

**Integrated Water
Resources Management
(IWRM): A way to
sustainability**

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Cover photograph:
Use of adequate technology and local-level management of water are key principles of the 'Integrated Water Resources Management' approach. This self-made hydropower turbine supplying a household with electricity for light in Bassid, Bartang Valley, Tajikistan, shows how water, a renewable natural resource, can be used sustainably.

(Photo: R. Middleton, AKDN)

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Integrated Water Resources Management (IWRM):

IWRM is a process which promotes the coordinated development and management of water, land and related resources in order to maximise the resultant economic and social welfare, paving the way towards sustainable development, in an equitable manner without compromising the sustainability of vital ecosystems. (Global Water Partnership, 2000)

Water is a natural resource that is...

...multifunctional and multidimensional

Water is the origin of every form of life. It is a habitat, an aliment, a means of production and transport, and a commodity.

By its very nature, water creates networks: it is linked to other natural resources — land, forests, biodiversity, etc. Aquatic systems are interconnected; environmental problems have repercussions from one end to the other of a hydrographic basin. Various groups and stakeholders use water for their needs. Water is international, national, regional and local, with highly diverse temporal and spatial frames of reference. The complexity of this network makes it difficult to implement adequate management measures.

...threatened

Demographic and urban growth and the worldwide progress of industrialisation combine to increase the demand for water. The ecosystems which produce and regenerate this resource, are threatened, polluted or destroyed.

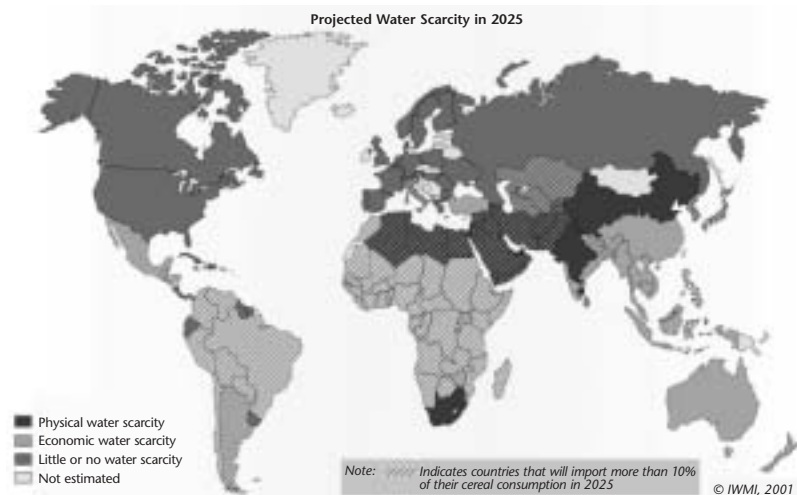
- The world population tripled during the 20th century, its water needs have multiplied by six.
- 1/6 of the world population has no access to drinking water; 1/3 is not connected to a waste water treatment system.
- 7 million persons die each year from diseases transmitted by water.
- Irrigated areas have multiplied by five during the last century, and 70–80% of the water used worldwide serves the agricultural sector.
- 70% of industrial sewage in developing countries is fed into water ways without any form of waste treatment.
- 50% of the world's wet zones have disappeared during the 20th century.
- 1/3 of catchment areas have lost up to 75% of their forests.
- There are over 47,000 major dams worldwide.

In 1960, the village of Muinak lay directly on the shores of the Aral Sea. In 1970, the surface of its waters was still visible from afar. Today, a salt desert of over 80 kilometres lies between Muinak and the sea: this is the result of the diversion of its two major tributaries to irrigate cotton fields.

Water for People – Water for Life
www.unesco.org/water/wwap/wwdr/index.shtml

Documents mentioned in the margin are annotated in the bibliography.

Figure 1: 40% of the world population live in a potentially stressed hydrographic basin (IWMI 2001, based on the colour original).



Having recognised the severity of this crisis, world leaders committed themselves, at the United Nations Millennium Summit in 2000 and the World Summit on Sustainable Development in Johannesburg in 2002, to “reduce by half the proportion of people without sustainable access to safe drinking water and waste water treatment facilities by 2015.” This millennium objective has been recognised as a common concern and top priority worldwide — yet it is unrealistic even today. To implement it, 400,000 persons would have to be connected to a water supply and treatment system each day! Furthermore, it does not adequately integrate the issues of water regeneration and availability.

