



# **WATER SECURITY: EVERYBODY'S CONCERN, EVERYBODY'S RESPONSIBILITY**

by  
Paul van Hofwegen

**Discussion Draft Paper**  
for the session on  
**Water Security**

Wednesday, 13 June 2007  
Delft, The Netherlands

## 1. Defining Water Security

Water Security is the perception of having the possibility of being provided under varying circumstances with the needed quantity and quality of water and of being protected against the adverse and destructive effects water may bring.

Water Security needs to be established with the available resource potential in a competitive environment of multiple uses and users to meet basic human needs, to secure or enable improvement of livelihoods, to ensure a healthy living environment and to pursue a sustainable social and economic development for present and future generations.

Water security has many dimensions and will be perceived differently by different water users and uses in different geo-socio economic settings. Beyond securing basic needs, water security will be relative and perceived differently by individuals, communities, industries, nations and societies to the level of being assured of access to the needed amounts and quality of water for their particular purposes.

**Development of water security is shaped by local situations, asking for local knowledge, local standards, local approaches and local solutions.**

## 2. Elements of Water Security

Provision of water security means the acquisition, allocation, distribution and delivery of water to its users, the actual use and the collection and treatment of water after it has been used. It also involves the protection of the water source itself and the protection against water related hazards.

The establishment of water security needs the involvement of the following elements (fig. 1):

- The **needs** to be secured: what are they, how much water is involved, what are the priorities and what measures are necessary to reduce these needs?
- The **actors**: the key actors who need water, those who manage water, those who regulate, those who coordinate and those who ultimately decide. Support actors: civil society, research and education institutes, financing agencies.
- The **resources** and their potential: what are they, how much water is involved, what the variability of water availability is, and what physical and non-physical measures are necessary to develop these resources to meet the needs?
- The **infrastructure**: what is available, how can existing infrastructure be upgraded or modernised to facilitate the requirements in a water efficient and cost effective way:

Providing water security comes at a financial, environmental and social cost. The level of security planned will be decided by government, resource and utility managers ideally with the participation of the users. This will be based on the resource availability and characteristics, the needs, the infrastructure available or foreseen, the costs, the accepted level of risk and the price users and government have to pay.

