19 POVERTY, WATER SECURITY AND HOUSEHOLD USE OF WATER

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19.1 Introduction

This paper provides an overview of the key issues needed to understand the significance of water use within the household in relation to wider issues of water security and the reduction of poverty. It looks in broad terms at the range of uses made of water within the household and relates this to the dynamics of the livelihoods of poor people from different segments of society and in different settings. It also sets out the wider context of household water use in relation to different aspects of access to and the availability of water resources. Finally, the paper considers how the issue of household water use relates to overarching global and national development frameworks as expressed in the Millennium Development Goals (MDGs) agreed at the UN Millennium Summit in 2000, the outcomes of the World Summit on Sustainable Development (WSSD) and national policies and development priorities such as the Poverty Reduction Strategy Papers (PRSPs). These issues are discussed in more detail below, but the overall message is that the concentration on consumption rather than productive uses of household water has meant that the development significance of household water use has been under-estimated.

19.2 Who are the Poor?

The international approach to poverty has been changing rapidly in recent years. One recent trend has been to give far higher prominence to poverty issues in approaches to sustainable development. This is most apparent at the international level. The process that culminated in the Plan of Implementation agreed at the WSSD re-focused the international agenda on sustainable development away from the dominantly environmental perspective that was agreed at Rio in 1992, with poverty and development as the main issue. The trend is also reflected in many national policies (in both rich and poor countries), where the eradication of poverty is accepted as the main national mission (and PRSPs as a key vehicle through which this will be achieved). Finally, it is reflected in the new policies that many donors and international organisations have adopted and are using to guide decisions on what to support.

The second trend is the increasing recognition of poverty as being a complex, multi-dimensional phenomenon that includes both material and non-material features of life, that differs in its expression from person to person and place to place, and that can only be sustainably addressed where the assets and capabilities that the poor possess are improved. The most widespread single measure of poverty remains per capita income. From this basis, in 1998 1,175 million people (1,1834 million in 1987) survived on the equivalent of less than $1/day, 23.4% of the world's population (28.3% in 1987). 2,811.5 million (56.1%) survived on less than $2, up from 2,549 million (61%) in 1987. Most of the poor live in East and South Asia and Sub-Saharan Africa, where 1,090.5 million (93% of the total) of those living on less than $1/day are found. This income poverty remains a powerful measure of poverty, as it is a good indication of the material condition or people's lives. In particular, it helps us to understand whether people are able to gain access to many basic needs, including food and shelter but also including transport, clothing and other essentials of life. It is also a significant (but not perfect) indicator of the size of the livelihoods asset base of the poor and of their ability to invest in new livelihood opportunities if they exist.

Understanding the non-material dimensions of poverty is also now recognised as fundamental to understanding poverty itself. There are many ways that these non-material issues can be categorised but some issues are common to most approaches. The first is the significance of other basic needs, and in particular health and education. Ill health, poor life expectancy, poor access to education and high illiteracy rates are now seen as both a cause and a consequence of poverty that directly impact upon the quality of life and prospects of poor people. This is reflected in the importance given to health and education issues in the MDGs, the UNDP's Human Development Index and many other authoritative sources.

Closely linked to these are social and political issues, and in particular issues associated with equality (gender, social and cultural), freedom of expression and from oppression and threats to physical safety and fair access to key institutions in society. These issues find expression at different levels, including at

the individual level, at the community level and within society as a whole. Although hard to measure or tackle through conventional policies, these are real and tangible dimensions of poverty.

One characteristic of poverty that cuts across many of these above aspects is vulnerability: the poor are typically far more vulnerable to shocks and trends that disrupt their lives and set back any small progress that the poor do achieve. These factors include both natural events such as floods and human factors such as markets, and can be sudden (shocks) or gradual (trends) in their onset. Although many people are vulnerable to these forces, the poor are far less resilient to their impacts and often suffer from multiple vulnerabilities, the effects of which compound each other.

Finally, the poor are not a homogeneous category even in one place. The form and depth of poverty can vary greatly, including in many societies a group that are the poorest of the poor: those with few or no assets, people who may be socially or politically marginalised (and therefore excluded from most participatory mechanisms), people who have lost everything (for some even their homes) because of sickness, war or a natural disaster. For people with very few or no assets, then the opportunities provided by improved access to household water may be far more significant than for even poor people with some land or livelihood opportunities outside the homestead.

19.3 Approaches to household water

Household water has been recognised as a prominent issue in water development for many years. The 1980s was designated the drinking water supply decade, with major international and national programmes of investments that were aimed to increase the numbers and proportion of people connected to improved water supply systems. Similarly, the MDGs include a goal of reducing by half the proportion of people unable to reach or afford safe drinking water. Domestic water is also recognised as the first priority in national water policies in many countries, including India, South Africa, Bangladesh and Mozambique. The provision of improved sanitation and hygiene education is often linked to this, with organisations such as the Water Supply and Sanitation Collabourative Council (WSSCC) forcefully advocating for these issues to be seen as part of the same challenge. The recognition of this issue was reflected in the inclusion of a sanitation target to parallel the drinking water target at the WSSD in Johannesburg in 2002. Indeed, the issue of water supply and sanitation was seen as one of the few to emerge from the WSSD with any credit or consensus, in sharp contrast to issues such as renewable energy or world trade that were the source of bitter controversy.

