

Executive Summary

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### **Poverty is multi-dimensional and the poor experience deprivation at many levels**

*“...poverty is typically characterized not only by low income and assets, but also by hunger and under-nutrition, illiteracy, the lack of access to basic necessities such as safe drinking water and health services, and social isolation and exploitation” (CPRC, 2007).*

How single-use services impact poverty is fairly well understood. Domestic services improve health and free up time for productive activities. Irrigation services increase income and food security for those with irrigated land. In theory, multiple-use services can provide a broader range of benefits to a broader range of poor people (women, children, the landless), and thus more comprehensively address the multi-dimensional aspects of poverty.

To test this hypothesis, the study evaluated:

- The ability of poor people to engage in productive activities enabled by multiple-use services and the non-financial benefits—such as improved health, food security and nutrition, time savings, livelihoods diversification, and social empowerment—accruing from these activities and from domestic use of irrigation water.
- The direct and indirect poverty impacts from multiple-use as compared to single-use services.
- The incremental staging of benefits based on water service level.
- The potential of multiple-use services to provide “pathways” out of poverty for those with different levels of assets.
- The sustainability of water services

*Findings are based on analysis of approximately 40 credible case studies. Detailed analysis of 11 of these case studies is provided in Annex A.*

## Key Findings

- **Most rural poor have assets necessary to benefit to some extent from multiple-use services.** An estimated 60-70% of the rural poor rear livestock, have access to small cultivable plots (often around their homesteads) and engage in water-dependent small enterprises.
- Evidence suggests that **improved water services enhance the productivity of these assets, achieving multiple poverty impacts**—income, food security/nutrition, health, reduced vulnerability and livelihoods diversification, and social equity and empowerment (well supported).<sup>1</sup>
- **Communities with high water service levels have more home gardens, higher numbers of livestock, greater numbers of small-scale enterprises and more diversified livelihood activities** and therefore reduced vulnerability to shocks (partially supported).<sup>2</sup>

<sup>1</sup> Poverty impacts are maximized when improved water supplies are complemented by access to markets, credit, improved and sustained technical support, and redistribution of assets to the poorest (well supported).

<sup>2</sup> Given the heterogeneity in household poverty levels within any community, a reliable capital asset base or the lack of it and several other factors, including affordability and access to available water, determine the livelihood activity of particular households (well-supported).

### 3.2.1 Poverty Reduction Potential: Home gardens

#### Key findings

- Most of the rural poor own or have access to small cultivable plots, including communal cultivation schemes for the absolute landless (partially supported).
- Improvements in water supply are critical to enabling home gardening and have spin-off social equity and empowerment benefits, particularly for women (well supported).
- Improved water supplies result in year-round improved productivity, improved food security and nutrition (well supported).
- Subsistence benefits from improved gardens are highest for the poorest (well supported).
- Complemented by improved technologies, water services, and credit, home gardens can be upgraded from subsistence to marketing, giving women a source of income, which is often re-invested in food, education and health care, improving social equity and empowerment (inconsistent evidence).

Non financial benefits →	Food security and nutrition	Health	Reduced vulnerability and diversification	Social equity and empowerment
Potential for impact from MUS	medium to high	medium	low to medium	medium

- In South Africa, 45% of households with intermediate multiple-use services had cultivated home gardens, compared with 14% of those with basic domestic services. In Vietnam, 48% of households with intermediate service levels had home gardens, compared with 11% of those with no (improved) services (Perez de Mendiguren, 2003; Noel et. al., 2007). (see Annex A.2)
- In Nepal, daily vegetable consumption increased by 70% in poorest households with less than 0.5 ha of land through multiple-use service schemes (Pant, 2005). (see Annex A.1)
- In Nicaragua, households with the smallest plots and lowest incomes achieved the highest (comparatively) food security and nutrition benefits from improved water service levels (Alberts and van der Zee, 2003). (see Annex A.2)
- In Bangladesh, a survey of 45,000 households found that intake of Vitamin A and C was higher among households with home gardens, with quantifiable impacts on night blindness and diarrhea (Helen Keller Worldwide, 2001).

Women watering home gardens in Bolivia, South Africa and India.



