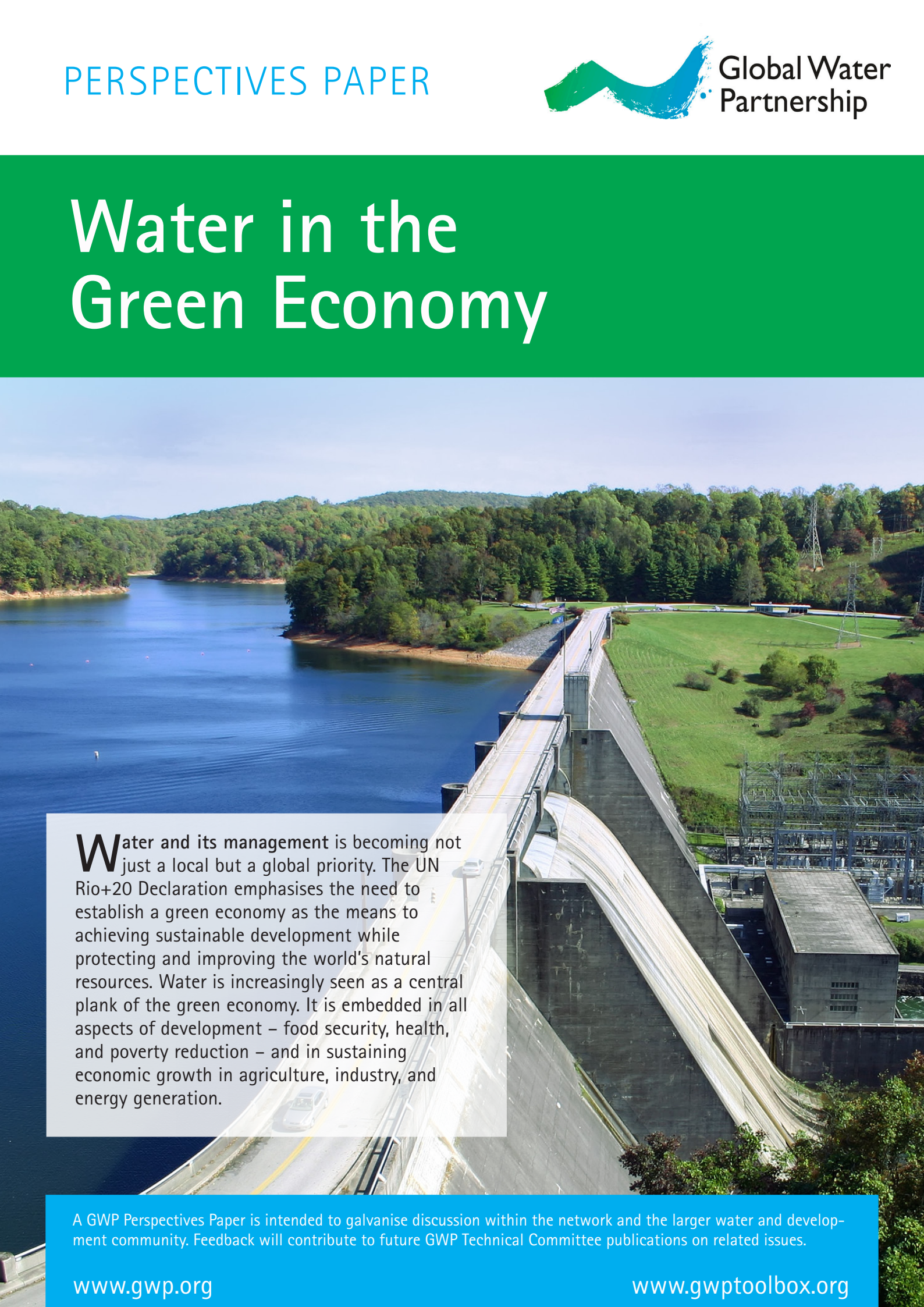


# Water in the Green Economy



**W**ater and its management is becoming not just a local but a global priority. The UN Rio+20 Declaration emphasises the need to establish a green economy as the means to achieving sustainable development while protecting and improving the world's natural resources. Water is increasingly seen as a central plank of the green economy. It is embedded in all aspects of development – food security, health, and poverty reduction – and in sustaining economic growth in agriculture, industry, and energy generation.