Water for People — Water for Life
www.unesco.org/water/wwap/wwdr/index.shtml
Global Water Partnership
<http://gwpforum.org>

...source of competition and conflicts

When water resources are limited and different stakeholder groups vie simultaneously for their use, competitive and conflict-ridden reactions are not far behind. Property rights, dam construction, management of a hydrographic basin by several countries, competition between natural and rural areas, where water can be regenerated, and urban areas, where it is consumed before being returned polluted into the rivers — all these elements generate conflicts that aggravate the world water crisis. Moreover, at present the distribution of water among users is inequitable, a situation that primarily affects the poorer populations.

The international community is very concerned by the increasing competition for water resources; it is much less attentive to the pressure exerted by man on the ecosystems that ensure the provision and regeneration of water. Polluted lakes and rivers, intensive agriculture, and deforestation make water less available.

Conflicts of interest and poor cooperation flourish at all levels — in the international debate, in the implementation of institutional measures, as well as in the way in which communities use water.

“We are creating jobs for the people and income for the nation. We are doing that with the most advanced and efficient water technologies. Hence, there is no reason to blame us for the water problems downstream.”
(Manager of a horticultural enterprise in the foothills of Mount Kenya)

Solving water conflicts

...looming

Irregular and violent rainy seasons, rising water levels, floods, landslides, prolonged droughts, climate change — these are just some of the factors that are already noticeable in respect of the drastic changes in the water cycle that afflict certain regions of our planet. The costs generated by water-related natural disasters have more than doubled over the past ten years.

Dams, other constructions and potential man-made risks make the situation worse.

Governments lack both the capacities and the financial resources to implement effective measures to prepare for and reduce the impact of these disastrous developments. Approaches focusing on preventive action still lag behind traditional curative solutions. Risk reduction has not been well integrated into water resource management, which continues to be viewed primarily as a technical problem with economic repercussions, while its sociocultural and environmental aspects are often ignored.

...calling for integrated management

The present sectoral organisation of water management institutions belies the multifunctional nature of water: the adaptation of integrated management concepts and methods is an urgent need.

Integrated Water Resources Management (IWRM) is seen worldwide as THE solution to this problem. Ideally, IWRM should account for interests relative to water conservation and use, for all existing constraints as well as for all major political, legal, administrative, economic, environmental, social and cultural aspects.

How can such an ideal concept be realised, when so many changes are required that it is difficult to know where to start?

Without a doubt, IWRM represents a highly challenging and complex approach. In fact, this is why it so well suits the nature of water. IWRM is not a product, but a process that offers a flexible framework with several points of entry, like a puzzle in which each move represents a further step on the way to sustainable integrated management.

In Vietnam, tropical cyclones have caused considerable loss to human lives and natural resources. With climate change, the frequency and intensity of these storms may increase in the coming decades. Vietnam has therefore begun implementing disaster risk reduction policies, as shown by the rehabilitation of mangrove forests in its coastal areas.

Livelihoods and Climate Change
www.iisd.org/publications/publication.asp?pno=529

Integrated Water Resources Management, TAC Background Papers No. 4
www.gwpforum.org/gwp/library/tacno4.pdf

IWRM: implementation at policy level

Water is not scarce; it is simply badly managed

The international community knows that the water crisis is a crisis of governance. Born primarily of inadequate management, its tragic repercussions hit the poorer populations the hardest. At political and governance level, the IWRM approach, first formulated at the International Conference on Water and the Environment, in Dublin in 1992 (cf. Dublin Statement) calls for new forms of cooperation, and institutional adaptations.

The Dublin Statement on Water and Sustainable Development
www.wmo.ch/web/homs/documents/english/icwedece.html

The challenge is to find new ways of assessing water flows to support the goods and services benefiting human welfare, which are generated by natural and human-dominated ecosystems. A prerequisite is to consider humans as a part of nature, not apart from it, and water as the bloodstream of the biosphere. Integrated water resources management has so far failed to do this

The Role of Green Water in Sustaining Ecological Functions

Vision for Water and Nature
www.iucn.org/webfiles/doc/WWRP/Publications/Vision/VisionWaterNature.pdf

“National water management strategies are needed to address the fundamental responsibilities of Governments: laws, rules, and standard setting; the movement from service delivery to the creation and management of an effective legal and regulatory framework.”