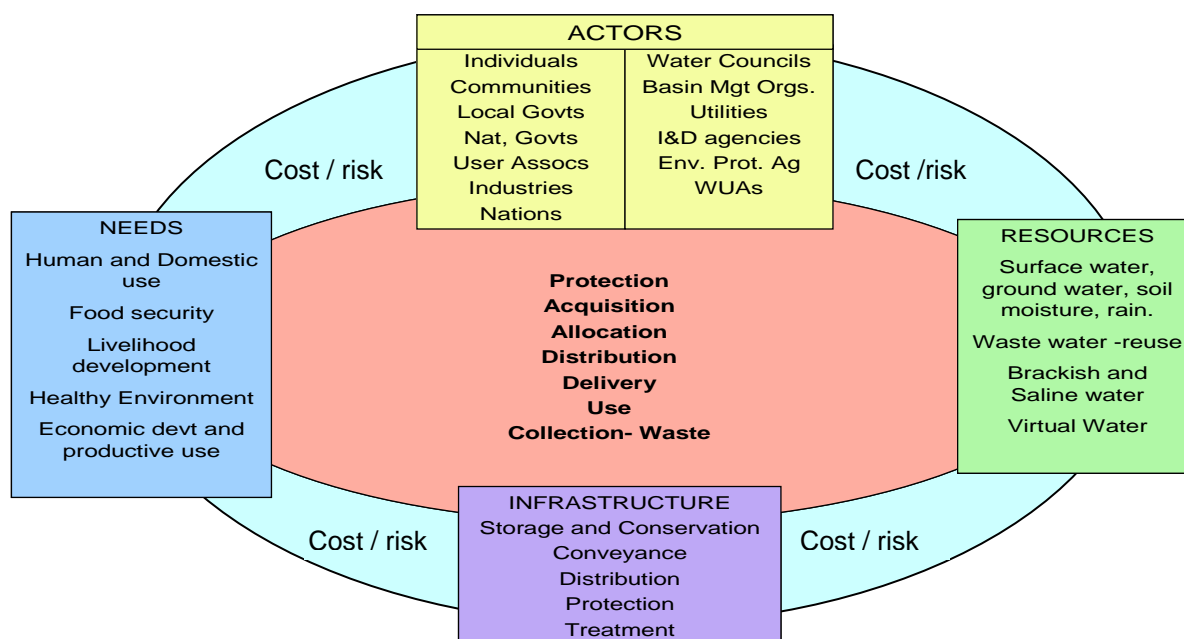


Figure 1. Elements for Water Security

### 3. The Needs

#### *Levels and priorities in water security*

Water is essential for life, and no one contests that every individual should enjoy the right to access water and sanitation to meet their basic needs and to live in dignity. However, at present more than 1.2 billion people worldwide are still denied access to safe water, and 2.6 billion people still lack access to basic sanitation. Every year 1.8 million children die from avoidable water-related diseases. (UNDP 2006)

Water security not only refers to security on quantity and quality of water but also on security against floods and other water borne hazards. Three levels of water security and priorities can be distinguished:

1. **securing human life: basic needs and protection** (drinking water, health, sanitation, hygiene, protection against life-threatening floods). - The recognition in national legislation of the right to water<sup>1</sup> which "*entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses. An adequate amount of safe water is necessary to prevent death from dehydration, reduce the risk of water-related disease and provide for consumption, cooking, personal and domestic hygienic requirements*".
2. **securing livelihoods:** access to water is required for farming, productive uses and a range of different purposes to secure livelihoods, exercising social, religious and cultural activities, creating a healthy living environment (e.g. flushing sewers, draining malaria mosquito pools etc) and providing a sufficient level of protection against "high frequency" destructive floods to protect these livelihoods.
3. **food security,** recognizing the right to food agriculture will remain the main user of water in the foreseeable future. More food and fiber are needed to cope with population growth, economic development and the trend towards more water intensive-meat based diets. Beside the potential for increasing production productivity, the potential for investing in consumer behaviour must also be tapped by reducing water intensive nutrients in the diet in many developed countries.

<sup>1</sup> The most explicit reference to the right to water is made in General Comment no. 15 (2002) which interprets Articles 11 and 12 of the International Covenant on Economic and Social Rights (ICESCR).

4. **economic and social development** (agriculture, energy, industry) to enable development of employment opportunities, access to proper nutrition, education, health and safeguarding investments to damage caused by floods or droughts.

**The hierarchy of priorities in water security for the various users and uses needs to be arranged in enforceable laws and regulations.**

#### *Water Rights and Right to Water*

Competition for water will continue to grow. Water users and water management organisations seek better institutional arrangements for coordinating use and resolving conflicts. Water security for basic needs, livelihood, food-security, industrial and environmental requirements will have to be based on mutual agreement among the actors based on a process of negotiation and resulting in rights, standards and processes to allow proper planning and implementation of water allocation.

Water rights can secure access to water for existing users and offer equitable ways to meet additional water needs related to population growth and migrations and including urban expansion, economic growth and environmental protection.

The right to water is an effective instrument to provide water security for all or in the case where many people are un-served, can be powerful in mobilizing local resources for local initiatives to obtain equitable and affordable access to water services and putting this higher on the political agenda..

Even if new laws and regulations are enacted, they remain unimplemented, opposed by powerful stakeholders, constrained by lack of political priority and institutional capacity or crippled by unworkable stipulations. Water right systems may help secure supplies for basic needs by restricting competing uses. However, actual delivery of basic needs depends on developing water supply systems and the institutions that manage and finance service provision (Bruns e.a. 2005).