A GWP Perspectives Paper is intended to galvanise discussion within the network and the larger water and development community. Feedback will contribute to future GWP Technical Committee publications on related issues.

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 164 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 eco-systems 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.

GWP Perspectives Papers are available at the GWP IWRM ToolBox: [www.gwptoolbox.org](http://www.gwptoolbox.org)

*Towards Integrated Urban Water Management* (2011)

*Increasing Water Security - A Development Imperative* (2012)

*Water in the Green Economy* (2012)

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The Stockholm Statement (2011) described water as the 'bloodstream of the green economy'. Yet water resources are limited in many parts of the world and pressures are increasing as the demand for water for people, food, industry and the environment grows. If the world continues to use water at current rates it is estimated that demand could outstrip supply by as much as 40% by 2030, putting both water and food security at risk, constraining sustainable economic development, and degrading the 'green infrastructure' on which everything else depends.

Momentum is now building to highlight water and its role in the green economy as a priority issue for Rio+20. In November 2011, world leaders and professionals gathered in Bonn to prepare for Rio+20 and they examined water as the common thread connecting food, energy, and climate change. The Bonn conference highlighted that sustainable development and growth beyond poverty eradication can be achieved by better management of the world's ecosystems and a more informed and optimal use of water, land, and other natural resources.

We argue that water is not just part of the economy; it is embedded within the economy. Without it the economy could not function. Thus water will be central to the innovative thinking and effective solutions required to establish the green economy. In this paper we set out the case for an Integrated Water Resources Management (IWRM) approach to water security (Box 1) and its potential to lead the process of 'greening' the world's economies.

## Shocks and challenges

Twenty years on from the first Rio Conference in 1992 – the world summit that addressed sustainable development – the world is still facing immense challenges. Meeting the Millennium Development Goals (MDGs) has been clouded by major issues that have slowed progress. Over the past decade we have seen increasing globalization, rapid demographic changes, and the continued presence of hunger and poverty, particularly in Africa and South Asia, where there is little prospect of meeting the MDGs by 2015. The world has also experienced several, and in some cases, unexpected shocks.

### Box 1: GWP's vision of 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.

*Global Water Partnership (GWP) Strategy 2009–2013*

These include:

- the rise in energy prices in 2008 and 2010 and concerns about energy security;
- related food and commodity price rises;
- worries about water and food security and how to feed 9 billion people by 2050;
- declining ecosystem services; and
- the global economic recession.

Climate change adds another level of risk, which may bring the prospect of more extreme and unpredictable floods and droughts to those parts of the world that are already struggling to cope with climate uncertainties.

All these shocks and challenges impact both developing and developed countries and they are testing the optimistic global vision of increasing prosperity and the relevance of the economic growth model accepted by industrialized societies. There is a growing realization that the earth's resources are

insufficient for the world to continue along this path if it is to meet the rapidly changing demands and expectations of a growing population. But the consequences of the financial and economic crises and concerns about natural resources degradation are coming together in a way that is creating unprecedented opportunities for fundamental economic, institutional, technological, social, and political change. Innovative economic models are required together with a fundamental need to 'green' the world economy in order to provide long-term economic and resource sustainability. Water security is crucial to these changes (Ait Kadi, 2010).

## The 'green economy' – a next step in sustainable development

Although academics and specialists may argue about what 'green economy' means, it is an idea that is intuitively understood by the general public and politicians and has been popularised by the media. Green economy is synonymous with 'green growth' though some critics are uneasy about the implications of 'growth'.

Several organisations, principally OECD and various

UN agencies, are working on what green growth means in practice. They are developing strategies and examining implications for both developing and developed countries. The OECD explains green growth as "fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies. To do this, it must catalyse investment and innovation which will underpin sustained growth and give rise to new economic opportunities" (OECD, 2011). UNEP defines a green economy as one that results in – "improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities" (UNEP, 2011a).

Such statements respond to the growing recognition that economic growth and environmental stewardship can be complementary, thus challenging the view that it is a zero-sum game. Tradeoffs will be needed but these can be managed. Agreeing a technical definition for green growth is not necessary to understanding its attractiveness. A more practical approach may be to seek consensus on the principles that underpin a green economy and to focus on the desired outcomes.

