

Increasing Water Security

– A Development Imperative

This Perspectives Paper argues that water security in the 21st century requires leaders, practitioners, and societies to continue their journey of taking an integrated approach to water resources management. Moreover, it argues the need to expand our views on how this can best be done—to make a difference at the local level, in river basins and cities.

A continuation of the fragmented water exploitation practised in the last century will be disastrous for the sustainability of our planet. More clarity is needed, however, on how Integrated Water Resources Management (IWRM) can best be implemented as a set of principles and as a process, and this requires an expansion rather than a narrowing of views and approaches.

This paper offers perspectives for an agenda to recognise and cut through the increasing complexity of water management with a focus on practical approaches that will move us forward. It draws on country experiences around the world as well as economic thinking about

institutions, and points out keys for success in moving forward with the adaptive management process of IWRM for sustainable development.

The recommendations in this paper do not directly address the operational challenge of delivering services for water supply, sanitation, and irrigation. Rather, they focus on the fundamental process of improving the management of water resources that lies at the heart of increasing water security:

- Ensuring the availability of adequate and reliable water resources of acceptable quality, to underpin water service provision for all social and economic activity in a manner that is environmentally sustainable;
- Mitigating water-related risks such as flood, drought and pollution; and
- Addressing the conflicts that may arise from disputes over shared waters, especially in situations of growing stress, and turning them into win-win solutions.

GWP's vision for a water secure world

A water secure world is vital for a better future: a future in which there is enough water for social and economic development and for ecosystems. A water secure world integrates a concern for the intrinsic value of water together with its full range of uses for human survival and well-being. A water secure world harnesses water's productive power and minimises its destructive force. It is a world where every person has enough safe, affordable water to lead a clean, healthy and productive life. It is a world where communities are protected from floods, droughts, landslides, erosion and water-borne diseases.

Water security also means addressing environmental protection and the negative effects of poor management, which will become more challenging as climatic variability increases. A water secure world reduces poverty, advances education, and increases living standards. It is a world where there is an improved quality of life for all, especially for the most vulnerable—usually women and children—who benefit most from good water governance.

GWP Strategy 2009–2013

© Global Water Partnership, February 2012

Portions of the text of this publication may be reproduced for educational or non-commercial use without prior permission from the Global Water Partnership (GWP), provided that the source is acknowledged, with mention of the complete name of the report, and that the portions are not used in a misleading context. No use of this publication may be made for resale or other commercial purposes without prior written permission of GWP. Opinions expressed in this publication do not imply endorsement by GWP.

Seeing our journey

“Increasing water security has become a development imperative. The stakes are raised and we need to question development paths and cut through the increasing complexity of water management with keys for success that move us forward.” – Dr Letitia A Obeng, GWP Chair

Today, more people than ever before are working together to explore how our world’s water resources can be managed in a more sustainable way. This is good news, as today’s pressures on water resources are also unprecedented, and are posing a serious and urgent challenge for communities and societies around the world.

Since its inception in 1996, the GWP family of Partners has helped countries around the world to:

- Recognise basic principles that underpin good water management;
- Develop a stronger enabling environment of policies and laws;
- Build more appropriate institutional frameworks; and to
- Share, adopt and adapt management instruments and tools

At the Rio+10 World Summit on Sustainable Development in Johannesburg in 2002, world leaders jointly agreed to apply IWRM principles in water resources planning, setting an ambitious target for IWRM and water efficiency plans to be developed by 2005, and thereby catalysing action at all levels, from international to local.

In 2012, when the world leaders will meet again at the United Nations Conference on Sustainable Development in Rio de Janeiro (Earth Summit or Rio+20), there will be encouraging progress to report and valuable experience to share, even if progress has been slower than expected. This opportunity should help to secure continued political commitment, and to mobilise further collective action for better management of water and other natural resources in the context of the world’s new and emerging challenges. In the lead up to 2013, the UN International Year of Water Cooperation, these efforts

must be consolidated around this central theme: the duty to cooperate.

While there is a growing consensus among world leaders, the global development community, and local practitioners about the urgency of increasing water security in our time of unprecedented changes, shocks and uncertainties, the debate on how to achieve this remains rich in diversity and is evolving continuously. To inform leaders and practitioners in these global and local debates on feasible approaches to increase water security at this critical time of multiple crises, this paper offers several perspectives and keys for success that build on lessons learnt by GWP and its family of Partners to date.

