

Adopting a Sustainable Livelihoods Approach to Water Projects: Implications for Policy and Practice

Alan Nicol

Working Paper 133

Results of research presented in preliminary
form for discussion and critical comment



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**Adopting A Sustainable Livelihoods
Approach to Water Projects:
Implications for Policy and Practice**

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The Sustainable Livelihoods Working Paper Series

This working paper is one of a series that cover practical applications of Sustainable Livelihood (SL) approaches within natural resources management. The papers provide substantial case study material of varied practical experiences, combined with reflection on the emerging findings concerning uses of SL. Some focus on specific types of application of SL approaches (e.g. project design, impact assessment) and some on their application to specific sectors (e.g. water, tourism).

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Summary

This paper has three elements. The first identifies the pre-eminence of a health-based view within the water and sanitation sector. This view emphasises the health impacts of improving access to supplies of clean drinking water and better sanitation. It then assesses the relevance of this view to wider debates on how to achieve supply sustainability by adopting demand-responsive approaches (DRA) and by shifting the emphasis to the principle of ‘consumer pays’. The paper argues that an overemphasis on health impacts does not fit well with DRA, which is being increasingly advocated by agencies at an international level. Thus, in order to encourage demand for water services in particular, and to ensure that communities can be engaged in self-financing their development, greater attention has to be paid to the role of water within wider household livelihood strategies – and livelihood impacts should become a major focus of interventions.

The paper also analyses water in the context of poor households. In doing so it uses the Sustainable Livelihoods (SL) framework as an analytical tool. Combining this theoretical analysis and the experience of water projects by the author, the elements of a SL approach are identified. Adding greater emphasis to these elements will help in the wider uptake of DRA, providing the means by which to ensure supply sustainability. The end result is anticipated to be greater water security for the poor.

Finally, the paper assesses the operational and theoretical implications of adopting a SL approach, in terms of the following:

- **Water should be treated as an asset and a good:** Understanding water at a household level means addressing the productive uses of water as an asset as well as its uses as an economic and social consumption good at this level.
- **Institutional linkages:** Institutional development should be more closely linked to developing social capital to benefit the poorest members of communities and to assist in their access to and communication with ‘institutions’ responsible for supply development, be they from civil society, government or the private sector.
- **Sequencing and time:** Understanding the significance of sequencing interventions to achieve desirable livelihood outcomes is important, as is the time taken to access supplies. A closer examination of this factor in all situations (e.g. by season, or according to urban or rural users) can assist in fine-tuning implementation to achieve maximum livelihood sustainability for the poorest in their specific contexts.
- **Knowledge environments:** Understanding the role knowledge plays in poor households’ decision-making over water access is crucial to understanding their wider decision-making. Acquiring and disseminating knowledge as part of project development is essential to building up a long-term picture of how livelihoods are enhanced by using a SL lens within the water sector.

1. Introduction

For many years the domestic water sector has focused on the achievement of health benefits through supply improvements, based on the premise that more and better water can help to improve the health of individuals. This approach has been consistent with the provision of improved supplies by governments and other agencies as part of a strategy of meeting the basic needs of the poor.

In the last decade however, the wider policy environment has moved towards self-financing and cost recovery on water projects, where greater emphasis is placed on community financing as a means of ensuring cost recovery. The idea of water as an 'economic' good has been the driving force behind this change. Whilst the end result is still anticipated health benefits, the principle that the 'consumer pays' is now more firmly linked to sustainable supply delivery. This shift in emphasis has various implications for poverty reduction, not least of which is whether or not poor consumers can afford to pay.

A major question in this shift is whether, in an environment where communities and households are expected to pay for a level they can afford, this demand will be generated on the basis of perceived health benefits, or other socio-economic benefits (including reduced time, greater income opportunities and food production). The central issue this paper addresses, therefore, is the need to understand the impacts of improved supplies on socio-economic 'livelihood' circumstances of households, and to move away from an emphasis on health benefits.

Grouping this under the 'sustainable livelihoods' umbrella, the approach can assist in creating clearer links between the expectations of policy makers and donors (in their drive to mobilise communities around a 'demand-based' theme) and the capacities and motivations to undertake this new role on the part of communities and households. A central strand in this relationship is likely to be the link between anticipated impacts at a household level and the motivation of households to participate in community efforts to pay for service.

Building on work already undertaken on sustainable livelihoods, a review of Save the Children Fund's global water and sanitation work (Nicol, 1997; see also Nicol 1998a) and the proceedings of a workshop held in Harare in 1997 (Nicol, 1998b), this paper seeks to identify the principal features of a livelihoods approach to water supply projects as a first step in reorienting work in the sector. It will examine the background to the current situation before exploring the elements comprising a livelihoods 'analytical structure' – the starting point for a livelihoods approach.

Three constraints suggest that any change within the sector will be incremental:

- SL demands a greater quantity and quality of knowledge of households and their livelihood strategies than current methods demand, which can be costly in terms of time and money.
- The structure of this knowledge is multidisciplinary (including politics, economics, sociology, and anthropology) and many of these disciplines are infrequently used within the sector.
- Given the need for such multidisciplinary inputs, some of the outputs may not fit well with existing institutions responsible for implementation, particularly given the division frequently existing between health, agriculture and water resource sectors. In short, the practical institutional problems of utilising a specific 'livelihoods' output require careful consideration.

2. Experience to date

This section examines the established ‘health-based’ approach – in terms of its constraints within the shift from a supply- to demand-based environment and the disjunction created between a health-emphasis, a demand-based operational environment and the criteria required of community financing for supply development.

2.1 A health-based approach

A health-based view has driven most sector development in the last 30 years, derived mainly from public health approaches to water supply and sanitation and government-led supply provision. During the 1960s and 1970s, this focus on developing supply and improving sanitation became the mainstream development approach within the sector, and was enshrined in the United Nations (UN) water decade¹ which had a central ‘health-based’ and supply-oriented message. In health terms, the overriding benefits were perceived to be the reduced transmission of water-borne diseases e.g. diarrhoeal diseases, typhoid and guinea worm. The focus widened during the 1980s to integrate water supply, sanitation provision and hygiene education, as the need to take a more comprehensive approach to reducing the presence and transfer of pathogens at a household level was recognised.

Poor health caused by poor water supply quality², insufficient sanitation and unsafe hygiene behaviour was regarded as both a symptom and cause of poverty. Images of open sewers and unclean water sources became a favourite medium for conveying the ‘idea’ of poverty in the developing world, regardless of the many other influences and causes. Table 1 gives figures for access to safe water and sanitation at a global level, which came to represent measures of success or failure in creating sustainable supplies.

Table 1 Access to safe drinking water in developing countries by region, 1994

| Region | 1994 population (millions) | Percentage with access | |
|---------------------------------|-------------------------------|------------------------|------------|
| | | safe water | sanitation |
| Africa | 707 | 46 | 34 |
| Latin America and the Caribbean | 473 | 80 | 63 |
| Asia and Pacific | 3,122 | 80 | 29 |
| Western Asia | 81 | 74 | 68 |
| Total | 4,383 | 74 | 34 |

Source: Gleick (1998)

This position was reinforced in poverty-focused international documents, such as the 1989 Convention on the Rights of the Child (United Nations, 1989) which, *inter alia*, called on governments to seek health benefits through reducing disease transmission. It suggested that, among

¹ UN International Drinking Water Supply and Sanitation Decade (1981–1990).

² Clean came to be a standard set by World Health Organisation (WHO) of less than 100 bacterial coliforms per 100ml. This standard had enormous cost implications in trying to establish it and has also heavily influenced practise all the way down to project level.

other things, states should take appropriate measures, ‘to combat disease and malnutrition within the framework of primary health care, through *inter alia* the application of readily available technology and through the provision of adequate nutritious foods and clean drinking water, taking into consideration the dangers and risks of environmental pollution’³. Definitions of what constitute ‘clean water’ have been established and revised by the World Health Organisation since the 1950s.

At the global policy level, safe water supply and sanitation have been closely linked to better health, whilst at the household level, establishing these links has proven far harder. These methodological difficulties have led to reservations about the practicality of the emphasis on health impacts. Cairncross states that ‘With the development of international aid in the post-war decades, donor agencies invested increasing sums in water supply programs in developing countries. Whatever their real motives, their ostensible rationale for this investment was its health impact. To evaluate their programs, they were willing to pay for epidemiological studies to measure that impact ... The results of a number of these and subsequent studies have surprised the authors by failing to show any difference in diarrhoea incidence between households whose drinking water contained large faecal bacteria and others who drank water of microbiological quality’ (Cairncross, 1992a: 176).