Water — Key to Sustainable Development: Recommendations to actions
www.water-2001.de/ConferenceReport.pdf

First of all, water companies should be allowed to set tariffs at all levels, which should enable full service cost recovery. Since the environmental protection effects will not occur automatically, environmental charges must be added to the normal operation costs. And the most vulnerable in society, the poor, must be protected with appropriate price differentiation strategies which put the additional financial burden on the other customers or the public authorities.

Water Pricing — An Instrument for Sustainability

The ecological aspect: regeneration

IWRM views the hydrographic basin as the basic water management unit; it inextricably connects surface and ground water and links it to its use on land. The environment ensures the provision and regeneration of water as a dynamic system of interconnected natural resources. More heed should be paid to the limits of this system. The sustainable management of the ecosystems that supply our natural resources should be integrated within political action plans. The international agreements and processes relative to climate change, desertification, biodiversity, humid zones, dams, etc. could be the groundwork for the introduction of new environmental action policies; but their efficient implementation requires that they be viewed in the context of the sustainable management and regeneration of all natural resources.

Social and institutional aspects: participation and decentralisation

In order to ensure the sustainable use of water resources, IWRM stresses the importance of involving all stakeholders within one hydrographic basin: the authorities, institutions, the public and private sectors, and civil society, with a special focus on women and marginalized groups.

Decentralisation and the subsidiarity principle play a key role in this process: the lowest possible unit of management should be fostered. This requires the establishment of a permanent framework for the local populations to vent their problems and needs, assume their environmental responsibilities, and acquire the knowledge and skills required to make decisions and launch initiatives. The structure of this framework should correspond to local sociocultural, ecological and economic conditions. Local participation should be backed by close cooperation at higher institutional levels: between the departments or ministries that administer water, forests, the environment, etc., between the decision-making bodies within one hydrographic basin, between countries. The International Conference on Freshwater in Bonn in 2001 stressed the importance of national strategies and of introducing legislative provisions that establish institutional responsibility for water-related problems.

The economic aspect: pricing and financing

Is water a common good? Is it an economic commodity? Who should pay for water? Should the polluter pays principle apply? How can rentability be increased without penalising the poor?

International organisations such as the World Bank and the International Monetary Fund (IMF) propose to privatise the water sector, arguing that this would eliminate monopolies and abusive prices. The issue is controversial, however - privatisation could give rise to new forms of power and dependencies linked to a product the population simply cannot live without. Human rights oppose considering water as a commodity; the debate, which has lasted for years, is far from being closed. A number of ideas have been formulated: free provision of the quantity of water for living (30-50 litres per person per day according to the WHO); adjusting water rates to income; a price that would be inversely proportional to the distance people must cover to meet their water needs.

In the industrial and agricultural sectors, water is a production factor that is often used to excess and in polluting manner. This jeopardises its availability for other users and the ecosystems. Here, economic mechanisms such as privatisation or the introduction of the polluter pays principle present viable options.

Admittedly, there are no ready solutions to be applied worldwide. State governments, civil society, the private sector, or any combination of these three, might have to cooperate to make the water sector more profitable. Relevant choices should account for public interests and aim for improved water distribution, availability and regeneration. Measures should be customised in line with the local sociocultural, economic and ecological situation, and take developments over time into account.

Financing Water for all
www.gwpforum.org/gwp/library/FinPanRep.MainRep.pdf

IWRM: experiences of projects

Every operational action can contribute to the integrated management process. Even when implemented at a very specific level, it should be integrated within the management of the whole hydrographic basin. A number of projects already implement certain IWRM components, e.g. the participatory approach (the Ewaso Ng'iro, Kenya hydrographic basin), evaluation (social impact study in Cameroon), or financial aspects (privatisation schemes in Romania); their experiences provide other initiatives with a solid groundwork. These projects are proceeding step by step, according to their capacities and the local situation, but always keeping the fundamental IWRM principles in mind as framework and guideline.

