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focus

Water for Food
– A Matter of Survival

Contents

Peri-urban vegetable production in Kumasi, Ghana: Irrigation with waste water has a great potential but is not without problems due to contamination with pathogens. (Photo: C. Morger)

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The main challenge in water management in the future will be to produce more food with less water for a growing population, while at the same time improving social equity, reducing hunger and poverty and maintaining the regeneration capacity of the environment and the water cycle.

Water ...

... a multifunctional resource

Water is key for a multitude of uses, for direct consumption by humans, animals and plants, for hygiene and sanitation, for agricultural and industrial production and for transportation and energy. Water can be a catalyst for development. Secure access to water can improve well being and food security while poor water management can create and perpetuate poverty. Water is crucial for maintaining functional ecosystems, which are in turn a prerequisite for the regeneration of the resource. Water also has cultural and social meaning.

"For all the ingenious channelling techniques developed since the earliest civilizations, we still rely on natural systems to regulate the flow of water through the river basins of the world."

Living Beyond Our Means *(p. 7)*
www.millenniumassessment.org/proxy/document.429.aspx

... a common good

Water – being essential and non substitutable – should not be considered just like any commodity, it is a common good which combines elements of public and private goods. The human right to water is not yet explicitly recognised. However, the UN Committee on Economic, Social and Cultural Rights (CESCR), in its General Comment No. 15 on the right to water, stipulates that everyone is entitled "to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses". Water for basic needs should thus be affordable to all while for purely commercial activities the economic price should apply.

For definitions of common and public goods or other water-related terms, see Glossary of ***Water 2015 – Policy Principles and Strategic Guidelines for Integrated Water Resource Management – IWRM***
http://162.23.39.120/dezaweb/ressources/resource_en_25138.pdf

General Comment No. 15: The Right to Water
www.unhchr.ch/html/menu2/6/gc15.doc

... finite but renewable

The amount of water on earth has been constant over centuries. It is in permanent circulation and regeneration and is, therefore, a renewable resource. Most of the water on earth is salty (97%) and thus not suitable for the majority of uses. Only 3% is freshwater in rivers, lakes, groundwater, fixed in soil or frozen in icecaps and a mere 0.4% of the total is easily accessible.

The main source of freshwater is the global annual rainfall of 110'000 km^3. An estimated 65% ends up as so-called green water in forest vegetation, wetlands, grasslands and crops. The remaining 35% reaches rivers, lakes and aquifers as blue water. Roughly one tenth of the blue water is diverted or withdrawn, of which about 70% for agriculture, 20% for industry and 10% for domestic or municipal use. Nine tenths remains in the natural cycle and eventually reaches the sea. Global averages have little meaning at the country or regional scale. In less industrialised countries, the proportion of water used by agriculture can be up to 80%, while in industrialised countries water abstraction for agriculture may be as low as 30%.

"For fresh water, there is no worldwide shortage – even after doubling our consumption we use roughly 10% of the water that flows from source to sea. But the supply is very unevenly distributed across the world and over time. The pattern of use in some areas simply cannot continue into the long term."

Living Beyond our Means *(p. 16)*
www.millenniumassessment.org/proxy/document.429.aspx

... an ever growing need

To produce 1 kg of grain may use between 500 and 3'000 litres of water, 1 kg of grain-fed beef may require up to 15'000 litres of water.

Securing the Food Supply
www.unesco.org/water/wwap/facts_figures/food_supply.shtml

Food production requires huge quantities of water. On average, 3'500 litres are needed to produce the daily food requirement of one person while, for household use, 50 litres per person per day is a recommended minimum. Water requirements for food production vary with climate, hot, dry or windy climates requiring more water to produce the same output. Water consumption for food production depends also on the diet, meat-based diets being much more water demanding than vegetarian food.

More on water use and water scarcity in ***Insights from the Comprehensive Assessment***
www.iwmi.cgiar.org/assessment/files_new/publications/Discussion Paper/InsightsBook_Stockholm2006.pdf

Today, a quarter of the world's population is affected by physical water scarcity – mainly in northern Africa, the Middle East, and in parts of India, Pakistan and China. Economic scarcity – where there is a lack of financial or human capacity to keep up with growing water demand – occurs mainly in sub-Saharan Africa. Water scarcity and environmental degradation often affect socially disadvantaged groups, women and children most severely because of their relatively greater dependence on natural resources for their livelihoods.

"As populations grow, the available resources per capita shrink and higher productivity is required to compensate."

