

Water Resources  
Management  
Ministry of Foreign Affairs  
Danida  
December 2000

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#### Abbreviations

ADB	Asian Development Bank
CD	Capacity Development
CAP	Catchment Area Protection
CBO	Community Based Organisation
CGIAR	Consultative Group International Agricultural Research
CSD	Commission on Sustainable Development
Danida	Danish International Development Agency
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPSF	Environment, Peace and Stability Facility
FAO	Food and Agricultural Organisation
GOI	Government of India
GWP	Global Water Partnership
IADB	Inter-American Development Bank
IIED	International Institute for Environment and Development
IFPRI	International Food Policy Research Institute
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
MIFRESTA	Environment, Peace, Stability funding facility
NEDA	Netherlands development Assistance
NGO	Non Governmental Organisation
SADC	Southern Africa Development Conference
SPS	Sector Programme Support
SRL	Sustainable Rural Livelihood
TAC	Technical Assistance Committee (of Global Water Partnership)

UN	United Nations
UNCED	United Nations Conference on Environment & Development
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization

UNGASS	UN General Assembly Special Session
UNICEF	United Nations Children Fund
USD	United States Dollars
VND	Vietnamese Dong
WAP	Water Action Plan
WRM	Water Resources Management
WB	World Bank
WHO	World Health Organisation
WMO	World Meteorological Organisation
WS&S	Water Supply & Sanitation
WWC	World Water Council

#### Preface

“Partnership 2000”, the overall strategy document for Danish Development Policy emphasises poverty alleviation as the basic and overriding principle for Danish development assistance. Gender equality, promotion of environmentally sustainable development, and promotion of good governance and public participation, are crosscutting themes of the policy 1). Assistance is primarily provided as sector programme support (SPS), and water resources management is addressed in a number of Danida’s 20 programme countries. Most of the assistance to water resources management is part of the sector programme support to the productive sectors – of agriculture, fisheries, water and sanitation. Water resources management is also supported through the environment sector programme support – as well as through the EPSF assistance 2). Danish policies on water resources management aim to foster an integrated management that recognises the need for balancing water as a finite and vulnerable resource with water as an essential input in most aspects of livelihood. The policy is formulated within the poverty alleviation framework of Danish development policy and with adherence to the principles of Agenda 21.

Danida’s objective is:

- To support integrated and efficient water resources development and management that contributes to long-term environmentally sustainable economic and social development. Specifically to enhance the right of access to the resource for the poor and other vulnerable groups and empower them to improve their livelihood.

Danish assistance to water resources management will mainly be targeted at the Danida programme countries and will chiefly be provided as sector programme support, with an emphasis on capacity development as well as on concrete activities. Regional and trans-boundary issues are also important in the Danish assistance. Danida’s involvement is envisaged as long-term and process-oriented.

1) “Partnership 2000”, Draft Strategy, June 2000.

2) EPSF (Environment, Peace and Stability) is a funding facility established by the Danish parliament. The Danish term used is MIFRESTA (Miljø, Freds- og Stabilitetsrammen).

#### Users of the policy paper

The policy paper provides guidelines for those who work with water resources management in a Danida-supported context. The policy paper is operational, but it is not a manual. Because of the crosscutting and thematic nature of water resources, the paper is necessarily less investment-focused, and more capacity development-oriented than policies formulated for support to productive sectors.

In the programme countries, the users of the policy paper will be government institutions (both at central and local levels), staff in different organisations charged with specific programme implementation, NGOs, various private sector stakeholders, higher learning institutions and interested individuals. Internationally, the policy paper is likely to be of interest to donors (multilateral as well as bilateral) and others who co-operate with Danida in programme planning and implementation.

The users are also Danida’s own staff at the ministry and at the embassies, consultants, contractors, NGOs, and higher learning institutions in Denmark that are engaged in development assistance. The policy document provides an opportunity for cross-sector dialogue, cross-sector co-operation, and synergy between Danish-assisted programmes. It also gives Danida’s viewpoints and scope of operation, and it provides an opportunity to strengthen co-operation with programme countries and other donors.

## Structure of the policy paper

The Introduction (Chapter 1) gives the context and rationale for a policy on water resources management. Chapter 2 takes stock of the current situation and summarizes the major challenges. Chapter 3 outlines the objectives, principles and scope of Danish assistance to water resources management and thereby points to the particular emphasis of Danida in addressing the challenges summarized in Chapter 2. Chapter 4 operationalises the objectives, the scope and the principles presented in Chapter 3. Chapter 5 sets out the implications of water resources management for Danish policies in relevant sectors and how it is essential in promoting synergy and co-operation in SPS. The final chapter (Chapter 6) discusses issues specific to planning and implementation.

Although the management of freshwater and coastal waters is strongly linked by virtue of the fact that development and management actions in the upstream catchments influence the availability and quality of water in the coastal zones, the policy document only addresses freshwater development and management. In doing so, it obviously considers upstream-downstream linkages, but it does not address coastal zone management, per se.

### 1. Introduction

On the threshold of the 21st century, it is apparent that the unprecedented population and economic growth of the last hundred years has resulted in global natural resource degradation. The deterioration in the world's supplies of what should be renewable resources – freshwater, soil, forests, and fish stocks – is a serious global problem.

Freshwater is so central to human activities and life in the future that the increasing pollution of surface and groundwater sources, droughts, floods, expanding deserts, declining fish stocks, and declining ground water tables must be addressed. However, the natural resource base includes more than water resources – land and vegetation are equally important. Rain and snow falling on the land may return to the atmosphere, infiltrate the ground to form groundwater, or run off to appear in rivers and lakes. People depend on water in all these forms, and the management of the land and vegetation determines where, when, and in what quality, water is available. (See also Annex 1.)

A few examples may illustrate this crucial interdependence:

A dense forest or other vegetation cover will retain rainfall, protect the land from erosion and prevent flooding. At the same time, however, forests return a very large proportion of the rainfall to the atmosphere, and hence reduce the total water available downstream. Large-scale deforestation and denudation of the land, on the other hand, may generate more total run-off, but with larger variability (floods and droughts) and with upstream soil erosion and downstream siltation as a result. Forests represent an economic resource for man to exploit; they also sustain rich animal and plant life (biodiversity) of value to mankind, and represent both cultural and recreational values. At the same time, forests are a vital element in the natural ecosystem and a key determinant for the water resource – and any management decision must reconcile these diverse interests.

Similar cause-effect relationships characterise agriculture, whether rain-fed or irrigated. The way in which land and water are managed by upstream farmers determines the availability and quality of water for downstream users. Large-scale pumping of groundwater for agricultural use leads to falling groundwater tables, and hence it affects other users of the same groundwater resource. Water management decisions cannot be taken in isolation from decisions on the management of land and vegetation.

Aquatic ecosystems, such as wetlands, play similar roles in regulating the hydrological cycle. They also sustain livelihoods, for example, through freshwater fisheries, aquaculture and rice production, and natural biodiversity, natural beauty, cultural heritage and recreation. Such ecosystems are, at the same time, fundamental for human activity and welfare – and for the sustenance of the natural resource base.

Rivers eventually flow to the ocean, and the quality and quantity of water flowing to the estuaries has an impact on these ecosystems, and thereby on fisheries, agricultural production, and bio-diversity based on the functioning of these systems. These examples all illustrate the conflicting interests in ensuring sustainable ecosystem functions while concurrently enabling the use of land and water for human activity and welfare. Likewise, the examples point to the need to address the interactions between land and water.

As resource scarcity increases, competing economic uses become a cause of conflict – with negative effects, particularly on the poor, who are often highly dependent on primary production for their livelihood – and who generally have the least influence on political decision-making processes.

The increasing scarcity of water of an adequate quality to sustain livelihoods and healthy eco-systems (both water quality and water quantity issues contribute to this scarcity) varies between regions, countries and locations. Some richer countries have recognised the consequences of the scarcity situation, and they are constantly engaged in political debates and

decision-making processes with the purpose of adopting policies on the allocation and management of their water resources (as well as other natural resources). In most low-income countries such management policies are necessary, but they are usually hard and difficult to implement. Scarcity leads to increased conflicts over the allocation of and access to the resource. Most of the scarcity of water is related to the consumption patterns of middle and upper-income groups – and powerful and competing sector interests as well as inappropriate public policies. This makes the achievement of changes towards greater equity and more efficient use an enormous challenge.

The seriousness of the water resources situation has resulted in an international consensus on the principles that should guide water use and management in the future. The Dublin Conference on Water and Environment established the Dublin Principles, (see Box 1 below), which were incorporated into Agenda 21 (Chapter 18), and became one of the key documents of the Rio Earth Summit in 1992.

#### Box 1 The Four Dublin Principles (The Dublin Statement, January 1992)

1. Freshwater is a finite and vulnerable resource, essential to sustain life, development, and the environment. Since water sustains life, effective management of water resources demands a holistic approach, linking social and economic development with the protection of natural ecosystems. Effective management links land and water uses across the whole of a catchment area or aquifer.
2. Water development and management should be based on a participatory approach, involving users, planners, and policy-makers at all levels. The participatory approach involves raising awareness of the importance of water among policy-makers and the general public. It means that decisions are taken at the lowest appropriate level, with full public consultation and involvement of the users in the planning and implementation of projects.
3. Women play a central part in the provision, management, and safeguarding of water. The pivotal role of women as providers and users of water and guardians of the living environment has seldom been reflected in institutional arrangements for the development and management of water resources. Acceptance and implementation of this principle require positive policies to address women's specific needs and to equip and empower women to participate at all levels in water resources programmes, including decision-making and implementation, in ways defined by them.
4. Water has an economic value in all its competing uses and should be recognized as an economic good. Within this principle, it is vital to recognize first the basic right of all human beings to have access to clean water and sanitation at an affordable price. Past failure to recognize the economic value of water has led to wasteful and environmentally damaging uses of the resource. Managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation and protection of water resources.

Agenda 21 also outlined the principle of integrated water resources management (IWRM), as an approach to action, which aims to ensure the co-ordinated development and management of water, land and related resources by maximising economic and social welfare without compromising the sustainability of vital ecosystems. An essential prerequisite for this international consensus is the recognition of the importance of the 'equity dimension' of water resources development and management, in which all population segments are stakeholders.

There were some important modifications and refinements of the Dublin principles at the Rio Conference, which gave the Rio statement a more social character. It was established that: water is a social as well as an economic good; that water is a strategic good and that drinking water is a first priority in relation to other functions of water 3). The seven focus areas identified in Chapter 18 are shown in Box 2. An abstract of the important international milestones is presented in Annex 2.

- 3) Access to clean drinking water and sanitation is a priority in Danish sector programme support. Reference is made to: Water Supply and Sanitation. Danida. Sector Policies. 2000.

#### Box 2 Rio – Agenda 21. Protection of the Quality and Supply of Freshwater Resources

A. Integrated Water Resources Development and Management, with the objective to satisfy the freshwater needs of all countries for their sustainable development. „Integrated water resources management is based on the perception of water as an integral part of the ecosystem, a natural resource and a social and economic good, whose quantity and quality

determine the nature of its utilisation. To this end, water resources have to be protected, taking into account the functioning of aquatic ecosystems and the perenniality of the resource, in order to satisfy and reconcile needs for water in human activities“ (Chapter 18.8)

B. Water Resources Assessment with the overall objective of ensuring the assessment and forecasting of the quantity and quality of water resources.

