



## Water planning in the transition towards a green economy

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*Freshwater is a finite and vulnerable resource, essential to sustain life, development and the environment;*

*Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels;*

*Women play a central part in the provision, management, and safeguarding of water;*

*Water has an economic value in all its competing uses, and should be recognised as an economic good.*

*The Dublin Principles*

*The opportunity to improve governance arrangements is one of the biggest opportunities to speed transition to a greener economy. In any area where there is water scarcity, it is critical that governance arrangements are put in place to prevent over-use and overdevelopment of the available water resources.*

*UNEP (2011)*

### The challenge for planning

Water is not only essential for the production of single commodities, goods and services and for meeting individuals' drinking water and sanitation needs. Water is also fundamental for the maintenance of the entire economy. Development prospects in any nation are propelled or constrained depending on the way water resources are managed. Welfare advances and economic progress in poor and rich nations are more or less vulnerable, depending on the state of conservation of water resources and water infrastructures. Personal development opportunities depend on the access people have to basic drinking water and sanitation services. The fragile border between social peace and civil conflict often depends on how the benefits and costs of water use are shared amongst individuals and countries. Ultimately, the future of humanity



depends on the conservation of the earth's ecosystems and their ability to provide the critical environmental and water services the economy and the entire global society depend upon.

For all the aforementioned reasons, decision making on how and how much water to use in the economy or to conserve in nature cannot be simply left to individual interest. *Water needs to be governed.* But water planning is not only concerned with building the infrastructures to satisfy rising water demand as a result of economic and population growth. This is not possible in the long term because, firstly, water resources have a limited capacity to cope with water abstractions and effluent discharges, and secondly, because the benefits we obtain from using and transforming water ecosystems (by abstracting, diverting, degrading water sources, etc.) enter in conflict with other important economic benefits whose provision depends on the conservation of water sources and their associated ecosystems. The last services include, for example, security in the face of droughts and future uncertain water supply due to climate change, flood control, self-treatment and depuration, biodiversity support, navigation, landscape and recreational opportunities and also the regulation of the water cycle which the provision of water depends on.

The transition towards the green economy requires improvements the water environment without harming prospects for economic development. This implies not only making welfare and social improvements compatible with the preservation of water resources but also finding new and innovative opportunities for economic growth and social development through sustainable water management. *Water plays a key role in economic development and water planning is a powerful social instrument for optimising growth, poverty reduction and environmental benefits.* This is the case in advanced, transition and poor economies as the cases of Spain, Korea and Laos show.

Water planning has a distinct role to play in less developed countries. The benefits of providing basic water and sanitation services in this early stage of development are of paramount importance for lifting people out of the poverty trap. Gains in health and education opportunities mean increased prospects for personal and social progress if revenue raising opportunities are also available (e.g. food production in rural economies). Water planning is important to start and sustain the development process. But water development can be challenging if water is scarce, requiring substantial investments in public infrastructure or the development of alternative water sources (such as water harvesting or desalination).

Climate change will increase the uncertainty and variability of water availability and will reduce the security of water services. Increasing water scarcity and variability (occurrence of droughts and floods) will affect rain-fed agriculture and water supply for domestic use, energy, industry



and agriculture, and will likely generate pressures for increasing irrigation and cultivating marginal lands. *Water planning must provide the institutional space to build a collective response to the climate change challenge and build the resilience of water management.*

The alternative to water planning is allowing the spontaneous, unplanned and uncoordinated actions of anyone affected by water stress; actions that could lead to increased vulnerabilities. Spontaneous responses from people, businesses, and farmers in rural communities depend on their perception of value and risk, the options available to them and their individual economic incentives. These responses may not necessarily produce the most sustainable outcomes. For example, they may add more pressure to cultivate marginal land, or unsustainable cultivation practices may be adopted when yields are reduced because of erratic rainfall. The end result may be increased water scarcity, land degradation and the endangerment of biodiversity, thus increasing vulnerability and reducing capacity to respond to climate change and other risks later on.

Planned and anticipated responses are needed to ensure the provision of water services which underpin the economic system. Water planning is also necessary to cope with environmental challenges such as water scarcity, water quality degradation and climate change risks.

