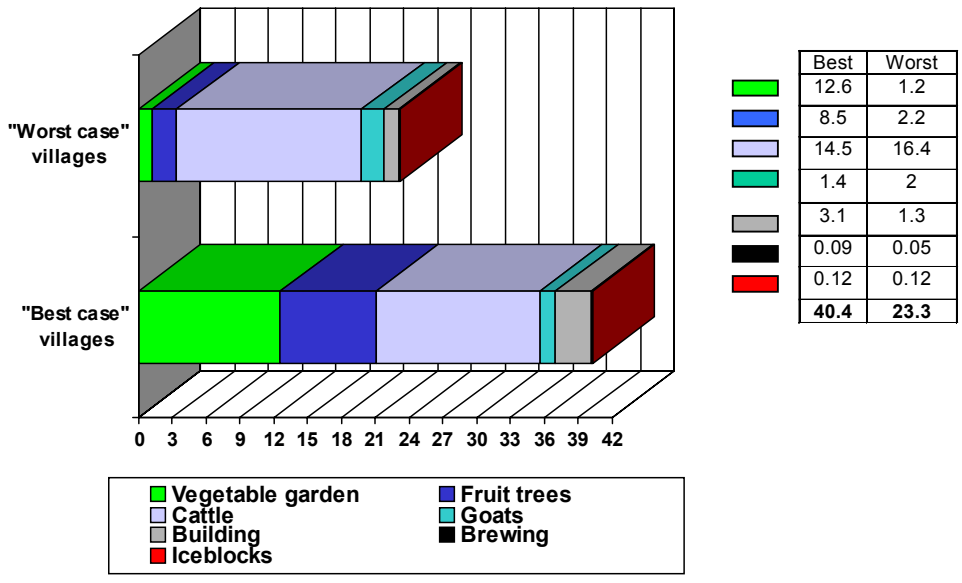
There were major differences in the quantity and pattern of water use for livelihood activities between villages dependent upon the quality of their water supply. Figure 3 summarises the average water consumption for all 'low level economic activities'. For each village, these figures take into account the total number of people involved in each activity and average their consumption across all households, regardless of whether they are involved in the activity or not. Therefore, the figures presented here provide an estimation of the per capita amount of water that is needed to support the current level of productive activities.

The main conclusion from these figures is that all economic activities using domestic water occur over and above the first 25 litres (basic needs). An additional 25 to 40 l/p/d will be needed to support these economic activities (given current proportion of household involved in the activities and water consumption). The activities using most water are cattle ranging, vegetable gardens, beer brewing and watering trees.

Also, the comparisons between consumption in "best case" and "worst case" villages provide an indication of the likely increase in water consumption with improved water supplies. Water consumption for all activities except for livestock and ice-blocks, is much higher in best case villages. The most important increases occur in the irrigation of gardens (950%), irrigation of fruit trees (286%), building activities (138%) and beer brewing (80%).

However, as they are averages for all households, the figures above do not reflect the real amount of water used by a household involved in a particular activity, being the amount required for each activity much higher than the above average. Figure 4 provide average consumption figures for each activity, when only those households that engage in the activity are considered.

Figure 3: Summary consumption for main water-based livelihood activities in "best cases" versus "worst cases (l/c/d)



	Best	Worst
Vegetable garden	12.6	1.2
Fruit trees	8.5	2.2
Cattle	14.5	16.4
Goats	1.4	2
Building	3.1	1.3
Brewing	0.09	0.05
Iceblocks	0.12	0.12
	40.4	**23.3**

Figure 4: Water consumption per business in households involved in the business (l/c/d)