C. Protection of Water Resources, Water Quality and Aquatic Ecosystems with three objectives pursued concurrently to integrate water-quality elements into water resources management: i) maintenance of ecosystem integrity; ii) public health protection; and iii) human resources development.

D. Drinking Water Supply and Sanitation based on four guiding principles: i) Protection of the environment and safeguarding of health; ii) Institutional reforms promoting an integrated approach and including changes in procedures, attitudes and behaviour, and the full participation of women at all levels in sector institutions, iii) Community management of services, backed by measures to strengthen local institutions in implementing and sustaining water and sanitation programmes; and iv) sound financial practices, achieved through better management of existing assets, and widespread use of appropriate technologies.

E. Water and Sustainable Urban Development, with the overall objective of supporting local and central Governments' efforts and capabilities to sustain national development and productivity through environmentally sound management of water resources for urban use.

F. Water for Sustainable Food Production and Rural Development based on four strategic principles: i) Water should be regarded as a finite resource having an economic value with significant social and economic implications reflecting the importance of meeting basic needs; ii) Local communities must participate in all phases of water management, ensuring the full involvement of women; iii) Water resources management must be developed within a comprehensive set of policies for (a) human health, (b) food production, preservation and distribution, (c) disaster mitigation plans, and (d) environment protection and conservation of the natural resource base.; and iv) Recognise and actively support the role of rural populations, with particular emphasis on women.

G. Impacts of Climate Change on Water Resources in accordance with the following principles: i) understand and quantify the threat of the impact of climate change on freshwater resources; ii) facilitate the implementation of effective national countermeasures, as and when the threatening impact is seen as sufficiently confirmed to justify such action; iii) study the potential impacts of climate change on areas prone to droughts and floods.

2. Current situation and future challenges

2.1 Water withdrawal, consumption and scarcity

A recent estimate of the global status of the water resources situation shows that, of the yearly global rainfall of about 40,000 cubic kilometres, only 13,500 is readily available to man; thus the total amount of freshwater available to man is finite. On a global scale, we are still far from reaching the limits of utilisation. Global water withdrawal has been estimated at 4,000 cubic kilometres

(see Box 3 below.) However, the disparities between countries are wide, and some are already experiencing constraints in meeting domestic demand owing to physical, socio-economic and political factors 4). Severe water scarcity is especially prevailing in arid and semi-arid regions, where the shortage of water has become the largest threat to food security, human health and life – and to the sustainability of natural ecosystems. A recent study estimates that nearly 1.4 billion people – 25 per cent of the world's population or one third of the population in developing countries – live in regions that will experience severe water scarcity within the first quarter of the next century 5).

### Box 3 The Hydrological Cycle

In the hydrological cycle, the sun constantly evaporates water into the atmosphere, part of which is returned on land as rain and snow. Part of that precipitation is rapidly evaporated back into the atmosphere. Some drains into lakes and rivers to

commence a journey back into the sea. Part infiltrates into the soil to become soil moisture or groundwater. Under natural conditions, the groundwater gradually works its way back into the “tissues” and releases some into the atmosphere in the process of transpiration.

Water scarcity occurs when the amount of water withdrawn from lakes, rivers or groundwater is so great that water supplies are no longer adequate to satisfy all human or ecosystem requirements, bringing about increased competition among potential demands. The hydrological cycle is illustrated in Annex 1.

Source: Comprehensive Assessment of the Freshwater Resources of the World.

4) WWC/CME: Water in the 21st Century, March 1998.

5) IWM The major forms of water withdrawal and consumption are in agriculture, industry and domestic use, and the global abstraction of water to satisfy demands has increased dramatically in this century. Since 1900 abstraction has increased more than six times, or more than twice the population growth rate, mainly due to increasing reliance on water for irrigation. In line with the growing requirement for food provision, agricultural production has increasingly changed to dependence on irrigation (based on freshwater from groundwater and surface water sources). Presently, irrigation-based agriculture constitutes close to 40 per cent of the total food production achieved from less than 20 per cent of the cultivated land.

#### Box 4 Water Withdrawal and Consumption by Main Sectors

Global water withdrawal    Global water consumption  
(4000 km<sup>3</sup>/year)    (2440 km<sup>3</sup>/year)

Part of the water drawn from rivers, streams, lakes, reservoirs and groundwater is consumed and not returned later as available water for consumptive use. Most of the water withdrawn by industries and for domestic use is returned, often polluted and degraded in quality, to rivers, lakes, groundwater aquifers, and other water courses. Water abstracted for irrigation is partly consumed in the crop production process and partly required to flush salts out of the soil. Irrigation has enabled the food production to keep up with the population growth, but with impacts on the world water resources that now give rise to concern.

Source: Comprehensive Assessment of the Freshwater Resources of the World, UN May 1997

Groundwater accounts for approximately one third of the global water consumption, and it is the most valuable source for drinking water and other domestic purposes. In several parts of the world, groundwater is the one and only available, reliable and safe source. Groundwater also plays an increasingly important part in the escalating irrigation. The distribution of groundwater resources is highly uneven.

Water scarcity has two aspects: quantity and quality, and quality of water is as equally important as quantity. Uncontrolled water pollution, especially from urban and industrial areas, and in several countries also from agriculture, is adding to water scarcity, degrading ecosystems, and affecting the environmental health situation. The Asian Development Bank estimates

that, in developing countries world wide, as much as 90 per cent of the wastewater may be discharged to water bodies without treatment 6). Water pollution is now claimed to be the most serious environmental problem facing Asia 7).

Another water quality aspect is caused by or linked to agricultural production; the use of pesticides and nutrients has increased tremendously. A high level of salinity is another problem recorded in connection with irrigation in arid or semi-arid zones. Notable examples are regions in the Middle East, Pakistan and the Aral Sea area.

The environmental impact, including the impact on human health, of the use of pesticides and fertilisers in agriculture is becoming one of the most serious water resource problems in many industrialised and near-industrialised countries, including Denmark. There is also a risk that further depletion of the groundwater aquifers in certain areas and regions will lead to deterioration in the composition of the chemistry of local groundwater resources. This might adversely affect local drinking water quality (e.g. fluoride and arsenic-affected areas in South Asia).

Given an expected future population increase – from the present 6 to some 8 billion people over the next 25 years – together with a general increase in unit demands due to an expected economic growth and improved living conditions, the global pressure on water resources will continue to increase. Even with the most optimistic assumptions on food demands, crop water requirements and irrigation efficiencies, food production for the growing world population over the next 30 years will, in itself, require an additional 15-20% water for irrigation purposes, and similar increases in water requirements for other uses are projected.

6) Policy on Water (ADB, August 1998)

7) Emerging Asia (ADB 1997)

#### ox 5 Groundwater Depletion, India

Groundwater is the primary source of water for India's domestic water needs. However, 95% of the groundwater abstraction is used for irrigation purposes. The groundwater-based irrigation has expanded significantly, and today groundwater provides close to 50% of the total amount of water used for irrigation abstracted from more than 15 million well structures. The rapid development in groundwater-based irrigation has led to a significant decline in groundwater levels in several of the 27 states. According to a survey carried out in 1994 and 1996, close to one third of all sample villages were affected by a seasonal or permanent fall in the groundwater table due to over-abstraction for irrigation purposes.

It is evident that the depletion of the groundwater aquifers in various parts of the country (10 out of the 27 states affected) has serious social, financial, and institutional implications for especially the rural drinking water supply. This is especially true for the many cases where rather simple and appropriate technology choices will have to be replaced by much more complex and expensive technology options, such as large piped schemes as an alternative to hand pumps or small local schemes. In the extreme case this would entail the replacement of an existing least-cost locally based technology with a piped scheme based on a distant surface water source requiring treatment and pumping. The overall cost differential between a "simple" and an "advanced" scheme could be in the magnitude of a factor 5-10 based on Net Present Value assessments.

Government subsidies to the agricultural sector, and in this respect highly subsidised irrigation electricity tariffs, and favourable investment terms offered for irrigation well construction, have led to the present indiscriminate and disproportionate level of groundwater based irrigation. In 1993/94 it was estimated that the irrigation subsidies were in the magnitude of 1.2 billion US\$ per year, or corresponding to approximately 50% of the total annual national allocation to rural water supply.

Source: Rural Water Supply and Sanitation Sector Study, WB & GOI – 1998

#### 2.2 Access to water – conflicting user interests

Water-related activities are often positioned within specific sectors (water supply and sanitation, agriculture and irrigation/drainage, hydropower and industry, fisheries and recreation, environment, etc.) and managed by sector-based institutions and subject to their specific objectives and interests. As a consequence, the management of water as a finite renewable resource tends to become lost within sector interests.

It has become all too common that the strongest groups in a society whether in a country or in a region – achieve disproportionately large control over water resources. As with other natural resources degradation in the world, it is not the poor, in particular, who cause degradation of water resources, because the poor have access to a relatively small proportion of the world's water, land, forests. They also control little of the non-consumptive uses in energy and industry. However, their right and access to the locally available natural resources, including water, is often the key to poverty reduction.



Often conflicts arise because of the combination of a scarcity situation and an unequal power relationship between user groups that are unable to solve problems within the social, economic and institutional structures. Such scarcity situations are mostly local, and they are not necessarily considered to be a national problem. There are many degrees, variants and types of potential conflicts and each situation has its own peculiarity, but the most common are: a) Between the same types of user in the same location. b) Between different types of user in the same location. c) Between different localities (upstream and downstream users). d) Between rural and urban areas. e) Between different government stakeholders 8).

As water is needed by many different sectors, the management of the resource implies co-ordination and regulation of demands from conflicting interests. Efficient and integrated management cannot be carried out within the administrative boundaries of individual sectors, but it must be handled as a cross-sector issue. Given that there are strong sector as well as economic interests involved, integrated water resources management often becomes very political.

#### Box 6 Water Resources Constraints in Danida Programme Countries

- Absolute water scarcity 9). The distribution of resources and the distribution of demand often do not coincide. Some few countries already do, or will within a foreseeable future, face a situation of overall national absolute water scarcity. These include Egypt, the southern and western states of India, Palestine, Alto Plano in Bolivia and, to a lesser extent, Niger, Kenya, Malawi and Zimbabwe.
- Fluctuating water availability. The distinct monsoon patterns experienced in India, Bangladesh, Vietnam and Cambodia create situations alternating between those of abundance and drought. Flooding is a major water resources issue. Large reservoir capacity associated with groundwater tends to alleviate the effects of climatic variations in relation to water availability. Over-pumping for instance in connection with irrigation or larger town water supplies creates scarcities, and shallow wells often dry out – with serious consequences for the poorer segments of the populations. India and Bangladesh are examples of countries where such issues are significant.
- Water pollution and non-acceptable quality are critical issues, also in water “rich” countries such as Nicaragua, Vietnam and Bangladesh.
- Low awareness of land- water interactions in resource management has often led to erosion, nutrient leaching, water logging and salination. As a result, agricultural production has not grown or been intensified to keep up with population growth in large parts of these countries. This is particularly seen in India, Egypt and Zimbabwe.