With green growth as a major theme of Rio+20, it is a natural next step to make sustainable development a reality that includes economic growth and which





respects the limits to the earth's natural resources. However, there is no 'one size fits all' approach and a variety of solutions will be needed to achieve green growth depending on national circumstances. Green growth is relevant to rich countries which need to retrofit their resource-consuming industries and lifestyles as they begin to realise that sustainability applies also to them. It is relevant to poor countries which have opportunities to avoid copying damaging development paths. They can leapfrog old solutions and adopt new technologies and ideas, such as mobile phone banking, without incurring all the extra costs. But importing development pathways and institutions that underpin technologies is far more challenging.

Growth is still the first priority for most countries. The MDGs cannot be met without growth. But unsustainable borrowing from natural resources will not help to meet these targets. The unusually high consensus on the need to mitigate and adapt to climate change is focusing minds on sustainability and the fact that we are borrowing natural resources from the future to satisfy the economic demands of today. This is worse than the financial crisis because if resources are depleted beyond a sustainable level there is no means to pay back the debt. 'Quantitative easing', as practised in the financial world, is not an option for natural resources.

### Box 2: Green growth...

- Takes account of natural resource constraints and realities
- Understands physical, social and political realities
- Recognises the climate is changing
- Transforms a country over time and sustains the wealth created
- Does not disadvantage future generations

Green growth is about productivity related to limited resources such as water. It is not just about GDP. It is not just about energy in the context of a low carbon economy that reduces greenhouse gases (GHGs), though this is often the overriding area of concern. Green growth goes beyond energy and climate change and must embrace and extend ideas that have been on the table for decades and culminated in the 1992

### Box 3: Green growth in action

Proponents argue that green growth would emphasize sectors that are among the most dynamic in terms of both growth and employment creation. For example, the exponential growth in renewable energy such as wind and solar, both in developing and developed countries enabled these 'green' sectors to grow and deliver double dividends, being beneficial both for the environment and for development. Green economy investments in the maintenance and restoration of natural capital would directly contribute to growth by improving productivity (e.g., in agriculture) and create additional income-generation opportunities through improved ecosystem services.

*Preparatory Committee for the United Nations Conference on Sustainable Development, 2011*

UN Conference on Environment and Development (UNCED). UNCED addressed the state of the global environment and the relationship between economics, science, and the environment in a political context. Governments agreed and acknowledged that environmental protection and human development were inextricably linked. They described sustainable development as "meeting the needs of the present without compromising the ability of future generations to meet their own needs". This is still the guiding principle for what is now called green growth.

Green growth requires economists, with others, to find realistic solutions that take account of future natural resource scarcity when considering growth and to translate environmental values into economic analysis in order to fully assess overall wealth and well-being. A green economy would recognise the sum total of all human and ecosystem contributions to well-being and how they collectively provide the complete life system support we need for present and future generations.

## Water for development and development for water

Water has always played a central role in societies and is a key driver of growth and poverty alleviation. It is a source of production, growth, and prosperity,



but it is also a threat because of its destructive powers which can cause poverty and death through droughts and floods, and can cause contamination, disease, dispute, and conflict. All aspects of production depend on water – agriculture, industry, energy, and transport. Most industrialised nations have a legacy of 'easy hydrology' – low rainfall variability and rain distributed throughout the year and perennial rivers sustained by groundwater base flows (Grey and Sadoff, 2007). They invested heavily in water infrastructure, institutions and management capacity to both exploit the benefits of water and to insulate society and economic growth against water's destructive powers.

Developing countries recognise this but lack the investment, institutional structures, and capacity to improve their water security. Most have large rural populations that rely on subsistence agriculture and are exposed to the vagaries of unpredictable seasons and also to the 'difficult hydrology' of absolute water scarcity and severe flood risk, usually at different times but often in the same place (Grey and Sadoff, 2007). More difficult hydrology usually means more costly infrastructure to control and manage water.

Water security is the main aim of investment in water. But does investment in water drive growth or does growth drive investment in water? In most cases water security is a driver of growth and a prerequisite for business investment. But in some places good water management comes as a consequence of growth. Improved water supply and sanitation, for

example, can boost economic growth. Poor countries with improved access to clean water enjoy average annual growth rates of 3.7% whereas countries with the same per capita income without access have average growth of only 0.1% (WHO, 2005). What is clear is that water security and growth are symbiotic.