Platforms to exchange experiences:

Water Portal, Unesco
www.unesco.org/water/
Global Water Partnership
www.gwpforum.org/
ToolBox: Integrated Water Resources Management
www.gwp.ihe.nl/wwwroot/GwpORG/handler.cfm?event=home

Conflict resolution and participatory approach

The Ewaso Ng'iro, Kenya hydrographic basin

The hydrographic basin of the Ewaso Ng'iro River at the foot of Mount Kenya, provides water resources for intensive farming upstream, and for small farmers and nomadic herdsman downstream. Irrigation that does not account for the basin's real water availability, erosion and evapotranspiration on land that has been stripped by farming, threaten these various groups with a growing water shortage. Competition is very high in this semi-arid zone, and the stronger competitor wins. Some large-scale farmers irrigate excessively, and the poorer populations downstream are deprived of the water they need to survive. Water sources are diverted clandestinely at night; conflicts grow more and more frequent.

An integrated water resources management project has been set up to cope with this situation. It consists of different parts: drawing up data on the basin's true potential (measurement of the water flow and the quantities used, computer models); meetings and discussion workshops between government representatives and the different user groups in order to pinpoint problems and needs, and search for joint solutions; training in appropriate

techniques (drip irrigation, planting of crops that combat erosion and can be used as fodder, mini-dams); institutional support (training and institutional consolidation, awareness-raising campaigns for the local population). The creation of "Water User Associations" is the key element in this integrated approach; they offer all players a platform for debate and action with a view to cooperative management solution.

Project monitoring and integration of the social context

Social impact study in Cameroon

Helvetas has been building drinking water infrastructure for 30 years. In Cameroon this NGO faces a major problem: many installations no longer operate, since the population refuses to pay even a small price and prefers to get water of inadequate quality at a distance of several kilometres. Four of these installations were studied from a social angle, by means of discussion workshops within and between the villages, one-on-one interviews and analyses of village organisational forms. The study revealed that the structures set up by international development officers to manage these new water supply systems — "water committees", for example — did not correspond to the village's traditional management structures. The persons chosen to sit on the water committee simply did not enjoy the trust of the villagers, who therefore refused to give them money.

In a second stage, the study proposed a system of management better adapted to local ways of functioning: municipal offices were established, incorporating persons who are well known and trusted by the population. What happened in Cameroon is far from being an isolated occurrence. It shows that even the most effective new technology will fail if it is not integrated in the local context, which itself is evolving constantly and requires monitoring and constant adaptation measures to ensure the project's sustainability in terms of integrated management.

"If this drinking water system fails, then the whole community is a failure..."

Financing scheme

Sânmartin municipality, Romania

Romania is going through a difficult transitional process from planned communist economy to an open free market one. Concerning the water supply, privatisation is still not an option for the large state-owned companies, but has been introduced at local level in many places.

Sânmartin is a farming village located on the edge of the vast Olt plain in what is called the Romanian Siberia. A drinking water supply and waste water treatment project has been launched there, based on a form of financing that is new for the region. The project is being run in cooperation with a Swiss engineering firm, with funding from Meyrin municipality in Switzerland. MESA, a mixed capital limited liability company, is in charge of managing the water supply, and of waste water disposal and treatment. Investment costs for the water supply system amount to CHF 700,000, financed in equal part by the Swiss Agency for Development and Cooperation, and the Romanian government. MESA provides the base capital, and exploitation costs are covered by the water fees. This is a pilot project, with one of the most advanced management systems in Romania, and it is likely to serve as a model for similar projects. Half a dozen other municipalities have already announced their interest to the government.

At first, the inhabitants of Sânmartin were rather unwilling to pay for water;

an effective information campaign and the thirst for running water finally prompted them to assume a more cooperative stance. Two public drinking fountains in the village's "informal" zone are available to the Gypsy population, which is not integrated in village life. The Sânmartin project owes its success not only to a privatisation scheme that was closely studied for its economic aspects, but also — and above all — to its participatory component and its adaptation to the sociocultural context.

*For more information please contact:
infoservice@cde.unibe.ch*

Management of the hydrographic basin and capacities development

Fergana Valley, Central Asia

Fergana Valley, once the most fertile valley in Central Asia, is subject to high soil salinization; crops no longer suffice to feed the population. The valley stretches across Uzbekistan, Kyrgyzstan and Tajikistan, and it is one of the most densely populated areas in the region. The problem is not due to the climate, but to inadequate water management. Over sixty percent of the inhabitants of the valley have no access to drinking water. The water management system follows the new country borders, and the old administrative borders inherited from the Soviet era, instead of running along catchment areas. Results are often inefficient, as well as inequitable. Since financial resources for the upkeep of the water infrastructure are scarce, irrigation and drinking water supply systems are deteriorating, leading to great water loss and higher prices. This increasingly critical situation has prompted the concerned states to consider introducing new water policies. Switzerland, together with the ICWC (Interstate Commission for Water Coordination) and the IWMI (International Water Management Institute), is backing a cross-border project to improve water management. Swiss experts assist local institutions in switching from a focus on purely national needs to organisation along catchment areas. Institutions at all management levels — river commissions, provinces, municipalities, companies — are trained and advised by local ICWC staff. To strengthen cooperation and adapt more effectively to local needs, the project also encourages local users' associations and applied research programs.