The difficulty in proving the link, and the ability to monitor and evaluate progress in disease reduction provided the rationale for the ‘integrated approach’, which sought to reduce the transfer of contaminants through other routes than water supply. The integrated approach aimed to reduce contamination levels within local household and community environments, and to establish better hygiene procedures at a household level. Established as ‘best practice’ in the sector in the 1990s, the level of commitment to this idea is demonstrated in the Department for International Development (DFID) Guidance Manual which states that ‘water shortage, poor water quality, or unreliable supply have profound effects on people’s well-being. Providing safe water alone is not enough, however, as water can quickly become unsafe, and the faecal-oral transmission of diseases can occur in other ways. If people do not have adequate and appropriate sanitation facilities or the chance to develop good hygiene practices, diseases can be spread through the contamination of water or through other pathways in the home environment’ (DFID: 1998).

2.2 From supplying to demanding a service

Since the early 1990s there has been further change centring on the persuasive idea that water is an ‘economic’ as well as a ‘social’ good⁴– with significant implications for health-centred approaches. The emphasis shifted from service supply to demand, and had major implications for communities and project financing. The link this new relationship creates with household livelihoods and the wider social and political policy environments is argued to be far stronger than previous supply-oriented, health-based approaches.

The major operational challenge has been the ability to achieve sustainable systems, given that the goal of achieving health benefits has focused on an integrated approach to supplying clean water, providing sanitation and promoting good hygiene. During the 1960s and 1970s, international and national efforts focused on the achievement of coverage levels through governments extending supplies to communities, based on the premise that governments could provide the maintenance and management capacity required. This focus remained during the 1980s ‘Water Decade,’ although community-level participation and appropriate village-level operation and maintenance became

³ Convention on the Rights of the Child adopted by the General Assembly of the United Nation on 20 November 1989; Article 24, Paragraph 2c).

⁴ This idea was institutionalised at an international level at the Dublin conference in 1992.

increasingly important as optimistic international targets set for clean water coverage ‘for all’ required greater levels of community input.

Problems of unsustainable technology, poor delivery systems and government incapacity in operation and maintenance⁵ meant that the largely unrealistic targets were missed, and highlighted the problem of financing the necessary huge capital expenditures. How communities could participate in supply and improve the operation and maintenance of community-based supplies through simple financing mechanisms and capacity to purchase supplies of spare parts was emphasised. This idea powerfully complemented the other discourses at the time on creating ‘ownership’ of processes at the local level, and also suited wider integrated development approaches to poverty reduction.

The central arguments around which the transition from a supply-based to a demand-based approach has taken place are that: 1) public sector delivery is financially unsustainable; and 2) giving communities a financial stake in their own supply development is more likely to lead to durable systems – a variant of the World Bank’s ‘lowest appropriate level thesis’ (see, for example, ideas in World Bank, 1993b). This fits well – in most environments – with wider processes of institutional and policy change, such as the emphasis on decentralisation and the ‘democratisation’ of government.

The 1992 International Conference on Water and the Environment in Dublin which preceded the Earth Summit in Rio, drew attention to the new challenges facing policy makers in managing and allocating water resources. The meeting marked the first major international expression of water as an economic (as well as social) good and the ‘commoditisation’ of water which it implied encouraged the establishment of approaches based on expressed demand by communities of ‘consumers’. How the cost level (capital and recurrent) was determined and who covered all or part of these costs became the central focus of ‘new approaches’ in the sector in the mid- to late-1990s. Service coverage guaranteed by the public sector gave way to an approach emphasising government, civil society and the private sector, in which government undertook to enable and facilitate a new service delivery relationship between civil society and the private sector.

The logic of sustainability – encapsulated in the ‘demand-responsive’ expression of this idea by the World Bank – places the onus of covering costs (most if not all recurrent and some capital) of delivering clean and reliable supplies on consumers rather than suppliers. Communities have assumed the role of purchasers of a private service and (economic) good rather than being users of a public (social) good. The World Bank has summarised the key characteristics of this demand-responsive approach (DRA) as:

- The community initiates and makes informed choices about service options and how services are delivered;
- The community contributes to investment costs relative to the level of service and has significant control on how funds are managed;
- Government has a facilitative role, sets clear national policies and strategies (including legal frameworks) and creates an enabling environment for all participation groups;
- The community (or a representative legal body) owns and is responsible for sustaining the facilities;
- Community capacity is appropriately strengthened, and awareness is raised to stimulate demand (World Bank, 1998b).

⁵ It should be noted, however, that the 1980s was a period of acute financial and economic crisis for the governments of many developing countries, reducing their capacity to finance essential services. Perceptions of government failure have to be understood in this context.

This approach is becoming entrenched within the international policy environment. The Bank acknowledges resistance to the approach when implemented in centralised, supply-oriented situations, though approval from lower-levels could potentially overcome this resistance. The Bank states, with reference to a project in India ‘the initial challenge in implementing such a project was overcoming the resistance and scepticism of the government and other players in the sector, particularly in an environment of public subsidies and centralised decision making. There was no such problem with NGOs and local communities, however, and once local communities expressed enthusiasm for the demand-driven approach, government cynicism diminished’⁶. The assumptions of this approach are numerous, and many are outside the scope of this paper – including how easily communities are identified and suitable as ‘institutions’ of management, and how capable they are of making informed choices.

For the purposes of this analysis, the major issue is whether stimulating community demand around the idea of health benefits can be achieved. Given the present difficulty in establishing these links, convincing communities to adopt a package of measures some of which have fewer tangible economic benefits will prove even harder. The ‘paradigm’ shift to demand-based approaches appears to be a major challenge to the status quo on integrating water supply with sanitation and hygiene education, indicating the importance of taking a livelihoods view of scheme development.

2.3 Financing and livelihoods

The main link between the change in the operational environment and the livelihoods approach is the level of financing required and the livelihoods strategies undertaken by households. The key features of household livelihoods strategies in relation to financing are that:

- Different types of livelihood strategies determine different levels of disposable income and/or available labour time to engage in financing/cost recovery. For example, the availability of income and/or labour power at different times of the year is important in subsistence agriculture. This issue is explored below.
- Water is classified as an asset, which is an input into household livelihoods (see below), so the relationship between supply and demand may be partly contingent on different ‘returns’ to different activities within livelihoods strategies. This has implications both for understanding the wider ‘economic’ tag applied to water, its significance at different times of the year (frequently reflected in its price in water-scarce environments⁷) and the sequencing of availability.
- Community-level financing requires sustainable levels of social and human capital capable of establishing networks and institutions required to facilitate cost recovery within communities and to prevent or manage disputes between households. The importance of institutional linkages which the demand-based approach requires, implied in the ‘retreat’ of government from service delivery, is addressed below.
- Not all livelihood environments (particularly those that the rural poor inhabit) are necessarily conducive to operating a demand-based system, particularly where financing approaches require a cash-based economy. This is an important part of understanding knowledge environments, including requirements for, dispersal of and participation in knowledge acquisition.

⁶ Case study of Swajal project in Uttar Pradesh (see World Bank, 1998a).

⁷ The notion that water became recognised as an economic good in Dublin in 1992, in fact needs qualification. Water has been paid for and is intimately understood in economic terms in many parts of the world where huge expenditures in time and money are required to gain access. Water as an economic good is common knowledge for the poor.

There is a growing recognition by the World Bank, and others, of the need to link water developments with livelihood systems at the household level. A recent workshop in Africa concluded that community-based water supply and sanitation (WSS) required development within a 'holistic perspective,' which considered the 'network of capacities available to communities as well as the role of WSS in household livelihood systems' (World Bank, 1999). Investment in WSS services should 'keep in step with local economic development both contributing to improved livelihoods and benefiting from users' ability to sustain their systems' (World Bank, 1999). Nevertheless, the impact on the livelihoods of the poor being fully responsible for operations and maintenance of their WSS systems is still not made explicit. The link with livelihood systems at the household level is acknowledged, but the capacity to improve DRA through better understanding of such linkages and their implications for community-level financing are not. The main requirement for proponents of DRA is to understand the complexity of the economic environment within which water is demanded and supplied. Two examples, both from semi-arid areas of the Horn of Africa, serve to illuminate some of this complexity, from a livelihoods and a socio-political perspective (see Box 1).