Photo credits: Ronald Rospigliosi, Umgeni Water, and Accion Fraternal.

- During the recent droughts in Zimbabwe, small multiple-use productive water points allowed small-scale garden production when the major crops failed reducing vulnerability (Robinson et al 2004). (see Annex A.1)

### Key findings

- Livestock serve as the most common asset base of the poor; around 70% of the world's rural poor own livestock, including some landless (well-supported).
- Livestock enhance ability to meet food security and protein needs, even with small numbers of animals (well supported).
- Additional benefits from livestock include transport, fertilizer, fuel and a reliable source of bankable credit (well supported).
- Providing adequate quality drinking water in sufficient quantities greatly increases livestock health and productivity and reduces morbidity (well supported).
- Women and children are most often responsible for watering and feeding livestock (well-supported); providing readily accessible water for livestock generates time savings and reduces drudgery for women and children and improves social equity.
- Higher level multiple-use services have additional social benefits (reduced time and labor) and environmental and human health impacts (controlled grazing and reduced pollution of human water sources) (partially supported).

Non financial benefits →	Food security & nutrition	Health	Reduced vulnerability	Social equity & empowerment
Potential for impact from MUS	medium to high	medium to high	high	medium to high

- In Vietnam, 56% of households with intermediate multiple-use services had livestock, compared with 22% of those with no (improved) sources (Noel et. al., 2007). (see Annex A.2)
- In India, households with basic multiple-use services reported an income 300% higher from livestock than households with no (improved) services (Upadhyay, 2004). (see Annex A.2)
- In Mauritania, households with intermediate multiple-use services had more livestock, more diverse nutritional diets and more reliable income compared to households with basic multiple-use services (Bingham, 2007). (see Annex A.2)
- In India and Ethiopia, women saved between 4-6 hours of walking time per day, as a result of improved livestock drinking water facilities (Upadhyay, 2004; van Hove and van Koppen, 2004).

**Woman watering livestock with communal hand pump, India.**



Photo credit: IRC

**Key findings:**

- An estimated 5-15% of poor households undertake water-dependent, informal, small-scale enterprises (anecdotal evidence).
- Small-scale enterprises provide valuable cash income to households, help tide families over during lean agricultural periods and enable an efficient barter of local produce, skills and benefits (well-supported).
- Small-scale enterprises are often owned by women, who operate them in or around the home (anecdotal evidence).
- Cash earned by women is often used to meet household food, education and health needs (anecdotal evidence).
- Along with demand for products and services, and human and financial capabilities, access to water is a key factor in promoting small scale-enterprises (anecdotal evidence).

Non financial benefits →	Food security & nutrition	Health	Reduced vulnerability	Social equity & empowerment
Potential for impact from MUS	low to medium	low to medium	medium to high	medium to high

- In Uganda, a study of 95% of the enterprises in 2 small peri-urban towns found that areas with low water service levels identified water as a key constraint to enterprise scale and productivity. Study results indicated small-scale enterprises require modest amounts of water—between 20-40 liters/water/day (Davis et. al., 2001).
- In South Africa, 60% of households with higher level multiple-use services engaged in 2 water-dependent enterprises, compared with only 38% of those with lower level services (Perez de Mendiguren, 2003). (see Annex A.2)
- In India, women gain social equity and empowerment from home-based enterprises. Income is re-invested in household food needs and children's education and health (James, 2003).

Woman making bricks, India.



Photo credit: Charles Batchelor

Woman brewing sorghum beer, South Africa



Photo credit: Stef Smits

### Key findings

- Domestic use of irrigation water is prevalent in areas without potable groundwater or access to basic domestic water services (well supported).
- While the quality of drinking water is an important health issue, research shows that having water available in sufficient *quantities* for drinking and hygiene is equally important in preventing diarrheal diseases, especially when combined with improved hygiene (well supported).
- Providing irrigation water for domestic uses, coupled with home water treatment, may improve health more quickly and cost-effectively than piped domestic schemes (inconsistent evidence).
- Alterations in the design of irrigation systems to support water collection for domestic use can help prevent drownings and reduce schistosomiasis (partially supported).

