Water Policy Briefing

Issue 18

Putting research knowledge into action

Taking a multiple-use approach to meeting the water needs of poor communities brings multiple benefits

amily with rope pump, which provides them with domestic water and irrigation, Zimbabwe. Woman using hand pump to water livestock, India, Man bathihg in irrigation canal, Sri Lanka.

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Poor people need and use water for a wide range of essential activities, including earning much-needed incomes. Deliberately making provisions for these multiple uses of water when designing and managing water-supply and irrigation schemes could greatly reduce poverty, increase gender equity, and improve health—at little additional cost.

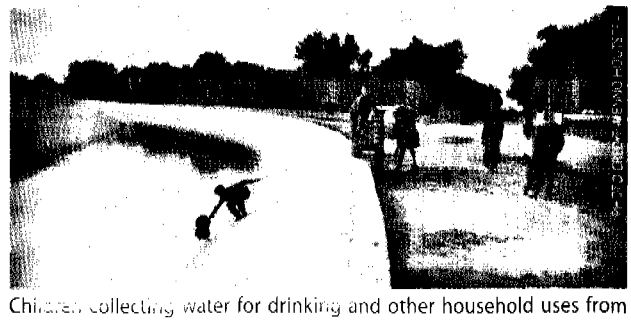
Taking a multiple-use approach to meeting the water needs of poor communities brings multiple benefits

Single-use approaches to water development and management do not reflect the realities of poor people's water use. People use domestic water supplies for activities such as irrigating backyard gardens, keeping livestock, fishing, processing crops and running small-scale enterprises. In areas without adequate domestic water supply, they use irrigation water to meet household needs, such as drinking and bathing, as well as to support a range of income-generating activities in addition to crop production.

A more integrated, multiple-use approach can maximize the health benefits and productive potential of available water supplies–leading to increased incomes, improved health and reduced workloads for women and children. Systems that cater to multiple uses are also more likely to be sustainable, because users benefit more from them, have a greater stake in them, and are more willing and better able to pay for them.

Policy-makers, planners, and project designers need to enable and support a multiple-use approach by developing the necessary policies, capacities, and institutions. Incorporating provision for multiple uses into plans for meeting the Millennium Development Goals, Poverty Reduction Strategy Papers, and IWRM and water efficiency plans and strategies (Box 1) is a start.

Taking an integrated, multiple-use approach to water development and management is an opportunity to advance progress on five of the eight Millennium Development Goals: Goal 1 to eradicate extreme poverty and hunger; Goal 2 to achieve universal primary education; Goal 3 to promote gender equality and empower women; Goal 4 to reduce child mortality, and Goal 7 to ensure environmental sustainability. Yet, policy-makers, donor organizations and government agencies are missing this valuable opportunity for improving the lives of poor and disadvantaged groups at very little additional cost.



Children collecting water for drinking and other household uses from an canal in Morocco. The task of collecting water often falls on children, in many cases preventing them from attending school. It can also be dangerous work—every year several children drown in the canals.

The current single-use perspective which dominates thinking on water development and service provision has led to domestic water-supply schemes that ban the use of water for production or that supply too little water for any but the most basic domestic needs, and to irrigation schemes that ignore the need for domestic or household-level production activities. By failing to address people's real needs, this top-down, technocratic approach disempowers them and leaves them responsible for systems that only partially meet their requirements.

When communities design their own water systems, they invariably plan for multiple uses. And, when single-use, public supply schemes are provided, they are almost always used for multiple purposes. However, because these uses are unplanned and only rarely acknowledged, they often lead to health risks for water users, water shortages at the tail ends of supply systems, damage to infrastructure, and conflicts between users.

Countries taking a strategic look at extending and improving water services for poor rural and peri-urban communities, should capitalize on the opportunity to reduce poverty, increase gender equity, and improve health by taking a multiple-use approach. South Africa, for example, has acknowledged the importance of

This briefing was produced by International Water Management Institute (IWMI), the IRC International Water and Sanitation Centre, the Technical Committee of the Global Water Partnership (GWP) and the GWP Advisory Center at IWMI. It draws primarily on research from the Multiple Use Systems (MUS) project and the Productive Uses of Water Thematic Group (Prodwat) (see references for further reading). The brief complements *Catalyzing Change*, the GWP handbook for developing IWRM and water efficiency strategies and plans, and the associated policy and technical briefs.