Water and Development

Recommended reading

The following list features a documented and targeted selection of print documents and Internet sites of relevance to "Integrated Water Resources Management".

For easier reading they have been grouped according to their central theme:



Overall view and general context



Policies, strategies



Methods, instruments



Case studies



Training

The documents are listed by title, in alphabetical order

Many documents are available online and can be downloaded.

The others are part of InfoResources' documentation.

For more information on this issue and the publications, please contact us by e-mail at: info@inforesources.ch.



Centre for Development and Environment, CDE

ALS — Autodidactic Learning for Sustainability

www.cde.unibe.ch/programmes/global/glo23.html

ALS is a training program on sustainable natural resources management. It was designed as an autodidactic learning process conducted by an autonomous learning group headed by a coordinator. It consists of workshops that deal with concrete issues relative to a project or institution, and involves project and local community representatives. Its aim is to jointly determine ways to improve the management of natural resources, including water, in an autodidactic learning process.



Paul J.M. van Hofwegen, Frank G.W. Jaspers

Analytical Framework for IWRM, Guidelines for Assessment of Institutional Frameworks

1999, International Institute for Infrastructural Hydraulic and Environmental Engineering IHE, Delft, 96p.

How should a country's institutional framework conditions be modified in order to get closer to the ideal of Integrated Water Resources Management (IWRM)? The IHE proposes a two-step process in response to this query:

1. An analysis of the institutional situation at the following three levels: operational (water uses), organisational (water management) and constitutional (policies and rights).
2. The identification of interventions required for capacity building.

Besides theoretical reflections, the book contains indications and guidelines for evaluating the institutional framework.

**World Water Council (WWC), 3rd World Water Forum, Global Water Partnership (GWP)
Financing Water for All**



**Report of the World Panel on Financing Water Infrastructure
2003, 72 p., www.gwpforum.org/gwp/library/FinPanRep.MainRep.pdf**

Composed of financial experts of various fields, the Panel examined new financial resources for the water sector. Although it did not too exhaustively discuss the subject, the Panel considered the financial requirements linked to several types of water use (collecting and treating waste water, irrigation, industrial sewage, etc.), as well as issues of resource management, prevention of high water levels and floods, environmental conservation, etc. The focus is on developing countries and countries in transition.

The report presents an overview of the state of the infrastructures and financing, and looks for the origins of difficulties in this sector. It concludes that financial volume will have to be doubled to reach the millennium objectives relative to water and sanitation. Furthermore, it voices recommendations and proposes a strategy for the water sector.

Global Water Partnership

www.gwpforum.org/



The Global Water Partnership facilitates the exchange of information and experiences relative to Integrated Water Resources Management (IWRM). With the help of an extensive network of partners, it identifies global, national and regional information and knowledge requirements, promotes the formulation of relevant programs and connects concerned parties. The site also features links to databases, libraries and other Internet sites, and proposes online publications. The most important of these is the "ToolBox" for integrated water resources management.

Marten van Ittersum & Frank van Steenberg

Ideas for Local Actions in Water Management

2003, *The Global Water Partnership*, 103 p., www.gwpforum.org/gwp/library/Ideasbook%20Local%20action%20in%20water%20management.pdf



This document cites over 100 examples of water-related projects worldwide. It presents experiences undertaken by local governments, civil society, and the private sector. The Global Water Partnership (GWP) aims for this information to be spread as widely as possible, so that other stakeholders and organisations may use it to improve or launch their own integrated water resources management initiatives.

Stephan Rist

"If this drinking water system fails, then the whole community is a failure."