Water a Shared Responsibility *(p. 21)*
http://unesdoc.unesco.org/images/0014/001444/144409E.pdf

Population growth, changes in lifestyles and living standards, uncontrolled pollution and the effect of climate change result in growing water scarcity in various regions of the world. Competition between humans and between sectors for this essential resource is increasing steadily. It is estimated that by 2030, 60% more food will have to be produced which has important implications on water use and availability. This demand for food, and thus water, is not negotiable.

Integrated Water Resources Management (IWRM): A way to sustainability
www.inforesources.ch/pdf/focus1_e.pdf

The present *InfoResources Focus* highlights some of the challenges and controversial issues related to water for food. The topics presented are considered crucial in the context of rainfed and irrigated agriculture under conditions of water scarcity in semi-arid or arid regions. Water for fisheries and for livestock production is touched on in passing, although it is by no means less important. The Integrated Water Resource Management approach (IWRM) was the topic of the first *InfoResources Focus (2003)*.

Challenges

Water reliability – crucial for crops and livestock

In semi-arid and arid regions, food production faces a common challenge: rainfall variability and unpredictability. Insufficient soil moisture is the main reason for erratic yields and a major constraint for crop or animal productivity. Droughts or dry spells threaten the survival of crops, forage availability for animals or their watering possibilities. The risk for farmers or herders is high as is their vulnerability. Matching water supply and demand is crucial; water control and efficient use of water are essential for crop productivity. As a production input, water availability determines crop success or failure and is decisive for any intensification. Water management options range from purely rainfed to partially or supplemental irrigation through to fully irrigated crops.

Rainfed production – at the mercy of the rains

Rainfed food production has little chance to escape the influence of erratic weather patterns. Farmers have to take best bets on rainfall and if the bet fails, the harvest is at risk. Inputs in rainfed farming are thus kept low, fertiliser use is minimal and productivity is marginal.

A possibility to increase the amount of rainwater harvested and stored on site is the improvement of infiltration and water retention capacity of the soil. Sustainable land management is a prerequisite for sustainable water management. Other possibilities are to choose less water sensitive crops, varieties with shorter growth cycles and plant densities adapted to the available rainfall. At planting time, however, the amount of rain to be anticipated is still in the clouds.

"All in-field techniques (RWH) suffer the same limitation in that they offer little protection from poor rainfall distribution and the risk of crop failure is still high."

***Food security for sub-Saharan Africa** (p. 5)*
www.luwrr.com/uploads/paper03-02.pdf

Partial or supplemental irrigation requires local water harvesting and storage in small reservoirs or tanks, ready to bridge dry spells. On-station research shows spectacular results when small quantities of water are applied at the right time. Under field conditions, even such quantities are not always available when most needed and a residual risk always remains. Nevertheless, there is scope for greater attention to water harvesting, storage and soil and water conservation for improved land and water management.

*For methods of soil and water conservation consult **Where the Land is Greener***
www.wocat.net/

Irrigation development – achievements and disappointments

As the world population doubled in the second half of the twentieth century, food production almost tripled. This was achieved by increasing land productivity as well as water use efficiency by introducing new varieties, using more mineral fertilisers and pesticides and expanding the area under irrigation. This achievement, however, came at a price. Water consumption grew approximately four-fold during the same period as more irrigation invariably means more water abstraction from rivers, lakes or groundwater.

"The world's agriculture has responded well to the challenges raised in the second half of the twentieth century. Per capita food production increased by 25 percent as the global population doubled, leading to a progressive improvement in global nutrition. This response has steadily reduced the proportion of malnourished people."

***Water a Shared Responsibility** (p. 21)*
http://unesdoc.unesco.org/images/0014/001444/144409E.pdf

Most of the irrigation schemes built in the 1970s were large, government run schemes. Water efficiency was not a main concern and they were notorious for wasting water and for their operational and management

inefficiency. Irrigation is thus frequently pointed out as the main culprit of the water scarcity which we face today.

Further, the schemes were not concerned with equity. Poor farmers – if included at all – often had only access to the little water that reached the tail end of canals. In addition, the consequence of the marked increase in production of basic grains was a slump in their prices which affected the profits of farmers as well as those of the irrigation schemes.

Controversies

Irrigated agriculture – is it really all down the drain?

"Water abstraction is at present widely used as a proxy for water use. This is methodologically fundamentally incorrect. Unlike oil, water is a reusable resource, which can be used and reused many times."