Unfortunately, the perspective on household water represented in these high profile initiatives is almost entirely negative. Water supply and sanitation are seen to matter as issues because of the jeopardy to health resulting from inadequate access to basic services. Linked, but secondary, issues are also seen as the time and burden of fetching water on women that is an affront to the dignity of people (and again especially women) that poor services create. Indeed, household water problems are widely presented as the single most important health and poverty issue for many of the world's poor. Widely quoted figures of 1.2 billion people without adequate water supplies and 2.4 billion people without access to improved sanitation set the context for this perspective: both indicating the enormity of these problems and justifying the priority given to this issue in policy debates. Put simply, household water is seen as important because it degrades and kills people, with the most vulnerable - women, children, and the poor in general - most at risk.

These problems are real and immediate, and indeed are one of the most important development challenges facing the modern world. Who can argue against measures to ensure that all of humankind has safe water to drink and decent sanitation? The emphasis on these negative aspects of household water only tells part of the story, however. It assumes that household water is only used for domestic consumption and misses the central role that the productive uses of household water can play in the livelihoods of many poor people. Indeed, the poorer people are and the more limited their asset base and access to other resources, then the more important that these livelihood aspects of household water use will be. It is this positive perspective, a better understanding of the real and major contribution to livelihoods improvement and poverty reduction that household water can play and does play, that has been lacking in much of the discussion on household water issues. The rest of this paper concentrates on these perspectives. This is not intended to ignore or minimise the significance of the health and hygiene issues associated with household water, for these are indeed of tremendous importance. But the paper recognises the high profile that these issues already have and instead focuses on the wider uses and significance of household water, as these other dimensions of the issues have been largely ignored.

19.4 Setting the perspective: the range of benefits of household water

This wider perspective is important for political and funding reasons. Securing a priority for, and funding flows to actions to improve access to water for poor households, must compete with demands from other sectors that are perceived to have direct and positive development benefits. So long as household water is seen in negative terms only, it will be at a disadvantage in this process. Similarly, the assessment of where to focus investments traditionally relies, at least in part, in some sort of cost-benefit assessment. The failure to take into account a whole range of actual or potential (with slight modifications to the way investments are made) benefits gives distorted signals to such decisions.

These benefits can and will flow even where they are not designed in to the investment programme. Indeed, there is increasing evidence that these unintended benefits can often outweigh the intended health and welfare gains that improved household water supplies bring. What are traditionally seen as environmental health programmes do in fact have far wider development rationales and impacts. These benefits were dramatically revealed in a study by WaterAid, a leading NGO working in household water provision (WaterAid 2001). This study reported on an impact assessment of older water supply and sanitation projects in India, Ethiopia, Ghana and Tanzania. The results were remarkable, revealing a wide range of positive impacts that were not in the design rationale of the projects. Even though the projects were mostly straightforward supply-oriented, they were based on strong community mobilisation and empowerment at all stages, with women and children intended as the main beneficiaries. This inclusion of a strong social and institutional process in planning and implementation was a key to the success and sustainability of the projects.

Although the study confirmed the general trend that the initial justification for the investments in supply was usually based on health objectives, the assessment identified a wide range of positive impacts that affected many dimensions of life. The most important benefit was often the time saved and reduction in fatigue from not having to travel to collect water from, on average, 6 kilometres away. This was often translated into an increased number of working days, with direct income benefits, and inevitably benefited women in particular for whom the burden of work is often far more in terms of time than that of men. There were many health benefits, including reduced medical costs, including the main target of reduced diarrhoea and dysentery but there were also reductions in worm infestations, bilharzia, scabies and other health problems in many cases.

Significantly for this paper, there was a wide range of income opportunities around the house that emerged or increased in scope as access to water improved, including vegetable production, brewing, brick and pot making, food stalls and others. These were cited as significant by many respondents, with these changes to livelihood opportunities having direct and important benefits. These direct increases in economic activity were complemented by multiplier effects throughout the local economy from the increased income, as well as new economic activities and benefits that came from establishing supply and service points for water supply.

Many new skills were learnt, including masons and mechanics (including poor women in traditionally male preserves), management skills, negotiation skills and leadership skills amongst women. This enhanced human capital again created new livelihood opportunities for many. The local organisations set up for the water supply programmes often formed a basis for wider local mobilisation, provided greater community coherence and developed far greater levels of confidence amongst women and poorer, marginalised households. Savings and credit groups established for the water project provided a basis for the development of accessible credit facilities amongst the communities and assisted with the development of financial management skills. The new skills and confidence, better local organisations and increased economic momentum all had impacts on the wider political and governance systems, including on government policies. This wide range of benefits was not confined to isolated projects, but characterised most or all of the schemes studied by WaterAid.

Similar widespread benefits have been found in many other programmes. SEWA, a leading NGO involved in water management activities in Gujarat in India, has implemented a programme in Banaskantha District that combines the revival of the piped water supply and traditional water sources with a micro-enterprise development programme for female entrepreneurs (SEWA 2002). The approach has created a synergy between these two spheres of life, using the economic opportunities as a basis for ensuring widespread participation in decision-making and creating a basis for the sustainability of the water supply schemes. It also ensured that the women were the dominant force in the planning and implementation of the water supply activities, something that has traditionally been almost exclusively a male preserve.

A study undertaken in South Africa by AWARD and other partners in the WHIRL project (Soussan *et al* 2002) focused on the benefits that come from the productive use of household water. The study showed the importance of household-based productive activities that rely on water for many households, with poorer households in particular depending upon and benefiting from the livelihood opportunities that activities such as vegetable cultivation, beer brewing, brick making and hairdressing bring. The amount of income and scale of activities being undertaken were far lower in communities that suffered from restrictions in water supply when compared to those where access to water was good, with direct and material implications for the amount of poverty and range of livelihood opportunities available to these communities. In this way, it can be demonstrated that improving access to household water is not just beneficial to the poor as part of society as a whole: it is self-selecting for the poor in terms of increasing household-based livelihood opportunities.