multiple-use water services to lifting people out of poverty in its 2003 Water Services Strategic Framework. It pledges that: "Water and sanitation programmes will be designed to support sustainable livelihoods and local economic development. The provision of water supply and sanitation services has significant potential to alleviate poverty through the creation of jobs, use of local resources, improvement of nutrition and health, development of skills, and provision of a long-term livelihood for many households."[1]

The UN Millennium Project Task Force on Water and Sanitation also recognizes the value of including water for productive purposes in efforts to meet the water and sanitation target. The Task Force's Final Report notes that "the ready availability of water can be used to start or expand small enterprises and thus increase disposable household income," and it lists this benefit as part of the economic grounds for improving water supply.[2]

Box 1. How can the changes needed for multiple-use systems be catalyzed?

Integrated water resources management (IWRM) encompasses all aspects of water resources development, management and use, and is central to the key issues of water supply, sanitation and infrastructure-building. Its role in sustainable development was recognized at the 2002 World Summit on Sustainable Development which called for all countries to develop IWRM and water efficiency strategies or plans. This call was reinforced by the 2005 World Summit.

Recommendations for national IWRM and water efficiency strategies:

- Take a multiple-uses approach to planning the development and rehabilitation of infrastructure and the provision of water services.
- Introduce governance reform to create an enabling environment for cooperation among relevant agencies and to ensure a holistic approach to water supply that is tailored to fit communities' water needs and their resources. Multiple-use services may involve changes in water allocation frameworks, funding structures, water-quality standards, regulatory frameworks, and institutional mandates.
- Make provision for capacity building to develop a holistic approach to water supply and participatory approaches to water development and infrastructure rehabilitation/ upgrading.

Catalyzing Change: A Handbook for Developing Integrated Water Resources Management (IWRM) and Water Efficiency Strategies provides practical advice on how to tackle these issues.

Woman making bricks, India. People use domestic water supplies and irrigation water for a range of such small-scale enterprises. These uses may be considered "illegal" by water managers and can strain the capacity of domestic systems.

The opportunities provided by multiple uses of irrigation water have received less attention.[3] This is a common practice by poor people in many parts of the world and in some areas is supported by irrigation managers, often informally. In Pakistan, for example, irrigation managers allocate water to fill 'diggis' (community domestic supply reservoirs) in areas with saline groundwater.[4] And in Morocco they have helped to rehabilitate traditional underground storage tanks, which they fill regularly with irrigation water releases for domestic use.[5] The Sri Lankan authorities release water for bathing and have built concrete steps in canal banks to allow people to bathe and wash their clothes and dishes. Such interventions have been far more beneficial than efforts to ban 'illegal' water use (with little success) or simply turning a blind eye.

However, often, these water allocation arrangements are not institutionalized, so poor people have no formal rights. In Pakistan, this means community water supplies are cut off during the annual irrigation canal closure. In addition, irrigation departments are not equipped with the capacity or the mandate to address issues such as drinking water quality standards and water-related diseases, so people are exposed to a variety of health risks.

[1] http://www.info.gov.za/otherdocs/2003/waterstrat.pdf p.41

[2] UN Millennium Project Task Force on Water and Sanitation, Final Report, Abridged Edition. 2005. p. 16. www.unmillenniumproject.org/documents/What_Will_It_Take.pdf

[3] *Irrigation & Drainage Systems*. 2001, special issue on multiple use systems 15(2).

[4] Van der Hoek, W.; Konradsen, F.; and Jehangir, W.A. 1999. Domestic use of irrigation water: health hazard or opportunity? *International Journal of Water Resources Development* 15, 107-119.

[5] Laamrani, H.; Khallaayoune, K; Laghroubi, M.; Abdelafid, T.; Boelee, E.; Watts, S.J.; and Gryseels, B. 2000. Domestic use of irrigation water: the Metfia in Central Morocco. *Water International*. 25(3), 410-418.

What is a multiple-use approach?

In essence, a multiple use approach involves (1) assessing the range of water needs in collaboration with end users, (2) examining the water sources available—from rainwater to wastewater to piped systems, and (3) matching water supplies to needs based on the quantity, quality and reliability required for various purposes.

Three crucial aspects of a multiple-use approach that are neglected in traditional approaches to water supply are: participation of local communities, identification of all water needs, and consideration of the different water sources available. While this may require more time and effort than rolling out a blanket program, the end result is more economically efficient, social equitable and environmentally sustainable.