***An Assessment of Future Global Water Issues** (p. 231)*
www.thirdworldcentre.org/futurewaterissues.zip

Irrigation is the hot issue in water management and improving water conveyance and application efficiency is seen by many as the solution to all water scarcity. While it is true that many irrigation schemes have water distribution efficiencies below 50%, there are several misconceptions that make people believe that improving irrigation efficiency could solve all the water scarcity problems. Efficiency is a complex concept. All non-directly productive uses at scheme and field level are often considered as losses. However, some of the water "lost" at field level becomes available for re-use downstream and deep percolation "losses" recharge groundwater which can again be re-used.

"It is a paradox that enhanced local irrigation efficiency can increase the fraction consumed in irrigation since the irrigated area expands to absorb the water 'saved' and return flows fall."

***Prospects for Irrigated Agriculture** (p. 6)*
www.brad.ac.uk/acad/bcid/GTP/Berkoff.pdf

It is also necessary to realise that irrigation is not simply a matter of "crops per drop", since water in irrigation canals is also used for other purposes such as watering of livestock, washing, fishponds and small-scale enterprises. When considering multiple water uses and looking beyond the field level to the context of watersheds or even river basins, "water wastage" is much less prevalent and the potential for real water savings – that is freeing up water for other uses – is much smaller.

Strategies to conserve and save water may include deficit irrigation – meaning that less than the full crop water requirements are applied – or precision irrigation through its improved timing. All these strategies require full control over water in terms of quantity distribution and application as well as their timing. If supplies are irregular and unreliable, it is far too risky to plan for deficit irrigation or for "just in time" water application since failure to irrigate in a timely way can mean crop failure. Micro-irrigation, drip and sprinkler irrigation have an impact on water use efficiency by reducing local non-productive evaporation losses.

The most effective way to ensure real water savings is to reduce non-productive losses to the atmosphere such as evaporation from open water bodies, moist soil surfaces, or transpiration of weeds and by preventing water to flow or seep to low quality sinks – saline or polluted – from where a re-use is difficult or no longer possible.

Groundwater use – boom or bust?

More on groundwater in
The Global Groundwater Situation
www.iwmi.cgiar.org/pubs/WWVisn/GrWater.pdf

Farmers who use groundwater have better control and therefore an almost assured harvest. They invest more in inputs such as improved seed, fer-

tiliser and pesticides, and productivity is higher. In India for example, groundwater is considered private property and the development of small irrigation wells has allowed many small farmers to get out of the poverty trap with a relatively small investment – helped by the government in the form of subsidised or even free energy. The down side of the groundwater boom is over-exploitation, declining groundwater levels and drying drinking water supplies. Consequences can be dramatic: agriculture collapses and livelihoods are destroyed.

Groundwater resources are developed mainly through private investments and on an informal basis. Extraction is largely uncontrolled and policies to regulate it are not in place and difficult to pass against the lobby of the concerned farmers. To be sustainable, water abstractions cannot exceed the recharge potential. Without proper management and control, the groundwater boom will inevitably turn into bust.

Operation and maintenance – water only badly managed

A trendy message states that water is not really scarce, it is only badly managed. Water management reforms such as Participatory Irrigation Management (PIM) or Irrigation Management Transfer (IMT) and the formation of Water User Associations (WUA) have been the common response. The interest in transferring responsibilities to user groups is to increase water use efficiency and productivity, and to reduce government expenditures on irrigation.

A good overview on water management reforms can be found in ***Participatory Irrigation Management***
www.maff.go.jp/inwepf/documents/inaugural/inpim-note.pdf

Such management reforms have met with mixed success. They work best in small schemes operated by a few farmers or a single village. Transaction costs are usually higher than anticipated, farmers need intensive training and coaching to understand the technical challenges of operating complex canal systems or schemes with rudimentary control structures. Local management groups are also rarely democratic, they often rely on strong autocratic leadership and are thus not necessarily equitable.

"Institutional development activities have focused on the formation of organisations and on developing administrative and technical competence. Insufficient effort has gone into addressing social and power relationships or on strengthening the ability to design and enforce rules which will be accepted by water users."

Equity, Irrigation and Poverty *(p. 4)*
www.livelihoods.org/post/Docs/R8338-Summary-Report.pdf

The legal framework – framed in or framed out

Water allocation, access to water and user rights are the central issues when equity and poverty alleviation are addressed. Reform proposals mainly focus on the legal framework and it is assumed that by establishing clear water rights, access can be ensured for everyone. Legal frameworks are by nature rather rigid and discriminate against those who are outside the official frame. Bureaucratically defined rights are likely to conflict with customary or locally formulated rights. To strengthen the local normative system does not necessarily mean formulating specific rules but rather enhancing capacities to negotiate such rules amongst all stakeholders and creating the necessary enabling environment.