Box 1 Financing and cost – Horn of Africa examples

The complex relationship between seasonal availability of a natural asset and the types of property relationship surrounding it can have immediate impacts on livelihood sustainability. For instance, in the Somali region of Ethiopia, the construction of *birkas*¹ and ponds facilitated by Save the Children Fund is taking place in an environment of great demand for water by households and their livestock but suffers serious seasonal shortage (Nicol, 1997). The development of community *birkas* and ponds can significantly reduce the expenditure by households on water and create access to communal supplies. Given an average family size of around six people, and water costs of approximately \$US1/200 litres from private *birkas* (which would last a family for about a week), average monthly expenditure would amount to \$US6. At present, village committees are charging less than \$0.10/month for repairs and maintenance. The saving made could help families overcome water shortages in the dry season when the cost of water from private sources might be the equivalent of two oxen, forcing families to relocate or divest themselves of vital livelihoods assets. Instead, savings made earlier in the year could be expended on water (whilst protecting the asset bundle of the household) during the dry season.

Financing in North Darfur, Sudan, can mean more than cost recovery and raises the issue of water as an economic asset. The construction and rehabilitation of water yards and *hafirs* has enabled large revenues to be generated by some communities through tapping into the Nubian aquifer – necessary because of a lack of surface supplies. In some cases, tariff structures have been manipulated by water management committees to raise additional revenues for other community development activities (Nicol, 1997). One water yard visited at Shugara collected up to \$US40/day in the dry season from a human population of some 4,000 in the surrounding area and a more extensive livestock population over a wider area. At the time of the visit, the community was raising income for activities such as creating a vegetable nursery, buying spare parts for the pump and the purchase of a second pump motor. Some people visiting the yard were also purchasing water for resale in their area. In this case, provisioning by the community represented control over a key asset for a wider area (which included migratory routes for livestock herders).

¹ A concrete tank for collecting water of about 10x10x3m.

3. Building in sustainable livelihoods

This section describes the application of the sustainable livelihoods framework to the water sector, in the context of poor households. Elements of a SL approach are identified by assessing the ‘fit’ of the analytical framework to practical experiences within the sector. The section concludes by suggesting possible elements of a new approach.

3.1 Water and the poor

The problem of water access for the poor – both urban and rural – is well known and documented⁸. The challenge is to take the debate beyond the achievement of health benefits, and simplistic visual associations of water and poverty. This will involve demonstrating that support to water supply development can help to achieve sustainable livelihoods within poor communities, and in so doing make a real contribution to poverty reduction.

The premise is often stated that because the poor have been shown to pay a given percentage of their income for water supply and sanitation, they are capable of contributing to the administrative and maintenance overheads of a supply system. Financing by the poor forms part of the goal of cost recovery and is seen as a means of ensuring sustainability. This is the crux of the issue regarding sustainable livelihoods ‘If responsibility for operations is to be decentralised, care must be taken to ensure that local governments or beneficiary groups have enough funds and technical skills to handle the work. *In some instances, there may be tension between the financial sustainability criterion for including communities in a program and the poverty criterion for being able to reach the poorest clients...* Governments often oppose charging for water drawn from hand-pumps and stand posts for political and technical reasons. *But there is clear evidence that poor people will pay often a substantial part of their income if they can be assured a regular supply.*’ (emphasis added) (World Bank, 1993b: 186–87).

The section above neatly summarises many of the wider social and political issues involved. ‘Hard data’ that the poor can and do pay for water is available, but to make this a policy objective risks causing political damage and generates the need for complex tariff charging and enforcement mechanisms. Thus, there are inherent trade-offs between ‘political capital’ gained perhaps by free provision and supply sustainability on the one hand, and the ability and willingness of the poor to purchase their right to consume water on the other. The SL framework can establish an understanding which helps to assess the relative costs or benefits to poor households involved in (or subject to) such trade-offs.

At the local level, these trade-offs are likely to be related to political and social transactions between the state and society, some of which are deeply influenced by processes of decentralisation and privatisation (see Box G ‘state –society transactions’ in Appendix 2). The critical factor for longer-term shifts in approaches to demand-led development lies at the macro-level, and in the relative differences in water use by sector, as represented in Table 2 – which reveals the relative importance of withdrawals for agriculture and industry by regions of the world. Micro-level trade-offs are important in influencing the relative success of different livelihoods strategies by making water more or less available and/or costly. The macro-level trade-offs, which take place at national and regional levels, to manage competing water uses between sectors will also filter down to the individual households through policy changes (perhaps through demands for greater water use

⁸ One of the earliest and best analyses can be found in White et al. (1972).

efficiency) and institutional reform. The micro–macro linkages will become increasingly significant for countries with heavy relative sectoral withdrawals and increasing problems of access to water for agriculture. In the future these linkages will prove extremely significant in planning for poverty reduction within ‘integrated water resources management’ processes at a national level.

Table 2 Water withdrawals: Comparison by global regions 1970–98

| | Annual internal renewable water resources per capita (1998) m3 | Annual withdrawals | | Sectoral withdrawals (%) | | |
|-----------------|----------------------------------------------------------------|----------------------|--------------------|--------------------------|------------|-------------|
| | | as % water resources | per capita (m3) | Domestic | Industrial | Agriculture |
| | | | | | | |
| World | 6,918 | 8 ^a | 645 ^a | 8 | 23 | 69 |
| Africa | 5,133 | 4 ^b | 202 ^b | 7 | 5 | 88 |
| Europe | 8,547 | 7 ^b | 625 ^b | 14 | 55 | 31 |
| North America | 17,458 | 10 ^c | 1,798 ^c | 13 | 47 | 39 |
| Central America | 8,084 | 9 ^a | 916 ^a | 6 | 8 | 86 |
| Asia | 3,680 | 12 ^a | 542 ^a | 6 | 9 | 85 |
| Oceania | 54,795 | 1 ^b | 591 ^b | 64 | 2 | 34 |

Source: World Resources Institute (1998/99).

^a data for 1987; ^b data for 1995; ^c data for 1991.

Until recently, the main international focus has been access to a safe water supply; e.g. forming an important indicator of poverty levels used in the United Nations Development Programme (UNDP) Human Poverty Index (HPI). This multidimensional measure includes human deprivation categorised in four dimensions of human life: a long and healthy life, knowledge, economic provisioning and social inclusion. Under economic provisioning the UNDP states that ‘In developing countries, lack of access to health services and safe water, and the level of malnutrition capture deprivation in economic provisioning more practically than other indicators’ (UNDP, 1999). The emphasis on water quality remains, however, and is closely linked as an indicator to the level of economic provisioning within a community. The cost of supply and the relative impact this has on volume is of equal, if not greater, importance in terms of livelihoods strategies. Hence, whilst a lack of a good quality supply may indicate lack of provisioning for human consumption, it does not necessarily indicate lack of provisioning say, for livestock assets, or for the cultivation of crops – which may, in fact, be more significant determinants of poverty in given communities. In short, the presence of a good quality supply may be on the basis of higher unit costs for water collected. The relative trade-offs involved for households are what determine the poverty impact, rather than the presence or absence, *per se*.

This is a key departure for the livelihoods view of water supply. While a poor quality supply for a household’s own consumption might warrant a higher poverty weighting, the same supply might be plentiful and not harmful for livestock, serving to increase livestock productivity and reduce the vulnerability of the household. It may also increase the household’s income sufficiently to free other assets to improve supplies in the long term. Thus, whilst the water–poverty relationship is significant, the mechanisms to achieving greater poverty reduction through water supply involve trade-offs, which the livelihoods view helps to identify. The emphasis is not on water quality, so much as the uses to which it is put.

3.2 Using the framework

The SL framework adds levels of complexity to analysing water resource use at the household level, and identifying the trade-offs inherent in household-level decision making, through:

- unpacking the components of demand at the household level
- identifying the range and depth of barriers to access;
- embedding these household factors in community- and national-level processes
- making the micro-level linkages to macro-level policy and institutional environments

In broad terms, the framework begins to create linkages between water sector work and a range of parallel socio-economic and policy issues – including decentralisation, community based ownership, political representation and accountability, and managing risk in dynamic natural environments. In the process, it helps to broaden out water supply from health institutions and public health approaches. Whilst this embedding in wider contexts has attendant practical problems, it can simultaneously establish a greater reality in addressing community water supply problems, not least because it is more likely to identify early on potential barriers to sustainable supply development.

The level of complexity which this approach can build up also helps to address the water supply–water resources management dichotomy. This has arisen at all levels of water development planning and management, and has seen the removal of the domestic supply service issue from wider water resources management issues. Where the demand-based view identifies water primarily as a consumable good, the livelihoods approach sees it also as a productive asset. Thus, the relationship between demand and available supply at the household level is finely balanced between the success (or otherwise) of particular livelihood strategies. Household water management becomes part of the wider water management environment and suggests – though does not necessarily cause – a closing of the water supply–water resources management gap. The notion has important implications for differing types of water resource scarcity, and how these are viewed by communities and households.