### **Approach: the elements of planning**

*Reaching a social agreement on the desired balance between water use and water resource conservation*

The first purpose of water planning is reaching a social agreement on the desired balance between water use and water resource conservation, or in other words, agreeing on the balance between water use and pressures on the one hand, and conserving water on the other. This basic but politically challenging agreement is a necessary condition for successful water planning. For example, since 2002, the Water Framework Directive of the European Union has set the objective for water planning as making economic progress compatible with the improvement and protection of the status of the affected water bodies (any exception to this principle requiring a special justification in terms of improvements in economic welfare).

In an international river basin, this basic agreement on the balance between water use and water resources conservation might only be driven by the need to cooperate in sharing the benefits derived from the river. By specifying the responsibilities of each country and by enforcing the agreement among them, all the countries ensure their contribution to the benefits of preserving the international river basin. Successful cooperative agreements of this kind are based on the



mutual responsibility to comply with some precisely defined and observable environmental standards. A practical way to implement this kind of cooperative agreement is to incorporate these standards in national and local water planning so that the fulfilment of the international agreement and the credibility of the national partners are reinforced and foster cooperation. This is the case for the Mekong River basin international agreement and its important influence on the goals and means of water planning in the Lao PDR.

### *Harnessing development opportunities and coping with water and development challenges*

In the Ebro River basin, water management has been a tool for development. Water underpins the powerful agro-food industry, based on the development of irrigation systems, and a dynamic energy complex, centred on hydropower along the main river and its tributaries but also relying on water to cool thermal fossil and nuclear power plants. The river valleys are also essential for transport, the manufacturing industry and population settlement. Water planning has undoubtedly played a role in the progressive economic development of the region, but the amount of water used has exceeded its sustainable limits and recent efforts have been made to reduce water pressures and increase conservation of water resources. Modernising irrigation systems is now a priority for guaranteeing water supply and increasing the resilience of agriculture to droughts.

The existing dams in the Ebro basin are able to provide a reliable supply of water for urban areas and for irrigation as well as flood control services, but some efforts are required to avoid negative impacts on sediment balances, river bed encroachment and saline intrusion in the lower Ebro. Water development has been able to provide enough water of the desired quality for a variety of water uses, but increased use has reduced the amount of water stored and the potential for hydropower, thus reducing the value of the installed power generation capital. All this has reduced environmental flows and altered the habitat conditions, making river restoration one of the main objectives of recent water planning. The main objective of water planning in the Ebro today is recovering the balance between the status of water resources and their critical environmental services, and the gains already achieved in economic development.

The case of Laos is distinct because the country has abundant water resources (in fact most of the runoff of the lower Mekong comes from Laos). Moreover, in the Mekong river basin, Laos is a late comer to economic development and water resources are affected by water regulation in the upper basin, and in particular the significant hydropower projects already built or under construction in China. The transboundary nature of the river basin also means that intensive water use in Laos might have detrimental impacts on the already developed irrigation fields and populated areas of Vietnam and Cambodia in its delta. The development of Laos is only possible



if water planning is able to address potential conflicts between water users and uses, and able to transform competition over scarce resources into mutual cooperation to conserve and share the benefits of improved water resources. Adapting hydropower dams in China in order to meet irrigation needs in Laos, and water uses in Laos to help maintain environmental flows required in the Vietnamese Mekong delta, are examples of such mutually beneficial arrangements.

In contrast to the Ebro, Korea is a transition economy where there are still opportunities for the construction or the expansion of dams and weirs as a central element of water planning. Nevertheless, environmental objectives are still important as public demand for recreation and well preserved water landscapes increases with income levels. Moreover, there is a commitment to preventing further deterioration of water quality and water landscapes due to the perceived importance of water security and the need to meet water demand in the long term.

#### *Building governance and institutional capabilities*

Building governance and institutional capabilities is essential for agreeing on, designing and effectively implementing long-term integrated water management plans in order to support the transition towards green growth. The Laos experience illustrates a progressive strategy of improving water governance, by developing technical abilities, creating river basin management institutions, improving information systems and promoting stakeholder engagement.

#### *Coordinating public policies*

Water planning can only contribute to green growth if water is not perceived as a simple policy area (e.g. agricultural, energy or industrial policy). In the transition to the green economy, water planning needs to be converted into a cross-cutting policy, in order to guarantee that all other policies and projects – from urban planning to agricultural policy – are coherent with the collectively agreed objectives of water planning.