8) The listing is based on NEDA: Water for the Future, Integrated Water Resources Management, 1998

9) Absolute water scarcity: an indicator for the magnitude of water withdrawals (in percentages) as compared to the renewable water resources. For example, extreme absolute water scarcity is when the total withdrawals > 50% of the renewable water resources.

With the increased demand (scarcity) and hence competition for water resources, there is an evident risk of conflicts over water sources and the entitlement to supply – also at a regional level between countries sharing water systems. The Danida programme countries have some of the world’s highly disputed shared watercourse systems, including: the Nile, the Zambezi, the Niger, the Ganga-Brahmaputra and the Mekong rivers. With increasing scarcity, urban centres are often creating rather significant competition for the resources in relation to other high demands such as those from irrigation, and maintenance of environmentally sustainable water systems. Agriculture and rural water supply lose out in the competition for water to urban centres. Another issue created by bigger urban centres is the largely uncontrolled wastewater, which is discharged untreated and in a haphazard manner. Human health and ecosystems are endangered. Notable examples are found in Zimbabwe, Nicaragua, Egypt, Bangladesh and India.

- Some countries, particularly in Africa, face an “economic” water scarcity 10), as they, for economic reasons, cannot respond to the need to develop infrastructure for water supply, irrigation and hydropower purposes. Such increases also require substantial management capabilities. Niger, Uganda, Mozambique and Burkina Faso face this situation.

#### 2.3 The challenges

Although a gloomy picture has been presented, projections have often not been realised in the past because of inadequate consideration of developments in other sectors of society. Some examples are:

- i) Population projections as the primary determinant of water requirements have in the past proved too excessive and have had to be revised several times;
- ii) A combination of a reduction of energy prices and an improvement in technologies may reduce the cost of desalination several times over. This could change the water supply situation for numerous coastal cities dramatically;
- iii) Increase in food production and changes in the distribution of food could take the pressure off food production in water scarce areas;
- iv) New developments in the area of non-water-borne sanitation may help in reducing urban water requirements.

Other factors may also influence future needs for withdrawal patterns. However, the scarcity and the unequal access to water resources will, in spite of technological advances, be key challenges to address in the years to come – and in particular in low income countries, where human and financial resources are constrained.

- 10) Economic water scarcity: used to indicate that the theoretically available resources cannot be accessed for domestic, agricultural and/or industrial purposes due to difficulties in creating adequate water infrastructure.

In broad terms, the tasks can be summarized as follows:

- Secure water in adequate quantity and quality for people through a balanced and efficient use of available water resources. Access to drinking water is the first priority for the use of water; however, about one quarter of the world's population is without access to safe drinking water, and half of the population is without access to adequate sanitation.
- Secure sufficient provision and efficient use of water for food production. Even if the additional water needs for food production are kept low due to increased water productivity of crops, serious conflicts might occur between agriculture (in particular irrigated agriculture) and water for other human and eco-systems uses. Water rather than land is becoming a constraint on food production.
- Secure the rights of the poor (both men and women) and, in particular, their access to water for productive uses (food production and drinking water).  
As competition for water resources increases, the losers are likely to be the poor, who may be further marginalized with regard to access to both land and water.
- Secure the maintenance of basic ecosystem functions as the foundation of the hydro-ecological cycle, and of vital ecosystems and their biodiversity such as wetlands – as well as water for livelihoods. Ecosystems are rich bases for different kinds of primary production and essential for many types of production. It is imperative that such wetlands and watersheds are maintained and the present threats counteracted. It will have a serious impact on the hydro-ecological cycle and on development potential if water flows change or decrease, pollution increases, natural habitats disappear and forests are felled.
- Deal with water in its variability in time and space, and minimize risks and hazards. The tropical and sub-tropical regions of the world experience huge variations in rainfall and storms, often with catastrophic consequences. The extent of these events is often caused by degradation in watersheds. Warning systems are often not developed, and it is particularly the poor who are the losers. Such situations cannot be avoided, but risks can be minimized. These variations and the consequent risks may be aggravated by global climate change.

Danish assistance will support a number of the key challenges summarized above, and the following chapters will specify the particular priorities for Danish support.

### 3. Danish policies

#### 3.1 Overall objectives of Danish development policy 11)

The overall objective of the Danish development assistance is to support developing countries in their efforts to achieve sustainable development. The development policy is based on a strategy for poverty alleviation, which:

- a) With equal participation of men and women promotes broad based, poverty oriented economic growth and sustainable development.
- b) Develops the social sectors, including health and education, as a prerequisite for the development of human resources.
- c) Promotes democracy and popular participation in the development process and the establishment of a society based on the rule of law and good governance as a prerequisite for stability and economic, political and social progress.

Sustainable poverty alleviation as the overriding objective is linked to the cross cutting themes of gender equality, environmental sustainability and respect for human rights and democracy.

The poverty alleviation strategy as formulated above will be implemented based on the principle of partnership between Danida and partners in developing countries as well as in partnership with other relevant participants. In the context of the present policy paper, the principles above are placed in a livelihood context and with adherence to the principles of Agenda 21 – these form the basis of Danida’s policy on water resources management.

### 3.2 Objective and operational scope for Danish support

#### 3.2.1 Objective

The objective of Danish assistance to water resources management is:

- 11) Reference is made to Danish Development Policy: Partnership 2000. Draft Strategy. May 2000. • To support integrated and efficient water resources development and management that contributes to long-term environmentally sustainable economic and social development. Specifically to enhance the right of access to the resource for the poor and other vulnerable groups and empower them to improve their livelihood.

#### 3.2.2 Operational scope

Limited capacity is a cross cutting constraint and therefore capacity development will be integrated in all interventions. As water resources management is a new field in many countries, the combination of concrete activities and capacity development will aim to ensure that practical results and lessons learnt are fed into longer-term capacity development endeavours.

Youth and children need particular attention within the stated objective, as the interventions are long-term processes.

Co-ordination and co-operation between and across sectors, commitment and ownership at all levels are crucial. Therefore activities within IWRM must be demand-driven and participatory.

The major share of Danish support is provided to national and sub-national levels, but international, regional and trans-boundary assistance is also within the scope of Danish assistance.

The main focus of Danida’s support is at the national level (and also at the sub-national level) in order to maximise its efforts in poverty alleviation.

Regional and trans-boundary levels are important in order to facilitate regional co-operation, to share knowledge about a given resource, to improve the state, use and sharing mechanisms of a particular resource. It is also important to support those institutions that prevent and resolve conflicts, to exchange experiences, and to do anything possible to “level the playing field” between countries (see Box 7). Furthermore, Danida will – together with other donors – support activities directed towards solving specific problems between two or more countries.

The purpose of interventions at the international level is to positively influence – or even be part of – the formulation of principles and policies, strategies and international support programmes which aim towards equity and a fair access to resources. Recognising the importance of these efforts, Danida will support work at the international level in close co-ordination with other organisations and countries.

## Box 7 Trans-boundary water resources management

An estimated 50% of all land in the world lies within river basins shared between two or more countries. In Southern Africa this is the case for 70% of all the land area.

With increasing stress on water resources, both in terms of quantity and quality, actions by upstream riparian countries in a shared river basin may become critical for the downstream countries that depend on the trans-boundary flows. Collaboration in the development of management systems for the shared resource becomes a necessity, if conflicts are to be avoided.

The Helsinki Rules, the International Law Commission, and the UN Convention on the Use and Protection of Non-navigational Waters are international instruments designed to facilitate such collaboration. At the regional level, protocols have been developed, as, for example, the SADC Protocol on Shared Waters in Southern Africa, and at the river basin level (including shared lakes and groundwater aquifers) a large number of commissions and agreements have been established. Relevant examples involving Danish programme countries are the Mekong River Commission, the recent agreement on the Ganges between India and Bangladesh, and the ongoing development of international river commissions for the Nile and the Zambezi.

Common for most of these agreements is the large gap between rhetoric and action, not only at the political level, in terms of willingness to cooperate, but also at the practical level, in establishing the proper data bases and the analytical tools that enable meaningful collaboration. A significant problem in many parts of the world is the “uneven playing field” between the larger, more developed countries and the smaller, much weaker countries in the same river basin.

Recognising the importance of the trans-boundary dimension for national water resources management policies and strategies, Denmark has supported regional collaboration on water resources in Southeast Asia, Southern Africa, East Africa, and West Africa.

In regions with a major imbalance between the demand and the availability of the resource, it is important to support efforts to use the resource as efficiently as possible. Thus, the saving of water and the protection of the resource become important. These types of interventions can be part of an overall planning effort, but they can also be implemented as isolated initiatives. The assistance will be towards developing more efficient irrigation systems, the mitigation of pollution, the control of leakage in water supply systems, dry sanitation, etc. These types of initiatives may, when relevant, be implemented within all sectors, as part of broader sector programmes.

Danida's support strategies are clustered in five “blocks”, which are elaborated in the following chapter:

- a) Capacity development as an integrated element of all interventions (see section 4.1.).
- b) An enabling environment i.e. support to democratic policies, including legislation, and regulations at different operational levels. Awareness raising is seen as an important element in the establishment of an enabling environment (see section 4.2.).
- c) Appropriate institutional mechanisms and processes that promote effective co-ordination of and decision making on water resources development and management across sectors, and that allow close interaction between various stakeholders and administrative levels (see section 4.3).
- d) Strengthened livelihoods through specific interventions. Implementation of concrete activities– tangible results – is a cornerstone in a successful participatory approach (see section 4.4.). Awareness raising is also important for strengthened livelihoods. This is discussed in sub-section 4.2.2.
- e) Management tools, which are suited to the needs and balanced with the capacities, financial and human resources, of specific regions or countries are elaborated in section 4.5. Research and technology development is also included in this section.

### 4. Specific policies and strategies

#### 4.1 Capacity development

Capacity development (CD) is an objective and a strategic approach that cuts across all Danish supported interventions in water resources management. It is integrated in all programme analysis and throughout the programme cycle.

Capacity development in water resources management is essentially about increasing the ability of the different actors to take command of management of the resource, to act and interact. CD is rooted in organisational development, institution building and human resources development. The capacity in the sector depends on the availability of policies, a regulatory

framework, a political will to act, management systems, financial and human resources, and access to relevant information and data. It is a major challenge to develop capacity within traditional institutions, which are strong and influential in many rural areas.

Experience shows that capacity development efforts must be seen as a process and that such efforts benefit from being combined with concrete activities on the ground, which then function as a motivator and demonstrate new concepts based on “real life experience”.

Finally, successful capacity development has to be based on a genuine demand and willingness for change, and it needs sufficient time and flexibility to be able to adapt to and take advantage of new opportunities. As a consequence, inputs in capacity development within IWRM programmes should be designed with flexibility both in terms of character and intensity. The existing capacity varies between countries and even between different areas in a country and this calls for thorough assessment of capacity development needs.

Danida will mainstream capacity development in water resources management programmes.