The vision of the Global Water Partnership is a water secure world where there is enough water for household needs, for social and economic development, and for ecosystems. With Partner organisations in 157 countries, working through regional, country, city and river basin partnerships, GWP brings together people from governments, the private sector, and civil society to show how better solutions can make a difference locally.

As a result, recognition has grown all over the world of the need for better coordination in the “development and management of water, land and related resources in order to maximise economic and social welfare without compromising the sustainability of ecosystems and the environment” (GWP’s definition of Integrated Water Resources Management or IWRM).

Part I: Where are we now?

“If 'business-as-usual' water management practices continue for another two decades, large parts of the world will face a serious and structural threat to economic growth, human well-being, and national security.”

– Margaret Catley-Carlson, GWP Patron

The challenges

Over the past five years, people around the world have faced up to a daunting array of new and increasingly inter-connected crises (food, energy, financial, climate and water) that impact heavily across scales and boundaries—threatening the security of households, communities, natural resources, and national economies—and are hitting the poor hardest. The concurrence of these crises during the last decade has challenged humankind's optimistic vision of continuing progress in development, as well as the validity of the current world economic models. Many more people have come to realise that the earth's resources cannot, in the long run, meet the demand of the world's growing population following the existing models of industrialised societies.

We have also become conscious of the immense risks associated with the adverse impacts of climate change on the sustainability of the world's natural resources and the global economy as well as on political stability. In addition, the lasting consequences of the financial and economic crises have precipitated more attention to long-term risks in the global economy. The issues of the economic risk and natural resources degradation are coming together in a way that has created unprecedented opportunities for fundamental economic, institutional, technological, social and political changes.

Water security underpins many of the global risk scenarios. There is certainly no lack of authoritative global assessments that articulate pertinent water challenges, including the United Nations World Water Development Report, which is published every three years. Water security is under severe pressure from

many sources: world population growth, rapid shifts from rural to urban areas, the impact of dietary changes as countries develop, increasing pollution of water resources, the over-abstraction of groundwater, and the climatic challenges exacerbated by global warming (more frequent and severe floods and droughts, shifting rainfall and river-flow patterns).

Today, water concerns are high on many national, regional and international agendas. However, despite billions of dollars expended on water by governments, water management decisions are often still based on narrow, short-term objectives and political expediency. It is increasingly well recognised that the conventional, compartmentalised approach to water management falls short, or is counter-productive to desired outcomes. Water management planning needs a holistic approach that better integrates water into socio-economic development planning in order to simultaneously achieve economic efficiency, social equity and environmental sustainability, the "3Es" that are the pillars of the IWRM process.

The global development landscape continues to change. The financial crisis has placed huge pressures on rich and poor countries. Soaring demand for basic commodities and food is creating new problems for many poorer and middle-income countries, posing greater pressures on natural resources including water.

Questioning development paths

Many countries are increasingly aware that they are moving along development paths that are likely to prove unsustainable from a water perspective. For example, in Yemen and in important agricultural areas of South Asia and North China, groundwater tables are falling at rates of over a meter per year. In India, farmers have committed suicide when their irrigation supplies failed. According to a preview of the Asian Water Development Outlook, the region's economic prosperity is imperilled by the poor health of 80% of its rivers. Extensive pollution has seen urban communities from Mexico City to Delhi to Jakarta struggle to find sufficient safe, affordable water. In China, pollution and environmental degradation, much

of it water-related, have imposed huge costs on the country. In sub-Saharan Africa, national economies are at the mercy of fluctuating annual rains—and climate change is expected to aggravate this variability.

Food security is high on the list of global priorities but, ironically, successful economic development is creating new challenges to achieving it. Growing populations need more food and their increasing wealth spurs demand for more fruits and vegetables as well as animal products, whose feed requires more land and water resources to produce. Yet, with the proportion of the global population who live in cities exceeding 50%, growing urban water demands are reducing the amount available for agriculture and the environment. Meanwhile, the increasing pollution of water by urban waste reduces the amount of water available for use without expensive wastewater and water treatment.

