Research-inspired Policy and Practice Learning in Ethiopia and the Nile region

Water, Livelihoods and Growth:

Concept paper

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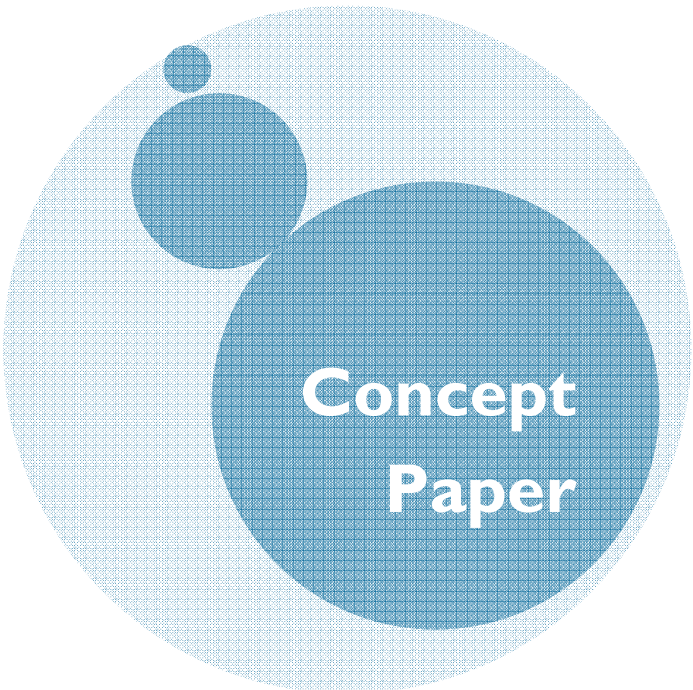

Research-inspired Policy and Practice Learning in Ethiopia and the Nile region (RiPPLE) is a five-year research programme consortium funded by the UK's Department for International Development (DFID). It aims to advance evidence-based learning on water supply and sanitation (WSS) focusing specifically on issues of planning, financing, delivery and sustainability and the links between sector improvements and pro-poor economic growth.

RIPPLE Concept papers introduce a new or existing concept, within its research themes.

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List of Acronyms

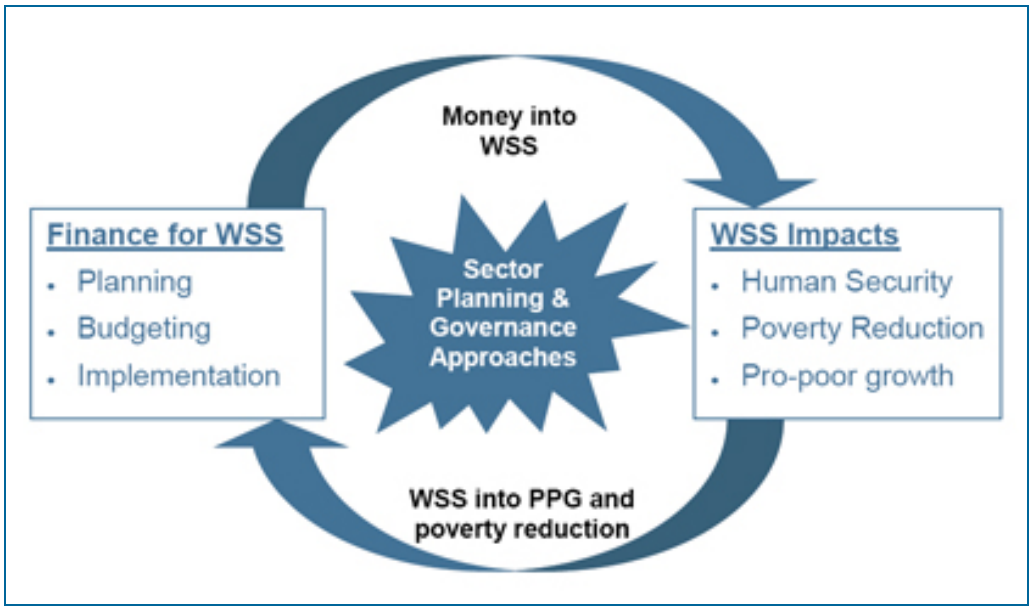
DFID	Department for International Development (UK)
DHS	Demographic and Health Survey
GDP	gross domestic product
GoE	Government of Ethiopia
MDG	Millennium Development Goals
PPG	pro-poor growth
RiPPLE	Research-inspired Policy and Practice Learning in Ethiopia and the Nile Region
WSS	water supply and sanitation services
UAP	Universal Access Plan
WHO	World Health Organisation

Introduction to RiPPLE

RiPPLE (Research-inspired Policy and Practice Learning in Ethiopia and the Nile Region) is a five-year research programme consortium funded by the UK Department for International Development (DFID)[1]. It aims to advance evidence-based learning on water supply and sanitation (WSS) focusing specifically on issues of planning, financing, delivery and sustainability and the links between sector improvements and pro-poor economic growth.

The RiPPLE conceptual framework comprises two overlapping focus areas: **money into water** (effective finance and delivery of WSS services) and **water into money** (impact of better WSS services on livelihoods and growth). The first is concerned with the challenges associated with finance and delivery of WSS services in low income countries such as Ethiopia. The second addresses much broader questions about the contribution of WSS sector development to wider efforts to promote pro-poor growth and poverty reduction in Ethiopia and the Nile region (see Figure 1).