19.5 Links between poverty and water security

The concept of **water security** was highlighted in the Ministerial Declaration of The Hague in March 2000 and is seen as the key to addressing the emerging global water crisis and improving the role of water management in poverty reduction. Water security is a condition where people and communities have reliable and adequate access to good quality water to meet the full range of their needs, are able to take advantage of the opportunities that water resources present, are protected from water-related hazards and have fair recourse where conflicts over water arise. The concept of water security is based on ensuring that the poor have ***secure and sustainable access*** to water resources, which in turn means strong links to the entitlements framework and the governance conditions that dictate this access. The idea of entitlements is particularly important for water resources, as they are rarely privately owned (though supply technologies may be), are variable in flows, move over space and have multiple uses. Access is consequently not usually governed by exclusive control. It depends on societal rules that define who can get what, where and when.

A key dimension of water security, and one that is particularly important for the poor, is that the needs of ***all* users,** and value and potentials of ***all* uses,** of water resources are recognised in decisions over their future. Water resources (including aquatic plants and animals and hydropower, aesthetic and other services) come from many sources (including surface and groundwater) and have many uses: domestic needs, irrigation, fishing, industry, waste disposal, etc. Where scarcity exists, conflicts emerge and the poor and powerless in particular are likely to be marginalised. The idea of water security means that there are mechanisms in place to ensure that this does not happen, and that any potential conflicts are resolved in a fair and transparent manner where the interests of the poor are properly represented.

Understanding this idea of water security, along with linked concepts of access, entitlements and conflicts as they relate to water, are fundamental to a full understanding of the role of water resources in the lives and livelihoods of the world's poor. Poor people depend upon water resources in four key ways:

As direct inputs into **production**: agriculture is the most obvious and the viability of agriculture is closely linked to reliable access to water. Agriculture represents 70% of all water use. Per capita food production has risen steadily over the last generation in all regions except Sub-Saharan Africa (where it continues to decline). But many millions are still malnourished. Around 800 million people don't have enough food to meet their basic energy needs and 2 billion lack a balanced diet. Improving food security depends on water in agriculture for both the ability to grow food and to ensure a means of employment for many landless rural people. Within this issue, a particular focus on rainfed agriculture is needed, as it is here where poor water security is most severe, where the poorest often farm and where less attention has been paid in the past.

Water is an important input into many other forms of production, including fishing, tree and garden cultivation around homesteads, livestock, small-scale manufacturing such as pottery, brick making and tanning, services such as laundering and others. Water is also vital for many types of manufacturing and other larger economic activities that provide employment for poor people, in cities in particular. The poor often rely on these other production activities to give essential diversity to their livelihoods and to overcome their lack of assets such as land.

The **health and welfare** conditions of the poor, and especially of vulnerable groups such as children, the elderly and women in general. Globally, 1.1 billion people lack access to improved water supply and 2.4 billion lack adequate sanitation. Most (84% for water supply and 83% for sanitation) live in rural areas but the number of urban residents without adequate services is increasing rapidly. The majority (63% for

water supply and 80% for sanitation) of those without adequate services live in Asia, but Sub-Saharan Africa has the highest proportion of people without water.

Health hazards where water is a vector are endemic in many regions. There are 4 billion cases of diarrhoea each year, causing 2.2 million deaths, mostly of children. Millions more are affected by malaria, dysentery, schistosomiasis, intestinal worms and other diseases. In extreme conditions, cholera, typhoid and other potentially fatal diseases are rife. Both the quality and quantity of water matters greatly, in relation to health issues, and safe and adequate quantities of water are recognised as a pre-condition for an acceptable standard of development. This is one of the most obvious areas where gender perspectives are of particular importance, as women are the providers of water in the home, are the main carers for the sick and often suffer worse health impacts than men (though of course it is children who are most affected).

The flow and quality of water is critical for the viability of the **ecosystems** through which the poor gain access to the natural resources that are the basis of many aspects of their livelihoods. Even where water is not a direct input into production, the availability of other important natural resources (such as forests, fishing or grazing) on which people depend is contingent on flows of water through ecosystems. It is widely recognised that the rural poor in particular depend more on their local resource base. For example, Rennie & Singh (1996) argue that "Predominantly the poor of the world depend directly on natural resources, through cultivation, herding, collecting or hunting for their livelihoods. Therefore, for the livelihoods to be sustainable, the natural resources must be sustained". Indeed, this relationship between the reduction of poverty and environmental sustainability is the most fundamental concept in sustainable development.

The poor are the most vulnerable to **water-related hazards**: extreme floods, droughts, major storms, landslides, pollution and so on that kill tens of thousands, cause billions of dollars of damage and affect the lives of many millions each year. This vulnerability can undermine any effort to break the poverty trap and can even cast the not so poor into poverty where the basis of their livelihoods is destroyed by a cataclysmic event. Low resilience to these water-related vulnerabilities is a defining characteristic of poverty where these threats exist. And things are getting worse due to climate change: the incidence of extreme events is increasing and will continue to increase, while the most vulnerable are often the poorest people in the poorest countries. As the most recent IPCC Impact Report stated: "those with the least resources have the least capacity to adapt and are the most vulnerable".

These hazards are not all sudden shocks or extreme events. Around 1.7 billion people live in countries that are water-stressed: that is, suffer from structural water deficits. This number will rise to 5 billion unless major changes are made to global water management. Most are poor countries, and in these countries, scarcity is not evenly distributed. It is often concentrated in more fragile, less productive environments. It is again the poor who are hit first and hardest.