Man bathing in irrigation canal, Sri Lanka



Photo Credit: Ronald Loeve

- In Pakistan and Morocco, many communities rely on communal storage reservoirs that are regularly filled with irrigation releases to meet their domestic needs (Boelee and Lamraani, 2003). (see Annex A.3)
- In Sri Lanka, shallow wells used to collect irrigation seepage water from canals and fields proved to be the best source of drinking water available, as deeper groundwater was contaminated by fluoride and surface canal water was contaminated by bacteria (Shortt et al., 2003).
- A study of domestic use of irrigation water in Pakistan showed that people in houses with their own water connection and a water-storage facility (even if the water supplied was irrigation water) suffered less often from diarrhea--mainly because of higher standards of hygiene and better sanitation enabled by a more readily available water supply (van der Hoek et al 2001).

**Children collecting water for household use from irrigation canal, Morocco**



Photo credit: Menno Houtstra

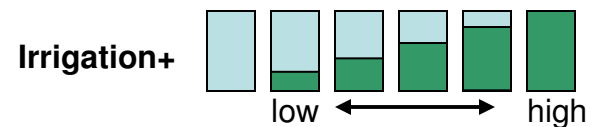
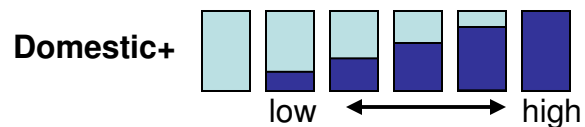
**Community storage tank for domestic use of irrigation water, Pakistan.**



Photo credit: Jeroen Ensink

Poverty dimension	Potential Impacts	
	Domestic	Irrigation
Low income	<ul style="list-style-type: none"> <li>- Indirect impact through increased time for productive activities</li> </ul> <p><b>Domestic+ adds:</b></p> <ul style="list-style-type: none"> <li>- Direct impact through marketed production from gardens, livestock, other enterprises</li> </ul>	<ul style="list-style-type: none"> <li>Direct impact for those with irrigated land</li> <li>Indirect impact on landless through labor opportunities</li> </ul> <p><b>Irrigation+ adds:</b></p> <ul style="list-style-type: none"> <li>- Direct impact on landless through marketed production from communal gardens, livestock, other activities</li> <li>- Indirect impact through increased time for productive activities</li> </ul>
Poor food security/ nutrition	<ul style="list-style-type: none"> <li>- Indirect impact on nutrition through better absorption of nutrients due to less diarrheal disease</li> </ul> <p><b>Domestic+ adds:</b></p> <ul style="list-style-type: none"> <li>- Direct impact through household consumption of vegetables, fruits, livestock products</li> </ul>	<ul style="list-style-type: none"> <li>- Direct impact for those with land</li> <li>- Indirect benefit through increased purchasing power/bartering</li> </ul> <p><b>Irrigation+ adds:</b></p> <ul style="list-style-type: none"> <li>- Direct impact through better food security &amp; more diversified diets</li> <li>- Indirect impact on nutrition through less diarrheal disease</li> </ul>
Poor health	<ul style="list-style-type: none"> <li>- Direct impact through reduced water-related disease</li> </ul> <p><b>Domestic+ adds:</b></p> <ul style="list-style-type: none"> <li>- Indirect health improvement through better nutrition</li> </ul>	<ul style="list-style-type: none"> <li>- Indirect impact through improved nutrition</li> </ul> <p><b>Irrigation+ adds:</b></p> <ul style="list-style-type: none"> <li>- Direct impact through reduced water-related disease</li> </ul>
Vulnerability	<ul style="list-style-type: none"> <li>- Direct impact on to vulnerability natural conditions (drought)</li> </ul> <p><b>Domestic+ adds:</b></p> <ul style="list-style-type: none"> <li>- Reduced economic &amp; health vulnerability (home gardens &amp; livestock made less vulnerable to drought - ensuring food security &amp; income)</li> <li>- Reduced vulnerability to water-related disease &amp; physical vulnerability for women and girls when fetching water</li> <li>- Reduced social vulnerability (especially for women)</li> </ul>	<ul style="list-style-type: none"> <li>- Direct impact on vulnerability to natural conditions (drought)</li> </ul> <p><b>Irrigation+ adds:</b></p> <ul style="list-style-type: none"> <li>- Reduced economic vulnerability by enabling diversified livelihood strategies</li> <li>- Reduced health vulnerability (see above) &amp; physical vulnerability for women and girls when fetching water</li> <li>- Reduced social vulnerability (especially for women)</li> </ul>
Social inequity, disempowerment & exclusion	<ul style="list-style-type: none"> <li>- Direct impact if access to water equitable</li> </ul> <p><b>Domestic+ adds:</b> Indirect impact through improved bargaining/purchasing power (often for women)</p>	<ul style="list-style-type: none"> <li>- Direct impact on those with title to irrigated land and enforceable water rights (often men only)</li> </ul> <p><b>Irrigation+ adds:</b> Direct impact on women and landless</p>