As competition, conflict, shortages, waste, overuse and degradation of water resources grow, agriculture can be perceived as the system's safety valve. Agriculture is not only the world's largest water user in terms of volume (65 to 70% of total withdrawals), it is also a relatively low-value, low efficiency and highly subsidised water user. These facts require us to rethink the economic, social and environmental implications of agricultural water use. Meeting the ever-rising demand for food, feed and fibre while at the same time increasing farmer incomes, reducing poverty, and protecting the environment, all from an increasingly constrained water resource base, is a major challenge facing agriculture.

Without further improvement in water productivity—or major changes in where and how agricultural production takes place—the amount of water required for food production will increase by anywhere from 60 to 90%, depending on population and income growth and on assumptions about the water requirements of livestock and fisheries. Demand will become even greater if there is significant growth in biofuel production, which competes with food and feed production.

Countries that promote tourism as a vehicle for economic growth find their economies in peril when tourists learn that once-famous rivers and beaches are no longer safe for recreation. Conflict erupted between Argentina and its neighbour Uruguay when a pulp and paper mill was built in Uruguay across the river from an Argentinean tourist resort—impacting the water quality. In South Africa, the beaches of the resort city of Durban lost their “blue flag” health status because of sewage pollution from rapidly expanding urban settlements.



In some countries, a minerals boom and associated industrial development has triggered economic development based on mining, often at the expense of water quality and environmental biodiversity.

Many of these problems are aggravated by violent flooding to which growing numbers of people are vulnerable because economic and population pressures force them to settle in unsafe areas.

Water security is not a water sector issue, it is a societal one. Encouraging other sectors to consider water in their policies and planning is the only way to ensure water security.

The impetus for action

With the increased awareness around the world of the pressing need for better water management, the good news is that more players have already shown their readiness to engage and contribute to solutions, and to do so across boundaries of public and private sectors, organisations, and disciplines.

The range of players working together to develop new solutions is steadily growing—from local water users in cities to farmer groups in agriculture, and communities in upper watersheds that can provide valuable ecosystem services for downstream users; and from NGOs and small entrepreneurs and financial services companies to local universities, national think tanks, and regional research centres. Private companies are contributing new and innovative technologies to reduce water losses and increase conservation and efficiencies in water treatment, use, and reuse. At the international level, support for better water management has also expanded:

- At the United Nations, the profile of water issues continues to be raised. The UN Secretary General has a dedicated Advisory Board (UNSGAB) to help set and drive a high-level water agenda. The Board recently established a high-level panel on water and disaster (HLEP/UNSGAB).
- The UN has declared 2013 The International Year of Water Cooperation, highlighting the need for increased efforts in the collective management of the world's most vital natural resource.
- There is also a global movement to promote the ratification of the UN Convention on the Law of the Non-navigational Uses of International Watercourses (UN International Watercourses Convention) as a framework for cooperation.
- The UN General Assembly adopted in July 2010 a Resolution on the Human Right to Water and Sanitation, calling upon States to increase their efforts in ensuring water and sanitation for all. In other global political structures such as the G8 and the G20, heads of government and cooperating multilateral development banks have stepped up discussions of water challenges since 2003 and have increasingly committed themselves to programmes to address them.
- Regional organisations such as the African Union declared water to be a top priority at the African Union Water Summit in Sharm el-Sheikh in 2008. Earlier, Japan and the Asia-Pacific Water Forum convened the first Asia-Pacific Water Summit in 2007, while developed world organisations such as the OECD and EU have launched programmes to consider the detailed technical challenges of financing and managing water-related activities.
- Twenty-seven member states of the European Union agreed to manage all European water bodies according to the Water Framework Directive. This represents a strong example of IWRM in action and provides a unique process of river basin planning of all waters in the EU including non-EU countries sharing the river basins.
- The CEO Water Mandate group and World Economic Forum's Water Initiative are seeking ways in which the private sector can contribute to more sustainable water management while managing its growing risks.
- In related processes, water is entering the international climate change debate where it is increasingly understood that water management will have to be a focus for adaptation efforts. This was highlighted during the Copenhagen Climate Conference in December 2009, where most of the imagery used to illustrate the potential impacts of climate change was water-related, and at the Cancun Conference of Parties in 2010, which led to the formation of the Alliance for Global Water Adaptation (AGWA), Durban 2011.