***Social Processes and Drinking Water Systems — Insights from a Learning Society*
2001, Helvetas- CDE, 64 p.**

Informal publication; additional information available at: infoservice@cde.unibe.ch



The study reveals that when international aid introduces new forms of drinking water infrastructure management, (e.g. "water committees"), that are incompatible with traditional village management structures, the former cannot be sustainable. The study proposes a system adapted to local usage: community offices, with persons who are well known and trusted by the population.



Global Water Partnership, Technical Advisory Committee (TAC)

Integrated Water Resources Management

2000, TEC Background Papers No. 4, 65 p., www.gwpforum.org/gwp/library/tacno4.pdf

A concise and readily understandable presentation of the IWRM idea, as developed by the Global Water Partnership. The second part of the publication offers recommendations on IWRM implementation at three levels: an enabling environment, the role of institutions and management instruments.



UNESCO

International Year of Freshwater 2003

www.wateryear2003.org

The International Year of Freshwater offers an opportunity to speed up the implementation of integrated water resources management principles. It presents a platform from which to promote existing activities and launch relevant initiatives at international, national and regional level.

The official site of the International Year of Freshwater 2003—in French, English and Spanish—targets both specialists and the public at large: items are grouped by subject and country with links and bibliographic data, a calendar of events, educational materials, a compilation of popular sayings, post cards, games, etc.



Task Force on Climate Change, Vulnerable Communities and Adaptation

Livelihoods and Climate Change

Combining disaster risk reduction, natural resource management and climate change adaptation in a new approach to the reduction of vulnerability and poverty

2003, IISD, IUCN, IC, SEI. 24 p., www.iisd.org/pdf/2003/natres_livelihoods_cc.pdf

Increasing climate variations have a direct influence on the water cycle, threatening the livelihoods of the poorest members of society. Strategies to adapt to climate change should account for this situation. They should also focus on improving the sustainable use of natural resources, in order to make ecosystems more resilient and less vulnerable to risks and hazards. The “International Task Force on Climate Change, Vulnerable Communities and Adaptation” stresses the urgent need for international policies and for a global debate on climate change centred on a bottom-up approach, and on the capacity of those directly concerned to act and adapt.



International Mountain Society (IMS)

Mountains and Water: Challenges and Benefits

2003, Mountain Research and Development

Volume 23, Number 1, 96 p., www.mrd-journal.org/

MRD is an interdisciplinary journal on mountain regions, and a communication platform on research, development and exchange of relevant experiences between institutions and individuals. The February issue deals with water and contains articles on mountain hydrology, water as a potential source of conflict, the water shortage, its consequences for mountain agriculture and potential solutions, infrastructures, social aspects, etc.



International Conference on Freshwater

Recommendations for Action

in: Water — Key to Sustainable Development Conference Report

2001, Bonn, p. 23–35, www.water-2001.de/ConferenceReport.pdf

In order to achieve more sustainable water use, the participants at the Bonn Conference concentrated on practical concepts and drew up a list of recommended actions in 27 paragraphs, under the following transversal headings:

- Governance
- Mobilising financial resources
- Capacity building and knowledge sharing.

Centre for Development and Environment (CDE), Food and Agriculture Organization (FAO)
Solving Water Conflicts in the Mount Kenya Region



2003, Video on CD-ROM, 22 minutes

The CD-ROM is available from: land-and-water@fao.org

This video on water use and the conflicts it may generate provides an exemplary illustration of the complexity of sustainable water management in the Mount Kenya region, where water resources are growing scarce. Scientific knowledge gathered over time, which is the basis for regional water planning, and the establishment of local associations of water consumers, coupled with the introduction of new irrigation technologies and more effective farming methods, may in the longer term contribute to better and more ecological management of this vital resource.

The Dublin Statement on Water and Sustainable development
www.wmo.ch/web/homs/documents/english/icwedece.html



An essential, ground-breaking document for the definition of a new water resources policy, the Statement was formulated during the International Conference on Water and the Environment (ICWE), held in January 1992 in Dublin: an appeal to the participants of the World Summit in Rio, inviting them to adopt new approaches to the evaluation, development and management of water resources, and to show the political commitment required for their realisation.

The recommendations are based on four fundamental principles relative to water management, and the social, ecological and economic framework conditions required to meet the targeted objectives.

Maharaj, N.