## The power of Integrated Water Resources Management (IWRM)

Agenda 21 (agreed at the UNCED in 1992) explicitly supports the use of natural resources for social equity, economic development, and a sustainable environment. Integrated Water Resources Management (IWRM) offers a set of principles which help to operationalize Agenda 21 (Box 4). It addresses key water related challenges by seeking to balance the 'three Es' – efficiency, to make water resources go as far as possible; equity in allocating water across different social and economic groups; and environmental sustainability, to protect the water resources base and eco-systems. These principles recognise that water is a public good with both social and economic values and that good water management requires both a broad holistic perspective and the appropriate involvement of users at different levels (Muller and Lenton, 2009). The integrated approach explicitly challenges conventional, fractional water development and management systems and emphasizes more coordinated decision making across sectors and scales. IWRM is not an end in itself; rather, it is a means to achieving the three strategic objectives.



Blueprint solutions do not exist but experience shows that good water management involves:

- sound investment in infrastructure;
- a strong enabling environment;
- clear, robust institutional roles; and
- effective use of management and technical instruments.

There are now a growing number of examples of the effective use of these principles. In spite of difficulties faced when implementing this approach, 84 countries out of 133 taking part in a UN survey have developed IWRM Plans with significant impacts on development and water management practices (UN-Water, 2012).

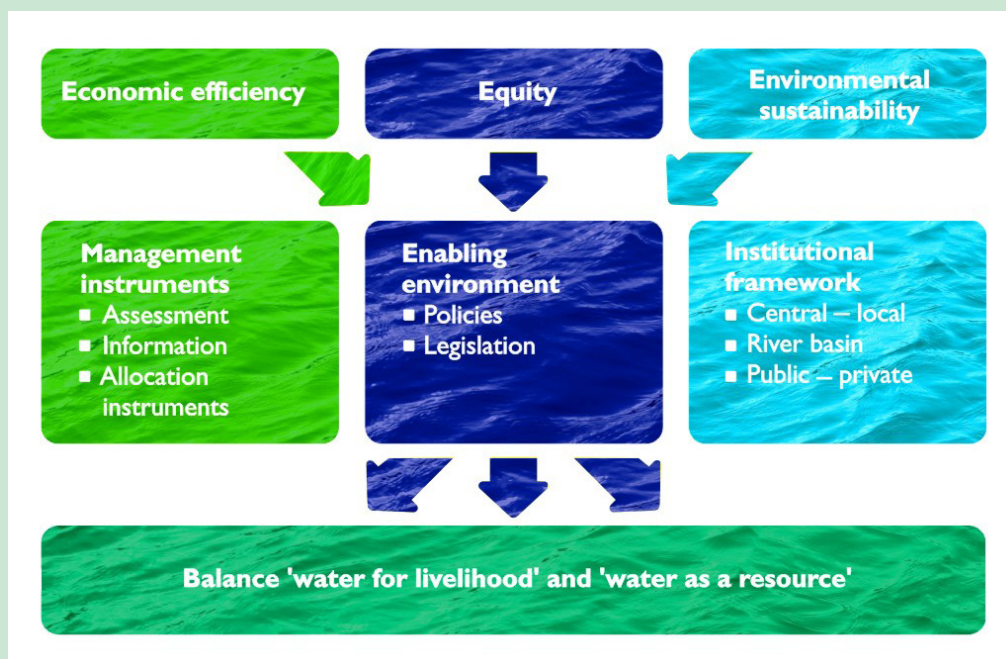
## Linking water security and green growth

Water security and green growth are inextricably linked. First, water, unlike any other natural resource, touches every aspect of society and the environment and is essential for our well-being. Water is embedded in all aspects of natural resources management for inclusive and sustainable growth, in energy and other productive activities, and in sustaining ecosystems on which everything depends.

Second, good water management depends on adopting an integrated approach. GWP, with others,

### Box 4: IWRM provides a lens

Integrated Water Resources Management (IWRM) provides a lens through which the many interlinked drivers and potential consequences of economic, social, and environmental changes can be identified, and coordinated actions formulated to holistically achieve economic efficiency, social equity, and environmental sustainability (GWP, 2000).



IWRM was an approach first called for in Agenda 21 of the UNCED in 1992 in order to improve water resources management by integrating water services and providing good governance, appropriate infrastructure, and sustainable financing. When water was plentiful and abstractors few, the rules of water sharing in most societies were few and basic. But as water use increased and shortages occurred and awareness grew of the impact this had on the environment, more complex institutions were needed to negotiate and coordinate water allocations among different users. Administrations responsible for developing and managing water resource infrastructure had to pay more attention to the management and protection of the resource.