Figure 1: RiPPLE Overview



Research and learning activities under the RiPPLE program focus on 3 thematic areas:

1. Governance and Planning (GaP)
2. Financing
3. Growth

Themes 1 and 2 are primarily concerned with issues of finance and delivery of WSS services (or *money into water*) whereas Theme 3 ('Growth) is concerned with the impact of better WSS services on livelihoods and economic growth (or *water into money*). The 'big question' to which RiPPLE's third

[1] For further information see the project website: www.rippleethiopia.org

theme hopes to contribute is '**how can investment in water supply and sanitation (WSS) contribute to the government's wider objectives of economic growth and poverty reduction and what are the implications for WSS sector policy and programming?**'. The purpose of this paper is to provide a summary of existing knowledge and current debates in this area and to identify key theoretical and practical challenges which can be addressed under the RiPPLE Growth Theme.

WSS, growth and poverty: Understanding the linkages

RiPPLE is primarily concerned with the WSS sub-sector but growth and poverty impacts ultimately need to be understood within the wider context of water resources management including linkages to other sectors. The literature on *macro level linkages* between water and growth highlights the relatively low levels of water resources development in Ethiopia and the Nile region, significant spatial and temporal variation in the distribution of water resources and growing variability and uncertainty in the context of climate change (MoWR, 2001). In Ethiopia, growth prospects centre on agriculture but are severely constrained by risk and vulnerability and chronic food insecurity which is directly linked to rainfall variability and periodic floods and droughts. Ongoing debates surround the drivers of recent growth and whether it can be sustained, and the extent to which it is actually contributing to poverty reduction (World Bank, 2006). Various studies have shown that access to markets and asset inequality are key factors determining the extent to which growth in a given location is 'pro-poor'. Access to WSS is a major form of asset inequality in Ethiopia but the 'effects' of unequal access to WSS on growth and rates of poverty reduction are not well documented. Global studies suggest a general correlation between improvements in levels of access to WSS and overall rates of economic growth, but detailed analysis of causation at national and sub-national levels is lacking (WHO, 2004). RiPPLE seeks to contribute to improved understanding of the relationship between changing patterns of WSS access and rates of growth and poverty reduction in Ethiopia and the Nile region.

The literature relevant to understanding *micro level linkages* is generally focused on two main areas: health impacts and time savings associated with access to improved domestic water supply and sanitation facilities; and improvements in agricultural productivity linked to access to water for irrigation. In both areas, there is an extensive literature highlighting the benefits of investments in improved services. The positive impacts of improved water and sanitation services on health are undisputed. The benefits resulting from time savings and productive water use are clear but the picture is slightly more complex as other factors may constrain the full realisation of these benefits. For example, time savings can increase the time available for productive activities but lack of employment may mean that this opportunity cannot be taken, while the benefits of increased productivity from irrigation may depend on access to markets for agricultural inputs (such as fertiliser) and outputs (produce). Relating these effects to broader patterns of growth and poverty reduction is not straightforward, for a number of reasons which are explored below. RiPPLE aims to address some of the gaps in current knowledge surrounding micro level linkages between WSS and poverty, with a particular focus on the role of water availability, access and use in relation to *livelihood protection* and *livelihood promotion*.

Bridging the divide between 'domestic' and 'productive' water uses

The impact of water sector investment on economic growth and poverty reduction generally remains poorly understood as compared with other sectors. There are several possible explanations for this. Firstly water is a cross-cutting issue and it does not easily fit into either the productive or social sectors but rather spans the two categories. Secondly, institutional fragmentation within the sector makes it difficult to coordinate, monitor and evaluate overall sector investment. Thirdly, attribution of specific growth and poverty impacts to water sector investments is complicated by the fact that they are frequently dependent on complementary measures in other sectors such as education or agriculture. There is nevertheless considerable scope for improved understanding in this area and a growing demand among sector stakeholders to enhance the evidence base required in order to 'make the case' for reversing the recent decline in levels of sector investment by developing country governments and public donors (2006a).

While there is an extensive literature on the health, time saving and agricultural productivity benefits, these debates have generally remained quite separate. There is, however, a growing body of literature which suggests that this dichotomous separation of thinking in relation to 'domestic' (social) and 'productive' (economic) uses is inadequate for understanding the complex relationship between water and livelihoods in developing countries. Understanding the 'grey area' in between is arguably the key to enhancing growth and poverty impacts of improved WSS services. There is particular scope for improved understanding in the following sub areas:

Maximising economic benefits from WSS services.

Recent studies have shown that the benefits associated with improved access to water supply and sanitation typically extend far beyond time savings and health (Thompson et al, 2001) and that small-scale productive uses of domestic water supplies are often an important source of additional food and non-food income at household level (Joshi, 2004). Moriarty et al (2004) identify a wide range of productive uses of domestic water, which are rarely factored into scheme design, but note that economic benefits are generally contingent on access to markets and other productive assets e.g. land and credit[2]. There is a growing interest in the potential of 'multiple use systems' (MUS) to promote livelihood opportunities and improve system sustainability (UNDP, 2006) but important questions surround the incremental costs of providing for productive uses, the distribution of benefits, and the implications for management and financing - especially of community-based rural schemes (Van Koppen et al, 2006).

Addressing livelihood risk and vulnerability.

It is important to note that in situations of chronic poverty and food insecurity, certain groups may not be in a position to realise potential economic benefits (Ariyabandu & Aheeyar, 2004). Improved access to WSS may nevertheless play an important role in preventing further destitution (Aklilu & Wekesa, 2001). WSS facilities are often provided as part of a 'package' of food security interventions but the relationship between WSS access and the capacity of different groups to cope with livelihood shocks and stresses and achieve basic food security remains poorly understood. Given the prevailing concern with food security and issues of livelihood risk and vulnerability (including resilience in the face of increased climate-related hydrological variability) there is a need to better understand how

[2] This is consistent with the literature on small scale irrigation which highlights the importance of access to other agricultural inputs, extension services and output markets (Tafesse, 2003; Lipton et al, 2003).

WSS sector interventions can help protect poor households against livelihood shocks and promote food security and productivity.