This includes:

- strengthening the links and combining CD with concrete and visible improvements in the use of the resource; formulating programmes in such a way that CD requirements are an important factor guiding the time frame set for implementation;
- assessing the capacity development needs in all organisational and institutional contexts (including civil society organisations), at relevant levels and address these in programmes with a realistic perspective;
- ensuring that sufficient flexibility is built into the programmes, both in relation to the direction and timing of the support, so that they are able to adapt to new situations and to take advantages of new opportunities;
- promotion of on-the-job training in a broad range of technical and managerial disciplines and skills, such as negotiation, leadership and information skills, which are important elements of CD;
- support to the enhancement of technical and managerial skills also through twinning arrangements and scholarships in higher education institutions when relevant;
- working towards a gradual transfer of control of funds to implementing institutions in order to enhance ownership and management capacity.

#### 4.2 An enabling environment

A legitimate, transparent and accountable system based on commitment and a sense of ownership is a prerequisite for development and successful implementation of equitable national policies on IWRM. These elements are crucial to balance the needs of different interests and establish regulatory mechanisms and incentives, which are generally accepted.

##### 4.2.1 National policy and legislative framework

A water resources policy framework should establish how needs are best balanced between various users and sectors and prioritise among conflicting interests, taking resource and ecosystem processes into account. A policy framework, based on democratic principles, would be concerned with equity and ideally consider the interests of all stakeholders. One of the most important elements of a national policy is to set the operational framework for the roles of the state at various levels and for stakeholders outside government. And it should set the principles for conflict resolution mechanisms. Danida has gained valuable experience in supporting such policy formulation in some programme countries (See Box 8). A main experience is that policies on IWRM and support to policy formulating processes should be demand led rather than supply led. The latter approach has often been the characteristic of donor supported water-sector policies.

Although national policies have been formulated in some countries, various internal power structures as well as different donor interests result in situations where different “policies” co-exist, and these are not always in accordance with the set of formulated national policies. It therefore becomes important in the preparation of a specific programme within IWRM to carefully analyse and understand power relations and the degree to which formulated policies are “real” or whether they are mere paper initiatives.

Often the legislation related to IWRM is very fragmented (sector based) and does not provide a comprehensive framework outlining the rights and obligations of the various managers and users of the resource. An example is that a system of water rights does not exist. A legislative framework should ensure that IWRM policies are implemented based on equity and ensure equal opportunities for development. The legislative framework is important in order to give legitimacy to the different appropriate authorities, enhance the rights of poor and resource scarce groups and provide clear “rules of the game“ for investors within the sector, e.g. establish a water rights system. In order to promote the credibility of legislation it is important that the level of ambition is closely related to the political will and capacity for implementation and enforcement of laws. Furthermore, a legislative framework should provide the means and obligations for transparent management of the resources.

#### 4.2.2 Awareness raising

IWRM only works if all stakeholders participate in spite of their contradictory interests. This is a challenge, because in particular poor and less resourceful stakeholders are unaware of their rights and their possibilities to act, and have limited economic power and access to decision making through democratic channels. Awareness raising is one of the most important means to increased participation. However, this process is difficult in situations where civil society organizations are weak and resources are scarce.

Environmental lobby organizations, governments and international organizations consider awareness raising as one of the most important elements in creating stakeholder participation and increasing democratic governance of water resources. At the international level, a number of organizations have developed approaches to the dissemination of information and awareness raising in different stakeholder groups. In a national context it must be recognized that there are a number of major barriers to overcome when raising awareness, in particular, among poorer stakeholders, these could be illiteracy, no access to media, gender and social and cultural barriers, which hinder participation. Raising awareness is a long term and complicated process, and targeting dissemination programmes at specific groups, such as children and youth, can therefore make an important contribution.

Awareness of responsibilities such as conservation and protection of the resources against pollution will have to go hand in hand with awareness of rights. Civil society organisations are likely to play an important role in this respect.

Awareness raising initiatives are also important in relation to more influential stakeholders, who often are not knowledgeable about the necessity of sustainable use of the resource. Information activities should therefore also be targeted at politicians, farmers, industrialists etc. in order to make them aware of a specific water resource situation and to gradually establish a knowledge base and an awareness on which sound IWRM policies and practices can be based.

Awareness raising should not only be seen as information activities. There is considerable benefit in a combination of information and on the ground activities, which provide concrete examples and practices on sustainable management of the resource.

An important element in the continuous awareness raising process will be the availability of and free access to data and information on the resource, which can enable people and institutions to be involved, take decisions and to act.

Danida supports formulation of national water resources policies through democratic processes with awareness raising as an important element.

Support to revision or formulation of national water resources policies includes:

- analysis of policy processes and identification of key policy makers as a basis for support to policy formulation;
- development of national policies and action plans in a participatory process. The policies should take different gender roles and the cross-sector and thematic nature of water resources management into account;
- policy development at the national level, which sets the main priorities for use of the resource and which outlines the main mechanisms for managing different demands and institutional structures for IWRM, while ensuring the transparency and accountability of these;
- policy development and harmonisation at national and regional level to establish and operationalise agreements and mechanisms for conflict resolution and/or prevention on international water courses;

- formulation or updating of realistic and enforceable legislation based on a policy process which includes equity concerns;
- supporting the formulation of policies in which land and water are managed in a co-ordinated manner so as to ensure the sustainability of natural eco-system functions.

Support to awareness raising:

- is aimed at decision-makers at all institutional levels within a national context. This includes the public and the private sector and civil society institutions and organisations in particular those which represent the poorer segments of a population;
- is seen as general information activities as well as more targeted activities directed towards specific sectors or on specific issues. Involvement of the press could be an important activity;
- could be channelled through the education system and targeted at school children;
- could be aimed at the regional level to enhance exchange of information on the status of water resources regimes and management and to facilitate dialogue between countries with shared water courses;
- could be aimed at enhancing the availability and access to information and data on the resources for everyone.

#### 4.3 Institutions and channels for policy implementation

The institutional setting for water resources management includes formal institutions and organisations (public and private), informal institutions and customs, which determine and affect people's access and utilisation of resources. Structural adjustment programmes and institutional reform programmes have, over the last decades, changed government structures and redefined public and private sector roles in most low-income countries.

Traditionally, the water resources management functions have been fragmented between several line ministries often with "arms" at the local level, each having their specific sector interests to promote. Ministries of Agriculture, Energy, Health, Water Supplies are examples of bodies which have vested interests in water resources and which have often acted with little or no co-ordination. The results have been an inefficient utilisation of the available water resources based on a "first come, first served" principle and the "rights of the strongest". In the longer term such practice cannot sustain economic development in situations of increasing water stress.

Although instituting changes is complicated and potentially full of conflicts, there is an ongoing redefinition and reinforcement of functions, roles and responsibilities at various administrative levels within the public sector. In addition, there is a need to build bridges that can prevent conflicts between different stakeholders and between the public and private sectors. It will be important that institutional changes and regulation on IWRM do not aim at establishing the ideal planning framework for water resources, but rather at establishing sufficient mechanisms for a more transparent levelling off of the different interests and demands for the resource.

Institutional capacity building also includes the development and maintenance of organisations for water resources assessments and surveillance, monitoring and regulation of surface and groundwater resources, systems for issuing and approval of permits for abstraction and disposal of surface and groundwater, and systems for conservation and protection of the resource.

Changes in formal system institutional set-ups affect informal institutions, customs and gender relationships. Such changes can have complicated and often negative effects, unless these issues and the consequences are understood and taken into account.

##### 4.3.1 Public sector

In accordance with the principle of management at the lowest appropriate level, and the range of existing institutional set-ups, the Danish support will be based on an assessment, which in each particular case determines the most appropriate institutional setting. The support may range from international to local level institutions, and should take its point of departure in existing structures and traditions for IWRM.

Decentralisation efforts in many countries aim to strengthen lower levels of governments and build up capacity, so the central level plays a monitoring and facilitating rather than an executive and implementing role. However, it is important not to confuse the concept of lowest appropriate level with decentralisation. A strong central level will be needed in order to define policy framework, monitor that allocation is based on equity, regulate and carry out data collection and research. Furthermore only central government institutions have the mandate and the capacity to handle major national and regional water conflicts.

Decentralised levels are important in implementation as local stakeholders can be involved and play a significant role in voicing local priorities within a given context of resource use. At the same time decision-making is more transparent at decentralised levels and the checks and balances between state and civil society are at least in principle (see below) more accessible for local stakeholders including civil society organisations.

The practical management of the resource is also best taken care of by local users, which have instituted both formal and informal management systems. Often, integrated water resources management has a weak institutional base below central government level. This can be a barrier for further implementing management systems at these levels of government. The efforts of setting up institutional systems at lower levels often run into serious capacity constraints, as human and financial resources are scarce. However decentralisation could create new options as financial and human resources are shifted towards local levels. It is therefore important that water resources management interventions are co-ordinated and interact with reforms of government (decentralisation reform, civil service reform, privatisation reform etc.). In this context it will be important that IWRM programmes aim at strengthening the capacity of local institutions and civil society to manage the resource, and ensure that there is sufficient co-ordination, co-operation and flow of information between central and local institutions.

Management systems for water resources should ideally be based on river basin boundaries, which are the context within which water resources have to be understood. However, political-administrative structures are not based on water.

Management of soil and land use, traditional beliefs and traditions, ethnic considerations, existing infrastructure and other issues are decisive for how political administrative structures have been established. The established political administrative structures to manage water resources are therefore a compromise based on a number of trade offs. In relation to IWRM it should be ensured that the resource is understood and assessed in a basin context and that sufficient mechanisms are set up to manage and co-ordinate the use of the resource within this frame. River basin management systems are found both within states and in trans-boundary river basins (examples are the Mekong River Commission or SADC). Such management systems are important, and they range from having an executive function, or an advisory function, in relation to a particular government. However, regional structures have at times developed into semi-independent bodies, functioning in isolation from national institutions and very much as channels of projects. Furthermore, the different partners in a regional co-operation context often have a very different capacity to take part in such a co-operation. It will be important for regional co-operation on IWRM that it is based on a commitment and involvement of national institutions and is aimed at levelling the capacity of the national institutions to take part in the co-operation.

The management of the resource at the national and regional level will focus very much on inter-sector co-ordination, regulation and agreements on the use of the resource itself. As mentioned above, IWRM at the local level needs to be seen in the context of land use, soil- and natural resource management, and consequently it turns into watershed management. Furthermore it is important to see the management of the resource in a livelihood context.

It is further important for management purposes that IWRM institutions in the public sector generate or otherwise acquire relevant data and ensure that information flows to decision making institutions and is made available to the public.

#### 4.3.2 Private sector

The major stakeholders in the private sector are industry, agriculture, energy providers and domestic water users, who are actually the practical managers of the resource.

Public and private partnerships are today viewed as a necessity for sustainable integrated management of water resources. The public sector needs the support of private sector stakeholders in implementing incentives and enforcing regulations. In spite of difficulties and conflicting interests, it is important to support capacity development, awareness raising and dialogue between the major stakeholders in the private sector and the public sector, as this could lead to co-ordinated action and agreement.

Private sector participation has indeed a potential role in some countries to improve the technical and managerial capacity of utilities and to provide essential capital investments.



There are also some former government responsibilities that are increasingly being taken over by the private sector. Examples are applied research, development of technologies, environmental monitoring and assessment functions and laboratory functions. Danida can support such private sector activities when they serve a public purpose and are potentially sustainable (12).