The Gender Approach to Water Management

Lessons Learnt Around the Globe

2003, Gender and Water Alliance, 16p., www.genderandwateralliance.org/english/advocacy.asp



The third of the four Dublin Principles stresses the importance of women for sustainable water use. The "Gender and Water Alliance" goes beyond that: it proposes equality between women and men in the water sector. The brochure gives a resume of practical experiences of implementing the "gender approach", and identifies the further stages required for equal integration of and participation by women and men as a major contribution to integrated water management.

Johan Rockström, Line Gordon

The Role of Green Water in Sustaining Ecological Functions

A global Assessment. 2002 in: GAIA 4/2002: 267–272



Ecosystems are a determining factor in the water cycle. Although the current debate often views them only in the context of water consumption, alongside household use, farming and industry, the present article stresses the role and importance of nature for the "green water flow" (evapotranspiration). Any decision concerning land use is also a decision concerning water: it influences the hydrological cycle and water resources, and consequently the capacity of ecosystems to produce goods and services.

The Global Water Partnership, Netherlands Water Partnership

ToolBox: Integrated Water Resources Management

www.gwp.ihe.nl/wwwroot/GwpORG/handler.cfm?event=home



The ToolBox has been designed to assist both decision-makers and practitioners in their establishment of integrated water resources management policies or programs. It provides a wide range of tools for use in different sectors, case studies and the relevant references to documents, organisations or Internet sites.



The World Conservation Union (IUCN)

Vision for Water and Nature

A World Strategy for Conservation and Sustainable Management of Water Resources in the 21st Century, 2000, 58p., www.iucn.org/webfiles/doc/WWRP/Publications/Vision/VisionWaterNature.pdf

This is the "environment and ecosystems" part of the World Water Vision. The document stresses the need for a fundamental change in human attitudes and behaviour in respect to freshwater and water-dependent ecosystems in order to ensure environmental, social and economic security. The "Vision" presents a theoretical framework for the key interactions between humans and nature, and proposes an action plan that consists of six principal objectives reaching from the sustainable management of natural resources to public management, communication and know-how.



International Water Management Institute (IWMI)

Water Accounting for Integrated Water Resources Management

www.iwmi.cgiar.org/textonly/tools/accounting.htm

The IWMI system makes it possible to calculate the water resources in a hydrographic basin, thus obtaining an overview of the water flow, of water use and the quantity still available. The tool is provided to all stakeholders in the water sector, and enables them to imagine ways of saving water and increasing productivity on the one hand, and to test interventions and model their consequences on the other. The results may then be used to develop customised strategies for specific contexts. An interesting feature of the model is that it accounts for the water needs of ecosystems.



Swiss Agency for Development and Cooperation (SDC)

Water and Development

Experiences of the Swiss Agency for Development and Cooperation (SDC) in the Water Sector www.deza.admin.ch

As part of the development of water-related strategies, the Swiss Agency for Development and Cooperation (SDC) has examined its competencies and experiences and published the results. The brochure consists mainly of examples of projects linked to different thematic areas, such as the fight against poverty and its connection to water, water and good governance at state level, water conveyance in rural areas, etc. In the end summary, SDC reviews its main strengths by theme and region, and the challenges for the future.

See also the SDC Internet site that deals with the International Year of Water

www.deza.admin.ch/dossier.php?dnav=49,49,49,49&userhash=1258386&l=d



World Water Assessment Programme

Water for People — Water for Life

The United Nations Water Development Report

2003, UNESCO, 580p., www.unesco.org/water/wwap/wwdr/index.shtml

The Report offers a first evaluation of the progress made — or not made — since the Earth Summit in Rio, and discusses appropriate evaluation methods. It sees itself as an aid to the setting up of policies for the development and sustainable use of our freshwater resources, and focuses on elements relating to human responsibility in respect of water: policies, legislation, social programs, economic approaches and management strategies.

It deals with eleven themes, grouped into two categories: the first discusses questions relative to life and well-being (health, nutrition, energy); the second treats management and conservation. Seven case studies that reflect different integrated management approaches are also included. Finally, all relevant factors are brought together like the pieces of a puzzle, and set out in diagrams and tables illustrating national data.

SAEFL, SDC, seco

Water in focus

2003, 25 p., www.umwelt-schweiz.ch/buwal/eng/publikationen/index.html

The brochure cites specific projects illustrating the principles and considerations that guide the Swiss approach to backing water management projects in Eastern Europe.