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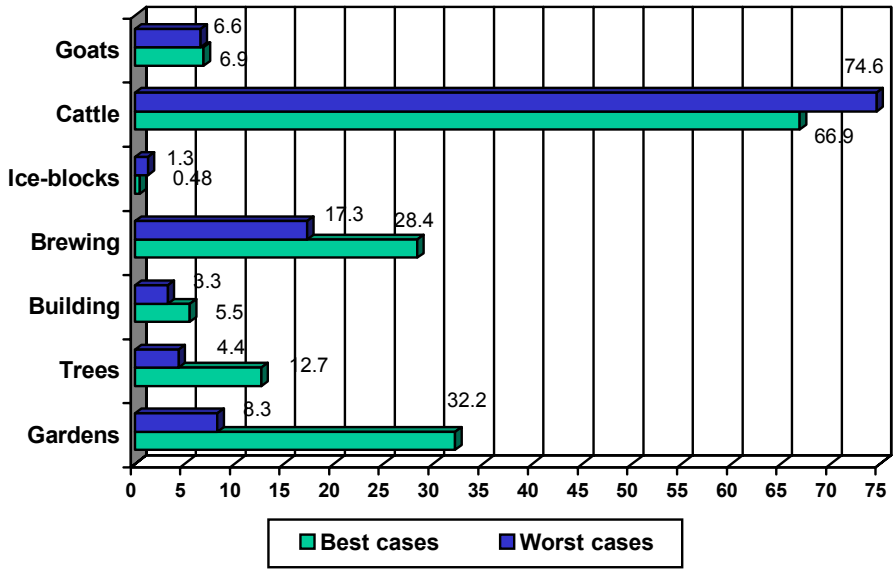


Figure 5: Percentage of households involved in each activity (%)