Danida will support

- institutional reform processes: At central government level this includes changing the role and responsibility of government sector institutions and agencies, and supporting the development of capacity to fulfil new roles – from service provider to policy maker, overall monitoring and regulating agent and facilitator. Changes will take their point of departure in existing institutional frameworks and traditions;
  - strengthening of accountable national and local institutions, enhancing transparent administration;
  - strengthening of institutions and mechanisms concerned with regional co-operation within water resources management as well as trans-boundary river basin organisations. In particular focus should be on levelling the capacity of the different partners in regional co-operation;
  - transparent mechanisms, rather than major planning systems, for levelling of the different and conflicting demands for the resource;
- 11) Danida may also support commercial projects. This falls under the private sector programme (see section 6.7.)

- decentralisation processes and assistance to build up local level capacity with the aim that the water resources can be managed at “the lowest appropriate level“;

#### Box 8 Support to Water Action Plans (WAP) – the Danida Experience

Danida has supported the preparation of National Water Action Plans in Uganda, Nicaragua, Burkina Faso and Ghana, as well as a regional Water Action Plan in Srepok River Basin in Vietnam. The experiences from these programmes were summarized in a Workshop in Copenhagen in September 1998.

Water Action Plans are political and institutional programmes with a high degree of technical content. However, technical issues and technical solutions are not the only constraints for effective water action plans. Rather, key constraints relate to organizations, institutions, policy and planning. In particular, the human resource capacity in the recipient countries to address these issues is limited.

It is the general experience from Danida’s involvement in WAPs that the national demand and ownership are a precondition if a comprehensive WAP process is to be successful.

It is crucial for sustainability that formulation is unrushed and that the experts involved have country knowledge and political sensitivity. Momentum and windows of opportunity must be exploited in order to promote motivation, demand and potential ownership. The ownership issue is complicated because of different stakeholder interests, and this underlines the need for donor flexibility and sensitivity throughout the programme cycle.

Recipients need to see tangible results in terms of transfer of technical know-how and tools for management of water resources, at the same time as the institutional capacity to do so is being built up. This is the combination of “walk-walk” and “talk-talk”, in other words an appropriate mix of overall planning and policy interventions and some practical activities that may have high priority on the local agenda.

Programmes should be process oriented and the phases of design, implementation and monitoring overlap. Process orientation and ownership are closely linked, and it is counter-productive to follow a classical blueprint approach.

Some WAPs and other water resource management programmes are technology-driven, often because planners have not recognized that the political and institutional issues are those, which constitute the real challenges. These aspects, and the capacity development needs, have therefore been given insufficient attention in the designs.

A WAP may be national or regional in design, but it is important that it is appropriate in scope and ambition in a given country setting at a given time. A long-term commitment from donors will enable the recipient and the donor to make an appropriate and flexible design with an appropriate level of ambition.

Baseline studies covering non-technical aspects should be included as planning and monitoring tools. Goals that relate to developing institutional capacity should be more specific so they can refer to baseline data.

Donors should increasingly shift focus from public institution orientation towards a broader range of stakeholders – customary organizations, NGOs, and private sector stakeholders, in addition to the public sector agencies. This includes building capacity also for these stakeholders.

- institutional assessments to be carried out prior to the formulation of programmes. This includes analysis of the formal and informal and traditional organisational and institutional set-ups, power relations, customs, poverty, and gender relations;
- establishing cross-sector dialogue between the principal actors in land and water management, implying collaboration between a multitude of sector ministries, private sector operators, civil society organisations including NGO's and other relevant parties;
- capacity development, awareness raising and establishment of dialogue between public and private sector stakeholders in order to promote joint actions for sustainable management of water resources.

#### 4.4 Strengthening livelihoods through specific interventions

The poor are often vulnerable because they are unable to claim their rights, as their right to natural resources is normally a customary right. It is essential to decrease the vulnerability of the poor. At local levels this means empowerment of the poorest and most vulnerable groups to manage their own resources and develop organisational structures which enable these groups to actively build on their assets and increase their participation, influence and defend their water rights in conflicts (The livelihood approach is briefly elaborated in Annex 3).

It also means supporting local initiatives, which can improve existing primary production systems, both in terms of environmental sustainability and income. In such support the starting point will be to analyse the assets and strengths of the intended target group and build on this rather than taking the point of departure in the weaknesses.

At national level and at other levels of government (i.e. both in policy formulation and implementation) and in stakeholder dialogues Danida will support attempts to involve poorer group's decision making and to ensure their rights in legislation. This includes taking local customs and practices, religious values, and informal institutional set-ups, into account – and to support the use of transparent decision-making channels. Civil society organisations often in the form of NGOs and CBOs are important partners in this process.

#### Box 9 Examples of micro-management of water resources at community level

##### Protection

- Surface water quality management through fencing of intake/collection areas to avoid pollution from cattle and by separating cattle watering points from points where water for domestic use is collected
- Surface water quality management through agreements with upstream communities about avoiding unhygienic use of the stream
- Groundwater quality management through spacing of latrines and wells and through hygienic practices at the well site

##### Conservation and development

- Conservation of vegetation cover in upper catchment
- Rainwater harvesting by appropriate tillage systems at farm level
- Rainwater harvesting from roof run-off where appropriate
- Minor conservation reservoirs for small scale irrigation
- Minimisation of wastage
- Development of micro-watersheds

##### Allocation

- Sharing of water in community irrigation schemes
- Securing water rights and access to conflict resolution mechanisms if rights have been violated or pollution from upstream has occurred
- Sharing of scarce water in prolonged drought situation

Understanding of any particular local context and its dynamics, i.e. the role of traditional culture, social relationships, gender relations etc, are prerequisites for strengthening of livelihoods through specific interventions. With regard to gender, for instance, it is often the case that men and women have different interests, roles and gains in relation to the management of water resources. Women are likely to give greater importance to drinking water access and health benefits, because they take the main responsibility for domestic chores. Men are likely to prioritise interests related to production. Mainstreaming of gender equality in WRM programming would comprise a) the identification of means to address differences in needs and priorities that arise from differences in the activities and responsibilities of women and men; b) the identification of opportunities to address inequalities in access and control over water (see also Annex 4).

Danida supports in particular:

- poorer groups' control of their water resources, as these are of critical importance to their livelihoods;
- poorer and marginalised groups access to information, education and decision making;

This includes:

- organisational strengthening and capacity development of various local communities, groups and organisations with the purpose of decreasing vulnerability and increasing the influence, control and environmental management of water resources;
- at policy level, promoting policy, legislation and management which protect the rights of poorer groups and increase their influence and economic possibilities;
- concrete projects which can increase the income and well-being of poorer groups;
- taking the different interests of men and women into consideration, planning and implementing support in a gender-responsive manner.

#### 4.5 Management tools, research and development

##### 4.5.1 Water demand management

Water demand management is an important aspect of IWRM, and is an alternative to the traditionally applied extension of supply provision within the productive sectors, such as water supply and sanitation, agriculture, industries, etc. Demand management is a tool which aims to regulate conflicting demands and ensure equal access to the resource, maximise the usage of a given water resource, and limit water wastage, low-value uses and water pollution through various tools that regulate people's demands.

Various strategies and tools are available for the regulation of the demands on the resource; from market based approaches over planning, to command and control. Different tools have particular advantages and/or limitations, and their composition depends on a careful analysis of the specific context and the capacity to implement and enforce the various tools. It will be important to build systems of licenses and water rights, to use pricing mechanisms and charging to regulate behaviour and promote sustainability. Often demonstration projects and information about different technology options will be important in terms of guiding behaviour. Information and data systems designed for specific decision making needs will be crucial for the possibility to make informed choices in scarcity situations as well as in flood situations.

There is a general consensus internationally on some important principles that should guide the management of the resource:

a) Water as an economic and social good is an important reference point, in that taking the full cost of water into account should be part of the context of setting water prices, effluent charges and incentives for water conservation and pollution control, while at the same time ensuring necessary cross-subsidies for poorer groups.

b) The users-pay principle should be applied as far as relevant and feasible in a given context, and with emphasis on transparency in the setting of prices, tariffs, taxes and subsidies.

The polluter-pays principle should be applied to the widest extent possible, considering the environmental externalities caused by major water polluters (cities, industries, mining, and in some countries also diffuse pollution from advanced food and cash crop production).

Danida will support:

- development of a variety of management and regulatory tools for water conservation, development and saving. The tools to be developed will depend on a careful analysis of the specific context.

#### 4.5.2 Water as an economic and social good

In accordance with the principles agreed at the Rio Conference (and Dublin) Danida will in its assistance advocate the concept of water as an economic and social good. The concept provides a theoretical frame for understanding the interaction (externalities and impacts) between different sectors, thus providing part of the basis for determining the “best” use of water (13). Its application in a political context, where choices are made based on interests and values, which go far beyond economic principles, is limited. When and where it is applied, it is one instrument among several that guide the use of water in a society. In relation to poverty alleviation it is always important to take the social aspects of water into consideration, and Danida therefore takes the viewpoint that the social aspects and meeting basic human needs have to go hand in hand with rational economic value aspects.

12) The full value, and the full cost, of water consist of several value and cost components. These are described in the GWP TAC publication “Water as a Social and Economic Good: How to Put the Principle into Practice” Figures 1 and 2.

Box 10 Value and charging are two different things

Concern has been voiced over the social consequences of the concept of “water as an economic and social good”: How would this affect poor people’s access to water? (While the Dublin principles refer to water as “an economic good”, water is referred to as an economic and social good in Chapter 18 of Agenda 21). To avoid some of the confusion on this concept, there is a need to distinguish clearly between valuing and charging for water. The value of water in alternative uses is important for the rational allocation of water as a scarce resource (using i.a. the “opportunity cost” concept), whether by regulatory or economic means. Charging for water means to apply an economic instrument, which affects behaviour towards conservation and rational use of water, exercise demand management and ensure cost recovery.

Source: Integrated Water resources Management. How GWP TAC sees it. GWP. March 2000

Nevertheless, the economic value principle is important as a reference of understanding. The determination of the full value of water is useful in order to:

- a) enhance allocation of scarce water resources to the highest value uses;
- b) encourage water conservation by reducing water losses and increasing water use efficiency; and c) improve water quality (and hence value of water) by reducing pollution. However, there are a number of methodological and conceptual constraints in the practical application of the principle – first of all the lack of reliable data and parameters for analysis. The political reality within different societies is also likely to counteract the application of the concept, and at present it is not even implemented in more developed countries.

Danida supports the principle that water is considered an economic and social good, while stressing the importance of meeting basic human needs as a first priority.

Danida will support:

- the economic and social good principle and recognises the principle as an important instrument of integrated water resources management along with a number of other instruments;
- in research and on a pilot basis the methodological development and refinement of economic considerations in national water policies, laws and regulations and research on the balance between water as a social and economic good.

#### 4.5.3 Information and monitoring

At present many countries have deficiencies in their information gathering and water resources monitoring and assessment. It is costly to operate complex meteorological and hydrometric systems. Those systems that have been developed have often broken down due to the inability of governments to provide funds on a continuous basis to maintain the systems and their institutional requirements. Systems to be established must therefore take their starting point in meeting the most urgent needs, and ensure that monitoring, assessment, and quality assurance of data can be institutionally sustainable. Institutional options should be analysed from a cost-effective point of view considering, i) government as well as non-government agencies, ii) institutions shared by several countries, etc.

