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Water and sustainable development: the vision for world water, life and the environment *

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Abstract

Water is the essence of life. Fresh water resources have faced a crisis worldwide for the last five decades. The crisis is growing rapidly. This is manifested in numerous challenges showing the various elements of the problem. These challenges include, increasing scarcity of fresh water, lack of accessibility to adequate clean drinking water and sanitation, deterioration of water quality, fragmentation of water management, nationally and globally, decline of financial resources allocation for water development, threat to world peace and security and a continuing lack of awareness of the magnitude of the problem by the decision makers and the public at large. The World Water Council was established as an international nongovernmental think tank to deal with these challenges. It has stated a target to define the vision for the world water, life and the environment for the next century. The guiding principles for the vision are based on clear assessment of the world fresh water resources, application of the integrated water resources management, valuation of water, common and shared world interest among the stakeholders and their effective participation, comprehensiveness and global coverage of all forms of fresh water and the existence of will and commitment to translate the vision into action. A process and a number of mechanisms are identified, which include broadening of the participation of the stakeholders, raising public awareness, increasing capacity building, strengthening technology research and development, promotion of efficient and effective water management and mobilization of adequate financial resources from the public and private sectors. The vision should include specific targets and a timetable to accomplish them. It is proposed that a number of key targets may include clean drinking water and sanitation for all inhabitants by 2015, adequate and secure food supplies to all by 2005, preservation of the environment and aquatic biodiversity by 2020, secured sustainable economic growth and promotion of world peace and security starting now.

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1. Introduction: water, life and sustainable development

The world's fresh water is one of the most important resources known to mankind. Water is life. This powerful statement underlies several characteristics that can only be attributed to water. Water is the essential element in the biological functions of all living organisms: humans, plants and animals. It has no known substitute. Water distinguishes the planet earth from all other planets by giving it its blue colour. Water has a number of unique physical and chemical characteristics, rendering it indispensable for many industrial processes, hydroelectric power generation, transportation and food production. Our economic, social and cultural life depend greatly on the availability and the accessibility to fresh and clean water supplies. Most, if not all, of our ecosystems depend directly on the availability of fresh water resources for their existence.

It is not an exaggeration to state that nations that are well-endowed in fresh water resources have an economic advantage over those less fortunate. Most developed countries today enjoy a degree of abundance in renewable fresh water resources while most developing countries, especially those in Africa, suffer from a lack of such resources. Water is essential for sustainable development in its truest sense and full meaning of the word sustainability.

This simple and powerful fact has eluded the world for almost a quarter century. Since the UN conference at Mar del Plata in 1977, a debate has continued as to what extent water is an issue or if indeed it is an issue at all. Despite several UN meetings, commissions and finally the Rio summit and its allied meetings since that time, this has not been resolved.

2. The World Water Council

The World Water Council (WWC) was established in 1996 as the international water policy think tank dedicated to advise, assist, advocate and raise awareness of the public and especially the decision-makers on global water issues. The World Water Council is incorporated in France as an international nongovernmental organization to serve its members and to achieve its stated objective and mission in serving the world community. Currently it includes more than 160 members from over 30 countries. A range of professional societies, NGOs, government agencies, United Nation organizations, international financial institutions, private sector firms, utilities, universities, research organizations, river basin organizations, water companies and several eminent scientists, engineers and decision-makers from the developed and developing world are also members. The WWC completed its organizational structure in 1997, through its first general assembly of members. It now has an elected board of governors, bureau and committees to implement its mandate. The Council held its first world water forum in Marrakech, in March, 1997 and will hold its second world water forum in the Hague, in March 2000. It publishes the Water Policy Journal, and participates effectively in all fora dealing with world water issues. The WWC collaborates with its sister organization, the Global Water Partnership (GWP), to further enhance the realisation of resolving the world water crisis.