*Muller and Lenton, 2009*

has for many years supported countries to adopt an IWRM approach. The approach is increasingly seen as a pillar of green growth. A fragmented approach will not lead to green growth. For example, when a watershed is deforested, it is the value of the timber and the cost to harvest that timber that is generally accounted for in the economic analysis and price, not the clean water no longer being produced by the watershed or the carbon no longer being sequestered by the trees (UNEP, 2011b). Water security cannot be achieved without a more enlightened green growth approach to economic development. Water security and green growth are synergistic and mutually reinforcing.

to the sustainable management and use of ecosystems as the 'green infrastructure' which supports economic growth and food and water security, including protection from floods and droughts.

Rethinking water storage holistically is essential, whether through small-scale solutions such as rainwater harvesting and natural storage, or large-scale management of reservoirs, storm-water systems and aquifers. We can seek solutions in time-honoured traditional ways of safeguarding water as a precious resource and at the same time utilise the latest technologies of remote sensing and geospatial mapping to better understand the water system.

### Box 5: Synergies between water security and green growth

#### *Characteristics of green growth*

- More effective use of natural resources in economic growth
- Valuing eco-systems
- Inter-generational economic policies
- Increased use of renewable sources of energy
- Protection of vital assets from climate related disasters
- Reduce waste of resources – and finance

#### *Characteristics of water security*

- Ensure enough water for social and economic development
- Ensure adequate water for maintaining eco-systems
- Sustainable water availability for future generations
- Balance the intrinsic value of water with its uses for human survival and welfare
- Harness productive power of water
- Minimise the destructive power of water
- Maintain water quality and avoid pollution and degradation

IWRM is now well accepted in principle but it takes time and skill to apply it in practice as it requires considerable coordination and information sharing among multiple sectors and different layers of authority. Administrations are still structured principally by economic sectors (as are International Financial Institutions) whereas water, as a natural resource, impacts on and is impacted by these sectors but often has no institutional home. Water resources are thus easily exploited and polluted by users due to its weak management and/or regulation.

Managing water better can provide 'no regrets' opportunities and solutions to support green growth and build resilience to climate change. The profligate use of water is common in many countries and this is coupled with low rates of innovation and investment in water worldwide. Fortunately, there is tremendous scope for adaptation. This applies to all economic sectors including energy, industry, and agriculture, and

Recycling and reusing both domestic and industrial wastewater multiplies the volume of water available for human use, and treating waste can produce energy. Agriculture is a key sector where future water productivity gains are essential to achieve green growth. Since agriculture uses the lion's share of water in many countries (as much as 90% in some), these shifts will have benefits across other sectors – be it environment, energy, domestic water consumption, industry, and flood protection.

There is a risk that political attention and funding will be targeted entirely at climate mitigation related to energy issues while neglecting water or other natural resources. Of course, in many developing countries adaptation is the prime issue and building resilience to climate change is closely linked to achieving water security. (AMCOW & GWP, 2012)





## Managing the transition

A key question is how to best manage the transition to a water secure green economy. It will require prioritisation as not everything can be done at once. Possible actions will need categorising to optimise spinoffs and sequence activities for the short, medium, long term. The transition will require:

- Policy instruments that promote complementarities (economic, social, environmental) and leverage change
- Fiscal instruments that give a price to environmental goods
- Strengthened institutional arrangements that function within increasing complexity, cutting across sectoral silos and sovereign boundaries
- A new generation of financial instruments that share risk between governments and investors and make new technology affordable
- Skills development that support the emerging green sectors in the economy
- Information and monitoring: set targets, define trajectories and gather the right information to monitor progress (e.g., on water/energy efficiencies)
- Innovation planning: increasing water productivity, developing stress tolerant materials that can address water scarcity, salinization, groundwater contamination, as well as water quality and wastewater treatment.

The transition to a water secure and green economy will require contextualization and differentiation, and this will depend on each country's specific conditions. In the richer countries, the challenge will be to change lifestyles and reduce the consumption of natural resources to sustainable levels. In the developing countries, the transition will follow a different path as the challenge will be to stimulate economic growth in a way that water security and the green economy coincide with sustainable development. While hunger and poverty prevail, both water and food security will be high on the political agenda. A traditional approach to development through aid that tries to stimulate production is insufficient, and innovative ways of achieving growth are needed (Box 6).