In all four, the links between poverty, gender and the environment are obvious, as is the importance of the access of the poor to and the rights of the poor over water and other natural resources. This in turn is contingent upon the institutional framework and governance conditions that regulate access to these resources. In defining the key objectives of any strategy that seeks to improve poverty-water security, consequently, the goals need to be specified in relation to the real needs and uses of the poor for water resources. This is a particularly important issue for household water as, as we have seen, key aspects of the use of water at the household level have often been ignored. This is particularly true for productive water uses that have great potential for livelihoods improvement and that are self-selecting for the poor.

19.6 Water Security: the overall position

The concept of water security has already been explained and the diverse and local character of the form it takes emphasised. Local communities do not exist in isolation, however: they are part of the global system and are profoundly influenced by events around the world. This section gives a brief overview of these issues, looking at both the overall state and trends of water management internationally and identifying the forces that are the 'drivers' behind changes in water use and availability within the modern world. This section draws heavily on a chapter prepared for the World Water Development Report, which will be published by UNESCO in 2003, and where a much fuller discussion of these issues can be found.

One word is widely used to sum up the world's present position and future prospects with regard to water: crisis. The general picture is gloomy: a world today where billions suffer the consequences of water scarcity and the environment is degrading and a world in the near future where many more suffer and the

biosphere is irreparably damaged. But amid the gloom and doom are fragmented pieces of evidence to suggest some things are getting better and hope does exist.

The characterisation of the world's water crisis is often very dramatic: "the world water cycle seems unlikely to be able to cope with the demands that will be made of it in the coming decades. Severe water shortages already hamper development in many parts of the world, and the situation is deteriorating" (UNEP, 1999, p362). Similarly, WWF emphasises "freshwater is essential to human health, agriculture, industry and natural ecosystems, but is now running scarce in many regions of the world" (WWF, 1998). This is in spite of the fact that globally only about 8% of annual renewable freshwater resources are withdrawn (Gleick, 1993). As the Prince of Orange stated in his submission to the WSSD, "No Water No Future": "Some forecasts show that, by 2025, more than 3 billion people will face water scarcity. But this is not because the world lacks water. The world water crisis is a crisis of governance – not one of scarcity".

How much freshwater is there globally and how does the dynamics of the water cycle relate to water use and scarcity? Some 110,000 km^3 of precipitation falls on the continents each year. Of this roughly two-thirds evaporates back into the atmosphere from plants or soil. This means that approximately 42,700 km^3 of water flows into the global river system each year. Despite this being a tiny proportion of the total renewable fresh water reserves, if this water were distributed and used evenly over the earth's surface then each person would receive about 8,000 m^3 per year, more than enough to meet their needs. But neither precipitation nor the subsequent runoff are evenly distributed, nor are aquifers that store groundwater , and a lot of this water cannot be captured as it occurs as floods. For example, Asia has about 60% of the world's population but generates only 31% of the global runoff. In South Asia, the per capita annual runoff is 2,900 m^3, but in contrast, both Latin America and Africa have much higher per capita runoffs (27,900 m^3 and 8,300 m^3 respectively). This means that there are many countries where the runoff (and consequently maximum potential resource) is much less than the global average water use. As Table 1 shows, there is some relationship to per capita income in this, with the countries with lower water availability often having lower per capita incomes, but of course this is not a direct or causal relationship and exceptions abound.

Table 1: Freshwater Resources Per Capita

Per Capita Annual Runoff (m^3)	Number of Countries	Total Population (millions, 1999)	Average Per Capita GNP (US$ 1999)
Less than 1,700	34	494	3270
1,700 – 2,999	27	3090	2280
3,000 – 4,999	17	462	13440
5,000 – 9,999	23	739	14100
Over 10,000	61	1134	3320
No data	45	59	16170

Of course, there is often tremendous variation within countries, and especially large countries, over the amount of water available from place to place. Countries such as China, India and the United States contain regions that are deserts and areas with some of the highest rainfall levels in the world. Water availability is also not evenly distributed over time. Some places can receive adequate rainfall some years and then receive very little in other years. Even where there is a regular amount of rainfall per year it may vary greatly within the year. Most of the annual water flow may come in a short period and be in the form of floodwaters, flowing directly into the sea. In fact, experts have estimated that approximately only 9,000 km^3 per year is readily accessible for humans to use, around one fifth of the total water in the river systems. There is an additional 3,500 km^3 of water that has been captured and stored by dams and reservoirs (WMO, 1997).

Water serves a number of functions. Water is essential for human life but our global requirements for household uses are relatively small (around 7 % of total withdrawals). Essential household needs for drinking, cooking and washing (and sanitation) total less than 100 l per person per day. This very modest amount, in theory at least, can be met by almost all countries around the globe, but of course this figure does not take account of the many other uses of household water.. Of course usage varies around the globe. The World Resources Institute reported that domestic water use varied from as little as 7 m^3 per person per year in Oman to over 200 m^3 per person per year in the USA. Per capita domestic water use is increasing, reflecting increases in the availability of safe drinking water and sanitation in developing countries.

Household and municipal needs are only a small part of global demand for water supplies. Nearly 70 % of current global fresh water withdrawals (roughly 2,000 km^3 globally per year) are for agricultural

activities, primarily irrigation. Roughly 16% of the world's cultivated land is under irrigation, with yields typically much higher than for rain-fed agriculture. The amount of water used for irrigation has increased 10 times this century (Clarke 1993). Global industrial activities, including the energy sector, account for approximately 22% of current global freshwater withdrawals (Raskin et al. 1997). However, this broad group of industries hides differing development and technological patterns across industrial sub-sectors and regions. For example, the energy sector accounts for over half of this as power stations use water for the cooling.