The WWC's top priority is to develop a *vision for world water, life and environment* in the next century. This priority is a result of the resolution made at the first world water forum in

Marrakech mandating the council to develop the *world water vision*. The Marrakech declaration identified the process to develop the vision as "building on past international efforts and relying on the collective wisdom and resources of the global community. The process leading to the vision will include research, consultations, workshops, print and electronic publications and many other means for absorbing, synthesizing and disseminating knowledge. At the conclusion of this process, fully aware of the pitfalls along the way, the vision will offer relevant policy and region- and country-specific conclusions and recommendations for action to be taken by the world's leaders to meet the needs of future generations".

Several steps and actions have already been taken to initiate the process and to meet this challenge in co-operation with several organizations worldwide. The Paris International Conference on Water and Sustainable Development held in March 1998 was one such activity towards developing the vision and fulfilling the mandate given to the WWC in Marrakech.

3. World water challenges

The world's fresh water situation has reached a critical state over the last three decades. As we enter the 21st century, water shortages throughout the world continue to multiply at an unprecedented rate. Global warming and climatic fluctuations have exacerbated the situation. We have seen the effects of the El Niño phenomenon in floods, droughts, the unusual distribution of precipitation and other disturbances to weather patterns which add to the complexity of water management. The challenges posed by this crisis can be highlighted in the following seven points.

3.1. Water scarcity

Fresh water available for human consumption, for social, economic and cultural needs and for environmental requirements is rapidly becoming scarcer. In the 1950s, only a handful of countries faced water shortages. Now, in the late 1990s, the number of countries facing a water deficit has grown to 26 with a total population of 300 million. If action is not taken to reverse this dangerous trend, it is predicted that two-thirds of the world's population will face water shortages in one form or another by the year 2050. Food production, which consumes about 70% of the world's fresh water, is at risk and is the first area to be severely affected, with a wide range of ramifications. Uncontrolled population growth in the face of finite quantities of fresh water resources is at the heart of the problem and cannot be set aside without the gravest of consequences.

3.2. Lack of accessibility to clean drinking water and sanitation

Despite international efforts, approximately 1.2 billion people lack access to clean drinking water, 2.2 billion lack adequate sanitation and 4 billion do not have sewerage service. Those that suffer the most are the poor, particularly women and children. Some 5–10 million deaths annually are attributed to water borne diseases. This trend is likely to grow as water scarcity

increases and investment in the provision of water and sanitation services continues to decline. The world, for all its wealth and technology, today fails to meet the most basic human needs of its population. A shameful fact in this century.

3.3. Water quality deterioration

As a direct result of industrialization, urbanization, the growth of mega-cities, and the intensification of agriculture, massive amounts of pollutants have been discharged directly into waterways and leaked through to many ground water aquifers. Treatment of waste and pollution control measures has lagged greatly, resulting in the rapid deterioration in quality of most surface and ground freshwater resources in the world. It is rare to find pristine bodies of freshwater in the world and equally rare to find nonpolluted lakes or rivers. The effect on human health, especially in children and on the environment is incalculable.

3.4. Fragmentation of water management

International and national management of water resources have been conducted in a fragmented way, based on immediate needs and interests, without adequate regard to the finite nature and interdependence of the elements of the natural water cycle. Contradictory policies, plans and action are rampant. Weak institutions with competing mandates and overlapping responsibilities have resulted in waste of many of the scarce resources and are impeding the rational and integrated planning and management of water resources. Large segments of the civil society, such as the NGOs and private sectors are significantly involved in water management. Institutionally, a vacuum characterises world water management at the apex while at the base there is confusion. This is one of the reasons the WWC was created. A great deal more is needed to get the house in order.

3.5. Decline of financial resources allocation

Financial allocations to water projects and programs has steadily declined since the late 1980s. Developing countries in particular suffer from that decline. The private sector had been expected to make up the shortfall, however, this has not materialised to any significant degree. Current systems of water supply, sanitation, irrigation, drainage, flood control, waste treatment and watershed conservation are deteriorating due to lack of funding. Further decline could cause irreparable damage and endanger public safety. New investment is needed for the stability and growth of services to meet present and future demands.