3.3 Vulnerability context

The SL framework regards the vulnerability context (including natural and human-led trends and shocks) as the starting point for analysis (Carney, 1998). The starting point for adopting the framework in the water sector, is a sound understanding of the vulnerability contexts within which people gain and secure access to water resources. Access and water security are determinants of local-level processes (including local norms and customs, local property rights regimes and local economic factors); regional and national political and policy issues; and international policy development and global climate issues.

Different environments present different levels of risk in securing access to supplies – particularly where there is natural aridity. A number of factors will affect the risk profile including the context (urban or rural); topographical factors; the transparency of government, availability of local private sector companies, and the channels of communication through which demands can be expressed. Hence, vulnerability is not confined to physical factors; but includes the risk and vulnerability to livelihoods posed by unstable social, physical and political environments which see voting controlled through patron-client networks, and local processes of decentralisation captured by elites.

A change in policy at the international level driving national change can therefore have significantly different impacts on vulnerability as these changes are adopted within these different environments.

Physical vulnerability can vary between short-wave events – such as lack of rainfall in a season – to longer-wave events – such as over abstraction of aquifers, pollution of surface and ground waters and climate change. Social vulnerability may relate to fragmentation within communities and households caused by adverse social processes, the age–sex composition of households and communities, and the ability to overcome challenges posed by heterogeneity and extremism. Political vulnerability includes the arbitrary exercise of power by political authority (at all levels) and the link between political change and decision-making regarding resource access (including the closure of resources by government and political clients of government).

3.4 Capital assets

At the heart of the framework is an analysis of the capital assets of the household, divided into natural, social, human, physical and financial. A sixth – political capital – has been suggested (see Ashley and Carney, 1999: 35). From the perspective of water resources the latter could be a major asset, in terms of the political bargaining involved between the government, the private sector and communities. It may also help to increase the capacity of the poor to influence the form and weight of trade-offs from the community-level upwards. The poor, after all, are themselves political actors.

The main point of the asset pentagon is to force ‘users to think holistically rather than sectorally about the basis of livelihoods’ (Carney, 1998: 7). Robustness resulting from a strong asset bundle can be manifested in reduced household vulnerability and increased influence on policies and institutions, leading to the conclusion that asset building is a ‘core component of empowerment’ (Carney, 1998: 8). Different asset bundles at the household level are manifested in the different degrees and types of access to water resources in different environments. The composition of the bundle can determine access through the relative availability or absence of:

- Labour power (human and/or animal), which draws on physical capital to collect water;
- Water purchase (or the means to purchase), which can be obtained through mobilising financial capital;
- Natural capital, which determines water availability, and is a factor in scarcity;
- Social capital, which creates opportunities to raise other forms of capital through the community (as communal resources) and is an additional factor in scarcity, as it can involve the removal of social barriers; and
- Human capital, which provides the knowledge and educational environments by which decisions can be made on gaining access and lessons can be learnt and disseminated.

Many of the links between different forms of capital assets and water supply are revealed in an example from the livelihoods and water workshop in 1997. This case study demonstrates the complexity of the household asset relationships. The livelihoods cycle is taken to represent assets used in productive activities to create income. Income is then spent to meet household consumption needs and maintain household asset levels. Water is thus both part of the expenditure and part of the consumption of a household economy.

Table 3 A comparison of the health-based and livelihoods views of enhancing the asset bundle

| | Health-based approach | Livelihoods approach |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Physical capital</i> | Health benefits (reduced diarrhoeal disease incidence) through improving household- or community-owned water supply and sanitation systems (hardware). | Improved decision making ability through better systems to deliver water. Remove risk and uncertainty of access (including maintenance and management of natural capital stocks). |
| <i>Social capital</i> | Community mobilised to establish water committees to lead on construction and maintenance of delivery structures. Local collaboration and links with other committees and/or organisations to provide hygiene education. | Identifies the poorest households and strengthens participation in, and influence on, community/ local and/or private resource management systems; creates safety-net structures within communities to ensure the poor have access to water; improves rights environment, including the establishment of right to access by poor households within communities. |
| <i>Natural capital</i> | Stocks enhanced through use of physical and social assets to capture of rainfall and other parts of the hydrological cycle. | Enhanced through training in catchment protection and maintaining natural environment. |
| <i>Financial capital</i> | Mobilised through establishment of community-level tariffs and charging mechanism (volumetric or flat rate). | Secured through access to small-scale credit for provision of connections to service. Enhanced by assisting water access for productive purposes (e.g. for animal consumption in pastoral areas). |
| <i>Human capital</i> | Public hygiene education. Promotion of gender equity. | Knowledge of DRA, community self-assessment of needs, participatory monitoring, gender mainstreaming. |

Water is a consumption need which must be paid for with revenue gained from economic activities (or in time spent collecting it), and is an asset which can produce certain types of income in combination with other assets (Clarke, 1998). Increased scarcity of water (through drought or other access restrictions) reduce household capacity to combine water with other assets in order to produce income.

Making an asset more available at the community level can also have negative impacts at the household level, reinforcing the need for a heterogeneous view of the community. It is also necessary to recognise water as just one type of asset available to households that determines the types of livelihood strategies employed. Availability and access are ‘elements in a network of choices and activities which form the livelihood of [communities]’ (Clarke, 1998). Those with the range of assets necessary to combine with water to create income or produce for exchange may, in fact, benefit a richer strata of a community disproportionately, either through increasing the value of other assets (such as land) or through increasing the tendency to monetise access to water resources. These complexities are revealed by Clarke in the Wajir region of Kenya where the increased sinking of boreholes since Independence has caused the monetisation of the water supply. ‘Whereas pastoralists were previously able to move long distances by using water which they had rights to, by virtue of reciprocal obligation, now most water has to be paid for...this can prevent poorer pastoralists from moving, as they cannot afford the water at “foreign” boreholes. This inability to move makes their herds far more vulnerable to dying in a drought. So increased provision of water resources – and the monetisation that has gone with it – have, ironically, reduced the food security of the poor in times of emergency’ (Clarke, 1998: 63). The relationship between access to one capital asset and other household assets, including physical capital, can be critical. Increased access

to water can create greater demand, so where water is made more easily available and access is improved, demand for labour power (often gender specific) at a household level is frequently increased. In some cases, children (particularly girl children) may spend more time collecting water (and/or collecting more of it) as a result of improved access (Nicol, 1997). The human capital consequences of this impact will require careful consideration in future interventions.

3.5 Policies and institutions

Linking micro and the macro levels in the livelihoods framework demands that policy and institutional analysis must take place at all levels (see Carney, 1998), and include gender analysis. The policies and institutions mediate between the vulnerability context and the livelihood assets of the household. They are critical in defining the types of bargaining and decision making that take place within the trade-offs referred to earlier. As part of the political environment, they are also important in the vulnerability context and in the development of policy to reduce the impact of shocks on the poor.

Both formal and informal institutions are important, particularly at the community and district level. Formal institutions can determine the capacity of households to increase their asset base and secure new sources of provision. They include private sector providers such as local and international water companies and local authorities responsible for supply development. The nature of community engagement with the two is changing as supply development gives way to demand creation. Political organisations – e.g. those able to lobby on behalf of the poor, campaign for, say, tariff structures to benefit the poor or to establish cross-subsidisation – are additional and important formal institutions which can work with, and around, the changing policy environment. Informal structures include private water vendors, informal community-based organisations undertaking other routine community activities (e.g. the organisation of funerals) and other informal institutional structures (e.g. ethnic, clan, religious groups or loose associations of economic interests).

Policies within the water sector previously have been based on the achievement of coverage levels and access to resources defined in crude per capita terms. The move to eliciting demand as the basis for creating coverage means that the facilitating role of government replaces the target setting emphasis of the past. This does not, however, amount to a pro-poor enabling environment. Rather it creates the conditions which can require greater draw-down on the livelihoods assets of the poor, in particular social, human and physical capital. A SL approach helps to reveal the impact of the draw-down and to avoid the stereotypical view that communities are homogenous ‘institutions’ willing and able to manage resources on the basis of demand. Instead, it focuses on the household-level as the basis for the success (or otherwise) of community capacity to create the necessary capital to work within a demand-based environment. In so doing, a SL approach can help to highlight the specific poverty impacts of policy change within the sector.