Changes in infrastructure

In theory, a system purpose-built for multiple water uses would be best. And, this may well be the best option in areas that haven't yet been reached by public water-supply systems. Small-scale, multiple-use systems can be built and operated as income-generating businesses by community water users groups, if they have access to credit and appropriate capacity-building. Work by International Development Enterprises (IDE) suggests that low-interest loans used to finance such systems could feasibly be paid off in in three to five years through water user fees.[6]

Where formal supply systems do exist, they can be adapted to serve multiple functions. Irrigation infrastructure can be adapted to provide water for domestic uses, livestock watering and fishing. Likewise, adjustments can be made to domestic water-supply systems (Box 2).

The combination of drip irrigation and reliable domestic water supply allows this Nepalese man to grow vegetables in the off season. In Nepal, 60% of drip irrigation users employ water from domestic systems. The spread of such small-scale, low-cost irrigation technologies, has great potential to increase incomes and food security, but is severely limited by domestic systems that were designed to supply only a limited amount of water to meet only drinking and hygiene needs.

Changes in policies and practice

A multiple use approach also demands changes in policies and practices (Box 1). This means taking a look at regulatory and water allocation frameworks and financing structures to make sure they support a multiple-use approach; creating incentives and mechanisms for sector and subsector coordination and greater cooperation between government agencies, NGOs, and private sector organizations and between water suppliers and water users; and, finally, capacity-building for water planners, system designers and managers and changes in university curricula and training programs.

Box 2. Ways of accommodating multiple uses of water

Irrigation systems can be adapted by

- Releasing water for household uses and bathing
- Building or reviving community domestic-supply reservoirs
- Building steps in canal banks for laundry and bathing
- Adding pipes, canals and taps to bring water into villages/houses
- Promoting low-cost, point-of-use treatment for drinking water
- Sinking shallow wells to tap cleaner 'seepage' water
- Adding access and crossing points to canals for cattle
- Maintaining flows to preserve fish populations
- Building fish-friendly structures in sluices and canals.

Domestic systems can be adapted by

- Increasing pipe diameters/water discharge to allow productive activities
- Providing water without interruptions
- Adding cattle troughs to supply points
- Adding storage tanks
- Adding micro-irrigation systems
- Using different water sources depending on quality needs
- Promoting reuse of household "grey" (waste) water

Use of other water sources can be maximized by

- Working with the private sector to promote the use of affordable pumps and drip irrigation kits (also applies to domestic systems)
- Promoting community/rooftop rainwater harvesting
- Enlarging wells
- Developing gravity-flow systems to pipe in stream-water
- Promoting credit and access to other inputs to enable people to make use of productive water supplies (applies to all)

[6]Polak, P.; Adhikari, D.; Nanes, B.; Salter, D.; and Surywanshi, S. 2004. "Transforming access to rural water into profitable business opportunities" in *Beyond Domestic.*

Benefits of a multiple-use approach

Reducing poverty and improving livelihoods

Cases of people adding value by using water in ways which weren't originally planned for have been documented around the world. For example, a study in South Africa found that the productive use of domestic water accounts for around 17% of the average household income in villages with very limited domestic water provision, but 31% in similar villages with adequate domestic supplies.[7] In some semi-arid areas, a reliable water supply that fulfills domestic needs and the needs of livestock, kitchen gardens, and small-scale enterprises has been found to be a precondition for poverty alleviation.[8] Other development efforts are then able to build on this.

Fighting hunger and surviving droughts

Providing water to support activities such as backyard-gardening, fishing and livestock-keeping—which are not normally considered in domestic or irrigation water supply schemes—not only increases incomes, it reduces vulnerability. These activities provide food security—especially during lean times. For example, during the recent droughts in Zimbabwe, small productive water points proved to be crucial, allowing small-scale food production when the major crops failed.[9] And in eastern Ethiopia and the Sahel, reliable, multiple-purpose water supplies improve the productivity of livestock and reduce mortality throughout the year. There are, for instance, some 1500 multi-purpose small reservoirs in Burkina Faso and around 30,000 government-funded household-level water-harvesting ponds in Ethiopia's Tigray region alone.