The issues identified under the RiPPLE Growth Theme will be addressed at two broad levels: macro level analysis of linkages between access to water and wider processes of economic growth and poverty reduction, and micro level analysis of the role of WSS access in protecting poor households against livelihood shocks and promoting food security and productivity. The latter will form the basis for long term action-research and learning linked to improved programme implementation on the ground.

Conceptual and practical challenges to be addressed

Macro level aspects: Water, development and growth

Responding to the Pro-poor Growth agenda

There is widespread consensus on the importance of economic growth as a key driver of development and poverty reduction. Current debates centre on the concept of 'pro-poor growth' (PPG) and the relationship between rates of economic growth and the distribution of resulting rises in incomes. Ongoing discussions surround possible sources of growth in developing countries, factors determining growth rates, ways in which poor people participate in and benefit from growth, and the role of institutions and policies in influencing these things. At the same time there is still much to be done in defining what pro-poor growth is, how we assess and measure it and, more importantly, how we translate this knowledge into effective policy making across different sectors (see Box 1). The PPG agenda challenges water sector stakeholders to consider the role of sectoral investments in supporting wider processes of growth and poverty reduction which in turn have important implications for sector policy and programming.

Box 1: Defining and measuring Pro-poor Growth

There are at least two competing interpretations of what makes growth 'pro-poor'. The least demanding is simply that the incomes of the poor rise, i.e. an *absolute* definition. A more ambitious requirement would be that the incomes of the poor rise at a rate faster than those of other groups, i.e. a *relative* definition. If pro-poor growth has three dimensions: growth, inequality and poverty (as per Resnick & Birner, XX) then the absolute definition can be said to capture the relationship between growth and poverty reduction, while the relative definition captures the relationship between all three dimensions (OPPG, 2005; Sen et al, 2006).

Absolute (or weak) pro-poor growth is typically measured using the mean growth rate of the income of the poor (Ravallion & Chen, 2003), or by tracking other measures of poverty over time. Such measures can be used at a macro level to compare pro-poor growth levels within and between countries. At a micro level, the mean rate of growth of household consumption is a useful measure to analyse the distribution and determinants of growth in detail (Sen et al, 2006). Relative (or strong) pro-poor growth can be measured in a variety of ways including by comparing per capita income growth rate of the poor with the average income growth rate or that of the non-poor (Klasen 2004). A number of indices have also been developed such as: the Pro-Poor Growth Index (PPGI) (Kakwani & Pernia, 2000); the Poverty Bias of Growth (PBG) (McCulloch & Baulch, 1999); and the Poverty Equivalent Growth Rate (PEGR) (Kakwani et al, 2004). However none is without difficulties. Sen et al (2006) give a comprehensive discussion of quantitative approaches to measuring pro-poor growth.

A comparative review of efforts to operationalise pro-poor growth strategies in 14 countries during the 1990s (OPPG, 2005) concluded that, overall, growth is good for the poor but does not explain all variations in rates of poverty reduction. It emphasises the importance of combining macro-economic measures designed to ensure rapid and sustained growth with specific strategies to increase the participation of poor people in that growth. Kakwani and Pernia (2000) state that 'a pro-poor growth strategy entails the removal of institutional and policy induced biases against the poor, as well as adoption of direct pro-poor policies'. While such strategies tend to be context specific they typically address the twin challenges of market access and functioning, and asset inequality. It is important to note that pro-poor growth can only really be understood in the wider context of dynamic structural changes. In rural areas, for example, the focus is not only on making agricultural activities more

productive but also helping poor households benefit from non-agricultural and urban employment opportunities. An empirical evaluation by Serven and Calderon (2004) suggests that: (i) growth is positively affected by the stock of infrastructure assets, and (ii) income inequality declines with higher infrastructure quantity and quality. Klasen (2004) notes that pro-poor growth can also be achieved indirectly through redistribution of the gains from economic growth via progressive taxation and targeted government spending, for example, including welfare programs and investment in basic social services.

Operationalising Pro-poor Growth in Ethiopia

The Government of Ethiopia recognises the importance of strong economic growth to underpin its Plan for Accelerated and Sustained Development (MoFED, 2006). Economic growth is determined largely by the performance of the agricultural sector which accounts for 48% of GDP and forms the primary source of livelihoods for 85% of the population. Over 80% of the population lives in rural areas which have a higher poverty ratio than urban areas. Efforts to reduce poverty must therefore continue to focus on agricultural growth, in particular staple crops and livestock which have the greatest potential to contribute to poverty reduction (Diao and Nin Pratt, 2005). However, growth prospects need to be understood in the wider context of risk and vulnerability. Exogenous factors such as small variations in annual rainfall or world agricultural prices can have dramatic impacts on the incomes of millions of poor rural Ethiopians. Overall, growth was good in 2000/01, slower in 2001/02 and collapsed in 2002/03 because of the drought. Recovery followed in 2003/04, with an impressive 11.6% GDP growth, but growth rates in future can at best be expected to slow down – as production recovers to pre-drought levels – and at worst collapse – as another climatic or economic shock hits (World Bank, 2006). The drivers of recent strong GDP growth remain poorly understood[3] but are thought to be due partly to a combination of increased agricultural productivity, expansion of cultivated land and growth in markets for major agricultural exports.

A further salient characteristic of economic development in rural Ethiopia is chronic food insecurity, irrespective of exogenous shocks. Major causes include continued reliance on high risk, low input, rain-fed agriculture and growing pressures associated with land degradation, recurrent drought and population growth (Tolossa, 2002; Amare et al, 2000). In addition, recent research has highlighted the role of weak governance, lack of effective pro-poor policies and inadequate preparedness for drought (including early warning systems) in Ethiopia's continued food insecurity (see Tolossa, 2005; Amare, 2001; Mussa, 1995). Ethiopia has been the largest per capita recipient of food aid in the world over the past decade. Persistent food insecurity remains the single overriding concern for government and donors alike who continue to provide humanitarian assistance to over seven million chronically food-insecure Ethiopians via various multi-sectoral and multi-year food security programmes.