### Box 6: Achieving green growth – the role of food security

In sub-Saharan Africa, where more than 80% of the population are smallholder farmers, with few exceptions all the effort and investment by governments and development agencies over the past 50 years have failed to improve productivity and stimulate growth in agriculture. Attention has focused on improving seed varieties, using fertilizers, and building agricultural extension services and on restoring water and ecosystems to reverse anthropogenic damage. But farmers rarely adopt productivity enhancing technologies when the links to cash markets are poor. So there are few incentives to grow more than household needs and in such circumstances people become trapped in subsistence farming and in poverty.

Pushing productivity is necessary but not sufficient. It is equally important to consider how to deal with crops once they are harvested; how to develop agricultural value chains which link farmers and consumers; how to improve postharvest handling, value addition processing, and develop thriving and profitable market-driven food sectors. These are the 'pull' factors which drive most modern market economies and in turn drive productivity and growth. Fewer farmers may be needed as productivity increases but more people will be needed to work along the value chain. So employment shifts from farming to agriculture in its broadest sense. In the UK for example, less than 4% of the population work in farming whereas up to 25% work in the food industry. The opportunities are there and the twin pressures of scarce water resources and a growing consumer demand for safe, quality food products with sound provenance can provide the conditions for both growth and sustainable development – the very essence of the green economy.

*Kilimo Trust, 2012*

River basins are a natural and logical place for spatial planning and making visible upstream/downstream effects on resource use. Stimulating business development will require a trans-disciplinary approach which brings together the different sectors and stakeholder levels. By focusing on responsible business development this would encourage 'river basin development and management planning' rather than the more traditional focus on water and 'river basin management planning'. This would bring together private investors to work with spatial planners and water managers in a more constructive dialogue. The development of new business could be guided by the participatory processes of IWRM. This would enable businesses to assess the reliability of available water resources from an investment perspective and would enable planners to elaborate strategies for managing drought and flood risks and indicate clear limitations for investors.



However, moving from a conservative approach to sustainability to something more dynamic will require a strong and flexible framework to guide development initiatives. Froebrich (2011) suggests using the IWRM approach together with 'Basis-Boost-Balance' as a useful framework for achieving growth (Box 8).

Such frameworks are in their infancy and whatever emerges, for the developing world boosting innovation and business must be at the centre of development. Tools will be needed to quantify the magnitude of production upstream with restrictions downstream in a manner that is easily communicated to stakeholders, decision makers, and planners. Shared understanding and agreements between business development and



### Box 7: Facilitating green growth by extending the IWRM process

- Putting an organized process for business innovation at the centre of development
- Specifying the related needs on land, water, energy, and biodiversity
- Specifying the acceptable damages from risks of droughts and floods
- Specifying related inter sector interactions
- Elaborating sustainable production limits and related adaptations for business development
- Specifying related uses of land and water resources at basin scale
- Formulating the River basin development and management plans