"Reforms have been attempted when the administrative or political resources to implement them did not exist. The result has generally been misallocated resources, wasted political capital, and frustration."

Defining Water Rights *(p. 224)*
www.iwmi.cgiar.org/Assessment/files/Synthesis/Policies/francois molle_Defining water rights.pdf

Rights mean little unless they are enforced. This places a heavy burden on the administration and the legal system and "if courts are unable or unwilling to enforce legislation then regulation of social and environmental externalities is difficult" (Molle 2004).

Water governance – politics, the art of the possible

Sustainability is said to be based on three pillars: economic efficiency, social equity and environmental integrity. Unfortunately, these three pillars are not per se mutually supportive, they can be in conflict with each other. Management for sustainability is thus a complex task of continuous negotiation and compromise, optimising the economics, maintaining social justice and keeping the environment intact.

Without external intervention, short-term economic goals usually take the lead at the expense of longer-term social and environmental issues. Managing scarce resources requires trade-offs, it involves balancing the interests of different groups, restricting the powerful and empowering the disadvantaged. Reaching a multi-stakeholder consensus on a complex issue with multiple interests is a lengthy and difficult political process. Local communities are more likely interested in pragmatic solutions to immediate problems and may have little enthusiasm for policy reforms and equitable water allocation and control across the basin.

"Access to water and other resources is politically contested, so 'management' is not a neutral technical exercise in optimizing water productivity, but also an arena for continuing struggle among competing claimants."

Community-based Principles for Negotiating Water Rights *(p. 3)*
www.nri.org/waterlaw/AWLworkshop/BRUNS-B.pdf

"Policy models must be tailored to the local situation and be based on what is feasible rather than on what is considered desirable."

Defining Water Rights *(p. 1)*
www.iwmi.cgiar.org/Assessment/files/Synthesis/Policies/francois molle_Defining water rights.pdf

Processes and Experiences

Within development projects, "water for food" issues are increasingly embedded in projects focusing on poverty reduction, food security and on sustainable, participatory management of natural resources. The new strategy "Water 2015 – Principles and Guidelines" of the Swiss Agency for Development Cooperation (SDC) takes a holistic view of all water uses, it puts emphasis on IWRM and prioritises "water for people" and "water for food" as entry points. Selected on-going or recent experiences and processes addressing water for food in the portfolio of SDC are outlined below.

Water 2015 – Principles and Guidelines
http://162.23.39.120/dezaweb/ressources/resource_en_25139.pdf

Sahel Study

The study was initiated since it was felt that successes in natural resource management in the Sahel are underestimated and that local development dynamics go sometimes unnoticed. Research on the impacts of soil and water conservation projects has often concentrated uniquely on yield impacts and overlooked important secondary impacts, for instance on vegetation and groundwater.

Etude du Sahel, Case Studies
www.frameweb.org/ev_en.php?ID=10773_201&ID2=DO_TOPIC

The focus of the study is on rainfed agriculture in an arid climate with special emphasis on the management of the interests involved and the social sustainability of induced change. In villages with soil and water conservation investments, farmers perceive a substantial reduction in rural poverty while in villages without investment in soil and water conservation, the trends are mainly negative.

Challenge Program Water and Food (CPWF)

The CPWF is an international, multi-institutional research initiative with a strong emphasis on north-south and south-south partnerships. It works with a competitive grant system, funding a mixture of basic, applied and adaptive research for development. The focus is to create and disseminate knowledge to improve the productivity of water in river basins in ways that are pro-poor, gender equitable and environmentally sustainable.

Challenge Program Water & Food
www.waterandfood.org

The Challenge Program addresses different aspects of water and food and concentrates on five thematic areas:

- crop water productivity improvement,
- water and people in catchments,
- aquatic ecosystems and fisheries,
- integrated basin water management systems and
- global and national water and food systems.

Emphasis is given to synthesise the results, put them in a basin perspective and create links within and between basins and thematic areas. Research reports are published on the website of the CPWF and partner institutions.