Improving health

Making more water available for bathing, sanitation and drinking also reduces the incidence of water-borne diseases and lowers child mortality. While this can also be said of single-use, domestic water supply schemes,

Women watering kitchen gardens in Bolivia, South Africa and India. Across the developing world, small gardens near to the home and watered with domestic supplies enable women to provide their families with food security and better nutrition and to earn a small income from the sale of vegetables.

multiple use approaches have the added value of also providing water for more food and more income, which improves nutrition and allows people to take extra preventive health measures and pay for health services.

A multiple use approach also addresses the health risks involved in unplanned and unacknowledged uses of irrigation water and allows people greater benefits from this source of water in areas that are as yet unserved by domestic schemes.

While the quality of drinking water is an important health issue, research shows that simply having water available in sufficient quantities for drinking and hygiene is equally important.[10] In fact, providing better access to larger quantities of water through multiple-use approaches may improve health more effectively than costly and often ineffective measures to ensure that high-quality water is supplied. This is especially true if this approach is combined with the use of household treatment technologies and hygiene education.

A study of domestic use of irrigation water in Pakistan showed that incidence of diarrhea was not related to the quality of drinking water from various sources (including irrigation canals).[11] Instead, it proved to be linked to water availability—as people in houses with their own water connection and a water-storage facility (even if the water supplied was irrigation

[7]de Mendiguren Castresana, J. C. P. 2004. "Productive uses of water at the household level: Evidence from Bushbuckridge, South Africa". In *Beyond domestic.*

[8]Moriarty, P.; Butterworth, J.; and van Koppen, B. (eds). 2004. *Beyond domestic: Case studies on poverty and productive uses of water at the household level.* www.prodwat.watsan.net/page/302

[9]Robinson, P.; Mathew, B. and Proudfoot, D. 2004. "The ownership and management of productive water point gardens in a time of drought, Zimbabwe". In *Beyond domestic.*

[10]Howard, G. and Bartram, J. 2003. Domestic water quantity, service level and health. Informal paper WHO/SDE/WSH/03.02, Water Engineering and Development Centre (WEDC), Loughborough University, UK, and Water, Sanitation and Health Programme, World Health Organization (WHO), Geneva, Switzerland. http://www.who.int/water_sanitation_health/diseases/wsh0302/en/index.html

[11]Van der Hoek, W.; Feenstra, S.G.; and Konradsen, F. 2002. Availability of irrigation water for domestic use: impact on prevalence of diarrhea and nutritional status of children. *Journal of Health, Population, and Nutrition.* 20(1), 77-84.

water) suffered less often from diarrhea, mainly because of higher standards of hygiene and better sanitation enabled by a more readily available water supply.

Improving gender equity

Improved water availability also promotes gender equity, as poor women are primarily responsible for fetching water—women in Africa alone spend around 40 billion hours per year on this activity. A study in Gujarat (India) revealed that rural women put the time saved by improved water supply into other productive activities. In this way, each woman could earn between US$16 and US$115 per year.[12] Multiple-use approaches to water supply are deliberately gender-sensitive, taking into account women's water needs for cooking, food processing, cleaning, and other domestic tasks—which are often otherwise considered secondary to the need for drinking water.

In addition, for women who are landless or land-poor, or who cannot go far from their houses for cultural or security reasons, multiple-use facilities near to dwellings can provide valuable income-earning and food-security opportunities. A variety of options, besides piped domestic water, can be used. Examples include rooftop water-harvesting structures, new or enlarged family wells, and household run-off storage tanks, which allow wastewater from washing and bathing, for example, to be used productively.

Increasing system sustainability

To be sustainable, water-supply systems need to continue to deliver the required amounts of water well into the future. This means on-going investment and maintenance. If a system fulfils all people's needs, and if they have a strong stake in it, they will be more willing to pay for its establishment and upkeep. Anecdotal evidence from around the world shows that allowing for the productive use of water in domestic schemes makes men (and women) more willing to engage in maintenance. And, importantly, people are better able to pay if they can earn more income from their increased access to water. What is more, the extra capital costs involved in providing for multiple uses are a very modest proportion of the overall investments in single-use schemes.

Involving communities in the design of systems, and taking a long-term view—both integral parts of a multiple-use approach—means that systems are better able to adapt to changing needs, again increasing sustainability. And, because they are specifically designed to fulfill local requirements, multiple-use systems suffer less damage to infrastructure—as a result of illegal connections or cattle trampling down canal banks, for example.