As an institution, a community is both the sum of its households (with their various SL strategies) and more than the sum – it also includes features of human and social capital which add social and cultural texture ranging from political, clan or tribal affiliation, to possible regionally-specific characteristics. These additional facets of communities serve to underscore the importance of the policy and political level within the box of ‘state–society transactions’ (see Appendix 2) and the impact of these processes on water supply development.

3.6 Outcomes and feedback

In Appendix 2, (Box G) places the political context firmly at the centre of the framework. It emphasises the political processes by which relations between state and society are transacted – either through policy processes or through institutional structures, or a combination of the two.

Livelihood strategies ('D' in Appendix 2) of households within a community have to negotiate this box of state–society transactions principally through membership of a community, and the social and human capital constraints and opportunities which this might represent. This negotiation in gaining access can substantially alter the outcomes 'H' and 'I', either reinforcing livelihoods or undermining them. Positive outcomes can include increasing income by increasing household water-use productivity (perhaps by sharing labour between households on family plots); greater social well-being created by reducing queuing at collection points, and thus reducing stress; more sustainable use of resources, achieved through better micro-watershed management and protection of water quality through co-operation. On the negative side, political pressures could force a community to abandon its plans to seek improved supplies in a particular location; questions of ownership of processes and structures within a community may be raised (particularly given control by community elites) causing disputes between households; new tariff structures introduced may increase the cost to certain households so that they are forced to seek alternative livelihood strategies.

These outcomes will have an immediate impact on household asset security and stocks, but can also have an impact on the state–society transactions themselves. Aggregated outcomes of these impacts and the resulting community responses might come to constitute a regional, national or even international policy issue. In years of poor rainfall, for example, when livelihoods are jeopardised, competition for water may force communities to seek changes in the way governments proceed with different policy agendas and/or restructure national institutions. Furthermore, decisions to move location in search of water during the onset of drought can have substantial impacts on other, perhaps host communities, in neighbouring regions or states. The same applies during floods. Conversely, if the outcome is positive, then increased wealth and success can attract the attention of elites intent on capturing the benefits for themselves. Alternatively, greater political attention can be translated into greater leverage (and increasing political capital) with which to force better terms in negotiations on water resource issues (e.g. regarding tariff collection or in prioritising work in particular areas). Hence the feedback loops described are very significant at a number of levels, and certainly require more detailed research.

3.7 Constructing a new approach

The central challenge to applying the framework to the sector is in understanding how this affects the development of institutional relationships, types of intervention and even the relationship to other 'sectoral' issues such as food security.

Building a livelihoods approach which is distinct from just 'doing' water projects:

- Focuses on the existing policy environment and changes taking place therein (in this case, principally the move to a demand-based environment);
- Has an end goal that is not the achievement of health benefits, but seeks to increase the overall robustness of the household asset bundle, in order to strengthen livelihood strategies, assist in creating pro-poor outcomes, and to increase positive linkages in state–society transactions;

- Should increase the range of livelihood options available and the capacity of poor households to diversify through seeking assistance from other institutions, including translating knowledge into capacity.

How is this to be achieved? The starting point is that water is multipurpose as a part of natural capital, as described above. Knowledge of the ‘fit’ of water as an asset within household economies (costs of access, its use in production, its contribution to survival and subsistence, and its contribution to production and income generation) is necessary. Understanding the importance of different access barriers to poor households (and between households) requires knowledge of social, legal, political, economic and physical environments as well as their effects on risk and uncertainty.

Whilst the livelihoods approach can address the policy and institutional environments and their dynamic nature, it is specifically concerned with the political and rights-based issue of how policies and institutions are accessible to the poor. It is also concerned with the routes through which expressions of demands by poor households and communities can be addressed within this environment. Enhancing water’s productive uses at the household level complements the focus on removing access barriers. A livelihoods approach need not necessarily involve ‘doing’ water construction at all, but may involve a number of stepped activities aimed at:

- Improving the claims of the poor on resources by removing barriers to institutions responsible for assisting water supply development;
- Increasing poor households’ participation and decision-making capacity in community processes that elicit and express demand for a service and determine what is affordable;
- Improving the knowledge of policy environments from the local level upwards, and improving the ability of the poor to manage and access water supplies within these environments.

Given the range of vulnerability contexts and of shocks which can be caused, there are no recognised blueprints for water supply projects, and certainly no single technical solution. There is, rather, a range of responses for different situations, which span emergencies to longer-term development contexts. Livelihoods options draw on a range of disciplines to form an improved understanding of poverty and analysis related to, *inter alia*, households, gender, governance and farming systems.

4. Implications for policy and practice

The broad elements of a livelihoods-focused approach are derived from the variety of sources outlined in the introduction. A number of strands emerge to guide future work in the sector, and are outlined below.

4.1 Water as a good and an asset

Most discussion of domestic water is concerned with human consumption requirements and its use as a part of daily household requirements for cooking, cleaning, washing and drinking. The weighting given to this view of water – as opposed to its use as a productive asset – is perhaps undue and arises from the health-based approach described earlier. Water is both a good which has costs attached (in delivery and disposal), and an asset in productive processes at a household level – whether watering animals, supplementing small plot irrigation, producing local drinks for sale or other cottage industrial products or even reselling for a profit to other households.

Water as a natural asset forms part of the asset range available to households and its economic value as well as its cost needs to be properly understood in order to understand the linkages with livelihood strategies. This is the case not just because this points towards ways of strengthening asset bundles through improving access to natural capital, but also has methodological implications for demand assessment. The structure of demand for water within a community – particularly demand over and above the survival level – may be informed just as much by its productive uses as by its routine daily consumptive uses. Calculating anticipated demand at the household and community level may, therefore, require greater depth of analysis of household livelihood uses (and potential uses) than is commonly undertaken by demand-assessment. This also has policy implications for notions of scarcity, particularly in terms of the presence or absence of other assets critical to gaining sustainable access to supplies. Scarcity can be determined by the unavailability of physical and human capital as well as by the absence of the water.

Thus, sequencing asset availability is important in order to support a new policy environment based on demand, from the financing perspective. In the case of community-level financing and management, where the key issue is anticipating, calculating and expressing aggregate community demand, far greater levels of social capital will be required, not least to ensure the capacity of communities to agree on and enforce sanctions against those breaking the rules established for access. The sequencing of asset availability will also affect who can participate and contribute social capital at different times to financing and management of supplies.

If, in the case of the poor, the requisite assets are unavailable or beyond the capacity of the poor to access at particular times, then different demands may be placed on scarce resources. Responses may include greater conservation and/or a switch to higher-value uses, or seeking different sources for different uses, perhaps sacrificing drinking water quality in the process. These responses mirror some of the processes involved in demand management at a macro-level, where water pricing impacts on use in agriculture and industry, forcing users to move water to higher-value activities or to use water more effectively in existing activities. As a result, the need for the three sub-components (water supply, sanitation and hygiene education) to be introduced in parallel is diminished. Whilst sanitation is clearly important and the promotion of hygiene messages is significant in reducing disease transmission, their automatic attachment to water supply (at least at the outset) is not always necessary – if health improvement is not the immediate goal then their inclusion would seem wasteful. Water supply improvement can stand alone, given the range of other livelihood-enhancing functions it may provide. In addition, a demand-responsive environment

suggests a tendency to de-link water supply (for which there will be user charges and specific management structures) from sanitation and hygiene promotion. The social and financial capital necessarily expended by communities in getting agreement to 'bundle' together the three activities may be far higher than for water supply alone.

A livelihoods view also takes an important step towards integrating water supply for domestic use with meso- and macro-level water resource management issues. Clearly, as the implication of taking a socio-economic approach to developing water supplies for communities emerges, the issue of allocation within and between communities sharing one or more catchments increases in importance. Here, community water management strategies should be viewed in a wider context, where securing catchment sustainability, reducing runoff and erosion, and emphasising micro-catchment management are complementary to the construction of wells, boreholes ponds and other surface structure development.

Box 2 Politics, poverty and participation at the micro-level

Engaging in a demand-based environment involves mobilising household-level assets in order to muster sufficient resources to achieve a communal goal (e.g. to finance particular technologies or to provide the labour required for construction). However, the livelihoods approach demands an understanding of the differential impact of such asset mobilisation on households within that community. The question of who can participate in the asset mobilisation (who is excluded voluntarily or wilfully) is crucial to addressing the issue of poverty reduction within communities. In many cases, the poor lack social networks and human capital – including the education and knowledge with which to become active participants in developing water supplies for a community. Although they may contribute labour this may in fact be reinforcing their dependence on higher income households. They may, alternatively, be coerced into certain actions and involvement in development processes.