3.6. Lack of awareness by decision-makers and the public

Water is taken for granted, as always being abundantly available and of good quality. This perception continues to persist even until, in many parts of the world, water shortages become a reality or until the quality deteriorates to a level that renders the water unusable. The media, education systems, professional associations and NGOs have paid inadequate attention to water issues and pending crises. Both the public and decision-makers accorded water a low

priority, resulting in inadequate public policies. Insufficient investment and lack of planning for the future reflect that weakness. The sustainability of the planet is threatened due to water scarcity and much of the world remains unaware of the threat and the consequences of inaction.

3.7. Endangering world peace and security

Water is the fundamental building block of life, the base of the socio-economic foundation of society and its environment. The decline of availability is increasingly threatening peace and security in many parts of the world. Most countries facing water shortages also suffer from political instability, social tension and public unrest. Some have already witnessed bloody conflicts, sectarian and tribal warfare. National and international trans-boundary water conflicts are powder kegs ready to explode at any moment in many parts of the world. Resolution of disputes regarding the shared water of more than 300 international river basins is still far from being reached. Millions of human lives are lost every year due to floods and droughts. Famines are the result of temporary or chronic water shortages. In a world of global community and interdependence, no one can be safe in the face of widespread threats and chronic problems. Water is central to many of these problems.

4. The vision ahead

The vision for world water, life and the environment is fundamental to unifying world leaders and world opinion makers towards a common goal and shared objectives, clearly defined targets and realistic commitment. The WWC realizes the importance of such action and accords it the top priority in its program of work. The work to develop the vision entails the analysis of thinkers; the scientific and professional skills of many world water professionals; the input of political leaders and decision-makers of diverse views and backgrounds. The ultimate vision must satisfy the needs and accommodate the views of a broad section of stakeholders around the world. It is equally important that the vision be inclusive of all sectors and uses of fresh water, without distinction of the state of development, geographic location and political or cultural affiliation. The basic components of the vision building blocks are outlined below.

4.1. The guiding principles

A number of basic principles need to be stressed in guiding our work to develop the vision. These *guiding principles* are based on and derived from our past experience in world water affairs since the Mar del Plata conference of 1977 and other subsequent fora. Many of these principles were considered more recently in the WWC workshop in Delft, Netherlands, as part of the building blocks to develop the vision.

4.1.1. Assessment of fresh water resources

Our present knowledge of the world's fresh water is inadequate to render efficient and effective management. Although there is a common agreement that water scarcity is pending,

the exact temporal and spatial distribution is not fully known. The various forms of fresh water need to be quantified and their quality is still to be determined. The comprehensive fresh water assessment completed in 1997 reveals many of the gaps and points to the need for continued coordinated efforts to carry out the assessments. Many actions are under way by the UN organizations and other institutions, which need to be fully coordinated to benefit the world community. Data collection should not be a one-time action, instead arrangements should be made for continual efforts to collect strategic information and update the world inventory on fresh water resources. Accurate data and information are prerequisite to sound and timely decisions. The assessment will develop adequate indicators for water supply, demand, scarcity and adequacy for humans and ecosystems needs within the framework of sustainable development.

4.1.2. Application of integrated water resources management

The principle of integrated water resources management was developed decades ago and received wide acceptance in many parts of the world. The vision will respect this principle and embody it in its concept for wider and practical applications.

4.1.3. Valuation of water

The cultural and socio-economic values of water are still a very elusive subject. Several learned meetings stressed the economic value of water, while others stressed its social and cultural values. The importance of one or the other will vary from one society to another and from time to time, depending on the specific historical background, cultural heritage, extent of fresh water availability and the socio-economic conditions of the concerned region. Developing a unified approach is required, with clearly defined associated conditions and limitations for its applicability, which should accommodate the diversity of the world's regions.