A key question for further research is what kinds of investments are most likely to generate pro-poor growth? There is general agreement on the importance of infrastructure. A number of studies note the high returns to investment in roads in terms of reducing rural poverty (e.g. Dercon et al, 2006; Mogues et al, 2007), reflecting the fact that access to input and output markets is a significant constraint facing farmers: road density in Ethiopia is considerably lower than the African average and

[3] Ethiopia's growth prospects have been a major focus of recent debates among academics, government officials and donor organisations (see for example Ethiopian Economic Association Conference Proceedings at www.eeaecon.org)

around 65% of rural households are said to be more than half a day's walk from an all-weather road (Bryceson et al, 2006). Mogues et al (2007) suggest that the welfare benefits to farming households of investments in agricultural extension and support (and hence the ability of these investments to generate growth) may be highly dependent on access to markets. Transport infrastructure may thus be a key prerequisite for accessing the benefits of increased agricultural productivity and for generating broad-based (agricultural) growth.

Studies of the role of water investments in agricultural growth have mainly focused on irrigation. These broadly agree on the potential for irrigation to increase agricultural productivity significantly, but note that the picture of success has been patchy in Ethiopia: centrally planned irrigation schemes have not always taken account of the strategies employed by farmers in drought-prone regions (Teshome, 2006), while small-scale irrigation and impoundment schemes have often been marred by poor project design (Seleshi, 2006). Catterson et al (1999) observe that in the most food-insecure areas of Ethiopia there is frequently only 5% or less irrigable land area, meaning that irrigation may not be a viable solution to achieve local level food security.

While there is a growing body of literature on the growth effects of investment in other basic services such as health and education, the growth effects of WSS investment remain poorly documented. Improved access to 'domestic' water supplies is likely to contribute to growth at a macro level primarily through health impacts which enhance the productivity of labour and reduce the financial and time burden of healthcare. Growth effects of increased availability and productivity of labour generated by time savings may also be observed. However it is not expected that productivity resulting from small-scale irrigation at household level will have a significant effect upon macro level agricultural growth figures. There has been very little work examining the *relative* benefits of investment in water as compared with investment in other areas such as transport, although such analysis could usefully inform investment allocation and sequencing by governments and donors.

While the agriculture sector is central to growth prospects in Ethiopia, a number of studies agree that broad-based growth including the development of manufacturing and other services offers the best prospect for sustained poverty reduction (e.g. Diao and Nin Pratt, 2005). The government has made significant efforts in recent years towards improving the business climate for the private sector and recent high growth rates have indeed been seen in manufacturing, construction and services as well as agriculture. Linkages between WSS services and growth outside the agriculture sector could occur through the increased labour availability and productivity which result from time savings in water collection, although the significance of labour as a constraint on private sector growth is not clear. The private sector in Ethiopia is operating under a number of other very serious constraints, including lack of competence in key financial and commercial fields, and the inadequacy of existing legal institutions for handling commercial relations (SIDA, 2004).

Specific issues and challenges facing the water sector

RiPPLE is primarily concerned with the WSS sub-sector but, as noted above, growth and poverty impacts need to be understood within the wider context of water resources development including linkages to other sectors. Ethiopia – and the broader Nile Region, with some exceptions – has a relatively low level of water resource development and highly variable distribution of resources (Seleshi, 2006). A recent World Bank Country Water Assistance Strategy for Ethiopia estimates that the current economic cost of hydrological variability is over one third of the nation's average annual growth potential and argues for increased investment in water institutions and infrastructure (World

Bank, 2006). It has further been argued that recent water policy and institutional reforms might provide an entry point for promoting (agricultural) growth in Ethiopia (MoWR, 2001). Currently, planning for water resources management, irrigation and WSS are handled separately in Ethiopia although coordinating mechanisms do exist between sub-sectors. Donor activities in water resource management and WSS service delivery remain largely separate and hugely unequal in terms of levels of financing[4], but the current donor bias towards basic services delivery is increasingly being questioned amid calls for greater attention to the role of water resources management in bringing about the economic growth necessary to ensure long term sustainability of service improvements.

The pro-poor growth agenda therefore raises a number of interesting 'big picture' questions for policy and programming in the WSS sub-sector. Various studies have shown that market access and asset inequality are the major factors determining the extent to which growth in any given situation is pro-poor (OPPG, 2005). Access to WSS is clearly a major form of asset inequality in Ethiopia where less than 40% of the population has access to safe water and less than 20% has access to sanitation facilities (WHO/UNICEF, 2006). The general importance of improving access to basic infrastructure services is recognised in the Millennium Development Goals on WSS and the GoE's ambitious Universal Access Plan (UAP), but the actual effects of improvements in WSS access on patterns of economic growth and poverty reduction (and the relative importance of access to WSS compared with other forms of asset inequality) are generally poorly understood. There is nevertheless considerable scope for improved understanding through analysis of existing national and sub-national data. Available data[5] shows a positive trend in % coverage of improved water supply over the previous thirteen years (particularly in the poorest population quintile) which is strong in comparison with many other African countries, albeit from a low starting point (WSP, 2007). However analysis of the poverty or growth impact of this trend has not so far been carried out. Indeed there is even debate as to whether, and to what extent, poverty reduction has occurred in Ethiopia during the 1990s (Devereux and Sharp, 2003).