An example from Nepal helps to illustrate the problem of achieving benefits to the poor *within* a community. 'We became increasingly concerned that the programme was not reaching through to the very poor in the community. They will always tend to hold back whilst more vocal and confident people will step forward to claim the benefits. In the water context, we had to take a firm stand at the planning stage to ensure that low-caste groups were adequately served. The message here is that it is not enough to classify an entire community as "poor", since every community will tend to subdivide itself and marginalise subgroups within it' (Ruddal, 1999: 49). The thorny questions of the level of input into community processes of decision making and to what extent livelihood sustainability and poverty reduction are achievable without greater disaggregation of impacts within communities are highlighted in this example.

The complexity of the relationship between assets within a household and the balance required to achieve favourable outcomes suggests the need for asset management to be viewed holistically, and both at the intra-household and intra-community (inter-household) levels. This is particularly the case within a demand-based environment where local institutions are responsible for cost recovery and, in many cases, for the management of structures and processes of water supply. Not only are the linkages between assets and institutions made far more immediate, but so are the processes of social capital accumulation and intra-communal politics which can determine the long-run success of supply delivery.

In practical terms, whilst households may not consciously manage their assets, their strategic decision-making may well be affected by perceptions of asset availability (including social and human capital) and potential future barriers to gaining access to natural capital resources. Having a greater stake in planning and decision-making, and being able to consider resource security over a longer time horizon may be critical to their capacity to manage their assets effectively. Much as the health-based view came to integrate water supply with sanitation and hygiene promotion, so the livelihoods view integrates the management of water as a natural asset with financial, physical and

other household asset management. This type of management involves planning ahead for years of poor asset availability and suggests that participation is not important just in terms of getting views across, but also for gaining access to information on resource availability.

This holistic management of assets works at the household and community level and requires, *inter alia*, knowledge of:

- The stock of community resources available/accessible;
- The relationship between household resource use and common pool resource availability within the community (i.e. why a household chooses to access a private supply versus a communal supply, and the rules and norms which surround that resource);
- The threshold level for access to resources, below which households will be forced to seek assistance (i.e. the minimum level to ensure livelihood sustainability);
- Existing resource management strategies and rule-defining behaviour (across a range of livelihood strategies).

Managing assets in an integrated fashion is closely linked to the process issues discussed below in relation to sequencing and time – particularly the aspects of seasonality of demand and supply of water resources. It is also closely related to the question of knowledge environments, including capacity to monitor levels of natural asset stocks, and to use knowledge to assess the availability of resources for human and livestock use. One of the most pressing practical concerns is to link the management of water resources to food security needs. Understanding household-level integrated asset management helps to draw out the critical relationships between access to water resources and food security. The institutional implications of this and other aspects of a livelihoods approach are dealt with below.

4.2 Institutional linkages

Institutions – as the vehicles for policy change and implementation – are the filters which determine the success (or failure) of livelihood strategies. The established practice of seeking direct health impacts has naturally involved institutions concerned with health, from the local health extension worker to the World Health Organisation. The focus has been on constructing capable local-level institutions to manage and maintain new structures and to be the local conduits for hygiene messages. This has frequently involved a set of institutional linkages within the community (between households and management committees) and between communities and outside interests, ranging from private service or goods suppliers to local and regional government. The implications for policy makers of the livelihoods view is essentially three-fold:

- 1) Institutions involved should reflect the need for micro–macro linkages and should facilitate communication between all levels, and between institution types. (This is particularly important in an environment which requires close collaboration between civil society, government and the private sector). For instance, local structures controlling community financing and management should be able to create channels of communication with higher order institutions.
- 2) New local institutions should also be capable of linking horizontally with existing indigenous institutions which may be the most important stores of social capital and influential in linkages with external institutions. These links and networks will be important in building capacity to address water supply improvements in a demand-based environment.
- 3) Institutional linkages should be framed around water as a consumption good and as an economic asset of production. In practice, this means greater connectivity with local business, microfinance organisations, local government and the private sector. Financial management

and the enforcement of charges and other levies requiring sanctions, place demands on human, social and financial capital assets of households.

The emerging picture is of very complex formal–informal institutional linkages at the local level, which will be less easily managed than the triumvirate between government, civil society and the private sector envisaged under the demand-responsive approach. The increasing institutional complexity in both formal and informal spheres is likely to increase the political input into decision-making over water resources at all levels, and tensions may arise as civil society engages in the use of political capital to increase access to other capital assets to combine with changing levels of access to water resources.

4.3 Sequencing and time

The sequencing of interventions is an important factor in placing water project developments in the wider context of sustainable livelihoods approaches – namely, where and when water should fit in, and when particular types of actions should be undertaken. Cross-disciplinary analysis, inter-institutional communication on development options at the local level, the complexity of the livelihoods approach and the need for micro–macro linkages all have implications for policy makers. For example, the specific needs of a pastoral community may be veterinary extension services and water interventions (sources to enable better use of available forage), but the relationship between the two might require careful sequencing to avoid overgrazing and/or the transmission of livestock diseases in a given locale.

Within the intervention timetable, sequencing to strengthen household access at the household level to social, financial and human capital will be important in providing the precursors to successful demand-led water supply interventions. This will involve more skills in social intermediation, household economy analysis and other tools than are currently brought to the sector. The establishment of local water forums for discussion of stakeholder interest in sequencing might form an important part of the approach particularly in terms of awareness-raising at a district and sub-district level.

Time questions will be critical, as the cost in time for household collection often varies according to seasons, and this will be important in terms of the capacity to participate by different households and for the timing of activities within the communities related to water development. Time has been addressed in detail in earlier studies⁹, but its increasing importance under a livelihoods approach requires further attention. This should focus particularly on the implications of different time–capital availability for management and cost recovery processes within a demand-led environment. The opportunity cost of the time commitments required in gaining access to water resources would appear one of the major constraints to livelihoods diversification strategies. Access barriers causing considerable time loss can include distance to water points, yield, terrain and transport, and queuing time. Other – less tangible – access barriers can include fear (perhaps because of local-level conflict within or between communities) and lack of available income to purchase vessels, transport and/or the water itself. Where the opportunity cost is lost earnings or reduced production through reduced labour time, or other costs, the negative impact on livelihood strategies can be considerable and immediate. Other, longer term costs, such as missed education by girl children are far harder to quantify in the short term, but can have far-reaching consequences at an aggregate level in the longer term. It might be found, for instance, that the pattern of time consumption is more a function of unreliability than distance from households. Thus, understanding the pattern of demand might reveal greater net benefits in time-savings achieved through rehabilitation of existing water points

⁹ An important paper which made an early attempt to draw attention to the issue of time was by Anthony Churchill (1988).

(to increase their yield, though perhaps further away), rather than the construction of a closer piped supply.

For practical purposes, helping communities to understand accurately the picture of the daily, weekly, monthly, seasonal and annual household demand for water – including extra demand in bad years – can establish the basis for more informed decision-making about the level of service required and for which households are prepared to pay. Sequencing support functions properly means that communities are not kept waiting for responses, and do not receive inadequate assistance at critical moments.

Another important livelihoods component is the longer time horizon. Rather than the simple achievement of health benefits, *per se*, the livelihoods approach seeks to build long-term savings into the structure of the household economy. This impact can be two-fold: firstly by increasing the capacity to diversify household economies; secondly by creating the conditions for greater accumulation of capital assets, including social capital (establishing networks within and between communities and developing links with local private sector and government institutions) and human capital (perhaps more education for girl children).

In both policy and practice, sequencing and time have important implications for the livelihoods approach. Both issues are vital to the achievement of long-term poverty reduction through achieving sustainable (and diverse) livelihoods. However, neither is operationally easy to incorporate, not just for institutional reasons, but because of the kinds of knowledge required by practitioners and policy makers.

4.4 Knowledge environments

Underlying this paper has been the question of what we need to know and how we need to use knowledge. The systematising of knowledge and its use has deep implications for future policy and practice in the sector, not least because the acquisition and use of knowledge is frequently an elite-based process which, *de facto*, excludes the poor and yet frames the development of formal or informal policy towards the poor. Knowledge environments, as they have been termed here, refer to the knowledge systems surrounding the various sectoral actors – communities, households and individuals, government institutions, the private sector and civil society (predominantly NGOs) – and do not refer to formal systems of knowledge on their own.