Access to reliable and transparent information supports the following purposes:

**Conflict prevention/resolution:** Application of appropriate data monitoring and assessment means (or tools) for water resources development scenarios helps to identify and predict potential conflicts at an early stage, hence providing the basis for developing prevention strategies. In case conflicts arise, reliable information can provide the required knowledge as a common basis for discussion and conflict resolution.

**Transparent decision-making:** Decision-making based on appropriate levels of information on the water resource and on how alternative allocations and regulation will affect the different interest groups will allow the trade-offs between the different users to be determined. An example is that water resources information (quantity and quality in time and space) and appropriate assessment tools are required in support of introducing the concept of water as an economic and social good as a policy instrument.<sup>14</sup> This will require a proper overview of all water users and interests within the river basin (or other administrative boundaries), and how individual users/sectors impact (via the resource) on other users/sectors. Such information will be needed to estimate important components of cost/value figures, e.g. the opportunity cost, economic and environmental externalities and net benefits from return flows, which otherwise would have considerable uncertainties.

**Awareness raising/stakeholder participation:** Easy access to sufficient and reliable water resource information and efficient visualisation measures may be applied to enhance the public awareness of key water resource problems and issues, and facilitate stakeholder participation. It will be important that the approach for disseminating information is appropriately tailored to the actual levels of society.

- 13) This concept involves estimation of the full cost and value of water in its various uses as inputs for deciding on water allocations and setting water prices and effluent charges.

#### 4.5.4 Research and technology development

Research and knowledge of water resources both in technical terms, and in terms of human production systems, traditional conflict mitigation measures etc are scarce in most low-income countries. Knowledge of the interrelations and consequences of different stakeholders' usage is a prerequisite for awareness raising and decision-making. Furthermore, it is important to strengthen research in developing countries in order to promote the building up of a national knowledge base, which will eventually have an impact on the future education of students of higher education, and as such limit the need for foreign TA support. Applied research results can also be part of and add value to the planning and practical implementation interventions, and are therefore within the scope of Danish assistance.

IWRM is a relatively new field, which demands solutions cutting across sectors and traditional research disciplines. Much research in water issues in developed and developing country institutions has had a narrow technical focus. There is a need to develop more interdisciplinary research, and research within political and socio-economic areas. Some major and newer areas where research is needed are: conflict prevention and resolution, implication of the principles of water as an economic and social good, the function of aquatic ecosystem in water management; land-water interactions; political, institutional and administrative aspects and interaction between technical knowledge and decision making.

There is a need to strengthen research within the above-mentioned fields in developed as well as developing countries. The support for research activities can be in the form of direct support to institutions in developing countries as part of sector programmes, as part of regional or global research programmes and as twinning arrangements between Danish institutions and institutions in the programme countries or regionally based institutions.

Water resources data is also required for research and purposes of developing new appropriate technologies, which can contribute to distribution of more knowledge on issues such as: alternative treatment technologies, rainwater harvesting measures, water conservation and water-efficient methods and appliances etc.

Danida can support:

- applied research (technical and non-technical) within the programmes;
- interdisciplinary research activities, which involve different professional areas;
- research co-operation between Danish and/or regional research institutions and research institutions in the recipient country;
- design of appropriate water resources management information systems (based on existing systems and data), which are closely tailored to the specific needs of the decision-making processes, and ensure that quality assurance procedures of data collection, processing and dissemination are integrated elements of such systems;
- establishment of financial and institutionally sustainable water resources monitoring and assessment systems, such as national laboratories, national and regional monitoring networks, computerised regulatory management instruments and models (tailored to decision making);
- that water resources assessment and data and information management is given priority in the weaker countries of international river basins, in order to make them more equal for dialogue and negotiations;
- that an information and publication strategy accompanies the above;
- that assistance is aimed at capacity development within the institutions targeted. This implies a longer time frame for assistance and transfer of appropriate technologies, which are relevant and can be sustained;

Danida may assist, where appropriate with activities such as:

- development of instruments and guidelines on how to assess and monitor natural ecosystem functions, including environmental (and health) impact assessments;
- development and application (on a pilot basis) of tools to estimate environmental values and costs, and resolve conflicts between water for ecosystem uses (economic, biodiversity, cultural etc.) and water for other purposes.

## 5. Implications of IWRM for other sector policies 15)

### 5.1 Agriculture development

#### Policy level

Danish support to the agricultural sector will promote the incorporation of improved water resources management in national agricultural policies where relevant. Support within this field will, in particular, be given to programmes with a

focus on integrated land and water management, ensuring sustainable ecosystem functions and an optimal allocation of scarce water resources.

#### Specific strategies

More specifically, Danida will support:

- National policy formulation with a particular emphasis on the role of water in national food policy. Water-scarce countries will be assisted in the development of agricultural strategies that promote improved water efficiency in crop production. This will include the development and application of tools for economic evaluation and conflict resolution between competing users, as well as financial instruments (pricing) as incentives for water conservation in agriculture.
  - Watershed management activities to reduce soil and water losses through improved land husbandry. Improved watershed management aims to reduce dramatic fluctuations in downstream water availability, which may be caused by flooding and/or droughts.
  - Measures aimed at the reduction of agricultural pollution from pesticides and fertilisers. The tools will, inter alia, be integrated pest and plant nutrition management.
  - Improved efficiency of water use in relation to irrigated agriculture. Danida emphasises support to small and medium-sized irrigation schemes, giving
- 14) Reference is also made to Danida sector policies, which are available for the following sectors: Agriculture, Water Supply and Sanitation, Health, Energy, Transport Infrastructure and Guidelines for environmental assessment.

priority to the rehabilitation of existing schemes, the establishment of adequate drainage, and management and institutional issues.

## 5.2 Water supply, sanitation and hygiene

### Policy level

Danida in its support to national policies should promote that drinking water is given preference above other water demands in water resource allocation policies.

#### Specific strategies

More specifically, Danida will support:

- Water supply, considered an economic and social good, and this should be reflected in the design and formulation of cost-recovery policies (water tariffs, subsidies);
- Water conservation and demand management, especially within the urban sector, will be an important issue to be dealt with. The WS&S policy should address this issue and define areas and conditions for Danida support; Danish assistance will, in this context, promote ecological sanitation and will support pilot initiatives on the re-use of wastewater in agricultural and forest production;
- The “polluter-pays” principle should be a guideline on sanitation tariff policies (especially relevant in urban areas);
- The minimising of pollution both upstream and downstream. Questions of siting, technology choice and criteria related to effluent reduction should be taken into account in supporting improved sanitation;
- Rural and urban WS&S stakeholders to be active partners in the IWRM dialogue and to take part in the capacity building programme as defined in the IWRM policies;
- Establishment of protection measures for catchment areas when needed.

### 5.3 Energy

#### Policy level

Danida support to energy should recognise that some aspects of energy planning are closely interlinked with water resources management, and, consequently, it should promote IWRM in national energy planning. The particular areas of concern are when cheap electricity (subsidised) encourages farmers to waste it and practise inefficient irrigation methods. It is also recognised that the development of hydropower generation may have a significant impact on water resource management.

#### Specific strategies

More specifically, Danida will support:

- Support to policies that include IWRM considerations in regional power planning and sharing, in particular, in regions where hydropower plays (or will play in the future) a significant role;
- Support to national energy policy formulation with an emphasis on incorporating IWRM considerations – including environmental considerations – in long-term energy planning;
- Support to energy sector reform leading to the removal of inappropriate incentives resulting in a general wastage of power (and consequent unnecessary pollution) and hidden subsidies causing unsustainable water use, especially for groundwater-based irrigation.

### 5.4 Transport infrastructure

#### Policy level

In relation to the transport sector, a national environmental policy framework and related legislation often do not exist in developing countries. Danida should, in policy development within the transport sector, contribute to the strengthening of environmental analysis and environmentally sound planning and implementation of transport programmes. 16)

Danida has a transport infrastructure policy where due consideration is given to environmental issues – including water resources, for instance, when transport routes traverse wetlands and other fragile ecosystems.

#### Specific strategies

Danish support to transport infrastructure mainly covers roads and maritime systems:

15) Among references to international standards particular mention should be made of the World Bank's Technical Paper No. 140, Environmental Assessment Sourcebook, the "Environment Manual" of the Commission of the European Community, Danida's guidelines for "Environmental Assessment for Sustainable Development", and the Directory of Impact Assessment Guidelines, distributed by IIED.

- In practice, policies may be implemented that restrict traffic through catchments, etc. It is an integrated procedure in planning of road infrastructure to carry out an EIA and an EMP during implementation and monitoring, and the costs of environmental mitigation are included in the economic calculations for an investment. These procedures take water resources into account. Danida also follows relevant international conventions on the protection of the environment.
- With regard to water transport, Danida mainly supports inland waterways transport. Navigation is an activity that depends on having sufficient flow of water in water bodies. It can have negative effects on water quality (through pollution), and, therefore, it may conflict with other uses. It is also an integrated procedure in planning and implementation to carry out EIA and EMP, which in each case will document and monitor the potential impact of the programme on the environment. Furthermore, Danish support will promote IWRM in areas where maritime systems could be impacted by – or will have an impact on – other water use activities.

### 5.5 Environment, including industrial development

#### Policy level



In relation to environmental programmes, the concepts of IWRM will be promoted in policy dialogue and in planning and legislative processes. Water resource considerations will also be taken fully into account in environmental impact assessment (EIA) of development schemes, as indicated in the Danida guidance notes on environmental assessment for sustainable development.

Specific strategies

More specifically Danida will:

- Support policies, strategies and activities, which are designed to ensure sustainable functioning of water-related ecosystems. This entails focussing on improved watershed management as well as on the conservation and use of catchment areas, wetlands, estuaries and other vital ecosystems;
- Support the collection and analysis of water resource data by national authorities and research institutions concerned with determining water requirements for ecosystems;
- Promote pollution reduction measures within industrial activities, as well as activities which reduce water pollution arising from disposal of chemicals and both toxic and solid waste;
- Support development and implementation of water conservation measures and appropriate technologies including recycling, re-use and “good housekeeping”.

## 6. Programming and implementation issues

### 6.1 General comment

The guidelines for sector programme support are the basis for the implementation of Danish support to all sectors, and they cover all general requirements for the programme cycle. This chapter is, therefore, a presentation of supplementary remarks of particular relevance to integrated water resources management. The following brief sections are meant as recognition of the fact that policies are only valid if they are being implemented in practice. Policies must be realistic for implementation purposes, and, vice versa, implementation procedures should support policies.

### 6.2 Identification and design

Experience shows that a programme identification and a design phase that are based on a limited knowledge of key issues and a lack of familiarity with the dynamics of the sector lead to programmes that are based on an “ideal picture” of a situation rather than an accurate analysis – and this often leads to the setting of objectives that are too ambitious and too much of a “blue print” nature.