Capitalisation of Experiences Water, Land and People (CE-WLP)

Capitalisation of Experiences Water, Land and People
https://extranet.intercooperation.net/cewatersheds/

CE-WLP is a SDC initiative that aims at sharing and deepening the knowledge base with regard to Integrated Water Resource Management (IWRM). It is a learning process at different levels with involvement of farmers associations, water users associations, authorities, project teams and staff of SDC coordination offices as well as headquarters.

The perspective and perception of the local actors is taken as the starting point and the learning agenda is jointly defined by all partners. In order to achieve widely applicable results, the initiative is implemented in three continents, focusing on India, Bolivia and Mali. Local teams are using story telling to capture key experiences; they will conclude their work at the end of 2006. The results will be compiled and be available in 2007.

Community of Practice on Water for Food (CoP W4F)

For more Information see:
Community of Practice on Water for Food
www.water-for-food.ch

A CoP is a network of interested people who wish to capitalize experience, share and create new knowledge and innovations. The main topic of this particular CoP W4F is “sustainable use of water resources for food production within the concept of Integrated Water Resource Management in developing and transition countries”.

The CoP was initiated in 2005 and it is open to all interested people from local and international NGOs, NGO networks, development programmes and projects, government institutions, research and extension institutions, etc. People from developing and transition countries are especially welcome to participate.

The way forward

Water for food is a "many parties – many issues" task, and decisions to be taken often go beyond the food production objective alone. Water as a resource and water provision has a price and this also has to be recognised in its contribution to food production. Agriculture is a low value user of water and thus risks to be ousted from the market. However, this would have serious social and political consequences since a substantial number of rural and peri-urban people depend on agriculture for their livelihoods and in many developing countries it is still the dominant economic sector.

Increasing water productivity at all levels and in all sectors has the highest priority. For food production, this means growing more food without adding more pressure on the environment. Water use efficiency in crop production can only be improved by optimising all inputs simultaneously.

Rainfed agriculture deserves special attention, and making the best use of the available land and water requires innovative methods built on traditional wisdom. Expectations on water savings must be realistic and the effects of water harvesting or land management changes on other users have to be taken into consideration.

The experiences show that watershed development projects, which specifically target disadvantaged groups and have a livelihood focus, have considerable potential to address food production and water use efficiency. They need to include awareness and capacity building at individual and institutional level to reduce the risk of capture by the elites. Equity and poverty issues need constant and special attention.

Water user groups involved in the management of irrigation schemes need training and coaching to learn how the system is supposed to operate and to understand its limitations. A complete redesign of the distribution system is very often needed to allow better water control and flexibility. Systems designed for multiple use increase the opportunities for diversification of rural livelihoods and thus reduce vulnerability.

Low cost technologies such as micro-irrigation and treadle pumps have considerable potential where conditions are favourable and markets exist for input materials as well as for the output products. They target small farmers, men as well as women, and have a poverty alleviation and food security focus.

The complexity of the issue and the often informal management setup require subtle approaches. Promising opportunities corresponding to local needs must be identified as entry points instead of trying to apply blanket concepts without adaptation.

"Many of the rural poor work directly in agriculture, as smallholders, farm labourers or herders. The overall impact can be remarkable: in India, for example, in non-irrigated districts, 69% of the population are poor, while in irrigated districts, only 26% are poor."

UNESCO Newsletter: Water and Poverty
www.unesco.org/water/news/newsletter/159.shtml

"Whatever strategy is chosen, there will be difficult trade-offs between productivity, ecosystems and poverty reduction."

Insights from the Comprehensive Assessment
(p. 16)
www.iwmi.cgiar.org/Assessment/files_new/publications/Discussion Paper/InsightsBook_Stockholm2006.pdf

Recommended reading

The following list features a documented and targeted selection of print documents and internet sites of relevance to "Water for Food – A Matter of Survival". For easier reading they have been allocated to four rubrics: ***Overview, Policy, Instruments, Case studies.***
The documents are listed by title in alphabetic order. Most of them are available online (accessed on 21 November 2006).

Ashit Biswas. 2005

Overview

An Assessment of Future Global Water Issues

In: Water Resources Development, vol. 21, no. 2, 229 – 237.

www.thirdworldcentre.org/futurewaterissues.zip

The author, winner of the Stockholm Water Prize 2006, argues that the focus of the debate on the global water crisis is still wrong. The main crisis is not water scarcity, but the continuing and rapid water quality deterioration, and the availability of investment funds. Consumers must pay for the water services they receive and subsidies should be very specifically targeted to the poor.