There is more awareness of the importance of water resources management and greater will to tackle its associated challenges than at any other point in history. The question is how to most effectively harness that will.

Part II: Where are we going?

“Pooling knowledge through the prism of water security will help us design collaborative solutions.”

– Dr Mohamed Ait Kadi, GWP Technical Committee Chair

A number of water security imperatives must be met if we are to continue making progress in the social, environmental and economic dimensions of development:

Social dimensions

- Ensuring equitable access to water services and resources through robust policies and legal frameworks at all levels.
- Building resilience in communities in the face of extreme water events through hard and soft measures.

Environmental dimensions

- Managing water more sustainably as part of green economies.
- Restoring ecosystem services in river basins to increase river health.

Economic dimensions

- Increasing water productivity and conservation in all water using sectors.
- Sharing economic, social and environmental benefits of transboundary rivers, lakes and aquifers.

While there is growing agreement that water security is an important goal—not just for water management, but for broader development—there is not yet agreement on how we define water security. Is there a minimum level of water security that allows households, cities, river basins and countries to take off in their development without the risk of having

their economy wiped out by the next flood or drought disaster? And how can we define and measure such a minimum water security threshold?

To date it appears that the most widely acceptable definition of water security would read as “the availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to people, environments and economies.” (Grey and Sadoff, 2007)

The definition is firmly embedded in the concept of sustainable development, with its aim to ensure a triple bottom line of social, environmental, and economic development outcomes.

Whatever the definition used, acceptable standards of water security will have to be identified and agreed upon in policies and laws. These should embed monitoring and compliance processes that can be regularly reviewed on a case-by-case basis, at local, national, regional, and international levels as conditions evolve.

These standards, including the legal frameworks that support them, will have to recognise that water security, or the lack of it, is felt at the household level, among farmers and industries, in cities, in the natural environment of river basins, and in communities that are building resilience to adapt to changes, including climate change.

Furthermore, the availability of water implies more than simple access, and should afford a reasonable level of robust and transparent legal protection of that access, in other words, rights, which are especially important and accessible for poor and vulnerable communities.

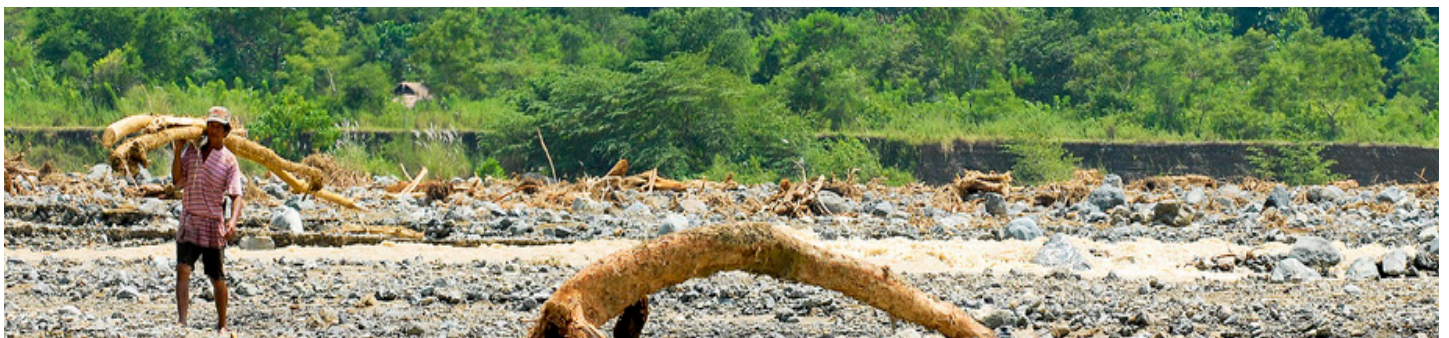


Table 1 describes a water security matrix that positions countries according to their degree of water stress and their financial and governance capacities to cope (including, perhaps, their determination to act).