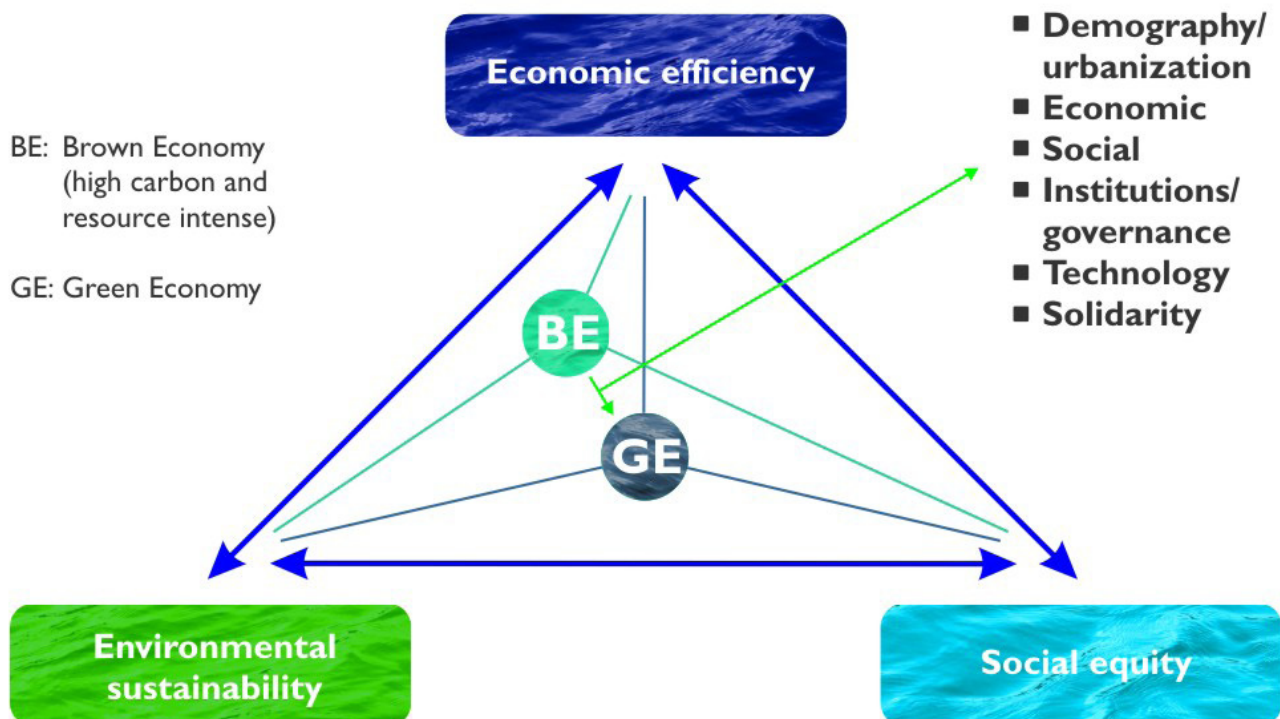
resource management will be essential. It will be crucial, for example, for water and environmental managers to understand that farmers are driven by questions of investment, harvest risks, and the impact of markets rather than by managing the restricted availability of natural resources. Only when all the actors are involved can there be a common accord and successful discussions on green growth.

Demographic, economic, and social transitions will all be needed as well as core changes in institutions and

governance. Domestic institutions may play a major role in either facilitating or inhibiting the transition. The higher the level of institutionalization and governance, the more the transition is likely to be facilitated. Technology and solidarity are two key drivers for this transition. It includes both South-South solidarity and cooperation, mainly with regards to sharing trans-boundary waters, and North-South solidarity in the form of transfers of technology, training and capacity building, investments, and greater market access (Figure 1).

Figure 1

### Managing transition to Water Security and Green Economy (3 Es)



Mohamed Ait-Kadi, Chair GWP Technical Committee

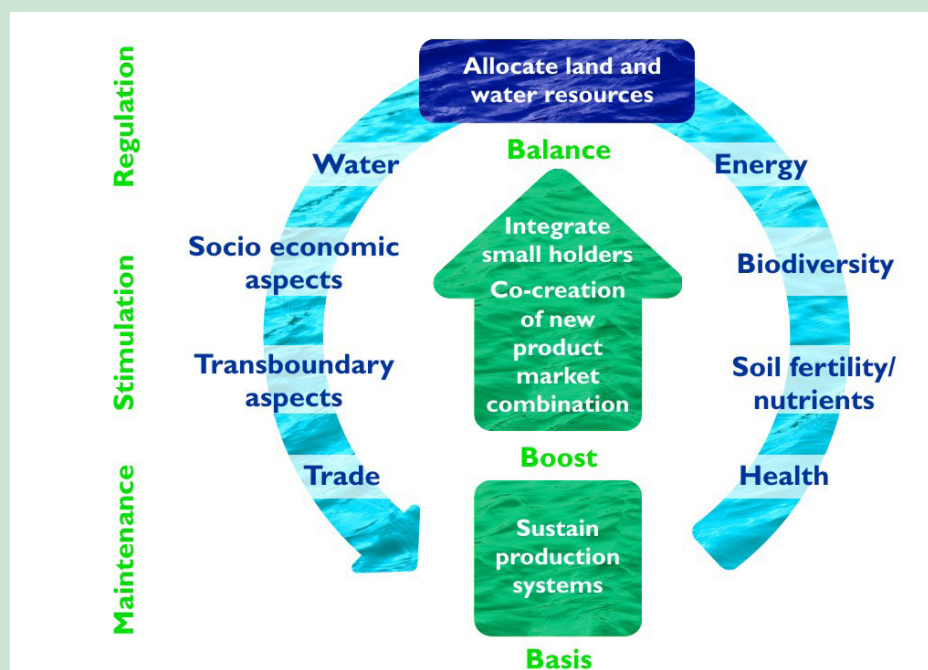
## Moving forward

An IWRM approach to development is a potentially powerful tool to facilitate and lead the process of 'greening' the world's economies.