Whilst more needs to be known about the water economy at the household level in order to develop a successful livelihoods-based approach, this has cost implications, requiring as it does the combining of insights across different disciplines. Nevertheless, being more informed need not be much more expensive if existing knowledge systems are tapped into – including those of the communities and households themselves. This process of generating better knowledge needs to be complemented by better informing of communities at a local level. For instance, how households respond to shocks in the availability of water as a natural capital asset in different circumstances affects their capacity to finance and – in all probability – participate in the management of community resources. It may also affect their attitude to private versus public sources in the long term. One of the key knowledge requirements, therefore, with major policy implications, is how to create interventions with the participation of communities and households that can feedback information on asset availability and use.

One of the tenets of a livelihoods approach is that there is no fixed response to a given situation; just as livelihoods are dynamic, so are the means by which to address them. A project-by-project basis should be adopted, but in a loosely networked fashion which allows for sharing between

projects. Information on changes taking place in any given environment is a prerequisite for avoiding blueprint approaches. In practical terms, this entails operational research and simple monitoring systems which surpass the reporting formats and usual monitoring and evaluation tools of donor-funded projects. For instance, recording demand on water points over time and across seasons can help users and providers to anticipate future requirements and the impacts of changes in the natural environment. Combining this data with knowledge about water use to maintain to support diverse strategies across seasons can assist in identifying households and communities particularly vulnerable to changes. At a community level, the research approach would involve rapid assessment based on key informants at local and sub-regional level rather than lengthy (and costly) research projects. Principal aims should be to establish:

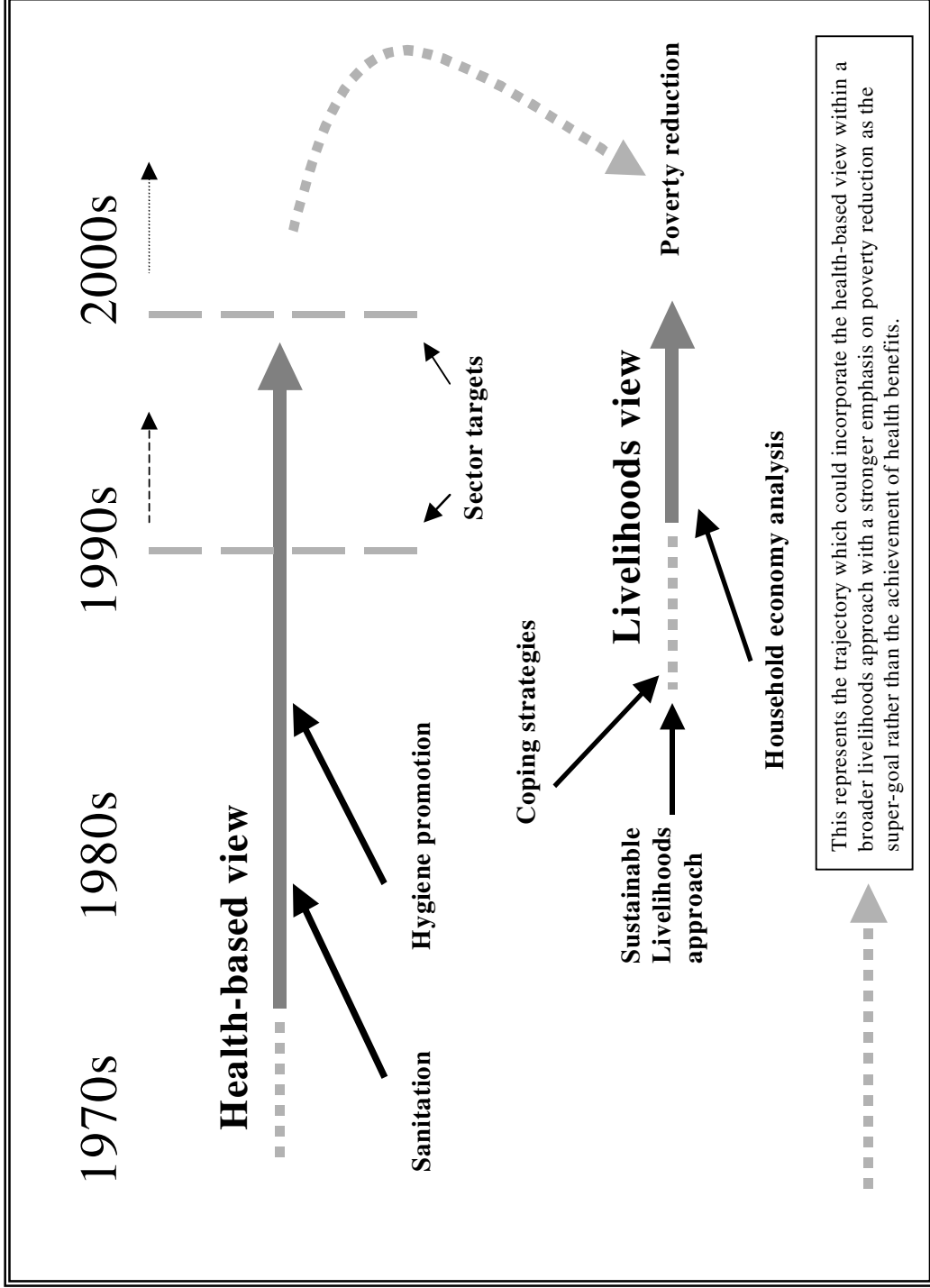
- The impact of changing water availability in terms of natural asset stocks on the range and use to which other household capital assets are put, including labour and financial capital assets.
- The impact of changes to the vulnerability context (including greater or lesser risk caused by indirect effects of policy changes in other areas such as agriculture and livestock marketing) on the types of household assets required to overcome access barriers.
- The impact of changes in structures and processes within the box of state-society transactions (see Appendix 2) on the types of activities undertaken as part of livelihood diversification and the knock-on effects on the demand for water resources for productive purposes.
- The range and types of strategies for gaining access to water resources adopted by different household types within communities and the extent to which these are livelihood-dependent (for instance based on the availability of animal power).

A demand-based environment is more onerous in terms of community knowledge of itself. Thus, being self-knowledgeable, and developing environments to inform community decision makers is as important as being able to diversify livelihood strategies at a household level. A question checklist can help to establish the level of knowledge important to a sustainable livelihoods approach (see Appendix 4). How do communities establish what they can afford by way of service levels and how do livelihoods-based analyses complement (or perhaps contradict) information acquired in 'willingness to pay' surveys through contingent valuation or revealed preference? It has been found that income is only 'one among several determinants of willingness to pay for improved water', and that 'differences in characteristics (quality, cost, reliability, etc.) between the improved and alternative sources of supply are very important, as are socio-economic characteristics of the household and attitudes to government policy' (DFID, 1998: 109). For those involved in demand-assessment in government and the private sector analysis rooted in a livelihoods view can assist the understanding the qualitative institutional and policy issues, and in fleshing out the environment within which demand assessment and management is undertaken.