UNESCO

Water Portal

www.unesco.org/water/

The Portal aims to improve access to online information on freshwater issues. It features links to programs coordinated and managed by UNESCO and other governmental and non-governmental organisations. It functions as a site for exchange and interactive research, enabling its users to add their own information and make it accessible to a large public.



Centre for Ecology and Hydrology Wallingford, World Water Council

Water Poverty Index WPI

A tool for monitoring and prioritising activities at all levels

www.ceh-wallingford.ac.uk/research/WPI

A tool that offers a better understanding of the connection between water and poverty, so as to focus local, regional and national activities, and evaluate progress made within IWRM projects. The Water Poverty Index includes physical and social data, such as: resource status, access to water and its use, and human, financial and ecological capacities. It is a transparent tool that addresses decision-makers at all levels, to be used for varied ends: choosing activities, understanding the complexity of water management, evaluating progress, increasing the stakeholders' competence. Although the proposed methodology appears complex and very quantitative, the establishment of a water-poverty index involves the cooperation of all actors at different levels and makes it possible to pinpoint gaps and priority areas for action. It should be completed by a hand-book on the use of the method.



Dieter Rothenberger, Bernhard Truffer

Water Pricing — An Instrument for Sustainability?

2002, in: *GAIA* No. 4: 281-284

This concise article points out how the adequate pricing of water services can contribute to a sustainable development in this sector. The important thing is to address social, environmental and economic concerns while taking into account the specific local context.



World Bank Group and Water Resources Management

Inweb18.worldbank.org/ESSD/essdext.nsf/18ByDocName/WaterResourcesManagement

The World Bank's water resources management homepage presents an integrative approach split into several sectors and activities (sanitation, irrigation, hydroelectric energy etc.), and encompasses social and economic questions. The site offers access to numerous World Bank documents (policy papers, technical notices, project information etc.), as well as links to other sites and documents.





Guerquin François et al.

World Water Actions: Making Water Flow for All

2003, World Water Council (WWC), 163 p., www.worldwatercouncil.org/www_contents.shtml

Drawn up for the Third World Water Forum, this report presents an inventory of the steps taken by the international community to convert the Vision into actions. It cites almost 3000 actions (available as a data base on the Internet), designed to improve water management at local, regional, national or international level. They are the result of examples of good practices, of applied research projects, of studies and awareness-raising campaigns, and of institutional and legislative reform.

The report thus is a complement to the "World Water Development Report" and the "ToolBox for integrated water resources management".



Rosegrant Mark W., Ximing Cai, Cline Sarah A

World Water and Food to 2025 — Dealing with scarcity

2002, International Food Policy Research Institute (IFPRI), International Water Management Institute (IWMI), 322 p., www.ifpri.org/pubs/books/water2025book.htm

The question at the heart of this publication is —will the quantity of water available for irrigation purposes be enough to ensure food security in the future and satisfy the growing needs of food production? Several elements must be considered in a study of this subject:

- An approximate estimation of the water available as compared to demand
- The repercussions of water shortage on food production and the environment
- The proportion of food grown by irrigated or rain fed agriculture
- The impact of alternative policies

Three scenarios have been established with the help of electronic models; the authors propose action areas and technical measures to ensure food security based on the sustainable use of water resources.



William J Cosgrove and Frank R Rijsberman

World Water Vision — Making Water Everybody's Business

2000, World Water Council, 108 p., <http://watervision.cdinet.com/visioncontents.html>

The "World Water Vision" was developed pursuant to the World Water Forum in Marrakesh, in 1997. It is the first document that proposes a global policy based on an integrated approach, focusing on issues of availability and sanitation.

It includes an analysis of the current situation relative to the use of water resources, possible developments over the coming 25 years, and a vision of what the situation should be in 2025. Investment needs and potential sources of financing are also mentioned. However, the significance of ecosystems and of climate change is largely by-passed.

InfoResources Focus provides a general overview of pertinent and topical subjects to guide one through the information jungle. Each issue focuses on a current theme relative to forests, agriculture, natural resources and the environment, in the context of international development cooperation.

Each theme is viewed from several angles:

- Policies and strategies
- Implementation and practical experiences

The first section of InfoResources Focus proposes a brief introduction to each subject, highlights specific problems, compares theoretical approaches and opinions, and reports past experiences.

The second section presents a selective and commented choice of documents, books, CD ROMS and Internet sites. The range of documents presented reaches from basic introductions, through instruments, methods and case studies, to conceptual texts.