#### Flexibility

Experience also shows that the major shortcomings in environmental and capacity development programmes can partly be related to inadequate planning methods. Analytical identification and design processes require certain flexibility with regard to timing, planning of activities, and external resources (funds and technical assistance). 17)

17) Concluded at the Snekkersten Workshop (May 1998), and the Workshop on Water Action Plans (September 1998). The identification and design process should focus on the key IWRM problems, setting the targets, the modality and the strategy for the programme – and focus especially on how poor and vulnerable groups can be involved. The process should ideally result in programmes that are flexibly managed in relation to objectives. The discussion in earlier sections of this policy paper fully supports this. It has underlined the importance of planning specific interventions when there is clearly identified demand, ownership, and commitment on the part of the recipient – and where there is confidence in the agreed intervention and its activities, outputs and objectives. The discussion has also stressed the conflicting interests of different stakeholders. This supports the argument that the identification and design phase should include a thorough mapping of the different interests – and that it should be participatory.

What has been said about identification and design is also true for the

implementation process. It, too, should have clear targets; indeed, it should be process-oriented, in order to develop suitable strategies and continuously adapt these in the light of changes in the environment of implementation.

#### Cross-sector analysis

The cross-sector nature of IWRM, and the presence of many different stakeholders, also call for in-depth analyses and assessments, which can further support the definition of realistic objectives and identify the main strategic elements for the programme, the level of involvement of key stakeholders, and realistic capacity development activities. Further, the analysis of the cross-sectoral and institutional context has to respect the country-specific nature of a particular setting and the solutions that are needed and that are realistic. Experience shows that there is no one solution that is appropriate for all situations.

#### Capacity development

Capacity development is an important element in implementation, but given a more extensive identification and design (or preparatory) phase, it can also be important in these preliminary stages. Capacity development should be included from the outset, based on need and demand. (This has also been discussed in 4.1.). Time frames and objectives should be set with due consideration to capacity development activities. Technical assistance should be provided with clear terms of reference, and milestones should be set in order to “measure” the effect. Exit strategies for technical assistance should also be elaborated and followed.

#### Poverty-oriented analytical tools

Participatory analytical tools and methods should be used extensively in both identification and design. With a focus on support that can lead to an improvement of livelihoods for poorer groups, and a decrease in their vulnerability, the analytical methods that are applied should ensure that the demands of these groups are made explicit.

#### Policy dialogue

A final issue which calls for an elaborate identification and design phase is that the policy dialogue – which usually is ongoing between the Embassy and a number of different national stakeholders, mainly public – should be strengthened through the incorporation of the views of private sector stakeholders.

### 6.3 Co-ordination and coherence

Internal co-ordination in Danida is important because the support must create a synergy between different sector support programmes in a country – as well as with other programmes. (Support to decentralisation of government is a good example).

The country strategies are important tools in this respect because when such support is directed towards national IWRM policies and strategies, it is likely to have an impact on activities in other sectors with Danish involvement. Also, these sectors should be involved in the IWRM activities. The potential for co-ordination should be (as far as possible) identified during the formulation stage.

Co-ordination with other donors – led by the programme country government – is given high priority in sector programming. Co-ordination with other donors can be complicated, as this may involve the co-ordination of donors in a number of sectors. However, this makes co-ordination even more important, as the possibility of duplication is considerable – and efforts may be contradictory. The national leadership of the co-ordination is crucial, and it is important that one institution is accepted as being responsible for co-ordination. For water resources management, this entails the co-ordination and participation of stakeholders from the private sector, user organisations and NGOs.

### 6.4 Implementation

Implementation will generally follow the guidelines stipulated for Danish sector programme support. 18) These include a degree of flexibility, which is very important in order to achieve objectives. The flexibility is crucial because often water resource issues are political and influenced by strong sector and economic interests. Therefore programmes must be capable of adapting to developing national policies and priorities. In this context, specific attention needs to be paid to the improvement of the situation for the poorer stakeholders.

#### Programme management requirements

Programme management should have the capacity to adjust strategies, outputs and activities during implementation. This approach to implementation can only be practised with a strong nationally led management team. This underlines the need for a relevant host institution of the programme – and for clear and transparent decision making mechanisms.

18) Guidelines for Sector Programme Support. May 1998.

#### 6.5 Monitoring

Performance and impact monitoring are important tools to continuously ensure that the programme partners agree that the overall objectives will be met, and that adjustments in strategies are justified. It is also an important management tool, as flexible implementation necessitates efficient monitoring in relation to the achievement of objectives.

#### 6.6 The Danish resource base

The Danish resource base has a broad range of expertise and experience covering management, monitoring and assessment, within ground water and surface water issues. As Denmark has been involved in IWRM for a decade, the Danish resource base has gained substantial experience both with national water resource planning – as well as river basin management. However, the field of integrated water resources management is still relatively new, and there is, both internationally and in Denmark, a special need for non-technical expertise within the fields of conflict prevention and resolution, economic analysis and valuing, and regulatory and institutional analyses. Moreover, there will be a need to further develop the capacity to combine non-technical and technical expertise and inputs. There will be a need to include not only Danish, but also international and developing countries' research institutions, in the strengthening of these areas. This includes the involvement of institutions and expertise that have not traditionally been involved in IWRM.

The resource base includes:

- NGOs;
- consulting companies;
- universities;
- research institutions (a broad range of technical and non-technical research institutions);
- government agencies;
- technological service institutes.

#### 6.7 Funding and support modalities

The Danish assistance to integrated water resources management will be mainly through development aid as bilateral and/or regional assistance to the programme countries and regional institutions. It will, therefore, have a national, regional and a government-to-government focus.

There are also other modalities: multilateral regional assistance and support to NGOs. Of more commercially oriented modalities Danida has a private sector programme, which aims to support the private sector in selected programme countries through cooperation between Danish companies and companies in the programme countries that are included in the aforementioned programme. Mixed credits are a modality that can be used to finance Danish deliveries to programmes. Mixed credits are provided on conditions similar to export credits, where the recipient in reality gets an interest free loan. The grant element is between 35% and 50% of the total amount.

MIFRESTA (the Environment, Peace and Stability facility) is a funding facility, which has water resources management as a central area of operation. This type of assistance can support important regional co-operation in Southern Africa and South East Asia.

Multilateral funding is relevant for regional assistance and for channelling through regional and multilateral organisations, the Global Environment Facility, and networks such as the Global Water Partnership.

Research funds are already available for Danish research institutions, and internationally to the CGIAR institutions, IWMI and IFPRI. Further issues related to IWRM can be included as part of the general Danish research-supported activities. Research can also be included in bilateral and regional programmes, either as direct support to developing countries' research institutions or in the form of twinning arrangements.

Technical assistance has a major role to play in specific aspects of integrated water resources management. However, other forms of co-operation, such as institutional twinning and research co-operation, also have important roles to play. There are, for example, possibilities for private sector involvement in technology development.

#### Annex 1

#### HydrologicalCycle

Hydrological cycle with global annual average water balance given in units relative to a value of 100 for the rate of precipitation on land. It can be seen that evaporation from the land surface consumes 61 percent of the annual precipitation on land, whereas the remaining 39 percent forms runoff to the oceans, mostly as surface water.

A recent estimate of the global status of the water resources situation shows that of the yearly global rainfall of about 40,000 cubic kilometres, only 13,500 are readily available to man. Out of this resource only about 4,000 cubic kilometres are classified as economically available, and of this an estimated 2,440 are used for consumption (According to "Water in the 21st Century" (World Water Council, March 1998)).

#### Annex 2

A brief overview of important global water policy processes since the Rio Conference in 1992

#### Rio/Dublin

The Dublin and Rio Conferences together marked the beginning of a new global consensus on water resources management. Previously, the water sector was to a large degree synonymous with water supply. Water for other uses was considered as part of the respective productive sectors, agriculture and industry. Under the new global consensus it was recognised that freshwater was a finite, vulnerable and fundamental resource to all socio-economic development and for the maintenance of healthy ecosystems.

This consensus has been clearly expressed in the Dublin Statement (see page 2 of the main document).

#### Post Rio CSD Process

The immediate follow-up to Dublin and Rio on freshwater management within the UN was somewhat slow. In 1994 the Commission on Sustainable Development (CSD) initiated the Global Assessment of the Freshwater Resources of the World to be presented at the its fifth session (CSD-5) and at the UN General Assembly Special Session (UNGASS) both in 1997.

However, it was only from 1997-98 that the UN-led discussions about the operationalisation of Dublin and Rio really took off. Strategic approaches to freshwater management was made the theme of CSD-6 and a number of high level meetings took place and documents were produced, including:

- Harare, Zimbabwe 27-30 January 1998: Expert Group Meeting on Strategic Approaches to Freshwater Management (report of meeting included in Compendium);
- Petersberg, Germany 3-5 March 1998: Round Table on Co-operation for Trans-boundary Water Management (report in compendium);
- Paris 19-21 March 1998, Minister level meeting hosted by French Government – „International Conference on Water and Sustainable Development“ (resolution attached), and finally;

- CSD-6 in New York 20 April – 1 May 1998, which can be seen as the culmination of all the above meetings (the actual decisions of CSD on Strategic Approaches to Freshwater are included in the compendium).

All these high level policy meetings basically confirmed the Rio – Dublin consensus. In themselves they added little to the recommendation made in 1992 in terms of concrete operationalisation and priority setting. However, it is a strong indication that freshwater management is becoming a central global policy issue. This is supported by the fact that most of the important bilateral donor agencies have prepared or initiated preparation of strategies for sustainable water resources management within the same period.

#### Key “old” players

The World Bank has been a key player in spearheading the Rio – Dublin principles and forging a more integrated approach to water resources management in general. The Bank developed a new water policy/strategy following the Rio – Dublin principles almost simultaneously with the Rio – Dublin process. The Bank has played an important role in supporting the establishment of the Global Water Partnership and the World Water Council.

The Asian Development Bank (ADB) and the Inter-American Development Bank (IADB) have also been important players in their respective regions. Both organisations have developed regional strategies for integrated freshwater management.

There is no UN organisation specifically devoted to water. However, a number of UN organisations have important water resources related programmes. The most important UN players are UNDP, WHO, FAO, WMO, UNESCO and UNICEF.

At the central level, UN activities on water are co-ordinated by the Administrative Committee on Co-ordination’s Sub-committee on Water (ACC) chaired by UNESCO. The ACC Sub-committee is in principle the task manager for the UN system follow-up to Rio on freshwater, including the implementation of the Strategic Approaches to Freshwater Management agreed to at CSD-6. The actual achievements of the committee are, however, not very visible.

At CSD-6 UNEP was appointed the focal point among the UN agencies for the provision of assistance to member countries on the sustainable development of freshwater resources. Due to the present reorganisation of UNEP it is, however, uncertain when/ if UNEP will be able to take on this role.

#### New Global Mechanisms

In response to the rather slow progress on operationalisation and implementation of the principles and action recommendations for water resources management agreed on in Dublin – Rio, some of the key players took initiatives to launch two new global mechanisms.

#### Global Water Partnership

The Global Water Partnership is an international network open to all organisations involved in water resources management. The partnership was created in 1996 in response to the need to promote the management of water resources in a non-fragmented, coherent manner. The initiative to form the partnership came from Sida, the World Bank and UNDP, and the secretariat of the partnership is hosted by Sida in Stockholm.

The mission of GWP is to support mainly developing countries in the sustainable management of their water resources. GWP is a mechanism for promoting action on Integrated Water Resources Management and cross-sectoral dialogue at all levels. It is a reinforced network that facilitates:

- the identification and formulation of needs for strategic assistance on Integrated Water Resources Management (Channel demand);
- mobilisation of international expertise to address those needs (Mobilise Expertise);
- funding of global and regional programmes for developing, sustaining and applying this expertise (Facilitate funding).