Bryan Bruns. 2005

Overview
Instruments

Community-based principles for negotiating water rights: Some conjectures on assumptions and priorities

www.nri.org/waterlaw/AWLworkshop/BRUNS-B.pdf

This community perspective on the application of institutional design principles suggests distinct priorities for improving basin water allocation from those existing in current policies. Measures to support community involvement in basin water governance, such as legislative reform, legal empowerment, networking, advocacy, participatory planning, technical advice and facilitation, may be more effective if fitted to community priorities in negotiating rights to water.

François Molle. 2004

Policy
Case studies

Defining water rights: By prescription or negotiation?

In Water Policy 6 (2004) 207 – 227.

www.iwmi.cgiar.org/Assessment/files/Synthesis/Policies/francois molle_Defining water rights.pdf

The paper distinguishes between formal rights defined through a bureaucratic process and flexible allocation rules designed through a gradual and continuous process of negotiation. It investigates the prerequisites, advantages and drawbacks of these two kinds of water rights, and examines how they apply to the specific natural and historical conditions of Sri Lanka. Policy models must be tailored to the local situation and be based on what is feasible rather than on what is considered desirable.

François Molle, Hugh Turral. 2004

Overview
Policy

Demand management in a basin perspective: Is the potential for water saving overestimated?

www.iwmi.cgiar.org/assessment/FILES/pdf/publications/ConferencePapers/Demand management in a basin perspective(1).pdf

The paper examines critically the scope for saving water in water short basins. It shows that demand management interventions often result in some users being able to increase their water use to the detriment of downstream users. Water pricing, often proposed as a way to curb water use, is shown to be problematic in irrigated agriculture. The paper also suggests that supply management remains indeed the most effective way to reduce water use, and that in many cases supply augmentation cannot be avoided.

Charlotte de Fraiture, Ximing Cai, Upali Amarasinghe, Mark Rosegrant, and David Molden. 2004

Overview
Policy

Does International Cereal Trade Save Water? The Impact of Virtual Water Trade on Global Water Use

www.iwmi.cgiar.org/assessment/FILES/pdf/publications/ResearchReports/CARR4.pdf

Virtual water refers to the volume of water used to produce agricultural commodities. When these commodities enter the world market, trade in virtual water takes place. This report argues that the role of virtual water trade in global water use is modest, since most trade takes place, and will continue to take place, between water abundant countries.

UK Department for International Development (DFID). 2005

Case studies
Instruments

Equity, Irrigation and Poverty

www.livelihoods.org/post/Docs/R8338-Summary-Report.pdf

Water Users' Associations are widely promoted for improving water management on large-scale irrigation schemes, but their performance has not been as effective as had been hoped. DFID investigated the current situation and tested methods for improving water management in selected projects in Nepal, India and Kyrgyzstan, and developed guidelines to help ensure that large irrigation schemes have a better impact on poverty reduction.

Randolph Barker & François Molle. 2004

Overview

Evolution of Irrigation in South and Southeast Asia

www.iwmi.cgiar.org/assessment/FILES/pdf/publications/ResearchReports/CARR5.pdf

The report presents some salient aspects of the evolution of Asian irrigation. It identifies the major factors that have influenced irrigation development, focuses on the current issues, and suggests what this implies for the future development of irrigation and for the steps needed to promote this development.

John Gowing. 2003

Overview

Food security for sub-Saharan Africa: Does water scarcity limit the options?

www.luwrr.com/uploads/paper03-02.pdf

The World Water Council (WWC) vision for 2025 assumes 40% more food will be produced and this will require a 9% increase in the consumption of blue water by irrigated agriculture. In this scenario the irrigated area expands by 5% to 10%. Significant improvements in water productivity are required to meet projected large increases in use of blue water by industry and municipalities in developing countries. Planning for future food security requires integrated analysis of land-use and water resources issues.

United Nations. Economic and Social Council. 2002

Policy

General Comment No. 15: The right to water

www.unhchr.ch/html/menu2/6/gc15.doc

Articles 11 and 12 of the International Covenant on Economic, Social and Cultural Rights.

T. Shah, D. Molden, R. Sakthivadivel and David Seckler. 2000

Overview

The Global Groundwater Situation: Overview of Opportunities and Challenges

www.iwmi.cgiar.org/pubs/WWVisn/GrWater.pdf

This document clarifies the issues surrounding groundwater management and the consequences of overexploitation of this resource. It explores potential strategies for averting a groundwater crisis.