The data which underpin such national-level analysis of trends in access to water, i.e. that generated by the WHO/UNICEF Joint Monitoring Programme through surveys such as the Demographic and Health Survey (DHS), should be treated with some caution. These large-scale multi-issue household surveys, while offering considerable advantages over the use of data provided by local governments or service providers, typically ask two to five brief questions relating to water access which do not explore potentially complex patterns of household water use or address the quality and functionality of supply systems (UN Millennium Project, 2005). For example, the 2005 Ethiopia DHS questioned over 20,000 respondents who were asked to identify: the type of water source used by the household; the round trip time for water collection; the age and gender of the principal water collector; and any treatment applied to the water before drinking. However if the limitations and likely inaccuracies inherent in such data are acknowledged, it can nevertheless serve as a useful basis for cross-national comparisons or broad national-level analysis of trends.

[4] See European Union Water Initiative (EUWI) Ethiopia Country Dialogue (www.itacaddis.org/italy/index.cfm?fuseaction=basic_pages.basic_page&page_name=121)

[5] Welfare Monitoring Survey 1999/2000 and 2004/2005, Demographic and Health Survey 2000 and 2005.

Box 2: Key research questions for macro-level analysis

- What is the relationship between water, development and growth in Ethiopia, and what are the implications of increased climate-related hydrological variability?
- What is the effect of WSS access on economic growth and rates of poverty reduction, and how strong is this effect compared with that of other indicators of asset inequality?
- How does the balance and sequence of investment in the water sector and other determinants of growth (e.g. other infrastructure, institutions and social protection measures) affect rates of growth and poverty reduction?
- What is the correlation between GDP per capita and access to WSS, and what other factors (e.g. governance, inequality, government spending, debt payments, geographical factors) determine access to WSS?

The issues identified above will initially be addressed through macro level case studies employing a combination of qualitative and quantitative techniques in order to 'set the scene' for subsequent more detailed micro level analysis:

- Qualitative analysis of the relationship between water, development and growth in Ethiopia and the wider Nile Region, past and present
- Quantitative analysis of the determinants of WSS access and the effects of improved access on patterns of growth and poverty reduction in Ethiopia, based upon existing data

Micro level aspects: Water, livelihoods & poverty reduction

Role of water in livelihood protection and livelihood promotion

The above macro level policy debates on pro-poor growth are similarly reflected at micro level. Farrington et al. (2004) argue that there is scope for greater synergy between 'productive' and 'social' sectors and that the key to operationalising pro-poor growth lies in more effective linking of interventions designed to *promote* livelihoods with those designed to *protect* livelihoods. WSS interventions may serve both to protect basic needs, and to promote productivity among poor households. As such the WSS sector provides an interesting entry point for exploring the linkages between livelihood promotion and livelihood protection.

The general importance of access to WSS services as a basis for human health, welfare and productivity is well established. Estimates suggest that 88% of global cases of diarrhoea (which kills around 2 million people each year) could be attributed to unsatisfactory water, sanitation and hygiene (WHO, 2004; UN/WWAP, 2003). Hutton and Haller (2004) estimate global time savings associated with meeting the MDG targets for water and sanitation access to be around 20 billion working days per year. Interestingly they find that the majority of this saving would derive from more convenient access to sanitation facilities than from closer water access, though at the individual or household level this balance is likely to be highly variable. Time savings from meeting the MDG target on water access alone are estimated to run to about 4 billion working days. Health and time benefits interact with poverty through their effects on labour availability and productivity of households, and the educational opportunity available to children, as well as through the costs of healthcare and the time invested by household members (typically women) in caring for the sick. However, detailed studies of livelihood impacts associated with WSS sector investment are relatively few. In particular few studies go beyond these well-characterised health and time benefits to incorporate the role of water services in small-scale production at the household level and the potential of such productive uses to improve food security and reduce poverty and vulnerability.

Micro level growth studies are rare due to data requirements but can be revealing. A recent study on determinants of consumption growth at household level in Ethiopia identified access to infrastructure as one of the key sources of divergence (Dercon, 2004). This suggests that lack of access to WSS may well act as a constraint on consumption growth, but it is difficult to disaggregate impact from other livelihood assets. This and other studies identify risk and vulnerability as key factors preventing poor households from investing in productive activities and engaging in markets. Risk refers to the likelihood of shocks and stresses which can be either external (weather-based events, market crises etc) or internal (marriage expenses, sickness and death) to the household. Vulnerability is the susceptibility of households or individuals to specific risk events. According to their location, asset status, social networks etc, some households will be more vulnerable to these shocks and stresses than others[6]. Dercon's studies show that risk and vulnerability have a major impact on short and long term growth prospects in rural Ethiopia.

Current debates centre on how best to reduce or mitigate risks, and how to support poor households to cope with shocks and stresses. The pro-poor growth agenda suggests that growth plus welfare is not enough. Instead there is a need to mainstream risk-reduction into macro and sector policy making as well as developing innovative forms of growth-promoting social protection. This is an ambitious agenda which presents a number of challenges for water sector stakeholders. Firstly there is a need for improved understanding of how water sector development impacts on efforts to reduce or mitigate risks faced by the rural poor. Secondly we need to consider how WSS sector policy and programming can support or complement measures designed to help poor households cope with shocks and stresses, and enable more active participation in labour and commodity markets. Important questions surround the relationship between access to WSS and vulnerability to shocks in different livelihood systems (urban, rural, agricultural, pastoral etc) and the conditions under which access to better WSS services can provide a 'springboard' for poor people to engage in productive market-oriented activities.