The overall global picture is consequently one of an abundant total resource potential, but with this resource being very unevenly spread over space and variable over time and much of it beyond likely physical or economic use. Patterns of need and use also vary, reflecting population patterns, levels of economic development and other factors. What is clear is that the total level of demand is growing, and growing rapidly: whilst the global population tripled in the 20th Century, demand for water went up six-fold: reflecting economic development and improvements to water services throughout this time. It is also clear that the pattern of water use is changing, along with so many other aspects of life. What factors are driving these increases in and changes to the patterns of use of water resources?

19.7 Drivers of the water crisis

We have seen that water resources issues need to be analysed in relation to wider environment and development issues. These wider issues are critical if we are to understand what motivates people in their use of water now and where the main pressures on water resources will come in the future. They set the context within which any one aspect of water management, such as household water use, should be set even if the connections may seem tenuous at times.

19.7.1 Population growth

Rapid growth of the world's population has been one of the most visible and dramatic changes to the world over the last hundred years. Population growth has huge implications for all aspects of resource use, including water. Despite water being a renewable resource, it is only renewable within limits and the extent to which increasing demands can be met is finite. As population increases, freshwater demand increases and potential supplies per person inevitably decline (though the actual availability may improve as capacities to harness the resource develop). Per capita water supplies reduced by a third between 1970 and 1990 and there is little doubt that population growth has been and will continue to be one of the main drivers of changes to patterns of water resources use. It is obviously an issue of key importance in relation to household water use, where the relationship between demand and supply is most immediate and obvious.

Future projections of worldwide population growth have been revised downward in recent years, primarily as a result of significant declines in birth rates throughout the world as more countries go through the 'demographic transition' from high birth and death rates to low birth and death rates. Despite this, *"the pace of future population growth will largely determine whether 25%, or as many as 60 %, of the world's people will face shortages of freshwater that seriously constrain both food production and economic development"* (Gardner-Outlaw and Engelman, 1997, p1). Although there are differences of opinion, most projections expect this slow down of growth rates to continue and for the world's population to stabilise at around 9.3 billion people (or over 50% higher than the 2001 population of 6.1 billion) somewhere in the middle of the 21st Century (UNFPA 2002). Increasing numbers of people will consequently be a major driver of water resources management for at least another 50 years. Given this, the future for many parts of the world looks bleak. Worst case scenarios suggest that nearly seven billion people in 60 countries will live water-scarce lives by 2050. Even under optimistic assumptions, two billion people in 48 countries will struggle against water scarcity in 2050 (Gardner-Outlaw and Engelman, 1997).

19.7.2 Urbanisation

The human race is in the middle of a change in its way of living more profound than anything since the advent of agriculture more than 10,000 years BC: the move from the countryside to cities. At the beginning of the 20th Century only a small percentage of the population lived in cities in most regions of the world but as the world population has increased, so has the proportion that live in urban areas. The urban population rose steadily throughout the 20th Century and reached 47% by the Millennium. It is projected to reach 58%by 2025 (UNFPA, 2002). The majority of this increase has historically been in the developed world, but many parts of the developing world are catching up, reaching 40 %by 2000 and projected to be 54%by 2025. UN (2002) estimates show that the urban population of the less developed

world is expected to nearly double in size between 2000 and 2030 from a little under two billion to nearly four billion.

The majority of these people will live in large cities. Many will be in mega-cities, with over 10 million inhabitants. As the population in these centres grows, so do their demands for resources, including especially water: reflecting both the high concentrations of people and the very different lifestyles and aspirations of city dwellers. There are many examples of falling groundwater levels in cities, including Manila and Jakarta, whilst in others such as Hanoi and Bangkok depletion of the aquifer has led to land subsidence. The deterioration in water supplies and sanitation leads to the progressive decline in urban living conditions - water shortages, pollution and unsanitary water conditions all contribute to an urban water and health crisis. Many poor people in cities also pay very high prices for their water from private vendors, and agitation and even riots over poor water supplies (especially during droughts) are far from unknown.

Any improvements in health provision in developing countries may well be overwhelmed in urban areas by the reduced access to safe, clean drinking water. Out of India's 3,200 or so towns only 217 have partial or full sewage treatment facilities. The result is extremely polluted waters. A stretch of the Yamuna River which flows through New Delhi was found to have some 7,500 coliform organisms per 100 mm of water before entering the capital but after receiving an estimated 200 million lof untreated sewage each day, it leaves New Delhi carrying an incredible 24 million coliform organisms per 100 ml (WRI, 1986).

19.7.3 Globalization

We are frequently reminded that we live in an increasingly interconnected world. Many global brands that advertise new lifestyles are helping change demands and aspirations around the world. Changes to production technologies and transport opportunities have created an increasing globalised market. Changing aspirations that reflect increasing prosperity heighten pressures on resources, including water resources, so that water consumption has risen almost twofold in the last 50 years. A child born in the developed world consumes 30-50 times the water resources of one in the developing world (UNFPA 2002). These lifestyle choices are at least as important as population growth in determining our water future, and of course are particularly resonant at the household level where they are expressed in demands for better water services and new goods such as washing machines. Understanding the full impacts of globalisation on the world's water resources is challenging, but what is clear is that the world is changing irrevocably, with tremendous implications (for good and bad) for the management of water resources as for every other aspect of life.