Comprehensive Assessment of Water Management in Agriculture. 2006

Overview
Policy

Insights from the Comprehensive Assessment of Water Management in Agriculture

www.iwmi.cgiar.org/assessment/files_new/publications/Discussion Paper/InsightsBook_Stockholm2006.pdf

The Comprehensive Assessment of Water Management in Agriculture was conducted to bring diverse views on the issue together, to critically evaluate the current situation and to provide policy relevant recommendations on the way forward. The report contains the findings which were presented and discussed at the World Water Week in Stockholm, 2006. The full assessment results will be published in late 2006.

Indo-Swiss Participative Watershed Development Project, Karnataka (ISPWDK). 2006

Case studies

Integrating gender in watershed development: Lessons of experience

www.intercooperation.ch/offers/download/ic-india/ispwdk-2.pdf

This publication analyses changes in gender perceptions and relations and four case studies serve to illustrate gender dynamics in watershed villages. The experiences of promoting gender integration in ISPWDK provide a number of lessons for other development projects and organizations. For example, technologies are rarely gender neutral; thus the gender implications of new technologies must be thought through. Field practitioners and policy makers interested in social processes will find this document useful.

Millennium Ecosystem Assessment. 2005

Overview
Policy

Living beyond our means: Natural assets and human well-being

www.millenniumassessment.org/proxy/document.429.aspx

The MA synthesizes information from the scientific literature and relevant peer-reviewed datasets and models. It incorporates knowledge held by the private sector, practitioners, local communities, and indigenous peoples. The MA adds value to existing information by collating, evaluating, summarizing, interpreting, and communicating it in a useful form.

Barbara van Koeppen, Patrick Moriaty & Eline Boelee. 2006

Overview
Instruments

Multiple-Use Water Services to Advance the Millennium Development Goals

www.waterandfood.org/fileadmin/CPWF_Documents/Documents/Partner_Publications/IWMIRR98.pdf

This research report presents the findings of the first phase of the action-research project "Models for implementing multiple-use water supply systems for enhanced land and water productivity, rural livelihoods and gender equity". Multiple use water services, or "MUS" in short, is a participatory, integrated and poverty-reduction focused approach in poor rural and peri-urban areas, which takes people's multiple water needs as a starting point for providing integrated services, moving beyond the conventional sectoral barriers of the domestic and productive sectors.

United Nations Educational, Scientific and Cultural Organization (UNESCO). 2006

Overview
Case studies

Non-renewable groundwater resources

http://unesdoc.unesco.org/images/0014/001469/146997E.pdf

The utilization of non-renewable groundwater resources, whether on a planned or unplanned basis, implies the mining of storage reserves. To confront the challenges, an integrated approach to resource management is essential. The guidebook places strong emphasis on the socio-economic, institutional and legal dimensions of groundwater utilization and management. The target audience for this publication is water resource decision-makers; it provides easy reference and presents guidelines.

J. Raymond Peter. 2004

Overview

Participatory Irrigation Management

www.maff.go.jp/inwepf/documents/inaugural/inpim-note.pdf

Participatory irrigation management can offer one way of improving water user efficiency. The paper gives a brief overview of the different types of institutional arrangements of water user associations and suggests a realignment of incentives for promoting effective participatory irrigation management.

Intizar Hussain. 2005

Case studies
Instruments

Pro-poor Intervention Strategies in Irrigated Agriculture in Asia

Executive summary. www.developmentgateway.com.au/jahia/jsp/link.jsp?idLink=220

Concentrating on agriculture and poverty alleviation, this study offers a set of realistic options and guidelines for pro-poor interventions in agriculture and rural resource sectors in the Asia-Pacific region. With financial support from the Asian Development Bank, the study was implemented by the International Water Management Institute (IWMI), Colombo, in collaboration with national partners in six Asian countries including: Bangladesh, China, India, Indonesia, Pakistan and Vietnam.

Etude du Sahel. 2005

Case studies

Progress Against Desertification: Case Studies

www.frameweb.org/ev_en.php?ID=10773_201&ID2=DO_TOPIC

The Sahel Study assesses the prospects of natural resource management (NRM) investments and draws useful lessons for national policies and programme design. The study sets out from three basic premises: • Successes in agriculture and NRM in the Sahel / West Africa is underestimated; • Impact of policy and institutional reforms made by countries in the sub-region is underappreciated; • Local capacity to induce cooperation at grassroots level and to manage different interests over access to and utilisation of natural resources are underestimated.