Available literature suggests that the linkages between WSS services, livelihoods and poverty reduction might be analysed at a number of different levels:

The individual as an economic agent. Firstly, access to a basic supply of safe water can significantly improve the health, nutrition and productivity of individual labourers (Howard & Bartram, 2003). The impact of 'lost labour days' on household production and income will vary according to the degree to which they depend on wage labour and its availability, and may be greatest during peak periods such as harvest (ODI, 2003). Studies have shown that macro-economic impacts are less significant where levels of underemployment are high (Rosen & Vincent, 1999) but studies of benefit incidence suggest that potential returns to investment in WSS are huge. For example, WaterAid states that 'time savings and reduced sickness are major benefits of water projects – the World Health Organisation (WHO) estimates 5.6 billion working days and 443 million schooldays would be gained annually if there was universal access to safe water and sanitation. More time and better health reduce poverty. Women and girls particularly benefit through increased take-up of income-generating opportunities and education.' (Redhouse et al, 2005) Leipziger (2003) also demonstrates that the provision of basic infrastructure - i.e. clean water and sanitation – is a significant factor determining improvements in child health.

[6] See for example the World Bank risk and vulnerability framework

In addition to ill-health, the opportunity costs of time spent accessing water (especially women) may be considerable, not just in terms of income generation or school attendance, but also in reproductive tasks such as caring for children, the elderly or HIV sufferers all of which affect the overall health, welfare and productivity of the household (Magrath & Tesfu, 2006). It is important therefore to understand the trade-offs between expenditure of household resources (time and money) on accessing or managing water and expenditure on other competing priorities (Joshi, 2004). Only then can we begin to understand how water sector interventions affect outcomes in other sectors and identify particular combinations which maximise welfare and productivity gains. Studies of household economy have shown that increases in household income do not always correlate strongly with health and nutrition outcomes (Lautze et al, 2003) and that it is important to understand who controls household expenditure and how benefits associated with increased consumption are distributed.

The individual as part of a household unit. To understand the role of water in livelihoods it is important to look beyond the individual level to the household unit: of interest are both the distribution of water-related costs and benefits within and between households, and the relationship between household water use profiles and different livelihood, strategies, Within households, the costs of poor access to WSS are typically highly gendered with women bearing the majority of time costs for collection of water, and the indirect costs associated with caring for sick members of the household. Children also bear a disproportionate share of the costs of inadequate WSS access, as they are most vulnerable to diseases associated with contaminated water and poor sanitation. The majority of deaths from diarrhoeal disease occur in children: around 4500 child deaths per day globally (WHO, 2007). The elderly and sick, including HIV sufferers, are also likely to be particularly vulnerable to infection and their care may require greater supplies of water, so the costs of caring for these household members may be increased by poor WSS access (Wegelin-Schuringa & Kamminga, 2006). Between households, the costs of inadequate access to water are likely to be particularly striking for female-headed households. They may face particular difficulties if access to water is tied to land rights which are not easily available to women; according to UN-Water (2006) this may be a major reason for the high levels of poverty among female-headed households.

Water can be regarded as just one of a range of inputs to the household economy and a key factor affecting levels of vulnerability. Nicol (1999) argues that a broader understanding of household water supply and use is key to effectively incorporating a poverty reduction agenda into WSS sector policy and programming. Benefits extend far beyond health to include multiple different small-scale productive uses, but water alone is generally not enough to improve income. The potential poverty impact of improved WSS access depends on the availability of other livelihood assets e.g. land, labour, livestock, credit, local markets which can be combined to generate increased income in cash or kind (ODI, 2003; Moriarty et al, 2004). Understanding water as a livelihood issue implies rethinking the traditional narrow focus on health impacts. Outside urban areas water quantity is often more important than water quality and this has important implications for technology choice and scheme design including, where appropriate, development of multiple use systems and services. Important questions surround the definition of 'basic' services and trade offs associated with investing in higher levels of service.

The economic costs and benefits of multiple use systems and the design, finance and management implications remain poorly understood (Meinzen-Dick, 1997; Van Koppen et al, 2006). This not only has important implications for how water tariffs are structured but also for financing strategies in

other sectors. For example, subsidising water supply may be more beneficial in terms of impacts on household income, nutrition and food security than subsidising agricultural inputs. There is an extensive literature on linkages between household characteristics and food security, in which water supply is an important factor. Any WSS sector strategy aimed at poverty reduction and livelihood benefits will need to pay attention to these linkages, and there are important questions for RiPPLE about the role water services play in food security at the household level.

The household as part of a 'community' of water users. Water can also be regarded as a 'factor' of production (in a narrow sense, factors of production are labour, land and capital) and a scarce resource over which there is potential conflict between and within communities. There is an extensive literature on the potential and constraints to community-based management of common property resources (Bruns et al, 2005). Rules surrounding management of different resources (water, forests, pasture) frequently overlap to a significant extent and can be a major source of conflict. There are important questions around whether improving water supplies or formalising access arrangements is more important in terms of poverty reduction, and about the necessary conditions to enable increased investment in communal infrastructure or private water-related enterprise. Given that the poor are naturally risk averse, how can private investment be encouraged in small scale water supply systems and at what point does insecurity of tenure or water supply become a constraint? Such questions lie at the interface between RiPPLE Theme 3 (Growth) and Themes 1 and 2: Governance and Planning, and Financing of WSS services.

An OECD (2006b) report states firmly that the key to pro-poor growth lies in more effective support to private sector development. A key feature of the water sector, as compared with other sectors, is that it is capital intensive and relies heavily on outsourcing to contractors. Who is 'the private sector' in Ethiopia and how can they be incentivised to invest in poor communities and/or employ poor people etc? What are the relative merits in terms of growth and distribution of promoting small and large scale private operators? Possible interventions range from providing micro-finance to encouraging individuals to invest in basic infrastructure e.g. wells, storage tanks, cattle troughs, latrines etc (WSP, 2006), to supporting establishment of small scale water providers, to wider reforms designed to improve the enabling environment for large scale private sector investment.