4.1.4. Common and shared world interest among stakeholders

It is imperative to the vision's success that it be based on the common and shared interest among the main stakeholders of the world water. The common interest will facilitate reaching consensus and strengthening the resolve to unify objectives, minimize disputes and facilitate the entire process. The interest is to reflect the awareness of world water problems and the need to act in a coordinated and cooperative system to reach and implement the vision.

4.1.5. Participation of the stakeholders

The participatory approach is an integral part of the guiding principles. It is equally important to have a common interest and full participation of the stakeholders. The WWC, through its members, represents a large segment of these stakeholders. Reaching out to a wider stock will be needed to reflect the world community especially those under-represented in international organizations. Attention is to be paid to regional disparities in representations of stakeholders.

4.1.6. Comprehensiveness and global coverage of all forms of freshwater

All forms of fresh water, renewable and nonrenewable, liquid or solid, surface and ground water are to be covered by the vision. The comprehensive nature of the vision dictates that

condition. Also, the interrelationship between the various forms of water resources and potential trade-offs make it plausible to apply this principle.

4.1.7. Will and commitment to translate vision to action

The development of the vision is not an isolated activity. It must be fully integrated into a package of actions, aimed at resolving any identified problems promptly. The will to undertake such actions must be sought and maintained to ensure implementation. The will is to be reflected in a sustained commitment to carry out the necessary actions. The commitment is to cover the areas of continued dialogue and adherence to agreed targets, carrying out policy and institutional reforms, making financial outlays and the continued political will to carry out the actions.

4.2. The targets

There is a debate among many of us on what targets should be selected and some may shy away from stating any specific target at all. While the debate on the subject is healthy, avoidance of stating targets is not. To help in guiding the development of the vision a number of specific targets can be stated. These targets are crucial if the world is to reverse the current water crisis before the situation deteriorates beyond control. These targets must be re-assessed from time to time and be adjusted to match needs and availability of resources.

4.2.1. Clean drinking water and adequate sanitation

The basic human needs of access to clean drinking water and adequate sanitation have eluded planners, managers and policy makers during the twentieth century. Much has been achieved and more is still needed. It is shameful to start the twenty-first century with billions of people lacking such basic services, most of them in developing countries. The target is to achieve universal coverage of clean drinking water and sanitation to all inhabitants by the year 2015. However, this will entail more than doubling what was achieved during the 1980s and will require a sustained investment of about US$20–25 billion per year.

4.2.2. Secured food supply

Food is another critical basic human need. Food from agriculture, aquaculture and fisheries depends directly on water availability, primarily fresh water. More than 70% of all fresh water withdrawn is used in agriculture. Irrigation, drainage, flood control and rain-fed agriculture are a few of the water management techniques in use in agriculture. The world is enjoying a level of sufficiency in food production although disparities in availability have resulted in the spread of hunger and malnutrition amongst the poor and most vulnerable. Growth in agriculture has slowed to a dangerous level threatening world food security. The target is to assure every inhabitant on the planet of continual and accessible food supply that meets their needs at affordable prices without the need for displacement, migration or hardship. The poor and vulnerable must be protected and their food needs to be satisfied under all policies, strategies and actions devised to rationalise and protect world water resources. This target should be maintained throughout, starting in the year 2005.

4.2.3. Conservation of the environment and preservation of biodiversity

Much of the world's ecosystems depend on clean water for survival and sustainability. Discharge of wastes in fresh water sources must be eliminated or reduced to safe levels commensurate with the carrying capacity of the receiving body of water. Treatment of waste water, reducing use of water, recycling of used water and protecting of ecologically sensitive areas should be practised as a central policy. The target is to restore damaged renewable water resources to safe levels by the year 2020, ensuring that the rivers and fresh water lakes will be adequately clean to sustain natural habitats without restriction world wide. All industrial, municipal and agricultural wastes should be treated or disposed of safely by the year 2020.