Green growth requires a significant shift in thinking on the way economies are run. There is a risk that change will be too slow. There are dangers that green growth will be hijacked by advocates who manipulate

### Box 8: Extending IWRM to encourage entrepreneurship (Basis – Boost – Balance)

'Basis' is about sustaining production systems – maintaining and protecting land, water, and ecosystems as the foundation for green growth.



'Boost' is about economic growth. There are examples of development, such as irrigated farming, that have helped to increase production but have not necessarily contributed to poverty eradication and the development of entrepreneurship. Transboundary water resource issues are often restricted to compacts and agreements only to share water and often overlook the opportunities to share products and trade among riparian states. Economic development does not necessarily emerge by itself, rather it requires stimulus to initiate innovative business opportunities. Green growth requires dedicated initiation of activities that lead to both technical and non-technical innovations which can speed up poverty eradication and economic development using implicit knowledge, public participation, and co-creation processes.

'Balance' is about getting the right balance between economic growth and maintaining the natural resource base. There are many examples, such as the disappearance of the Aral Sea in Central Asia and Lake Chad in Central Africa and the irreversible biodiversity losses worldwide that have resulted from not getting this balance right. There are helpful, widely available instruments such as environmental impact assessments, water footprints, and lifecycle analyses. But they are often used only for single activities such as building a dam. So it is still difficult to address the intrinsic interactions at different scales – local, catchment, regional, global.

*Froebrich, 2011*





it to fit their own political agendas. This could lead to inefficient and costly policies that achieve neither growth, nor natural resources protection, nor inter-generational equity. There is discussion about employment impacts with some seeing opportunities and others using the rhetoric of 'green jobs' to promote unrelated policy aims. Poverty reduction is a key element of green growth but some may use it to promote anti-trade positions that militate against reducing poverty. Similarly, businesses can market the 'green' label while continuing to pollute or lobby selectively against policies that threaten their non-green practices.

Such approaches are unhelpful, not thought through, and contradicted by both economic theory and the experience of the world economy.

Experience shows that such concepts can lead to endless academic debate, studies, and revised policies and plans, all of which delay action. Green growth has to address natural resources more broadly, in particular for water. However, there is a risk that political attention and funding will be targeted entirely at climate mitigation related to energy issues while neglecting water or other natural resources. This is already happening to some extent.

The transition from current practice will require a paradigm shift. Integration is central to achieving such a fundamental shift, as is harnessing strong partnerships between policy makers, professionals and local communities in both the developing and developed world.

Governments need policy instruments that accelerate progress to a green economy. Seeking a green economy will not be easy and will require unpopular decisions. For example, the price of natural resources will have to increase. This is happening for oil and minerals, and water and food may have to go the same way if it is to be taken as a serious part of the green economy and not just exploited. Similarly, subsidies for environmental 'bads', including water pollution, have to be removed and taxes reformed to promote natural resource efficiency not profligate waste. Incentives are needed for business to adopt green practices and government investment programmes should target climate adaptation (e.g., flood measures, water reuse and recycling) and research for new green technologies. This will have to be accompanied by public awareness to promote green solutions. It is essential that we develop a framework for green growth and water security that incorporates the integrated approach and addresses water within wider socio-economic goals.

#### Box 9: Green growth creates new water market opportunities and new employment

The global water industry is on the cusp of massive change. By 2016 the capital expenditure on water infrastructure is estimated to increase 1.5 times from US\$90 billion in 2010 to US\$ 131 billion (Global Water Intelligence, 2011) About 0.5 million new jobs will be created by 2025 in South Africa as a direct result of green economic initiatives, half of them in natural resources management. This is according to a study by the Industrial Development Cooperation, the Development Bank of Southern Africa, and Trade and Industry Policy and Strategies.

*Maia et al, 2011*







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