19.7.4 Industrial Expansion

Water resources are also put under pressure from industrialization that increases demand and creates threats to water quality. This is often also often centred around major urban centres which serve as foci for industrial development. Like urban population growth, many of these industries are growing at a rapid rate. For example, the paper and steel industries, which rank as some of the most important industrial sources of water pollution in Latin America, have been growing twice as fast as the economy of these countries as a whole (Gleick, 1993).

19.7.5 Agricultural Development

The area of irrigated land had nearly doubled in the first half of the 20th Century, reaching nearly 100 million ha by 1950. Growth occurred at an even faster rate over the next 40 years which increased the total to over 235 million h (Gleick, 1993; Postel, 1993). The amount of new land being placed under irrigation has declined markedly since the 1970s, the result of reduced availability of funds for large scale schemes and the declining amount of land suitable for irrigation development. In some areas poor management has led to problems of drainage and salinity. It appears that in the future, irrigation's contribution will mainly be through the improvement of existing systems rather than the development of new areas.

However much irrigation expands, most of the world's farmlands will continue to be watered through rainfall in the future. Molden and Rijsberman (2002) estimate water use in rainfed agriculture to be 16,000 km^3 annually, over six times that used in irrigation, and argue for a focus on improving the efficiency of this use. Rainfed agriculture is as diverse as the regions in which it is found, including large areas of rich farmlands in Europe and North America and extremely poor communities with low productivity in marginal areas of the developed world. Where water management is in particular an issue for rainfed areas is where the rainfall is limited or erratic (and consequently a constraint upon production) and the communities do not have the means to supplement it by storage, using groundwater or other sources.

19.7.6 Energy Production and Use

Water is required both in the generation and use of energy. The most obvious use of water for energy production is through the operation of hydroelectricity facilities, where falling water is used directly to turn turbines that generate electricity, but water use for cooling in thermal power station is also of great significance. The growth in demand for electricity, along with the development problems that power shortages create, means that generation capacity (and water demand) is likely to increase greatly in the coming decades.

19.7.7 Recreation and tourism

There has been an explosive increase in tourism in the last three decades. During the 1970s, only one person in 13 from industrial countries had travelled to a developing country as an international tourist; by the end of the 1990s it was one in five (Honey, 1999). Tourism is the only sector where developing countries consistently run a trade surplus. There are multiple impacts, both positive and negative, of this boom in tourism on a region or country, including profound implications for water resources. Tourism can lead to sudden and massive increases in water demands (and pollution) that affect local communities, but it can also be the trigger for investments in services that also benefit locals. Similarly, the economic benefits of tourism can lead to the active conservation of ecosystems that would otherwise come under pressure from other external forces.

19.7.8 Climate change

The discussion of major water issues identified water-related disasters as one of the main challenges facing the modern world, with the number and impacts of such disasters increasing in recent decades. If all this was not bad enough, the news is that things are likely to get worse as the impacts of climate change kick in. That there will be change in the future is no longer open to doubt. What is far from clear is exactly what changes will take place in different places, and when change will happen. Despite this, there is a general consensus that many parts of the world that are already experiencing water stresses (and are likely to experience greater stress in the future even if rainfall patterns do not change) are the very ones where rainfall will be lower and more variable as climate change really takes a grip. These include arid and semi-arid regions of the developing world that are already poor and already have great problems in water resources management. The impact of climate change is likely to make all of these problems worse. Much the same is true for water-related disasters, with all projections agreeing that the incidence and severity of extreme events will increase sharply in the future.

19.8 International targets and household water

Although reaching a global consensus on development goals and aspirations is fraught with difficulties, the international community has in recent years agreed on a number of principles and targets for international development that are directly relevant for household water. The key ones are discussed here, though there is not the space for a full discussion of the all relevant issues.

The most appropriate starting point is the Dublin Conference of 1992, from which emerged the Dublin Statement on Water and Sustainable Development that was a contribution to the preparation of the Earth Summit in Rio. This statement contains the four Dublin Principles that have formed the basis of international debates on water policies in the years since they were first agreed. These principle are:

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

The importance of these principles for household water use is clear, and indeed in most cases would excite little controversy. The prominence given to the role of women, to participatory approaches and to the finite nature of freshwater resources is significant in terms of establishing household water as a priority issue. Perhaps the greatest importance for household water debates is the inclusion of an explicit statement on water as an economic good. This has opened the door to long debates on charging and cost recovery for domestic water supplies that are as yet still not resolved and that are directly and materially important to establishing the basis for the development of household water, including its development as an input into economic activities. The balance between charging as the basis for

efficiency and sustainability on the one hand and the need to ensure basic needs provision even where this requires subsidies on the other is a key focal issue for household water development.

The Dublin Principles were not, unfortunately, reflected in any adequate way in Agenda 21, the main outcome of the Rio Earth Summit in 1992. Indeed, Chapter 18 (the water chapter) is only really notable for its blandness and the lack of focus it gave to water resources issues. Water was not very prominent in Rio, which was dominated by biodiversity and forest conservation issues. These failings became increasingly apparent during the 1990s, with water emerging as one of the key sustainable development issues during the decade.

This culminated in 2000 with two key international events that are the basis on which any consideration of water, including household water, issues need to be considered. These were the World Water Forum and Ministerial Conference in the Hague in March 2000 and the Millennium Session of the United Nations General Assembly.