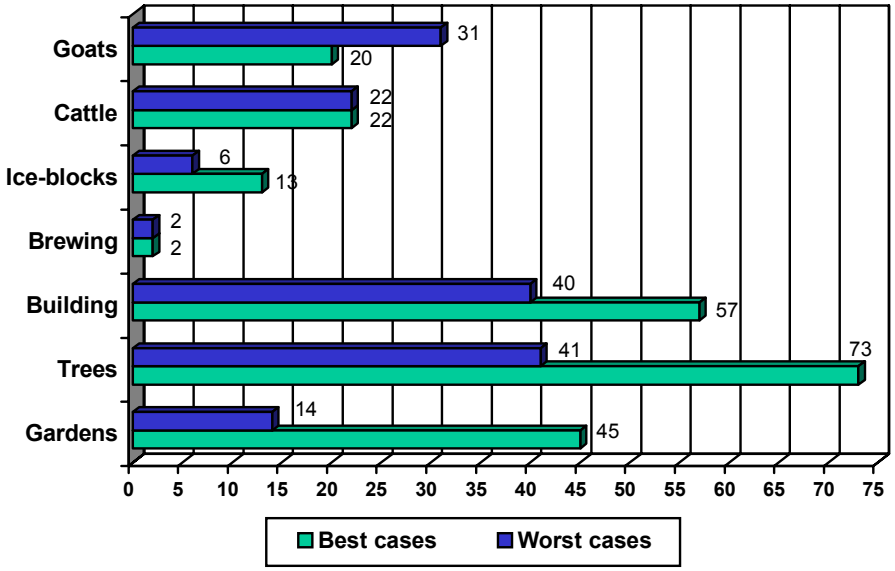


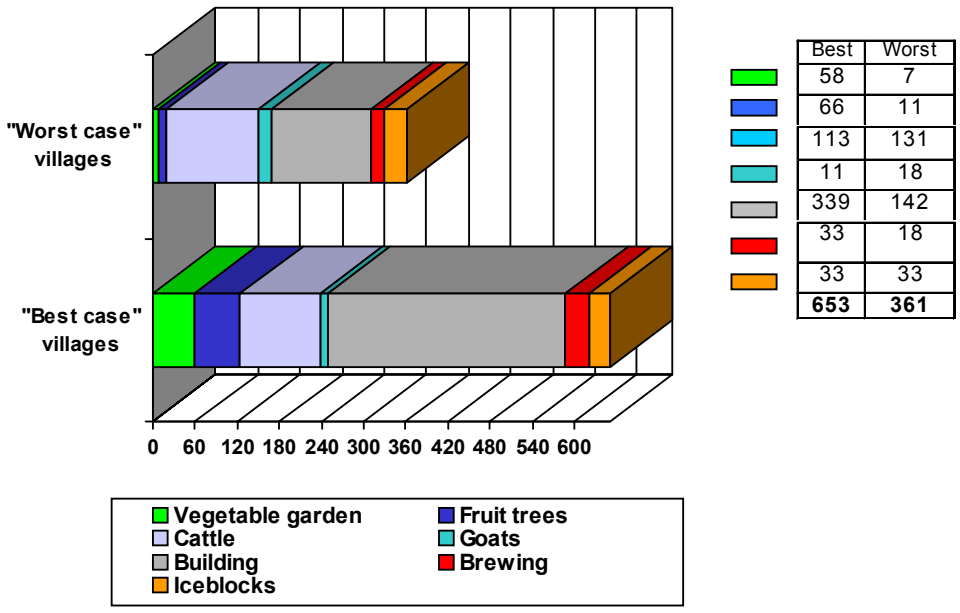
Figure 5 provides an overview of the average level of involvement of households in each of the activities. Not all households engage in “low-level economic activities”. In “best case” villages, the proportion of households involved in each activity range from 2% of the households for beer brewing to 73% for the irrigation of fruit trees. Moreover, for most activities, the proportion of households involved is also higher in “best case” villages than in “worst case villages”. This demonstrates that the ability to participate in these livelihood opportunities is directly related to the location and reliability of the water supply, a conclusion supported by the views of the respondents in the surveys.

We can consequently see that the productive use of domestic water is extremely common throughout the Bushbuckridge area, and in all probability would be even more widespread if all communities had reliable access to a convenient water supply. What is the economic significance of these activities? This can be assessed by looking at the income generated from each activity using "gross margins" figures per activity, and per litre of water.

Figure 6 summarises the returns from all household-based economic activities in both types of villages. This income reflects an average value for all activities when estimated across all households, regardless of whether each household engages in the activity or not (under current proportion of household involvement and water consumption). Total income generated from these economic activities averages R529 to R653 person/year (10.5 Rand = US$1). On average this represents around 10 percent of average household income in the Bushbuckridge area but the actual amount earned varies from household to household and community to community. In the 'best case' villages, where water supplies are not a constraint upon these livelihood activities, the income derived from the productive uses of domestic water are considerably greater than this average figure.

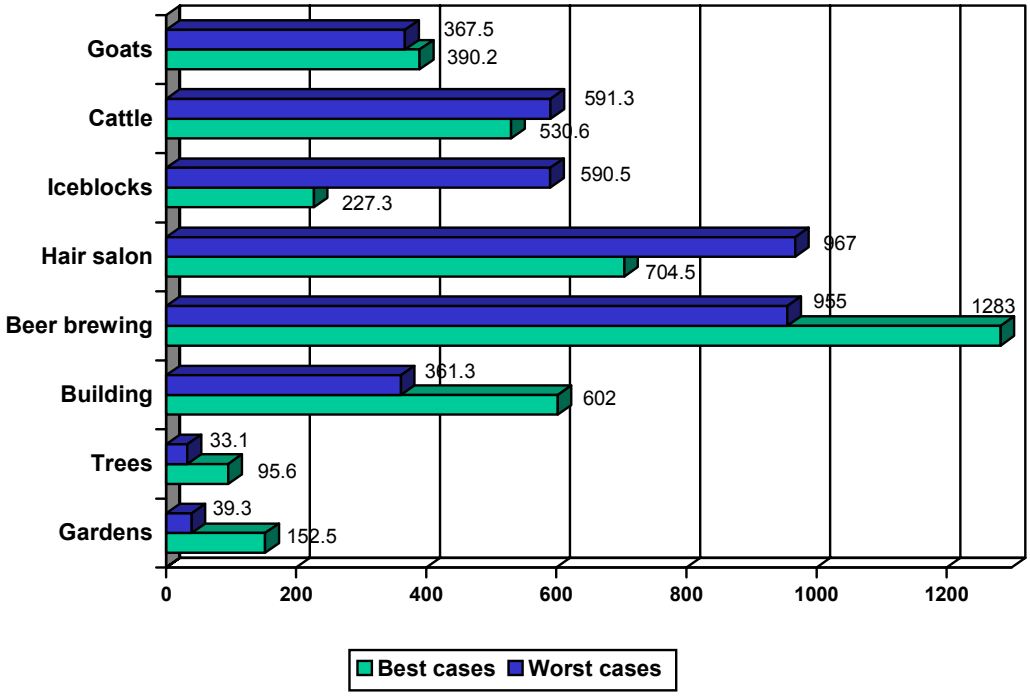
The income levels in Figure 6 show the average benefits of an additional water allocation, but they do not reflect the real income generated by a household involved in a particular activity. Figure 7 provide average "gross margin" figures for each activity, when only those households that engage in the activity are considered. The figures are, of course, higher, showing that for those households engaged in these activities they are a major source of livelihood. This is particularly true for the poorer households, many women-headed, involved as their income is often far below the average figure for the region.