Policy coherence is critical because of the limited ability of water ecosystems to meet all the increasing and competing demands for water in the economy. Global water demand is increasing due to population growth, rising living standards, and expanding production of agriculture, hydroelectricity, and the many goods and services for which water is an essential input. Water requirements today and in the future cannot be met unless all these uses of water are coordinated and water sources are conserved. Water planning enables the coordination and alignment of the many public policies (such as land use, urban and rural development, manufacturing and energy policies) and public policy objectives (such as economic efficiency, equity, basic needs coverage or cost recovery) which influence and are influenced by water management. Instead of being



another public sector action, water planning makes water policy a horizontal axis connecting and coordinating many individual areas of public policy.

Green growth means increasing economic wealth and welfare without further deterioration of the water environment, and this is impossible without more efficient water allocation. But efficiency arguments are not valid when used to oppose the legitimate option of charging less than full cost recovery prices to provide basic water services in order to reduce poverty. Even in this case, there is a dilemma between subsidising water services and sustaining the provision of these services in the long term, for which self-financing is required. Cost effectiveness and budget constraints might also lead to excessive focus on the urban poor, offering them the lower cost alternative rather than providing water services to scattered populations in the rural areas. Deciding on the objectives for a river basin is a political and not a technical exercise. Identifying tradeoffs between different objectives and decision criteria in water management (such as efficiency, fairness, financial and environmental sustainability) is key to the planning process and provides the basis for political decisions to be made over what actions to take. A transparent planning process with stakeholder participation at all stages is essential and ensures that all voices are heard.

#### *Stakeholder engagement and public participation*

Effective water planning requires the cooperation and engagement of a wide range of stakeholders. Public participation helps construct a shared vision of the objectives, opportunities, challenges and collective and individual responsibilities involved in the management of water resources. It helps foster the perception of water as a collective asset to be preserved by mutual cooperation rather than a common pool resource to be depleted by open access and competition.

When people are aware of the benefits of cooperation through, they have incentives to build a reputation of good behaviour and social responsibility, fines can be perceived as fair and the threat of moral sanctions can deter misbehaviour. But this collective action can only be based on the common perception that water benefits are distributed fairly. This requires trust that the water authorities represent the common interest and follow transparent rules instead of their own discretion. Cooperation also requires that individual behaviour is observable in such a way that deviations are detected and pay a cost. Building effective participatory water planning therefore requires proper incentives, and must ensure that decisions are perceived as fair, rules are enforced, and there is transparent and adequate information available to all.

#### *Aligning private decisions with collectively agreed goals.*



Within limits any water user has the option to decide how much water to use, for what purpose, in combination with what other inputs. These decisions depend on many factors such as income generated by the productive activity, water prices, and installed water use technologies. For water planning, it is essential that all the decisions taken by water users are compatible with the different objectives of water policy. Incentives and regulations are then an important part of the package of measures in water plans. Charges for water services are one instrument to consider. If, for example, water is charged for with a flat rate, productive uses might have an incentive to use more water than their legally authorised water use rights, neglecting the needs of other downstream users and causing negative environmental impacts. These external impacts are not taken spontaneously into account in private decisions unless there are adequate incentives in the form of tariffs or penalties, controlled by a regulator. Energy subsidies, yield-linked agricultural subsidies and even water flat fees are all examples of incentives that may not be compatible with the objectives of water plans, including environmental goals. Water planning needs to address the compatibility of incentives transparently, identifying situations where these incentives are justified, and where they are not.

#### *Establishing collective responses to scarcity and risk*

Poor and water-scarce societies that are now trying to develop their water resources and provide basic water and sanitation services are faced with the potential adverse effects of climate change, constituting a real threat to development (World Bank 2010). Water planning is the proper institutional framework for coping with the challenge of adapting to climate change and for developing resilient and adaptive responses to drought, floods and other water related risks. Increasing uncertainty and competition for reliable water supplies makes devising water policy difficult and requires adaptive responses. Water allocation decisions and water demand management are especially crucial in the context of increasing competition and scarcity.