4.2.4. Sustainable economic growth and development

Water has been the engine of economic growth in many parts of the world. This should continue unhindered within the framework of sustainable development. Economic activities in agriculture, energy, navigation, tourism and recreation should optimise the use and allocation of available water resources based on sound economic, environmental, social and cultural criteria. The intersectoral allocation of water should not lead to conflict. It should promote social harmony, stability and justice to all users. A system is to be in place including instruments such as world policies, strategies and plans and actions by the year 2005.

4.2.5. Promotion of world peace and security

Many of the world's rivers and lakes are shared between several countries. More than 300 shared rivers lack governing arrangements acceptable to concerned nations. This leads to continuing disputes and conflicts threatening world peace and security. Allocation of water within certain nations is also subject to severe disputes. The disputes and conflicts within and between nations are aggravated under water scarcity conditions. The target is to have in place an acceptable legal and institutional system, with disputes settling mechanisms to allow for peaceful and just settlement of these disputes. This should be in place by the year 2005. Resettlement of displaced people due to water scarcity and reallocation must be carried out as rapidly as possible following the identification of a scarcity. The world water forecasting system should be in operation by the year 2005 to assist in predicting, avoiding and response planning for such disasters.

4.3. The mechanisms

To implement a sound and all-inclusive vision, several tools are needed to accomplish the various tasks to meet the challenges effectively and efficiently. These mechanisms have been recognized for some time and are being promoted in many fora around the world, especially in the last two decades. More tools are needed to the specific needs of the world as it continues to undergo the changes and the adjustments to economic and social norms.

4.3.1. Broadening of the participation of the stakeholders

The participation of stakeholders in all aspects of water management is crucial to the successful implementation of any policies, strategies and actions on the ground. This should not be restricted to the influential elite. It should be broad, to include all segments of society in

a fully representative mode. Attention should be paid to the silent and underrepresented groups. Women in particular, who traditionally are responsible for household water, especially in developing countries, have to play a fair and effective role at all levels and phases of decision making. The civil society, largely absent in water affairs, should be encouraged to be formed and operate and participate as full partners in the entire process. The NGOs and private sectors in particular are needed to carry out a large share of the responsibilities of managing the water at local levels.

To address these issues, water user associations are to be formed to play active roles. Of equal importance, an environment must be created to induce the private sector to enter fully into this field. The role of the public sector has to be continuously examined and adjusted to complement and assist other parts of society to manage the resources effectively and efficiently. The main objective is to empower the population and to put the people first in all decisions related to water.

4.3.2. Raising public awareness

The mass media, educational systems, opinion makers and community leaders have a responsibility in raising public awareness on water issues at local, national and international levels. Equally important, the professional and scientific associations, United Nations organizations, international and national organizations must work in earnest on appropriate and timely information dissemination to ensure the diffusion of information relating to water issues. Research and scientific centres and academic institutions must make special efforts to provide information packages suitable for use by all segments of the information system. It is recognised that the information technology is rapidly changing and advantage should be taken of all relevant new facilities and technologies. The efforts of all these entities need to be coordinated in a certain way to ensure full impact. The celebration of the world water day on March 22 of each year can be a focal point to initiate awareness raising campaigns.

4.3.3. Capacity building

The ultimate benefits will result from action on the ground. Among the factors that contribute to achieving this is the ability of institutions and individuals to perform the tasks correctly and in a timely fashion. Most developed countries have adequate and qualified resources in the water fields. The opposite is almost universally true for developing countries: weak institutions, inadequate staff and lack of sufficient modern technologies. Capacity building in these cases is necessary to address these weaknesses in time to permit the provision of adequate service. This capacity building has to be rationalized to reach public, private, NGOs and water users associations as well as other groupings. Capacity building includes a wide array of actions such as organisational reforms, institutional strengthening, training and networking.