Degree of impact on poverty dimension:



Illustrative progressive staging of benefits with improvements in service levels

Poverty dimension $\longrightarrow$	health	time savings	income	improved food security/nutrition	diversification of livelihoods; reduced vulnerability	equity and empowerment
Highest-level multiple-use services						
Intermediate-level multiple-use services						
Basic-level multiple-use services						
Basic domestic/Basic irrigation*						

\* Assumes no unplanned uses as they cannot assure sustainable generation of benefits.

Both single and multiple-use services contribute to poverty reduction, but services that impact on a wider range of aspects of poverty have a greater scope for enabling pathways out of poverty by reducing vulnerability and supporting asset accumulation.

	Single-Use		Multiple-use	
	Domestic	Irrigation	Domestic+	Irrigation+
<b>1. Enabling basic subsistence: Reducing chronic poverty for resource-poor households</b>				
Improving health through safe drinking water, reducing time and labor burdens, especially for women and occasionally for children	✓		✓	✓
Improving food security and nutrition from productive subsistence livelihoods		✓	✓	✓
Enhancing social equity, empowerment and social cohesion through meeting both domestic and productive needs, possibly enabling equitable access, use and management of available water	Partially	Partially	✓	✓
<b>2. Enabling simple-accumulation livelihoods: Allowing households with some resources to increase secure assets</b>				
Reducing time and labor fetching water thereby freeing time for additional productive activities	✓		✓	Partially
Reducing uncertainty and risks relating to existing livelihoods (cultivation and livestock rearing)		Partially	✓	✓
Enabling food security and nutrition through consumption <i>and</i> sale of produce (income often used to supplement household food security and diet diversity and to upgrade existing livelihood practices)		✓	✓	✓
Improving social standing in the community as a result of increased ability to trade labor and goods		✓	✓	✓
<b>3. Enabling higher-return livelihoods: Allowing households with more secure assets to move out of poverty</b>				
Enabling investments and risks in new livelihood opportunities, offering potential for home –based enterprises, often undertaken by women	Partially	Partially	✓	✓
Enabling start-up of informal small-scale enterprises that have higher rates of return and generate cash incomes (often used for household food, health and education needs or reinvested in new enterprises) and which generally require relatively little water compared to livestock and gardens		Partially	✓	✓

### 3.3.3 Sustainability Considerations: Key Findings

#### Key Findings

- **Sustained access to water services is critical to achieving poverty impacts.**
- **Unplanned multiple uses of single-use domestic and irrigation systems** are widespread and these unplanned uses **threaten sustainability of water services** (well supported). Unplanned uses frequently result in system breakdowns, resource inefficiencies, poor cost-recovery and conflicts.
- **Explicitly catering to multiple uses enhances sustainability of water services** by better addressing needs for domestic and productive uses leading, generating financial and non-financial benefits and increasing ability and willingness to pay for improved services (partial evidence).
  - Due to relatively limited documentation available on long-term sustainability of multiple-use services due to the prevalence of single-use approaches, pilot implementation activities should include carefully designed monitoring and evaluation programs to further assess sustainability of multiple-use services.

Findings from the Multiple Use Systems project, part of the Challenge Program on Water and Food. Data gathered from over 25 multiple-use sites in 8 countries in Latin America, Asia and sub-Saharan Africa found evidence that not explicitly planning for multiple uses in water services resulted in sustainability problems of the services (van Koppen, et al. 2008 forthcoming).