Table 1: Water security matrix

Water Stress	Coping Capacity	
	LOW	HIGH
LOW	<p>Low water stress/low coping capacity</p> <p>Water security issues:</p> <ul style="list-style-type: none"> • Vulnerability to floods • Pollution • Increasing need for water and sanitation services (mainly to large cities) <p>Increasing water security through:</p> <ul style="list-style-type: none"> • Development of an appropriate stock of infrastructure (storage, flood control, etc.) • Proper legislation and adequate institutions • Integrated and comprehensive water planning 	<p>Low water stress/high coping capacity</p> <p>Water security issues:</p> <ul style="list-style-type: none"> • Mitigate for past, present and future pollution • Ecosystems need for water • Legal frameworks ensuring access for all <p>Increasing water security through:</p> <ul style="list-style-type: none"> • Effective legal frameworks at a range of scales • Economic incentives • Ethical management
HIGH	<p>High water stress/low coping capacity</p> <p>Water security issues:</p> <ul style="list-style-type: none"> • Water demand growing fast • Water availability falling to crisis level • Overexploitation of groundwater • Shortages compounded by pollution • Low efficiency of irrigation • Vulnerability to floods/droughts <p>Increasing water security through:</p> <ul style="list-style-type: none"> • Optimal mix of increasing supply and managing demand • Strengthening the institutional capacities and adopting a more cohesive and integrated legal framework • Developing appropriate mechanisms for intersectoral water allocation 	<p>High water stress/high coping capacity</p> <p>Water security issues:</p> <ul style="list-style-type: none"> • Declining water resources • Pollution abatement • Environmental requirements • Conflicts of use <p>Increasing water security through:</p> <ul style="list-style-type: none"> • Water conservation and reuse • Sustainable policies and legal frameworks and institutions for water management and dispute prevention and resolution • Strengthening waste water and pollution control through enforceable legal and institutional mechanisms

Water resources are unevenly distributed and this makes comparisons highly misleading. Water problems can range from regional to local in origin but are predominantly local in their effects. The strength of political, legal and economic institutions determines a country’s ability to manage water resources effectively. The higher the level of institutionalisation and governance the more water security is likely to be increased.

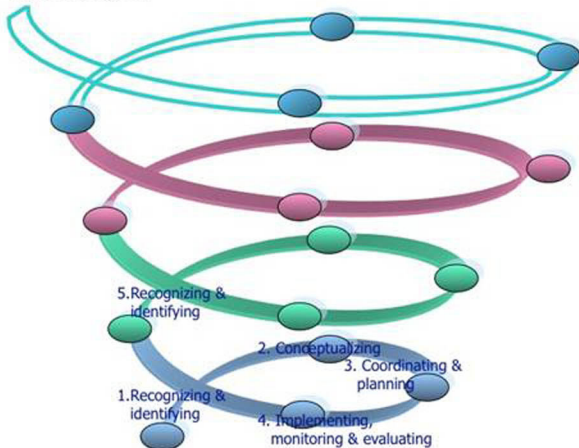
Challenges to increase water security are rooted in political, economic, social and environmental issues specific to each country. These issues are becoming entwined and cannot be solved unless a broader set of actors get involved.

Part III: How do we get there?

Increasing water security calls for an adaptive management process—since the context that informs water security is constantly changing. IWRM is such a process generating a virtuous spiral of progress and adaptation as depicted in Figure 1 (GWP, 2004; Lenton and Muller, 2009; UNESCO, 2009). The spiral visualises that through the collaborative and incremental approach of IWRM, the economic, social and environmental benefits of water resources in river and lake basins and their groundwater aquifers can be increased and balanced among a range of water uses and users.

In any location, the water management actions of today will build on the achievements and experiences in the past. The spiral process is therefore continuous as the basin stakeholders build on their strengths and experiences, work to manage current needs, and invest to prepare their river basin (and cities in the basin) for the future. Anywhere and anytime, stakeholders can assess their situation and options and determine the best way to proceed, thereby moving up a turn of the spiral.

Figure 1: IWRM as a process of adaptive management and the resulting spiral of progress



Global advocacy for IWRM began in the 1990s, at a time when the world community had already come to value sustainable development with its triple focus on achieving economic, social and environmental outcomes simultaneously. As stated in Agenda 21 (UN, 1992):

The widespread scarcity, gradual destruction and

aggravated pollution of freshwater resources in many world regions, along with the progressive encroachment of incompatible activities, demand *integrated water resources planning and management*. Such integration must cover all types of interrelated freshwater bodies, including both surface water and groundwater, and duly consider water quantity and quality aspects. *The multisectoral nature of water resources development in the context of socio-economic development must be recognized*, as well as the multi-interest utilization of water resources for water supply and sanitation, agriculture, industry, urban development, hydropower generation, inland fisheries, transportation, recreation, low and flatlands management and other activities. (Chapter 18, emphasis added).