Existing studies on micro-finance for water suggest that investing in water infrastructure requires relatively high investments and cannot always be done by individuals but also requires some form of organisation between different users (Fonseca & Cardone, 2007). The lack of basic credit and insurance facilities in rural areas, coupled with limited access to input and output markets often renders water-related enterprise too risky for many poor households. Organisation around establishing community-based water services can help to reduce risk. It has been argued that community-operated water schemes can provide an entry point for broader community organisation, with associated benefits in terms of community empowerment and capacity for organisation in other areas (Manoharan, 2005). However the opportunities are likely to be greater from agricultural co-operatives or irrigation organisations than from community-based water supply systems, as these two modes of community organisation require far more intensive ongoing cooperation (Murray-Rust et al, 2001; IWMI, 2003).

The interface between user communities and local government. A range of important governance issues surround the role of user communities vis-à-vis local authorities in decentralised WSS service

delivery, and the role of NGOs as intermediaries. Improved governance in water services requires attention to wider processes of decision making surrounding tax and public expenditure and the resulting incentives for communities to manage and finance water systems and services. Particular concerns relate to the ways in which sectoral concerns relating to equity and social exclusion are addressed under local planning processes in low capacity environments, and what 'spaces' exist for popular participation in planning and implementation at a local level. A common challenge in the context of ongoing decentralisation is linking traditional community-based decision making structures with newly decentralised government structures. Does one replace the other or do they co-exist and how do bureaucratic and technocratic decision making processes interface with local political decision making processes? Understanding the links between WSS, livelihoods and poverty reduction at the local level involves addressing broader processes of sector governance and planning (RiPPLE Theme 1) and financing (RiPPLE Theme 2) which affect the quality and equity of service provision in any given location, and requires effective integration of research across the three thematic areas.

Specific issues and challenges facing the WSS sector

Key considerations which ought to underlie any pro-poor WSS sector strategy include access, affordability and administrative capacity. Improving access to WSS is one of the priorities enshrined in the Millennium Development Goals but the effectiveness of any pro-poor strategy must be tested against the goal of expanding access to services, rather than just improving the quality of existing services. Poor people in low income countries face very real constraints on their ability to pay for WSS services which affects both access and consumption. Furthermore the costs of providing services to those areas where the poor live are often high. Therefore affordability concerns ought to be central to any strategy designed to improve access for poor people. Administrative and regulatory capacity is typically underdeveloped in low income countries. In remote rural areas the problem is further exacerbated by poor transport and communication networks. Effective strategies for achieving pro-poor WSS service delivery must therefore be carefully tailored to take account of constraints operating at different levels.

How far do current strategies for financing and delivery of WSS services in Ethiopia take account of livelihood risk and vulnerability? This question has important implications for assessing the feasibility of ongoing reforms to WSS management and financing arrangements, or re-examining current criteria and methods used for assessing the benefits of existing WSS interventions. The central concern, as always, is providing access to better (i.e. affordable, reliable, sustainable) WSS services which are tailored to the needs and priorities of poor people in different livelihood contexts. The key challenge is developing recommendations for policy and programming which ground responses to risk and vulnerability in existing practice and a realistic assessment of capacity constraints operating at different levels of government, particularly in remote or weakly integrated areas. In particular, trade-offs between different policy and programming objectives need to be made more explicit in sectoral decision-making processes.

How do WSS interventions interact with those designed either to help poor households cope with shocks and stresses, or enable more active participation in labour and commodity markets? There is an untested assumption underlying the WSS-related MDG targets, that those who are currently unserved are also the poorest and most vulnerable. In some cases lack of access reflects a failure to extend services to those regions or neighbourhoods where the poor live. In other cases poor households

may be unable to access existing services due to physical, financial or social constraints. An understanding of why people lack access is therefore critical to determining appropriate policy and programming responses in different contexts. There is a growing interest in the potential of different social protection measures to address acute, temporary and chronic forms of deprivation. Common examples in Ethiopia include food aid, employment generation schemes and cash transfers. It would be interesting therefore to examine how far approaches to WSS service delivery support, or indeed undermine, these measures. For example, how do changes in access to WSS affect the ability of poor households to engage in employment generation schemes? Are the poorest and most vulnerable – including the very elderly, the sick, female household heads with many dependents – better off receiving cash transfers or targeted subsidies? On one hand Ethiopia is unlikely to meet MDG targets for WSS access without a specific strategy for reaching out to the poorest and most vulnerable groups. On the other hand better sequencing of public expenditure on WSS sector and social protection programmes could be 'win-win'.

Box 3: Key research questions for micro-level analysis

- What is the relationship between WSS access, poverty and livelihoods in different parts of rural Ethiopia?
- To what extent are WSS policy and programmes grounded in an understanding of the livelihood needs and priorities of poor water users?
- What is the relationship between access to WSS and vulnerability to shocks in different livelihood systems (urban, rural, agricultural, pastoral, etc)?
- What is the relationship between improved access to WSS and food security at household level?
- What are the costs and benefits of multiple use water supply systems (MUS) at different levels, in comparison with traditional single-use (domestic or irrigation) services?
- How can WSS sector policy and programming support or complement measures designed to help poor households cope with shocks and stresses, and enable more active participation in labour and commodity markets?

The issues identified above will initially be addressed through the following research activities employing a combination of qualitative and quantitative techniques:

- Household survey to characterise (quantitatively) the relationship between WSS, poverty and livelihoods
- Case study analysis of linkages between household food security strategies and access to WSS
- Case study examining the economic costs and benefits of multiple use water systems (MUS) at different levels

Findings from the above activities will form the basis for long-term action research, developed in conjunction with regional LPAs and linked to ongoing WSS programme implementation.