#### **4. The Actors**

Every human being is actor in the water security play. Many may take it for granted but some do take it seriously and pursue action in an organised manner through user groups, consumer associations or civil society organisations. Water security concerns us all and we all have a responsibility to enable provision of security. The following are the main actors:

- The users whose needs are to be secured and whose lives and properties need to be protected. They also have the responsibility to protect resources, minimize pollution, contribute to security provision and act in solidarity with those that do not have the means or resources.
- The water resources managers and utility operators (public, private, community or user association) who need to be well informed on the water situation and have the necessary facilities to implement the provision of water security and to ensure reliable delivery of agreed level of services at the least cost
- The coordination platforms where water managers, government and users meet to set priorities, decide on allocations, protection measures etc.
- The national and local governments, who have to set the water security policies, develop the institutional framework enabling stakeholder coordination and participation, prepare associated legislation and regulation, allocate budgets, and facilitate access to finance and cost recovery for operators, and set policies for staff recruitment, incentive mechanisms and capacity development. Service failures and emergency response to droughts and floods become primarily issues of local governments.
- The politicians who need to be well informed on water issues before they decide on behalf of their electorate.

Providing water security is a public affair and therefore essentially a role of government through its local governments and specialised agencies. Water security allocations will be a result of a

negotiation process between all those concerned and require a common agreement on security standards based on application of the right to water, water rights and other entitlements. In such negotiations a hierarchy has to be observed in which a priority is given to basic human and domestic needs. Many countries have made this explicit in their legislation.

Distribution capacity needs to be available, in terms of infrastructure that allows delivery and use, and adequate financial, technical and human capacity to manage operate and maintain these systems.

However, it is impossible for the government to ensure all citizens to have been provided with their rightful amounts of water without active participation and involvement of the people: communities, water users associations, water conservation groups, farmer groups etc.

**Water security provision includes mobilisation and empowerment of user groups and providing them with the necessary financial and technical support. It requires a reorientation of water agencies to client oriented providers of water related services.**

## 5. The Resources

### *Hydro-meteorological observations*

The first requirement in the quest for water security is to know how much water of which quality is available. In a rapidly changing environment due to urbanisation and land-use changes the continuous collection and interpretation of hydro-meteorological data is of extreme importance. Unfortunately, the development and maintenance of hydro-meteorological observation systems and the capacity to make real-time purpose-relevant synthesis for decision making is usually lowest on the budget allocation priorities. Many decisions that are made are based on out of date, often not accurate and sometimes not even relevant data.

### *Development of access to resources*

Many countries, especially those in Sub-Saharan Africa suffer economic scarcity of water because water resources are inadequately developed. Infrastructure is necessary to enable harnessing of these resources and make them available to provide the necessary water security. Fragile political systems, low levels of economic activity and lack of access to markets make initial investments unattractive. Under such circumstances, development of water security requires local knowledge, local approaches, local solutions and local technology. It requires international solidarity mechanisms put in place appropriate infrastructure to trigger social and economic development.

### *Access to alternative resources*

In basins where water use approaches or exceeds the level of renewable water, access to alternative resources is required like reuse of waste water or desalinisation. Water resource managers and politicians also have the possibility to explore the potential of virtual water by considering reducing the stress on the resources through import of high water consuming food products. This requires adequate access to foreign exchange to pay for imports. This has to be generated by enabling exports requiring access to foreign markets.

### *Trans-boundary water bodies*

The dynamic nature of water as a resource makes its use in any one place affecting use and security in other places, including other countries. Modest changes in the water use upstream can affect water security in downstream countries. The way one country uses and manages its water will affect the water security situation of other countries due to (i) the competition for a finite supply of water; (ii) the impacts on water quality and (iii) the changes in flow regimes. International water resources like rivers, lakes, and aquifers support the hydrological interdependence of 40% of the world population. There are 39 countries with a population of over 800 million that depend on more than 50% of their resources from outside their borders. These problems are most evident in countries facing water scarcity. Lake Chad and the Aral Sea are visible illustrations of what happens when water flows are radically changed. Though water shortages have been the cause of the problem, the present water scarcity has been engineered through human intervention and diversion of flows. (UNDP, 2006)

In any country allocating water among users is a politically challenging task. Adding national borders to the equation complicates governance, especially when competition for water is intensifying. Trans-boundary rivers, lakes and aquifers bind countries into environmental resource sharing arrangements that shape water security and create livelihood opportunities. The optimal approach is to manage water, allowing benefit sharing of services and resources according to the countries' comparative advantage. Cooperation will only occur if the anticipated benefits exceed the cost of non-cooperation.