The options that may need to be considered in water planning include, as proposed by the IPCC, no regret strategies and climate justified strategies. No regrets strategies are measures that are worth taking anyway, regardless of climate change. Water storage schemes and infrastructures, water conservation programmes, and improvements in efficiency are examples of the kinds of measures already considered as beneficial but that are even more valuable in a climate stressed context (see Korea's four rivers programme). Climate justified strategies are measures which need only be considered in the face of uncertainty, for example, diversification of water sources (such as desalination or non-conventional sources), the upgrading of storm water systems, the reversal of coastal developments to reduce exposure, the recovery of floodplains for flood



protection, and the recovery of aquifers for buffering security stocks. Achieving water security requires agreeing on a combination of the available options.

### Summary of the elements of the approach

- **Obtaining consensus of the population.** Not only are the goals and instruments of water planning important but also the procedural aspects of how these goals and instruments are chosen with the participation of all the potential stakeholders. Participation can promote the vision of water as a social and economic asset that needs to be properly preserved instead of only as a provider of services. This way water planning promotes a common and shared vision of water assets such as aquifers and river basins.
- **Providing guidelines for economic activities and cities to make decisions on water use.** Once the goals and instruments of water policy are agreed upon, many practical recommendations are given to individuals, firms and institutions so that they can adapt their actions in order to improve their contribution to water conservation and green growth.
- **Making sustained welfare improvements and economic growth compatible with the recovery and adequate protection of water providing ecosystems.** This is the essence of sustainable green growth.
- **Coordinating individual actions with collectively agreed goals in terms of water use and water resources conservation.** Water planning can be a powerful instrument to ensure that the actions of individual water users are not in contradiction with the common social goal of protecting water resources, making growth sustainable, and ensuring intra- and intergenerational justice.
- **Avoiding the negative impact of individual, spontaneous and uncoordinated responses to natural disasters and climate change.** These kind of responses can lead to water scarcity, impair water related ecosystems and increase inequalities and social exclusion. Water planning can foster collective, anticipated and planned responses to climate change, water scarcity, floods, droughts and other water related risks.
- **Conflict resolution and management of the many social conflicts associated with the distribution of water among people, economic uses, time and regions.** Planning is a means to foster collective agreements, public participation and consensus building which are basic elements to promote a common vision of the river basin as a collective asset.



- **Promoting social justice** by guaranteeing basic human needs are met, despite the lack of market incentives to provide basic water and sanitation services. Planning can also promote equitable distribution of water use rights and water development opportunities among potential water users.
- **Helping preserve water resources and water providing ecosystems.** Instead of adapting water resources to the needs and demands of the economic system, the focus of IWRM is to ensure that economy expansion is not obtained at the expense of further degradation of water providing ecosystems, but on their improvement and adequate protection.

### Lessons learnt from implementation of planning processes

The approach	Lessons learnt from implementation
<p><i>Reaching a social agreement on the desired balance between water use and water resource conservation</i></p>	<p>Setting the achievement of a good or fair ecological status of the water bodies as the main objective of River Basin Management Plans in the European Union has been an important element of water planning in the Ebro River Basin in Spain and has helped make economic development compatible with environmental objectives.</p> <p>Adopting a set of international commitments regarding the environmental status of the Mekong River Basin in Laos has been a central element of the coordination of water planning with national development policies.</p> <p>In Korea, clear objectives for the recovery of river ecosystems has been a critical element for increasing legitimacy and gaining public approval of an extended programme of water works and infrastructure development in Korea that is critical for sustaining economic growth.</p>
<p><i>Harnessing development opportunities and coping with water and development challenges</i></p>	<p>Water planning has played an essential role in the development of the agro food and energy complex that now represents a competitive advantage and a defining characteristic of the Ebro River Basin in Spain.</p> <p>In Laos, water policy has been the cornerstone the country's success in progress with the Millennium Development Goals and in the ongoing transition from a rural to a urban economy.</p>