If we look at the past 20 years of IWRM experience, we see that it can be regarded as a process of adaptive solutions to water-related problems (Lenton and Muller, 2009), but where it has been promoted as a rigid formula or prescription it has often failed to deliver the desired benefits.

In the following sections, we briefly explore some of the key questions for the IWRM of the future.

At what level should we focus our efforts?

To date, the main focus of IWRM application and measurement has been at the national scale. Leaders at the Rio+10 World Summit on Sustainable Development in Johannesburg in 2002 called for the development of national IWRM plans, in the understanding that this would also catalyse action at local levels. Since then, several surveys have been undertaken on the accomplishment of these plans, thereby again focusing on the national level. We now live at a time when half the world's population lives in cities. We see cities around the world taking steps to increase water security, often with significant up- and downstream consequences for the water resources in the basins hosting these cities.

We can also observe how basin stakeholders around the world are working to accelerate IWRM to increase water security at the basin level, and this has been the main focus of the IWRM guidelines published by

UNESCO (2009), the Handbook for Integrated Water Resources Management in Basins published by GWP and INBO (2009), and also of the Water for All policy of the Asian Development Bank (2001), which chose to foster IWRM in river basins. This has led to a new generation of initiatives where governments working with stakeholders have developed long-term visions and roadmaps for IWRM, such as in the Citarum basin in Indonesia.

It seems high time that top-down advocacy for IWRM principles and national plans is matched by a bottom-up focus on nurturing IWRM at the local level in river basins and for cities within these basins. There is growing experience on how this can be done. In South Africa, the management of water resources for Johannesburg city is a good example of the challenges as well as opportunities to work collaboratively on the urban-basin interface, and with a stronger focus on demand management. The extensive interbasin transfer network put in place to meet the water needs of the city and surrounding industrial areas impact multiple river basins and reach all the way to a

neighbouring country (Lesotho). Through stakeholder involvement, demand management has now been recognised as crucial to meeting future needs.

Similarly in Karachi, the Karachi City Water Partnership has been successful in introducing demand management at local community level, and in multiplying the approach across all the towns within this massive urban agglomeration of 18 million people. Hence the implementation of IWRM is important at every level, with strong national leadership together with media exposure enabling multiple initiatives to take root.

How can we manage if we don't measure?

In all work to improve water resources management and thereby increase water security, it pays to measure the current status and 'performance' first, against clear policies. Only then can realistic future scenarios be constructed to guide policy. It is critical to understand the inter-connected "systems" of water resources, by measuring the quantity and quality of



their current and expected uses, and the current and projected needs and demands. This needs to be done for communities, cities and entire river basins (including groundwater aquifers). Unfortunately, governments around the world have disregarded and neglected the need to maintain and update even the most basic systems of hydro-meteorological data collection and monitoring. Typically, the expenses to maintain or expand such systems are the first victims of cost-cutting reforms.

As part of good governance, decision making to increase water security needs to be objective, balanced and transparent. And it needs to be supported by legislation at a range of scales. Access to the right information at the right time is essential to ensure coherent policy trade-offs. To implement policies, a better understanding and quantitative measurement of current water resources management is essential, and adopting good indicators early on will help to implement policies over time. Data collection helps managers focus resources, identify hot spots, and provide baselines for evaluating impacts. And equally important, access to intelligible data can enable populations to hold governments accountable for their water security.

In turn, data can feed modern modelling tools, which are indispensable to identify, analyse and communicate management options in complex water resource systems. They help to calculate water balances, and to visualise and understand the issues, the challenges, and the opportunities for better solutions to increase water security for all parties and stakeholders, including the environmental uses for ecosystem services.

Such tools, however, are only as good as the information they use, and so the decline in data quality seen over the past few decades in much of the world must be reversed; water managers need resources to build and maintain an accessible body of intelligible water information. What is needed is a record of different dimensions of water resources and their uses that can help decision-makers and stakeholders to understand trends, and develop strategies to respond to them. Sadly, in most countries, water resource management expenditure is also not accounted for in detail and cannot be

tracked. The UN World Water Assessment Programme reports that it is unable to monitor many key water trends because of a shortage of data (WWAP/UNESCO, 2009).