Governance of international water courses should be developed by taking into account the effects of use on other countries, the availability of alternative water sources, the size of the population affected, the social and economic needs of the watercourse states concerned, and the conservation, protection and development of the watercourse itself.

In 1997 principles for sharing water were codified in the UN Convention for the Non-navigable Use of Shared Water Resources. The core principles are "equitable and reasonable utilisation", "no significant harm" and "prior notification of works". However, only 14 countries are party to the convention for reasons that it does not provide tools for resolving competing conflicting claims and the lack of a practical enforcement mechanism.

**Water resource managers need to be supplied with information on (i) how much what water of which quality is available at which location, (ii) predict how much is needed where and when, (iii) trends and estimated variability, (iv) the possible impact of a variety of choices on water related interventions. They need to agree on and prioritize water allocations based on established and accepted agreements, rights, standards and regulations.**

## 6. Infrastructure and technology for reliable service provision

### *Matching infrastructure with management capacity*

Water security is not only about the availability of water but also about the capability to manage and maintain the infrastructure needed to provide the water services intended. Reliable service delivery depends on the serviceability and robustness of facilities and the financial, technical and human capability of service organisations to operate and maintain them. Many of the actual water security problems are due to lack of capacity, financial resources and incentives to properly operate, maintain and repair service infrastructure.

Technology choice is an important factor and should be based on affordability and local management capacities. It should be the result of interactions between service providers and their clients on the character and required level of security and service, the cost of service and the associated price to pay. This becomes even more relevant when systems are jointly managed with user groups like water user associations in irrigation systems or communities in local water supply or sanitation schemes.

### *Uptake of local innovation – many thresholds to overcome*

Local research has resulted in many potential cost reducing innovations but certifying and marketing these remains an obstacle for many. Much water saving or water purification technology exists but is often not accessible. Often the water saving potential cannot be realised because of lack of management capacity, technical support or operational funds.

Development of a local innovation capacity and linking this with the service organisations will beside establishing a technology support capacity, also trigger the development of a local water culture establishing pride in achievements and momentum in enhancement of sector performance.

### *Adapting to Climate Variability and Climate Change*

Accepting the notion of increased extremes in climate and the consequent increased likelihood of longer droughts and more extreme floods, measures need to be put in place to increase resilience of communities, water user associations and water service providers to deal with these phenomena.

Better understanding of the nature, extent and impacts of climate change requires progress in climate science on forecasts (seasonal and decadal) and their downscaling, effects of climate change on water resources and water availability in the next decade. It also requires clarification of the needs of

water resource managers for improved information and data collection as a basis for developing appropriate response strategies

To formulate priority adaptation measures, impacts and vulnerability assessments are required for distinct water users (e.g. utilities, water boards, national governments, coastal protection, agriculture, nature) to accelerating trends (sea level rise, snow cover melt, increased water scarcity) and extremes (including droughts, floods and hurricanes /storms).

Adaptation options (incl cost and benefits) need to be developed for distinct water users to increase their resilience like

- Early warning
- Structural measures: storage as a coping mechanism
- Non-structural measures: land use and spatial planning combating water pollution and desertification, effective management of surface and groundwater, watersheds and coastal aquifers, rain water utilisation
- Capacity building and finance

**Better understanding of the nature, extent and impacts of climate change requires progress in climate science on forecasts, effects on water resources and water availability and the needs of water resource managers for improved information and data**

*Bio-fuels*

The hiking oil prices, the realisation that oil and gas reserves are finite, the desire to reduce CO2 emissions and the desire to become more energy independent has led to an increasing interest in alternative energy sources. Bio-fuels have become an interesting alternative and changes in agricultural practices are already taking place. Sugar-cane, palm-oil, corn and other crops are now increasingly produced for bio-fuel production.