Figure 6: Total gross margins from water-dependent livelihood activities in the two types of villages (R/capita/year)



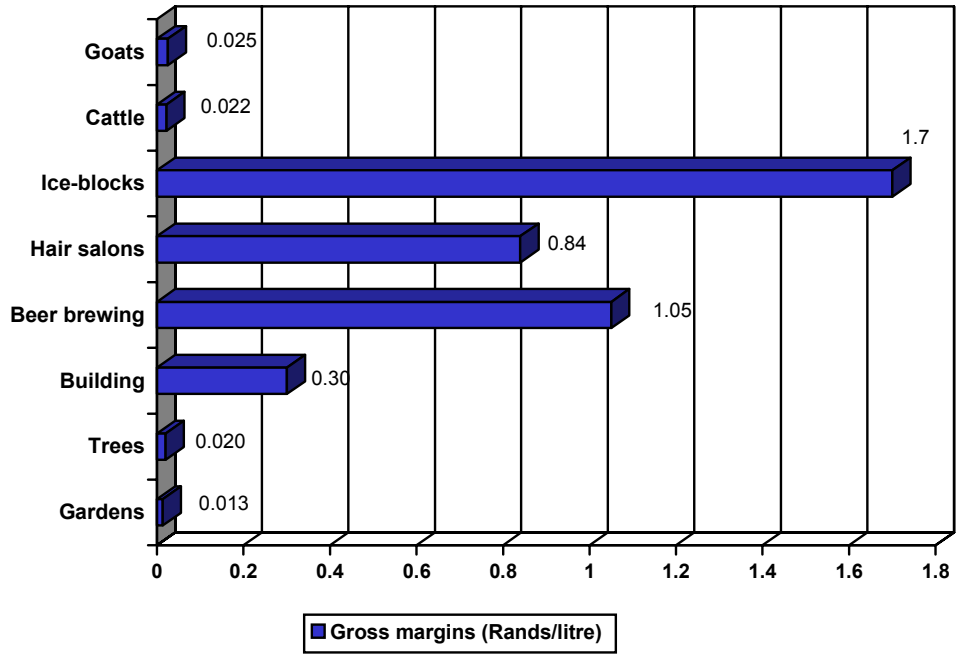
	Best	Worst
Vegetable garden	58	7
Fruit trees	66	11
Cattle	113	131
Goats	11	18
Building	339	142
Brewing	33	18
Iceblocks	33	33
	653	**361**

Figure 7: Annual gross margins per capita for those involved in each activity (R/capita/year)