GWP brings together three key groups of actors and facilitates dialogue between these groups:

- external support agencies (such as donors and development banks) through the Financial Support Group (FSG);
- providers of strategic assistance on Integrated Water Resources Management through Associated Programmes;
- clients in countries and regions through the Regional Technical Advisory Committees, through networking and through the Consultative Group (the plenary of GWP partners).

World-wide adoption and application of IWRM principles requires change from „business as usual“, particularly the way investments are made. The very large investments by external support agencies in the water sector need to be seen in a common perspective and priorities set accordingly. GWP aims to promote changes in the investment and management strategies through the formation of a forum of major external support agencies in a Financial Support Group and facilitation of dialogue between this forum and other major stakeholders within IWRM.

Now, two years after the establishment of GWP, the international network comprises a large number of developed and developing country government institutions, agencies of United Nations, development banks, professional associations, research institutions, NGOs and private sector organisations. The GWP Technical Advisory Committee (TAC) is leading the development of the analytical framework of the “water sector“ and initiates actions promoting sustainable water resources management in co-operation with Regional Technical Advisory Committees (RTACs) and with assistance from the GWP Secretariat in Stockholm. RTACs are now operating in South America, Southern Africa, Southeast Asia and South Asia and further networking is underway for instance in the Mediterranean Region, West Africa, Central America, China and Eastern and Central Europe.

#### The World Water Council, the World Water Vision and the World Commission on Water

The World Water Council (WWC), established in France in June 1996, is a membership organisation of countries and serves as a think-tank on water resources development and management. The main activity of the WWC is to formulate a Long Term Vision on Water, Life and the Environment in the 21st Century (World Water Vision). The Vision was presented at the Second World Water Forum in Hague on World Water Day March 2000.

The World Water Vision aims to develop a massive public awareness of the risks of major water problems as a result of inaction, as well as to encourage innovative, out-of-the-box, thinking on how these problems can be tackled. It should encourage and empower people to participate in devising and implementing solutions to these water problems. And it should generate the political commitment to turn this increased public awareness into effective action.

The World Water Vision project started in June 1998. It is guided by the World Commission on Water in the 21st Century and managed by a Vision Unit hosted by UNESCO in Paris. The Vision project has a small central component, with inputs from four Thematic Panels and an “in-house“ analysis capacity through a Scenario Development Panel, but its main activities focus on the organisation of consultations with stakeholders in the water sector at three levels:

- Sector consultations on Water for Food, Water for Nature and Water for People, focusing on bringing together the water sector professionals in a broad sense;
- Regional consultations in up to 20 regions that focus on bringing together the regional stakeholders to develop a shared long term regional vision on water issues and innovative solutions to these issues;
- Network consultations to allow inputs from a large group of individuals and organisations on the World Water Vision, as well as the sector and regional visions, as these develop.

The World Commission will be responsible for the World Water Vision – at the global level – while the organisations responsible for sector and regional consultations produce key inputs under their own responsibility.

In parallel with this activity, work has commenced on developing mechanisms that will translate the commitment arising from the vision into actions. At the 2nd World Water Forum and Ministerial Conference in the Hague in March 2000, the World Vision for Water in the 21st Century developed under the auspices of WWC and the corresponding Framework for Action co-ordinated by GWP was presented.

## The livelihood approach to poverty reduction

The sustainable livelihood approach has mainly a rural focus, and it concentrates on five types of assets 1):

- Natural capital: the natural resource stocks,
- Social capital: the social resources
- Human capital: skills, knowledge, ability to labour, good health;
- Physical capital: the basic infrastructure and the production equipment and means which enable people to pursue their livelihoods,
- Financial capital: the financial resources that are available to people.

A livelihood is sustainable when these assets are maintained or enhanced – at present and in the future – in a manner that does not undermine the natural resource base. In order to fully understand the concept, it will not be enough to concentrate only on capital assets, but a number of other areas must be included. First, it is the vulnerability context in which assets exist (the trends, shocks and local practices that affect livelihoods). Second it is the structures (organisations from public and private sector) and processes (policies, laws, rules of the game and incentives) which define people's livelihood options. The framework strives to empower the poor and to improve their livelihood through participatory methods. The framework explicitly links the micro with the macro and emphasises that policy and institutional analysis must take place at all levels in order to understand the possibilities and constraints that will either facilitate or obstruct the development of a livelihood.

- 1) Based on Carney, Diana, ed., 1998, "Sustainable rural livelihoods, what contribution can we make?" Papers presented at the Department for International Development's Natural Resources Advisers' Conference, July 1998. DFID.

Water resources have a multiple use and the movement and flow of the water means that a resource is seldom local, which also implies that there are different stakeholders and users with competitive interests involved. Many people, and especially the poor, are suffering from severe water scarcity that affects their food security, health and household maintenance, ecosystem maintenance, and the ability to diversify their livelihood. Integrating the SRL approach in water resource management means to go beyond the traditional way of dealing with water scarcity – to view it from a broader perspective in which the core problem is the limited availability of, or access to, the many different services water resources provide.

### Annex 4

#### Gender checklist

##### Key Issue

Uses and priorities: Women and men have different priorities regarding use, development and management of water resources. Women as well as men will share an interest in, and benefit from, irrigation schemes. However, women are often responsible for water supply for domestic and non-productive (e.g. health and sanitation) purposes, while men are responsible for productive use of water resources. This might result in disparate priorities regarding the use of water resources.

Access and control: Ownership and access to resources tend to fall on men rather than on women. Women's rights within this field are often disfavoured by national legislation, leaving women with a weak bargaining position.

#### Environmental impact

Actions/Strategies aiming at protecting the environment from water borne pollution might affect women and men differently and should be addressed accordingly.

##### Key Issue

**Bargaining power and decision-making:**

Often men play the active role in community decision making, while women are expected to remain passive throughout the decision making process. If the weak bargaining power of women is not considered, the programme/ project will risk serving the interest of men only.

**Gender mainstreaming within the WRM sector:**

Equal employment of men and women within the sector is important in order to provide for a gender mainstreaming of the sector. However, equal access to employment will not automatically reduce gender barriers, but additional training for women in non-traditional sectors (engineering, construction) will be required as well as workshops highlighting gender issues in water resource management. Data used for monitoring of the sector should be gender disaggregated and gender strategies should be integrated in policy /action plans.

**Check for**

What is the division of labour in the household and how can this affect different interests and need of men and women regarding water resources?

Are there national institutions and organisations that could support the development of gender-aware approaches in water resource management?

How can the water resource best be utilised in order to satisfy both men and women?

What does the law say about women's and men's access to and ownership of resources?

What is the policy of the government and the responsible ministry regarding equal access of resources to men and women?

How can the programme/project contribute to a more equal access of resources to men and women?

**Check for**

Will the recommended changes in production practices to control pollution affect the responsibilities and time burdens of men and women differently?

Are industrial pollutants causing women's health problems recognised by regulatory boards?

Do women and men play different roles in public decision-making and do these roles constrain women's ability to bargain?



How religious and cultural patterns deal with women's and men's bargaining power.

Whether women and men have equal access to employment in the sector and, if not, at what levels are men and women respectively employed and what is the reason for this?

If/How the policy/action plans address gender issues and how they can be improved.

Whether monitoring data is gender disaggregated and, if not, are there resources to be allocated for this purpose?

Generally within the sector where are the possibilities for changes that will promote gender equality? Can these be integrated into the priority areas identified by the government ministries?

Actions

Highlight the gender issues in the Terms of Reference, Project description

Consult with:

- Women's organisation
- Local experts
- Government ministries

Highlight international agreements/commitments such as the Beijing Platform for Actions and CEDAW.

Consult with:

- Government ministries
- Women's organisation and other NGOs/CBOs
- Local experts

Highlight international commitments such as Agenda 21

Actions

Consult with

- Government ministries
- Women's organisation and other environmental NGO's

Arrange if necessary separate meetings for men and women at hours outside women's working hours. This will facilitate women's participation and allow them to speak for themselves.

Consult with:

- Women's organisation
- Local experts

Consider the opportunities to support and strengthen gender equality in employment, sector monitoring, policy processes and training courses within the sector.

Consult with;

- Government ministries
- Women's organisation

Annex 5

Bibliography

Water Resources/Environment

Asian Development Bank, Working Paper 1998: The Banks Policy on Water

European Commission September 1998: Towards Sustainable Water Resources Management – A Strategic Approach

Geologi nr. 2 Oktober 1997: Water Resources Freshwater the 21st Century's Most Serious Resource Problem

Global Water Partnership, 1998 Technical Advisory Committee (TAC): Proposals for Action

Hirji Rafik and Grey David (chapter 6): Managing International Waters in Africa – Process and Progress

International Food Policy Research Institution, Rosegrant W.Mark: Water Resources in the Twenty-First Century – Challenges and Implications for Action

Inter-American Development Bank 1998: Strategy for Integrated Water Resources Management

International Water Management Institute (IWMI) Water Brief – David Seckler, David Molden and Randolph Barker: Water Scarcity in the Twenty First Century

IRC 1994: Towards Better Water Resources Management – A catalogue of policies and strategies of External Support Agencies

Netherlands Development Assistance. 1998 – Policy Priorities: Water for the Future – Integrated Water Resources Management

Rodriguez, Heinbuch and Lotz, Agriculture and Rural Development 2/98: Water – a Scarce Resource:

Stephen Merrett, UCL Press 1997: Introduction to the Economics of Water Resources – An International Perspective

UN Commission on Sustainable Development: Strategic Approaches to Freshwater Management

UN Commission on Sustainable Development Expert Group on Strategic Approaches to Freshwater Management, Harare 1998: Maintaining Functioning of Freshwater Ecosystems – The Key to Sustainable Management of Water Resources

World Bank Policy Paper 1993: Water Resources Management

World Bank Environment Department Papers 1998: Integrating Freshwater Biodiversity Conservation – Some Emerging Lessons

World Bank Keynote Paper John Briscoe, Senior Water Advisor September 1997: Managing Water as an Economic Good: Rules for Reforms

World Bank Paper – Sara, Garn, Katz: Some Key Messages about the Demand Responsive Approach

World Bank Technical Paper

1 Measuring Economic Benefits for Water Investments and Policies,  
no 338 1996

2 International Watercourses – Enhancing Cooperation and Management Conflict, no.414 1998

3 Water Pricing Experiences – An International Perspective, no.386 1997

4 The legal Framework for Water User's Association – A comparative Study, no.360 1997

5 African Water Resources, no.331 1996

6 Groundwater in Urban Development, Assessing Management Needs and Formulating Policy Strategies no. 390  
1998

7 A Guide to the Formulation of Water Resources Strategy no. 263 1994

8 Water Resources Management in Asia no. 212, 1993

World Water Council 1998: Long Term Vision for Water, Life and the Environment – Suggested Framework for regional Consultations

World Water Council, March 1998: Water in the 21st Century

Report from a Seminar Held in Stockholm 1993: Workshop on Gender and Water Resources Management. Lessons Learned and Strategies for the Future

Conference paper 1997: Freshwater and Gender – A policy Assessment – Comprehensive Assessment of the Freshwater resources of the world