Adverse effects of bio-fuel production are coming more and more to the surface. To make a significant impact, much land is needed and forests may be cleared for this purpose. If not, existing land for food production may be converted into bio-fuel land reducing food production capacity and consequently raising food prices. Bio-fuel production becomes more productive if water management measures are taken: irrigation and drainage claiming and important share of the already scarce water resources.

On the other hand, bio-fuels will provide an opportunity to lift the agricultural sector out of its misery as commodity prices have until recently been very low and unattractive to initiate innovations and investments in the sector. Impacts of bio-fuel production on water and land resources, water and food security, economic development and the livelihood of people need to be better understood.

**Impacts of bio-fuel production on water and land resources, water and food security, economic development and the livelihood of people need to be better understood.**

**7. The Capacity Challenge**

Actors	Contribution to water security	Requirements for effective contribution
Water conscious users	Water saving measures Awareness of water use impacts	Clarity on rights and obligations and associated processes. Access to and participating in decision

	<p>Water rights</p> <p>Contribute to system sustainability</p>	<p>making processes on service provision and tariffication.</p> <p>Access to technology, technical advise and support, finance to invest innovation and legal recourse.</p>
<p>Accountable, service-oriented utility or system managers</p>	<p>Reliable provision of agreed level of service at least cost</p> <p>Knowing the extent and state of assets – asset management plans</p> <p>Expansion to provide (basic) services to those not yet connected.</p> <p>Cost recovery through service fees and subsidies</p> <p>Adequate information and technical support to communities and water user groups.</p>	<p>Serviceable infrastructure in good condition</p> <p>Adequately funded operations and maintenance and client services/technical support.</p> <p>Capable staff for planning, development, management, operation, maintenance, billing, fee collection and administration.</p> <p>Access to finance for investments</p> <p>Client oriented attitude at all level of staff</p>
<p>Environmentally conscious, sustainability oriented water resource managers</p>	<p>Knowing the (dynamic) state of availability and use of all water resources in quantity and quality by effective monitoring, recording and reporting.</p> <p>Rapid response to hazards.</p> <p>Short-term operational plans on actual needs, established water rights, real-time resource status</p> <p>Medium and long term water protection, use and development plans based on facts, trends in availability and use, and policy scenarios.</p> <p>Developing measures to provide water conservation, catchments' protection, pollution control and reliable bulk water delivery services.</p>	<p>Adequately funded hydro-meteorological network with capable and reliable field staff for observations, maintenance, renewal, analysis and reporting.</p> <p>Early warning systems</p> <p>Adequately staffed and equipped water resource planning bureau capable of simulating operational scenarios for short-medium and long term plans as support for decision making on water allocations, issue of water rights and licenses, land-use planning.</p>
<p>A well informed, representative and empowered water resource coordination platform</p>	<p>Developing visions and policy for water resource use considering and balancing all interest, rights and obligations.</p>	
<p>A visionary, enabling and facilitating national government</p>		
<p>Water conscious Politicians</p>	<p>Giving appropriate priority to water on political agenda.</p> <p>Consider the water impact of decisions</p>	<p>Well developed water journalism</p> <p>Access to advise and understandable water related information for decision</p>

	proposed. Use water as political aim, not as political instrument	making. Access to
--	--	----------------------

**References:**

Bruns, B.R., C. Ringler, R. Meinzen Dick (2005); Water Rights Reform: lessons for Institutional Design; International Food Policy Institute, Washington DC.

Dubreuil C., van Hofwegen P. (2006); The Right to Water – from Concept to Implementation; World Water Council, Marseille

UNDP (2006); Human Development Report 2006: Beyond Scarcity: Power, Poverty and the Global Water Crisis

Van Hofwegen, P. (2006); Financing Water for All – Report of the Gurria Task Force; World Water Council, Marseille

WHO, UNICEF (2005); Water for life: Making it happen