A way to meet the needs of more people sooner

Costly centralized water-treatment systems and extensive networks of pipes devoted solely to delivering small supplies of 'high quality' water are not necessarily the quickest way of increasing access by the poor to water for drinking and other purposes, nor the most economically efficient in terms of a country's overall development needs. For example, in some areas, groundwater and surface water bodies are clean enough to drink without treatment and can be exploited as one part of a multiple-use system—especially if it will take years for formal supply services to reach a particular community.

Taking a wider view, people's needs for drinking water are only a fraction of their overall water needs. Why not take advantage of the infrastructure already in place to provide for those needs, so speeding up development and cutting poverty? Plus, affordable household technologies can be used to treat irrigation water to supply the small quantities needed for drinking.

Seepage water from fields and unlined canals is another potential drinking-water resource in irrigation systems. This can be tapped through shallow wells. This water is usually of a higher quality than other available water sources, as the soil acts as a filter and removes contaminants. Studies in Pakistan[13] and Sri Lanka[14] irrigation schemes showed that shallow wells with seepage water were the most appropriate for drinking water supplies, as deeper groundwater was too salty (Pakistan) or contaminated by fluoride (Sri Lanka) and canal water was contaminated by bacteria. This is why it is important to assess all water sources, including wastewater, available to a community—in terms of

[12] James, A.J. 2004. "Linking water supply and rural enterprise: issues and illustrations from India." In *Beyond Domestic*.

[13] Van der Hoek, W.; Konradsen, F.; Ensink, H.J.; Mudasser, M. and Jensen, P.K. 2001. Irrigation water as a source of drinking water: is safe use possible? *Tropical Medicine & International Health*. 6(1), 46-54.

[14] Shortt, R.; Boelee, E.; Matsuno, Y.; Faubert, G.; Madramootoo, C.; and van der Hoek, W. 2003. "Evaluation of thermotolerant coliforms and salinity in the four available water sources of an irrigated region of Southern Sri Lanka." *Irrigation and Drainage*. 52: 133-146.

quality as well as quantity—to work out which are best for which purpose.

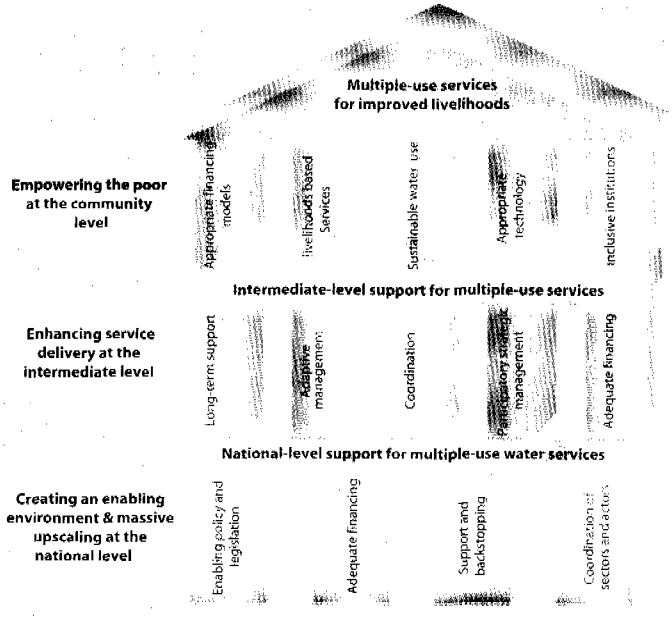
The need for change

The water sector is divided into a number of discrete subsectors, which hardly ever work together or coordinate their actions. A multiple-use approach, which aims for client-oriented, holistic and integrated service provision, is designed to overcome the problems this causes.

But, efforts to provide such services are themselves hampered by the subsector-based division of government departments, which each have different mandates and their own budget allocations. This is why policy change, better governance and capacity building are needed at multiple levels (see Fig. 1).

Special efforts are needed at the administrative district—rather than basin level—where the actual integrated planning for multiple uses takes place. Different sectoral agencies will not only have to work together, they will also have to work with local authorities, non-governmental and community-based organizations, and the relevant private sector actors. Such coordination and joint planning, as well as monitoring and support are crucial.

Figure -1. A multiple-use approach requires action at three levels.



Source: adapted from IWMI Research Report 98 "Multiple-Use Water Services to Reduce Poverty and Enhance Gender Equity: A Framework for Action-Research".