4.3.4. Development of technology through research and development

Technology plays an important role in water management. Water saving, waste water treatment, desalination, water storage, conveyance and distribution systems and water harvesting and conservation technologies are needed for the respective applications. The research and development efforts need to develop new forms of technology that can be used

for a wide range of cost, management systems, scales and technological advancement. Energy consumption and environmental quality are main concerns for all forms of water technologies. The steady decline in funding for research and development (R&D) in developed countries is jeopardising the opportunities to have adequate technologies available in time. Developing countries have and may for some time in the future lack the capabilities and the resources to mount a credible R&D program in water with only few exceptions. Intellectual property rights is an accepted system to finance and pay for the cost of technology development. An equitable system of sharing, accessing and using technologies by developing countries needs to be in place to allow for rapid adoption of appropriate technologies.

4.3.5. Efficient and effective management system

The diversity of water uses has, over the years, produced equally diverse management systems. Sectoral competition, overlapping responsibilities and very often contradictory policies perpetuate inefficiency and reduce the effectiveness of the water service. Although it is recognized that water is to be managed at the lowest level possible, planning and coordination has to be done at the river basin or the hydrological unit level. This will ensure better efficiency of the system and places responsibilities closer to the users. Introducing better management structure and instruments to manage the demand as well as the supply would enhance the effectiveness and the performance of the water uses.

4.3.6. Funding and mobilization of financing (internal and external)

Funding for water has been in a steady decline for the last decade and a half in many parts of the world. The hardest hit are the developing countries. Stimulation and mobilization of additional financial resources are necessary in order to cope with the demand needed to resolve current and future problems. To achieve this, an enabling environment is needed to attract adequate private sector investment to fill the shortfall created by the decline of public financing. Cost recovery from the users can ease the burden on public system financing. There is, however, a large gap in financing water works in developing countries. Traditional financing mechanisms are not adequate to fill the needs due to the competition with other priorities and decline of development assistance funding. The creation of a dedicated international water development fund is essential to raise the profile and channel, both development assistance and private sector funding with the necessary guarantees proposed, to resolve the financing burden. Such a fund will be dedicated to address water problems in the most affected countries as a priority to relieve current crises.

4.4. The process

The development of the vision is a long and complex process. Most important is the follow up of necessary action that will be the ultimate goal to translate the vision to benefits for life and environment. The proposed process includes several steps, some are sequential and others can be carried out in parallel.

4.4.1. Definition of the framework

The basic first step is the definition of the framework for the development of the vision. The WWC in cooperation with the Netherlands has completed the work on this step. A workshop was recently held in Delft on this subject. The result is a document outlining the framework that will be available at this conference. Accomplishment of this task is a major milestone to put forward the world water issue in its proper place on the world agenda on sustainable development.

4.4.2. Finalization of guidelines and protocols

It is important to develop a number of instruments, guidelines and protocols of agreements among various entities involved with the development of the vision to ensure adherence to the spirit of the framework and to establish time tables for major milestones. A great deal of coordination is needed between activities and entities.

4.4.3. Consultation with the stakeholders

As the framework implies, stakeholder consultation will be conducted as part of the development of the vision. The consultations will be carried out in such a way to ensure a wide representation for regions, sectors and various interest groups involved with world water affairs. The views expressed and knowledge gained shall be incorporated in the vision as appropriate.

4.4.4. Public awareness campaign

Raising public awareness during this exercise is of paramount importance to inform the public and to solicit a wide range of views and input to the vision. It is anticipated that various organizations participating in the exercise will plan and implement a vigorous awareness campaign to inform the public and decision makers on the world water problems, its impact on local communities and the needs of solidarity among world citizens and institutions to overcome current and future challenges.

4.4.5. Official launching of the vision, statement and strategy paper

It is hoped that by March 2000 the work will be completed and made available to the public at the WWC — second world water forum. Simultaneously, official launching may take place in various regions and by various participating and cooperating institutions. Members of the WWC can play a crucial role in the dissemination of the information related to the vision in all parts of the world.

5. Conclusion

I have outlined the WWC and how it seeks to meet the world's water challenges through its world water vision. This vision will be based on sound principles, specific targets, clear mechanism in a transparent and participatory process. The WWC invites all to participate in the creation of the vision and most important in implementing actions necessary to realize the vision.