Finally, Figure 8 provides an overview of the "gross margins" for all activities. They show a wide variation across businesses. Ice-block making provide the highest return (1.7 R/l) followed by beer brewing (1.05 R/l) and hair salons (0.84 R/l). Fruit trees (0.02 R/l) and vegetable gardens (0.013 R/l) provided the lowest returns

Figure 8: Gross margins for " water-dependent low-level economic activities" (R/litre)



The highest rates of involvement in the productive use of domestic water are for those activities with the lowest returns per litre of water. This is the case for fruit trees and vegetable gardens. In contrast, beer brewing and ice-block making activities providing the highest returns per litre, have the lowest rate of household involvement.

Overall, the data presented here demonstrates the importance of the use of domestic water for productive activities in the livelihoods of poor people and the general economy of the Bushbuckridge area. For poor and vulnerable households in particular, who have limited access to livelihood assets and few alternative income opportunities, the ability to undertake these productive activities in the home can make the difference between getting by and destitution. This is especially true for the many women-headed households who have much poorer access to outside job opportunities, can rarely engage in farming and need to juggle making a living with their domestic opportunities. For these people, growing fruit and vegetables, running a hair dressing salon or brewing beer can be the key to avoiding, or at least reducing, poverty. Although not measured in the surveys, the nutritional benefits from home consumption from backyard gardens were reported also to be of great importance. Indeed, it is possible that these nutritional benefits from gardens are as great as or greater than the cash income generated.

Where poor people have access to enough water above their minimum consumption needs then these water-dependent productive activities become viable. Where they do not then important poverty reduction opportunities can be lost. As such, enhancing the supply of domestic water in this region (the data from these surveys suggests a doubling of the average domestic minimum) is not so much about health and hygiene (most people can meet these needs) as about reducing poverty and creating livelihood opportunities.

4. Policy Implications

This section discusses in detail the main lessons learnt from the research and highlight some relevant policy issues. Above all, this case study demonstrates that a full understanding of the relationship between water management and poverty reduction cannot be captured by conventional approaches to water supply systems. The productive use of domestic water is a classic example of a key aspect of water management that falls into an institutional 'gap'. Domestic supply provision is premised on the assumption that the main issue is health and hygiene within the household. Conversely, discussion of productive uses of water by poor people tends to focus almost exclusively, in rural areas, on agriculture. Yet the key role of water in poverty reduction and livelihoods development for many poor people (and especially those with limited access to agricultural land) lies in opportunities for water-dependent production within the household. This requires a basic re-think of how we view basic needs and domestic water, as well as the types of poverty-focused water programmes that are developed. This essential message is clearly demonstrated by the survey results from Bushbuckridge. Similar experiences would be found elsewhere in South Africa and the rest of the developing world. A number of other specific policy conclusions can be drawn from the case study. They are:

- For the Bushbuckridge area, there is enough evidence to inform the allocation of water for the BHNR using the figure of 25 l/p/d as the minimum amount required to meet basic human needs for health and hygiene purposes.
- A major challenge is to how to make the concept of a BHNR operational. Research needs to be put into the design and implementation of appropriate allocation mechanisms from the technical, institutional and economic perspective

so as to ensure sustainable access to domestic water both for present and future generations.