Starting now, government investments will be critical to increase budgets and expand their capacity to track IWRM progress and measure water security at national as well as local levels, including river basins and cities. The development of quantitative water security indicators will need to be an integral part of such investments, and forms an area where GWP and its Partners can make a huge contribution through knowledge sharing and harmonising of standards and systems.

What is the role of the private sector?

“We need a better mix of public, private and citizen action.”

– Dr Uma Lele, GWP Technical Committee Member

Governments around the world nowadays regard the private sector as the main engine of the economy. They have in many cases successfully engaged the private sector in the energy and transport sectors. Yet when it comes to the water sector, the participation of the private sector is almost universally low and slow, with relatively few cases of public-private partnerships because of a variety of perceived risks from the perspectives of government, corporate, and civil society. The majority of public-private partnerships, moreover, are found in water services, particularly those for drinking water supply. This situation is, however, changing rapidly as more private sector firms are buying into sustainability agendas and are reviewing their supply chains, water footprints, and opportunities to contribute to water conservation and stewardship.

Global business has put water on its agenda. There is a CEO Water Mandate group, working under the auspices of the UN Global Compact, and an initiative from the Davos-based World Economic Forum to tackle the water-energy-food-climate nexus. Both are seeking ways in which the private sector can contribute to sustainable water management while managing risks.

The private sector also perceives a new range of business opportunities where water is becoming more scarce in many countries and users are willing to pay more for a reliable, secure supply. Such new water ventures can spark innovation and bring better management as well as additional investments. Simultaneously, it can also raise sensitivities about governance, particularly in economies where accountability and regulation are not yet well developed.



It is clear that the role of governments is no longer limited to creating and enforcing the enabling environment of policies, institutions and the legal and regulatory framework. They must also bring business and civil society together to help address commonly felt water challenges.

Inclusive government–corporate–society partnerships are the much needed coalitions for transformational change to work towards increasing water security at all levels, supported by financial instruments that value water, charge for services and discharges, and help to manage increasing risks. Governments and their partners can select and nurture boundary-spanning leaders, engage all sectors, increase capital (natural, social, and economic), tap into innovation,

deliver solutions, and build capacity for water resources management.

Part IV: Outlining an agenda

“Water resource management is complex, and that complexity must be recognised.”

– Prof Elinor Ostrom, Nobel Laureate

Water resources management is complex, and it is fundamentally important that governments and public and private stakeholders recognise this complexity. There are no one-size-fits-all solutions. Countries and communities will need to build up their capacity to work out solutions that suit their local conditions. The nature of these solutions will depend on many factors, including hydrology, climate, but also economies, organisational capacities, cultures, and other norms of behaviour.

Too often, however, the complexity of water resources management has been taken as an excuse by leaders and decision-makers to prioritise development investments in other sectors and organisations, leaving water agencies woefully strapped for capacity to perform their analysis, planning and management.

In the next few years, we expect to see countries, basins, cities and communities achieve measurable increases in their water security at the levels of households that are served equitably, productive economies, liveable cities, healthy rivers, and resilient communities. How each country manages its process to increase water security will depend on its local demographic, economic and social context including development goals, such as employment and poverty reduction. The higher the level of institutionalisation and governance, including legal frameworks, the smoother and more effective the IWRM process is likely to be. Solidarity within and among countries will also help, both to share experience and transboundary waters, and to facilitate the transfer of technology, training and capacity building, investments, and greater market access.

Moving the IWRM process forward will require prioritising and sequencing actions to achieve short, medium, and long-term objectives. Finding catalysts



to multiply outcomes, optimise positive spin offs, and build on existing strengths will be key.

The following sections identify some keys for success for investment to support this process.

Measuring performance

This paper recommends that more effort be given to measure water security and understand the inter-connected "systems" of water resources, assessing their quantity and their quality, their current and expected uses, and the current and projected needs and the demands.