Box 3. Multiple-use water services: how to make them happen

- ***Improve governance at all levels*** to allow communities to manage, maintain and finance their supply systems and let a wide range of actors work together on integrated plans at the district level. It also helps governments to improve cooperation between departments, adopt participatory approaches, allocate the necessary resources, and develop supportive policies and laws.
- ***Build the capacity*** of water managers and local organizations, to help them use participatory approaches, carry out needs assessments, and plan and design systems creatively in partnership with water users.
- ***Tackle competition for water*** by prioritizing supplies when water is scarce, ensuring equitable access for the poor, and encouraging more efficient water use. The latter can be achieved through stepped tariffs, household water-conservation education, water recycling, and small-scale, low-cost precision irrigation such as 'bucket-and-drip' systems.
- ***Develop partnerships for funding and financing*** between different government departments, NGOs, and communities. Micro-credit schemes and community management of funds will often be needed.
- ***Make technical changes*** to accommodate multiple uses. This may mean adjusting infrastructure and/or the quantity, quality and timing of water supplies (see Box 2).
- ***Maximize the impact of new systems*** by improving access to production inputs, credit and markets and educate people on hygiene and sanitation.

National policies, blanket standards for water quality, and fixed design criteria for water-supply systems, can also be obstacles to multiple-use approaches. For example, 'one-size-fits-all' supply systems may be rolled out with no flexibility to adapt to local conditions.

In addition, national water allocation frameworks and priority-setting often don't offer enough protection for the poor. National priorities are often sector-based, for example, prioritizing domestic uses over all others. Such policies, while aiming to provide basic access to water for all, fail to provide true social equity. For example, such a policy would dictate that domestic use by a middle class urban family, which seldom amounts to less than 100 liters per capita a day, receive priority over water for basic food and income by poor small-scale farmers, which may be half that amount.

Water Policy Briefing Series

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International Water Management Institute

About the Multiple Use Systems Project (MUS)

The objective of the MUS project is to identify and develop practical models, tools, and guidelines for implementing multiple-use systems for enhanced land and water productivity, rural livelihoods and gender equity. The project undertakes action research and capacity-building from community to national level in eight countries in five benchmark basins of the Challenge Program on Water and Food.

Coordinating Partners: International Development Enterprises (IDE); IRC International Water and Sanitation Center; International Water Management Institute (IWMI); Khon Kaen University, Thailand; and Mekelle University, Ethiopia.

National Partners: Association for Water and Rural Development (AWARD), South Africa; The Institute for Water and Sanitation Development (IWSD), Zimbabwe; Centro Andino para la Gestión y Uso de Agua (Centro AGUA), Bolivia; Instituto de Investigación y Desarrollo en Agua Potable, Saneamiento Básico y Conservación de Recursos Hídricos (CINARA), Colombia: Catholic Relief Services (CRS), Ethiopia. For more information, see www.musproject.net or contact Barbara van Koppen, b.vankoppen@cgiar.org.

PRODWAT

About the Productive Uses of Water Thematic Group (Prodwat)

The Prodwat thematic group was established in 2003 in order to contribute to the reduction of poverty and increased gender equity through the better recognition of productive uses of domestic water supplies, and the improved delivery of multiple use water services at the household level.

The group works to achieve its aims by advocating and supporting the development of improved policy and practice in providing water to people in ways that respond to their full range of needs: both domestic and productive.

Coordinating Partners: IRC International Water and Sanitation Center, International Water Management Institute, CINARA, Natural Resources Institute (NRI), Overseas Development Institute (ODI), Plan International, Pump Aid, and the Water, Engineering and Development Centre (WEDC) at Loughborough University. For more information, see www.prodwat.watsan.net, www.irc.nl or contact Patrick Moriarty at moriarty@irc.nl.

About the Global Water Partnership (GWP) Advisory Center at IWMI

The GWP Advisory Center at IWMI provides research-based knowledge to support implementation of Integrated Water Resources Management (IWRM)—drawing on IWMI's expertise in water and land management.

This issue of Water Policy Briefing is a cooperative effort between the Advisory Center and the GWP's Technical Committee (TEC). It is intended to compliment the series of publications recently launched by the GWP TEC to tackle key issues and potential stumbling blocks for countries developing and implementing IWRM and water efficiency plans and strategies. The series includes the *Catalyzing Change* handbook and a series of associated policy and technical briefs.

For more information about the Advisory Center see www.iwmi.org/gwp. To download the *Catalyzing Change* handbook and briefs, see www.gwpforum.org.

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