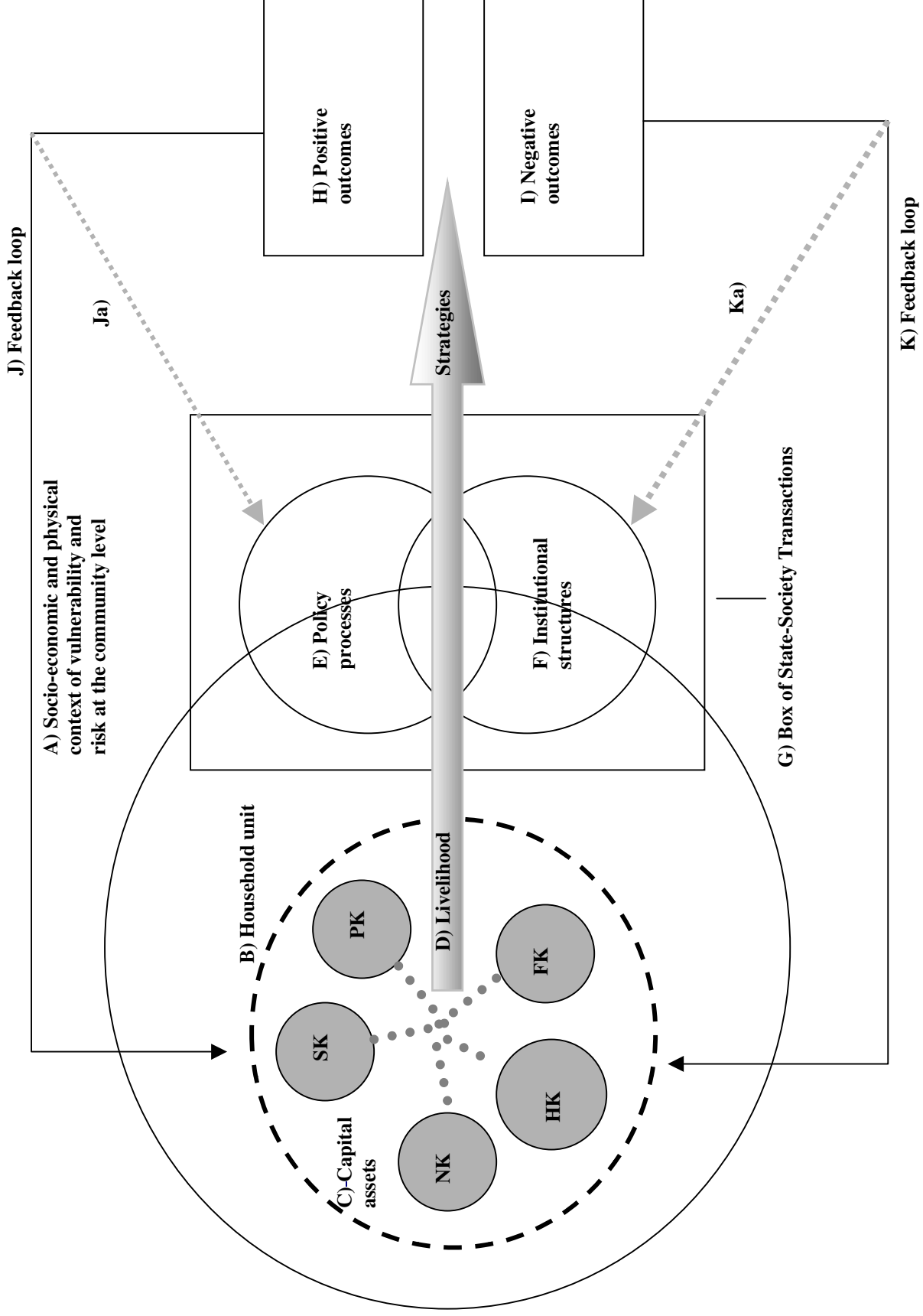
Nevertheless, the human resource issues mentioned at the outset, require a greater range of disciplines than are frequently on offer to water resources institutions¹⁰, including the use of sociological, anthropological, political and economic tools of analysis. Whilst demanding, this range of analytical tools is essential, and in helping to feed back information into decision-making at a local level (whether in a formal or more informal sense) is a truly vital part of the livelihoods approach in the water sector.

¹⁰ For instance, political scientists can help to inform projects about the local level power structures inhibiting access to natural assets, and the linkages between these structures and national policy processes. Likewise, an economist can bring greater understanding of the opportunity costs involved in choices made by households between different sources of water and sanitation. Linking the choices made to influences of external power structures then helps to build a wider picture of the way transforming structures and processes (policy, institutions and processes) influence livelihood strategies.

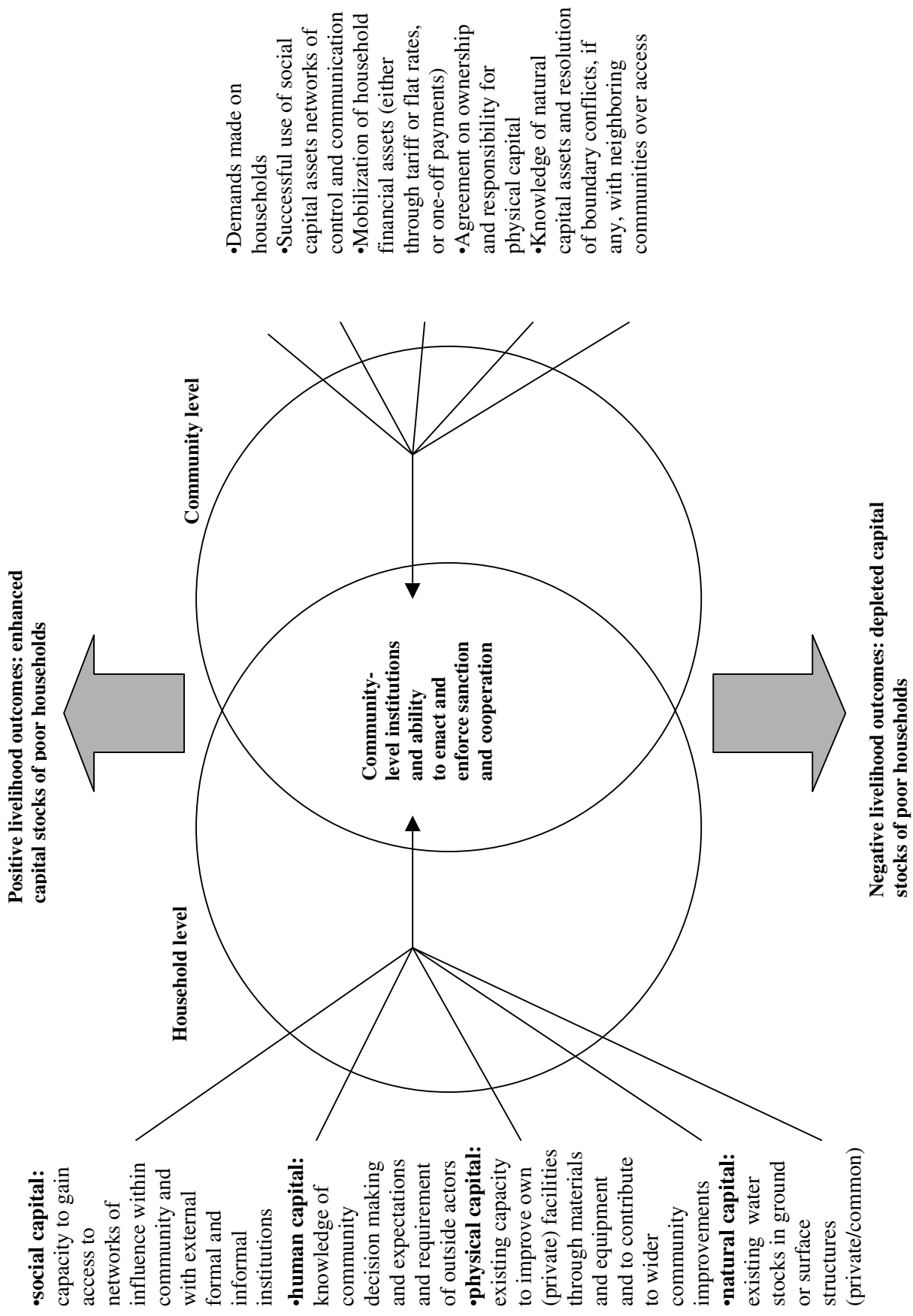
Appendix 1 Trajectories in the debate



Appendix 2 A (revised) Sustainable Livelihoods Framework



Appendix 3 Livelihoods and the household-community interface



Appendix 4 A sustainable livelihoods approach question checklist:

a) Governance context

1. How many institutions are involved in water and sanitation, water resources management?
2. What is the lowest level at which each one works?
3. At which levels are responsibility for budgeting/planning/implementation?
4. How demand-oriented are the institutions?
5. How, and at what time of year, is information collected on access/availability/coverage? What are the criteria used?
6. At what level, and how, are responsible implementing institutions and political institutions linked?
7. What institutional mechanisms exist for discussion of demands and decision-making on resource development?

b) Civil society

8. What are the main characteristics of communities – population, settlement patterns, broad livelihood strategies?
9. What is the institutional relationship, if any, to government?
10. Are there both customary and formal representatives at the local level?
11. How do these representatives work with higher levels of authority?
12. How are customary institutions constituted and what are their main roles?
13. Are there rules defining social and political behaviour concerning resource access?
14. How are these rules enforced and are there disputes over their enforcement?
15. What resource-use institutions exist, distinct from more general social institutions?

c) Communities and households

16. How is household labour divided, by activity/gender/age?
17. What water sources are used, and how?
18. Is water consumed/used for cooking/washing/cleaning, and how does this vary by household?
19. How much time is spent collecting – by household type and by household members?
20. Does collection vary seasonally, if so, how and why?
21. Does the presence/absence of other household assets significantly affect the capacity to access water and to use water consumptively/productively?
22. Are there social/cultural barriers preventing access to certain sources?
23. What proportion of household time is spent on water-related activities?
24. What proportion of household income is spent on access to water?

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