The World Water Vision, launched at the World Water Forum in 2000 and the Ministerial Declaration on Water Security in the 21st Century, affirmed by the representatives at the parallel Ministerial Conference in The Hague, together set a new agenda for international debates on water resources. The World Water Vision's sub-title, "*making water everybody's business*", in many ways sums up what it was all about: building a consensus on the importance of water and the ways forward in the future rather than coming up with radically new approaches. The Vision itself used a scenario approach to demonstrate that business as usual is not an option, as the projection into the future of present trends in water use and resource degradation would rapidly become unsustainable in many parts of the world, greatly deepening emerging crises in these regions. The Vision defined a sustainable scenario in which the basic needs of all people were met and environmental sustainability was maintained. It emphasised that realising this sustainable future would require *"that people's roles and behaviours must change to achieve sustainable water resources use and development"* (World Water Vision, 2000). Within the Vision, most of the concerns focused on agriculture and other productive sectors and it was assumed that, in most settings, household water needs would only be constrained by investments in supply infrastructure. The issue of productive uses of household water was not explicitly recognised as an issue.

The Hague Ministerial Declaration represented the political response to the Vision and the emergence of an international consensus on the importance of water in sustainable development. It identified seven challenges for the global community, challenges that are currently the basis for international discussions on the development of policies and priorities for water management:

- **Meeting basic needs:** to recognize that access to safe and sufficient water and sanitation are basic human needs and are essential to health and well-being, and to empower people, especially women, through a participatory process of water management.
- **Securing the food supply:** to enhance food security, particularly of the poor and vulnerable, through the more efficient mobilization and use of water and the more equitable allocation of water for food production.
- **Protecting ecosystems:** to ensure the integrity of ecosystems through sustainable water resources management.
- **Sharing water resources:** to promote peaceful cooperation and develop synergies between different uses of water at all levels, whenever possible, within and – in the case of boundary and transboundary water resources – between states concerned, through sustainable river basin management or other appropriate approaches.
- **Managing risks:** to provide security from floods, drought***s,*** pollution and other water-related hazards.
- **Valuing water:** to manage water in a way that reflects its economic, social, environmental and cultural values in all its uses, and to move towards pricing water services to reflect the cost of their provision. This approach should take account of the need for equity and the basic needs of the poor and the vulnerable.
- **Governing water wisely:** to ensure good governance, so that the involvement of the public and the interests of all stakeholders are included in the management of water resources.

The priority given to meeting basic needs is noteworthy, as is the emphasis placed on governance issues. Although there is some implicit assumption that the basic needs equate to traditional concepts of water for drinking, cooking, washing and hygiene, it provides a powerful basis for arguing, from a poverty reduction and livelihoods perspective, that this should also include water that is essential for the viability of livelihoods as a basic need. This in turn necessitates a fresh look at the full range of uses of water within the household and their roles in the livelihoods of poor people.

The UN Millennium Declaration has emerged as the most important document in a generation for the development community in defining a trajectory and priorities for international development. It is explicitly focused on poverty reduction as the key priority in sustainable development and in many ways is a counterbalance to the generally environmental focus of Agenda 21. The Declaration sets a series of targets, the Millennium Development Goals (MDGs) that set the context for policies by countries, international agencies and donors in defining development priorities. This includes an extremely prominent goal on household water in the overall development goal (paragraph 19):

> *We resolve further to halve, by the year 2015, the proportion of the world's people whose income is less than one dollar a day and the proportion of people who suffer from hunger and, by the same date, to halve the proportion of people who are unable to reach or to afford safe drinking water.*

This statement demonstrates the link between poverty, hunger, health and water security. Any consideration of the role and development of household water needs to take a similarly broad perspective. This link is significant in policy terms, as it indicates the overriding policy priority for water resources management: the governance barriers that prevent the poor from having sustainable access to water resources. The key policy priority for the global community is consequently to ensure that national and international water resources policies give priority to the reduction and eventual eradication of poverty through realising the full potential of water in different aspects of the lives of the poor. This reflects a belief that the sustainable use of water resources can contribute to meeting basic needs, reducing vulnerabilities and empowering poor people to control the water resources upon which they depend.

Extending the quantity and quality of water available for household water use is obviously the key to reaching the drinking water target (and the sanitation target that was added in the Plan of Implementation agreed in the WSSD in Johannesburg). This in itself is an important aspiration and will no doubt result in changes to policy priorities and increased flows of funds at national and international levels. There is a danger that this will lead to a far too narrow perspective on household water, however: the minimum of drinking water becomes the norm in terms of defining levels of service delivery to poor households. There is an inherent concern from this, that the potential contribution of other water uses for poverty reduction will not be reflected in policies or investments and consequently not realised. There is consequently an urgent need to ensure that a wider perspective on household water, and in particular a better understanding of the productive potential of this water, is more clearly articulated.

The significance of household water in achieving the aspirations of the Millennium Declaration is not confined to the drinking water and sanitation targets. It can contribute, directly or indirectly, to meeting all of the other MDGs. Again, a better understanding of this potential will strongly reinforce the case for prioritising household water in policy development by demonstrating that it is not just about removing the scourge of water-related health threats: it is also about creating or enhancing livelihoods and development opportunities.

The overall MDG, *to halve by 2015 the proportion of the world's people whose income is less than $1/day* will require sustained economic growth in developing countries, with that growth focused on sectors that provide livelihood opportunities for the poor. The basis for this is sustainable livelihoods development in which the asset base of the poor is enhanced and a wider range of choices on livelihoods activities is available to the poor. In this, household-based activities have many attractions, not least because they are less demanding in terms of the assets that the poor must possess before they are able to start a productive activity. This includes, critically in livelihood terms, opportunities to diversify livelihoods into secondary activities that supplement and reduce vulnerability to fluctuations in main sources of income (such as agricultural labour).