	In Korea, water planning has been developed as an anticipatory strategy to foster economic growth, preserve the welfare gains already achieved and provide water security in the future.
<i>Building governance and institutional capabilities</i>	An ambitious programme of building water governance structures is already in place in Laos. Transparency, regulation and enforcement, and building technical competences are key elements for this strategy to succeed, as seen in the Ebro river basin.
<i>Coordinating public policies</i>	<p>The simultaneous development of the energy, the agro food industry as well as urbanisation and the expansion of the manufacturing industry have been possible within the capacity of the limited water resources available in the Ebro river basin.</p> <p>The agreed commitments of the international Mekong agreement have been a central element in the National Development Plan of the Lao PDR and have contributed to the coherence between objectives in the different economic sectors and the general objectives of water policy.</p>
<i>Stakeholder engagement and public participation</i>	Active participatory mechanisms have contributed to the design of water management plans in the Ebro River, are being used in Laos and are an integral part in the management of water at local scales in Korea.
<i>Establishing collective responses to scarcity and risk</i>	The Water Framework Directive and the Mekong Agreement are promising examples of collective responses that have served to develop systematic efforts at a national and local level to respond to water challenges.
<i>Monitoring progress and compliance</i>	The acquisition of technical skills, the development of information systems, the building up of reporting strategies, etc. are all elements that have contributed to the reputation and credibility of river basin authorities in the Ebro and in the case of Korea. The capacity of the Lao PDR to manage its own water challenges have given credibility to its commitments in the Mekong agreement and has allowed Laos, in spite of being a LDC, to improve its position with respect to other national partners.



## Lesson learnt from the specific cases

The lessons learnt from planning experiences are the following:

Cases	Lessons learnt from implementation of planning processes
Laos	<p>Water planning needs to be based on and accompanied by institutional development. It is important to foster water governance structures such as the <b>establishment of River Basin Authorities</b>.</p> <p><b>Investment in the appropriate technical skills and the information technology</b> is essential for assessing the status and the potential of water resources for development, verifying the actual outcomes of water policy and for monitoring and enforcing the compliance of water regulations.</p> <p>Specific attention has to be given to <b>the development of participatory decision frameworks</b> and to favour stakeholders' engagement in the policy making process.</p> <p><b>Focused efforts to improve the ability of stakeholders to manage information</b>, compare complex water management options and also to agree on the objectives and instruments of water management are paying off.</p> <p><b>Fostering transparency</b> of water allocation decisions and the gradual replacement of discretionary decisions by rules and the application of norms is proving key to the avoidance of conflicts.</p> <p><b>Improving reporting and communication skills</b> can foster the ability of water management to fulfil international agreements in the framework of the Mekong river agreement.</p>
Korea	<p><b>Establishing clear objectives:</b> The Four Major Rivers Restoration Project of South Korea is to restore the Han River, Nakdong River, Geum River and Yeongsan River in order to provide water security, flood control and ecosystem vitality. It has five key objectives: 1) securing abundant water resources against water scarcity; 2) implementing comprehensive flood control; 3) improving water quality and restoring ecosystems; 4) creation of multipurpose spaces for local residents; 5) regional development centred on rivers. More than 929 km of national streams will be restored as part of the Four Major River Restoration Project.</p>



	<p><b>Linking it with national policy:</b> This project was first announced as part of the "Green New Deal" policy launched in January 2009. It was later included in Korea's five-year national plan released in July 2009.</p> <p><b>Coordination of sectoral Ministries:</b> The Four Major Rivers Restoration Project systematically approaches its objectives of restoring the rivers. As a comprehensive public project, the program includes a variety of plans submitted by several ministries, but coordinated by the Office of National River Restoration under the Ministry of Land, Transport and Maritime Affairs. The overall project consists of three sets of projects: 1) Main projects: the Han, Nakdong, Geum and Yeongsan rivers revitalization projects; 2) projects on the 14 tributaries of the four major rivers; 3) refurbishment for other smaller-sized streams.</p>
Spain (The Ebro River Basin Management Plan	<p><b>Establishing social development objectives:</b> The Ebro Water Plan is a social opportunity to build a system of water management which is ethical, efficient and sustainable within the Ebro River Basin in Spain. Under the principles of Integrated Water Resources Management it includes ambitious environmental objectives (at least 85% of river water bodies will achieve good status by 2015), and also contributes to sustainable growth, strengthening the agro-food complex in the Ebro valley and the role of water as an energy source in a future which relies on energy from mostly renewable sources, and encourages the inclusion of new uses of water, such as recreational uses.</p> <p><b>Implementing key measures:</b> The commitment to reduce pollution and the efforts to increase water efficiency are cornerstones of a process contributing to green growth. In particular, <b>technologies for modernisation of irrigation</b> in Ebro basin are necessary for efficient water management and the reduction of diffuse pollution, whilst simultaneously facilitating higher productivity. On the other hand, reducing pollution from point sources implies the creation of many <b>green jobs</b>. All in all, 56% of all the investments considered in the Ebro Water Plan are to improve water environmental status.</p>

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