Countries, river basins, and cities can assess their water security and decide on their vision and best path (roadmap) to increasing water security over time, balancing social, environmental and economic outcomes along the way. The development and adoption of water security indicators and tools to track and measure progress will be a core part of this process. GWP can contribute to developing standards for indicators that allow performance to be shared in a meaningful manner.

Convening the players

National and local multi-stakeholder platforms for water dialogue can bring together people from different perspectives to understand water resource management issues and develop better solutions in a collaborative manner across boundaries.

GWP Partnerships can support this process by serving as neutral platforms for collaboration. Through its convening power, GWP also has an opportunity to help bring diverse groups together to define common agendas and develop and implement plans for action—as demonstrated by the GWP-supported Partnership for Africa's Water Development.

In the years ahead, such platforms can influence the reform of institutions and organisations to ensure that water resources management will function better and help decision-makers cut through increasing complexity across sectoral silos as well as geographical boundaries. Water can no longer be treated through approaches that look narrowly at water needs for single uses—domestic use, irrigation, industries. It must be managed as a resource to fuel the entire economy.

National water commissions can help to strengthen water leadership at the national level, and river basin councils and authorities can do the same at local level. Lessons can be learnt from examples in Australia, Brazil, India, Indonesia, Japan, Morocco and elsewhere, to show how boundaries can be spanned with better coordination and cooperation.

Growing our knowledge: developing new skills, tools and capacities

Experience has shown that better understanding of the issues and possible solutions is a fundamental ingredient in creating and sustaining positive change. For example, sustaining the necessary changes will require a new generation of financial and regulatory instruments to value water resources, charge for water services and wastewater discharges, and to help manage the risks associated with increasing floods and droughts. Mainstreaming water into economic development plans will also require new tools—to support water policy reviews.

Water resource management will remain a complex and inter-disciplinary business that requires competences in natural sciences, engineering, environmental biology, economics and finance as well as law, sociology and management. People with skills in the analysis and modelling of extreme variability and complex systems are in great demand. Their value needs to be recognised and rewarded so that they can be retained in the water sector, in capable agencies that can attract and retain qualified professionals. Government and its partners can select and nurture leaders, engage all sectors, increase capital (natural, social, and economic), tap into innovation, deliver solutions, and build capacity for water resources management.



References

- Grey, D. and Sadoff C. 'Sink or Swim? Water security for growth and development'. *Water Policy* 9 (2007): 545-557.
- GWP (2004) *Catalyzing Change: A handbook for developing integrated water resources management (IWRM) and water efficiency strategies*. Stockholm: GWP.
- GWP/INBO (2009) *Handbook for Integrated Water Resources Management in Basins*. Stockholm: GWP & Paris: INBO.
- Lenton, R. and Muller, M. (eds.) (2009). *Integrated Water Resources Management in Practice: Better water management for development*. Stockholm: GWP & London: Earthscan.
- UNESCO (2009). *IWRM Guidelines at River Basin Level, Parts I & 2*. Paris: UNESCO.
- Asian Development Bank (2001) *Water for All: The water policy of the Asian Development Bank*. Manila: Asian Development Bank.
- WWAP/UNESCO (2009) *World Water Assessment Report 3*. Paris: UNESCO.
- World Economic Forum Water Initiative (2010) *Water security: the water-food-energy-climate nexus*. Washington, Island Press.

The Global Water Partnership's vision is for a water secure world. Its mission is to support the sustainable development and management of water resources at all levels.

GWP is a global network of 13 Regional Water Partnerships, 80 Country Water Partnerships and more than 2,500 Partner organisations in 161 countries.

GWP was founded in 1996 by the World Bank, the United Nations Development Programme (UNDP), and the Swedish International Development Cooperation Agency (SIDA) to foster integrated water resource management (IWRM).

IWRM is the coordinated development and management of water, land and related resources in order to maximise economic and social welfare without compromising the sustainability of ecosystems and the environment.

The network is open to all organisations involved in water resources management: developed and developing country government institutions, agencies of the United Nations, bi- and multi-lateral development banks, professional associations, research institutions, non-governmental organisations, and the private sector.

Global Water Partnership (GWP) Secretariat

Drottninggatan 33

SE-111 51 Stockholm, SWEDEN

Phone: +46 8 522 126 30

Fax: +46 8 522 126 31

Email: gwp@gwp.org

Websites: www.gwp.org, www.gwptoolbox.org