- As part of this, there is a need to think radically about new, more decentralised, systems for water supply appropriate for the diverse range of uses found in communities. For example, hundreds of thousands of new houses are being built for poor families in South Africa. None of these have a system for collecting rainwater.
- Water-based activities play an important role in rural livelihood systems in Bushbuckridge. The inability to access domestic water for economic purposes can reduce considerably the livelihood options for poor people in the area. A key challenge is how to ensure adequate and sustainable allocations of water for these livelihoods-based activities. It is argued here that these should be seen as a basic need, but meeting this need cannot be through the extension of the BHNR for 25 l/p/d, as the water needs for productive purposes vary greatly from household to household.
- Furthermore, the lessons learnt from this research are very relevant for the rural water supply and sanitation sector, given the growing concerns about cost recovery and sustainability. The ability of the rural poor to access increasing amounts of water quantities will not just be determined by the availability of the water but mainly by their ability to carry the costs of the water supply. The ability to pay, in turn, can only be enhanced by increasing the economic opportunities of the rural poor, and as we have seen before, accessing water for productive uses over and above the basic needs (25 l/p/d) may be a necessary precondition for this.
- In other words, the rural water sector policy should not only be driven by the supply of “basic needs” but also by the economic opportunities that the access to additional water can generate in rural areas. The allocation of water for these livelihood activities should be a key element of the on-going development of water service plans and catchment management approaches. These are recognised in the definition of Schedule 1, but the key challenge is now the development of mechanisms to promote Schedule 1 water uses over and above the BHNR. The Department of Water Affairs & Forestry (DWAF) has recognised the importance of water for small scale livelihoods activities, but there still remain uncertainties over how these needs will be met, both in terms of the allocation of water for these uses and, even more, the awareness of service providers to provide infrastructure for these critical needs.
- Alternative ways of providing water for productive uses need to be explored. In some circumstances, providing this water through current domestic water systems may not be most effective way (see experience with homestead gardens in Zimbabwe, Box 2). Some creative thinking will be needed from engineers and technical experts in order to provide solutions that are appropriated to the South African context.
- Finally, the provision of water for productive uses needs to be done without compromising the provision of basic needs. Evidence from India indicates that, in the context of a dramatic increase in groundwater extraction for small-scale irrigation during the last ten years, domestic water supplies are becoming increasingly threatened as a consequence of groundwater depletion and increasing demand. (Batchelor et al. 2000). Caution is needed before the wholesale exploitation of new resources starts.

Box 2: Water for Livelihoods Development in Zimbabwe

Small-scale horticultural production can provide valuable employment, nutritious food, and regular income for rural Zimbabweans. But many people do not have access to a reliable water source, means to pump water from underground, or access to reliable markets. Through a package of support and assistance the Mvuramanzi Trust in Zimbabwe are helping rural families to produce irrigated vegetables for home consumption, and for sale both in Zimbabwe and in European markets, from family water points that previously would only have been used for domestic purposes. Needs include micro-financing to improve access to credit, low cost and appropriate pumping technologies such as rope pumps, irrigation systems to make the best use of time and water, and training in crop production and managing water supplies. The trusts aim is to assist 3,500 families each year to install rope pumps and set up irrigation systems at their homes. Some of the farmers work with a private company Hortico, who have a special division for communal out-growers, and export vegetables like sweetcorn, babycorn, butternut, fine beans, mange tout and hot chillies to European markets.

Such opportunities are found elsewhere in rural Zimbabwe, where there are few sources of cash income for rural families and relatively small but regular sums of cash from the sale of vegetables are particularly important to these families. The money earned is often invested in saving schemes or other ventures, such as dryland cropping or petty businesses. Household or community-managed gardens can contribute significantly to the overall local economy. Community gardens are typically around 1 hectare in size, and each member family has several small vegetable beds. Crops are cultivated and watered individually by members, but some decisions, such as which crops to grow or how to manage water, are taken collectively. 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

Improved well and borehole construction technology, such as collector wells, can provide sufficient water for both domestic consumption and small-scale irrigation in the unfavourable geological conditions of Southern Zimbabwe. Instead of a deep but narrow borehole, a well about 2 metres wide is dug to the base of the weathered rock. Then horizontal boreholes are drilled from the bottom of the well. These extend for up to 30 metres and collect water from a large radius around the well. Using such methods, enough water can be abstracted to meet the basic needs of households and also to irrigate a community garden near to the well. During the 1992 drought such wells were able to meet the domestic water needs of surrounding villages, when conventional sources had dried up, and still be used for some vegetable cropping albeit on a reduced extent.

Sources: Lovell, 2000 and Waughray *et al*. 1998

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