Policy and programming considerations

Links to other basic services. Debates on design, finance and delivery of pro-poor WSS services tend to be narrowly focused within traditional sectoral boundaries but it is important to recognise that water is just one of a wide range of different services typically consumed by poor households. Interventions in different sectors therefore need to be carefully coordinated to maximise complimentarity and contribute to objectives which transcend individual sectors. Changing water access arrangements impact not only on water consumption but also on labour availability and consumption of other goods and services e.g. food, health and education. The economic costs and benefits of time spent/saved accessing water are likely to be greatest for those households where labour availability is a constraining factor (i.e. the poor and/or landless). Full economic benefits may not be realised in

areas of underemployment but the reproductive benefits associated with (women's) time spent caring for children, sick or elderly should not be underestimated. Poor households may also face trade-offs between the costs of accessing water (cash, labour) and expenditure on other essential goods and services. Various studies have posited a linkage between access to WSS and school attendance by girls (Woldehanna et al, 2005). In some cases, improving access to one infrastructure service may be dependent on improving access to others, such as where expanding access to WSS services depends on reliable access to electricity. Important questions surround the sequencing of, and trade-offs between, investments in different services in order to maximise poverty and growth impacts.

Links to wider agriculture-based growth strategies. Agriculture is a potential source of pro-poor growth but that there are many obstacles to rapid growth. The major constraints for farmers seem to be around gaining access to markets, especially urban centres. This is partly about increasing productivity through infrastructure, including water, and technology, but demand for staple crops tends to be relatively inelastic. Diversification into niche markets is a risky option. The greatest 'untapped' potential is probably in peri-urban areas with better access to markets and possibilities for agglomeration of supply chains and services etc. How far any of this is actually planned or shaped by policies and institutions is unclear. The most obvious link between agriculture and water is probably the question of land rights and proximity to markets. There are several reasons why rights to land and rights to water need to be treated in an integrated way (though not necessarily managed under the same regime). These include the facts that in many cases rights to groundwater are inalienably tied to rights to land, with important implications for both equity of water access and policies for sustainable groundwater management; that changes in land rights may affect agricultural practices with implications for water use patterns; and that aspects of land management can be critically important to effective water resources management (Brown et al, 2007; Mehta, XX) Land tenure is a key issue with important linkages to water access but detailed discussion of tenure issues is beyond the scope of this paper.

A key condition for growth of any kind is the provision of public goods including basic infrastructure such as water. Willoughby (2004) identifies ways in which infrastructure development can contribute to growth and poverty: directly through wages for labour, and indirectly through market improvements, risk reduction for both investors/business and households, and empowerment through education and health. However more important still is the establishment of clear institutional rules for regulating economic activity in a transparent and accountable manner (see Box 1).

Box 4: Institutions and Pro-Poor growth

Institutions are important to growth, poverty reduction and livelihoods. Many macro level studies show a positive correlation between institutional strength and GDP growth across countries. Causality can be hard to ascertain, and is likely to be two-way, but a review of current literature (Hare & Davis, 2006) suggests that a strong institutional framework supports growth in particular through 'making it easier to do business'. This involves sound contracting arrangements, law enforcement, protection of property rights, streamlined bureaucracy, good operation of financial markets, and higher levels of trust (Pande & Udry, 2005).

For these findings to translate into meaningful policy lessons, a deeper level of analysis is needed to understand the 'political and social mechanisms' through with institutions arise and are maintained, and the underlying framework in which they are embedded (Hare & Davis, 2006). Macro level correlations

between institutional quality and levels of poverty are less clear-cut than those with growth. These studies tend to focus on urban and formal institutions, while poor people engage disproportionately with rural and informal institutions, so the effects of institutions on poverty are unlikely to be well captured by such approaches (Pande & Udry, 2005). Micro level studies almost certainly offer the best way forward in analysing these linkages.

In Ethiopia the role of institutions in fostering agricultural growth is of key interest. Institutions which reduce the transaction costs of access to input and output markets, improve the functioning of these 'thin' markets, and increase smallholder liquidity could boost growth with significant poverty-reducing effects (Dorward et al, 2004). From a livelihood perspective institutions which enable farmers (or firm-owners) to manage risks and achieve greater coordination would be highly significant, and these could also enable investment and growth to occur (Hare & Davis, 2006).

In a recent article, Birdsall (2007) proposes that institutional weaknesses may be the key reason why many countries, particularly in sub-Saharan Africa, have repeatedly failed to convert episodes of strong growth, which occur thanks to high commodity prices or recovery from disturbances such as drought, into sustained patterns of growth and poverty reduction. She posits a 'weak-institutions trap' (WIT) as an alternative to the 'poverty trap' (a vicious cycle of inability to save, inability to invest and inability to grow) which is often blamed for continued poverty.

Reaching the very poorest. The Chronic Poverty Research Centre has done work to understand how growth rates affect the very poorest, as compared with the poor and the national average (Grant, 2005). It may be interesting to compare regional datasets on poverty with data on service levels in order to see if there are correlations. Anderson and McKay (2004) have done interesting work on reaching the very poorest which uses panel data to analyse the impact of growth on income and non-income variables (such as access to water). In Ghana, despite relatively low rates of income growth at the lower end of the income distribution, there have been significant improvements and catching up in other non-income indicators, such as primary school enrolment, use of good drinking water, and the value of assets owned (in proportional if not always in absolute terms). In Uganda, despite reasonably high rates of income growth, particularly at the lower end of the income distribution, there has been a deterioration of other non-income indicators. Devereux and Sharp (2003) demonstrate that while income poverty is deemed to have fallen in Ethiopia since the early 1990s, at least according to most measures, non-income poverty measures (such as life expectancy, per capita food production, infant mortality and households' own understandings of destitution and poverty) present a much more mixed picture. Overall, the analysis cautions against over-reliance on purely income-based measures of poverty and welfare. It also suggests the need to consider ways in which potential trade-offs between income and non-income welfare indicators can be incorporated into policy analysis.

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