Poor food security is reflected in both inadequate total nutrition and in poor nutritional balance, with deficiencies of proteins and other key elements of diet the lot of many hundreds of millions of the world's poor. This is reflected in the goal *to halve by 2015 the proportion of the world's people who suffer from hunger*. Food security is in part a national issue, but also needs to be addressed at the local level, with landless families, women-headed households, rainfed farmers, livestock herders and other vulnerable people key targets. Reliable water for home gardens, livestock, tree crops, fish ponds and other foodstuffs produced around the household are keys to improving the food security of those most vulnerable to hunger.

Education is critical for poverty reduction, as reflected in the goals to ensure that, by 2015, children everywhere will be able to complete a full course of primary schooling and progress towards gender equality and the empowerment of women should be demonstrated by ensuring that girls and boys have equal access to primary and secondary education. Improved health, resulting from improvements to household water, will play a key role in improving attendance and performance at school, whilst water supplies that are closer to home will mean girls do not have to spend study time collecting water. Similarly, community-based organisations for water management improve the social capital of women and lead to more balanced gender roles.

Water management will play a critical role in achieving the three *health-related MDGs*: to reduce by two-thirds, between 1990 and 2015, the death rate for children under the age of five years, to reduce by three-fourths, between 1990 and 2015, the rate of maternal mortality and to halve, by 2015, halted and begun to reverse: the spread of HIV/AIDS, the scourge of malaria and the scourge of other major diseases that affect humanity. Water-borne diseases are the biggest killer of young children and improved quantities and quality of household water and sanitation will directly reduce child deaths. Improved nutrition and food security will reduce susceptibility to disease and lower both child and maternal mortality rates. Malaria will only be reduced through water management that removes their breeding habitat. Similarly, water management will reduce vulnerability to a range of other diseases for which water is a vector.

Linked to the MDG on drinking water is the wider goal *to stop the unsustainable exploitation of natural resources*. Water is amongst the resources most under pressure in many parts of the world and is crucial for the maintenance of many ecosystems experiencing or threatened by degradation. Although household water is rarely a factor in this process of degradation, addressing these problems needs to be based on the development of integrated management within river basins that creates conditions where sustainable ecosystems management is possible and upstream-downstream impacts are mitigated. The full range of household water uses need to be taken into account in this process.

Improved water management and services are critical for achieving the MDG on *improving the lives of slum dwellers*. The urban poor suffer poor quality, unreliable water services, often having to queue for long periods to collect or pay high prices for these inadequate supplies. Few have access to decent sanitation and many are vulnerable to flood threats and contamination from polluted waters. Providing reliable, affordable and accessible water supplies, improved sanitation and protection from floods and pollution will require substantial investments and reform programmes that link to wider improvements to urban governance and infrastructure.

The importance of water in general and household water in particular in achieving the MDGs consequently varies. It is central to realising goals such as food security, some of the health goals, protecting natural resources and improving the lives of slum dwellers, but less critical for education and other health goals. What is clear, however, is that the need for improved water security is an issue that unites the world's poor wherever they live and whatever the specific form their poverty takes. Realising the potential of household water in these processes necessitates changes to policies and laws as well as new management practices. A far more effective articulation of the role and potentials of the full range of household water uses and, in particular a focus on the productive uses of household water, is needed if these potentials are to be realised.

19.9 References

Clarke, R.(1993). *Water: The International Crisis*. London, UK, Earthscan Publications.

CSE. (1999) *The Fifth Citizen's Report.* Delhi, India, Centre for Science and the Environment.

EIA.(1992). *International Energy Annual 1990*. Washington DC, USA, Department of Energy.

Gardner-Outlaw, T. and Engelman, R. (1997). *Sustaining Water, Easing Scarcity: A Second Update*. Washington DC, USA, Population Action International.

Gleick, P.H. (1993). *Water in Crisis: A Guide to the World's Fresh Water Resources*. New York, USA, Oxford University Press.

Honey, M. (1999). *Ecotourism and Sustainable Development: Who Owns Paradise?* Washington DC, USA, Island Press.

IFRC. (2001). World *Disasters Report 2001*. Geneva, Switzerland, International Federation of Red Cross and Red Crescent Societies.

McCarthy, J.J. *et al*. (2001). *Climate Change 2001: Impacts, Adaptation, and Vulnerability*. Cambridge, UK, Cambridge University Press.

Mehta, L. (2000). *Water for the twenty-first century: challenges and misconceptions*. Brighton, UK, Institute of Development Studies. (Working paper 111).

Postel, S. (1993). Water and Agriculture. In: P.H.Gleick (ed), *Water in Crisis: A Guide to the World's Fresh Water Resources*. New York, USA, Oxford University Press.

Shicklomanov, I.A. (1997). *Comprehensive Assessment of the Freshwater Resources of the World*. Geneva, Switzerland, World Meteorological Organization.

Soussan, J. *et al.* (2002). *Allocating Water For Home-Based Productive Activities In Bushbuckridge, South Africa*, Manila, Phillipines, Asian Development Bank. (Case Study prepared for the Water and Poverty Initiative).

UNEP. (1999). *Global Environmental Outlook 2000*. London, UK, Earthscan.

WaterAid. (2001). *Looking Back: the Long-Term Impact of Water and Sanitation Projects*. London, UK, WaterAid.

WRI. 1986. *Water Resources 1986*. New York, USA, Basic Books.

WWF. 1998. *Living Planet Report 1998: Over-consumption is Driving the Rapid Decline of the World's Natural Environment*s. WWF International, Gland.