Jeremy Berkoff. 2003

Overview

Prospects for irrigated agriculture: Has the international consensus got it right?

www.brad.ac.uk/acad/bcid/GTP/Berkoff.pdf

The provisional objective for agricultural water use adopted at Kyoto was "to achieve targets for decreasing malnourishment and rural poverty, without increasing global diversions of water to agriculture over the 2000 level" (WWF 2003). This reflects a perceived need to preserve water for the environment. The report reviews three aspects of this rationale: 1. The role of food trade; 2. Implications for water management; 3. The impact of declining prices on rural poverty.

The World Bank. 2006

Overview

Policy

Reengaging in Agricultural Water Management: Challenges and Options

http://siteresources.worldbank.org/INTARD/Resources/DID_AWM.pdf

According to Kevin Cleaver, Director Agriculture and Rural Development, World Bank, "about 60% of the extra food to meet the increasing demand will come from irrigated agriculture. At the same time, we face the challenges of increasing farmer incomes, reducing rural poverty and protecting the environment, all from an increasingly constrained water resources base". The publication reviews the current situation and provides a glimpse of the future of agricultural water use and food production, and suggests a range of policy options to meet the challenges ahead.

World Water Council (WWC). 2006

Policy

The Right to Water: From concept to implementation

www.worldwatercouncil.org/fileadmin/wwc/Library/RightToWater_FinalText_Cover.pdf

The report identifies the conditions necessary for effective implementation of the right to water and in particular the necessary implication of all stakeholders at the local and national levels.

Food and Agriculture Organization of the United Nations (FAO). 2003

Overview

Unlocking the water potential of agriculture

ftp://ftp.fao.org/agl/aglw/docs/unlocking_e.pdf

Agriculture will have to respond to changing patterns of food demand and contribute to the alleviation of food insecurity and poverty among marginalized communities. Agriculture will also have to compete for scarce water with other users, while reducing pressure on the environment. Water will be the key agent in the drive to raise and sustain agricultural production in order to meet these multiple demands. Agriculture policies and investments will have to unlock the potential of agricultural water management practices to raise productivity, spread equitable access to water and conserve the natural productivity of the water resource base.

United Nations. 2006

Overview

Policy

Water, a shared responsibility

www.unesco.org/water/wwap/wwdr2/index.shtml

The Report builds on the conclusions of the 1st United Nations World Water Development Report 'Water for People, Water for Life' published in 2003. It presents a comprehensive picture of the global freshwater resources and tracks progress towards the water-related targets of the UN Millennium Development Goals. It examines a range of key issues including population growth, increasing urbanization, changing ecosystems, food production, health, industry and energy, as well as risk management, valuing and paying for water and increasing knowledge and capacity.
Of special interest in the context of water for food are chapter 2: The Challenges of Governance, and chapter 7: Water for Food, Agriculture and Rural Livelihoods.

Swiss Development Cooperation (SDC). 2005

Policy

Water 2015 – Principles and Guidelines

http://162.23.39.120/dezaweb/ressources/resource_en_25139.pdf

Short version of the main publication mentioned on page 3 of the Focus. Has been elaborated with broad participation of Coordination Offices, Thematic Divisions at the Head Office and external partners.

Instruments

World Overview of Conservation Approaches and Technologies (WOCAT). Coming out December 2006

Where the Land is Greener

www.wocat.net

This book looks at soil and water conservation from a global perspective. It represents a prototype for national and regional compilations of sustainable land management practices. Two analytical sections uncover common elements of success, and offer hope for productive conservation at local level with simultaneous global environmental benefits. Finally there are policy pointers for decision makers and donors.

Web sites focusing on policy overview and technical competencies

- Centre for Science & Environment, India
  A look at India's water harvesting practices
  www.rainwaterharvesting.org/Rural/Rural.htm

- **Capitalisation of Experiences Water, Land and People (CE-WLP)**
  https://extranet.intercooperation.net/cewatersheds

- **Challenge Program Water & Food (CPWF)**
  www.waterandfood.org

- **Community of Practise on Water for Food (CoP W4F)**
  www.water-for-food.ch/index_es.htm

- **The Dublin Statement on Water and Development. 1992**
  www.wmo.ch/web/homs/documents/english/icwedece.html

- **UNESCO Newsletter: Water and Poverty**
  www.unesco.org/water/news/newsletter/159.shtml

- Swiss Development Cooperation (SDC)
  Water for Food
  www.sdc.admin.ch/index.php?navID=21880&langID=3&userhash=77ed3c706269dd53db2155c9ca64e14

- **World Water Forum Mexico. 2006**
  www.worldwaterforum4.org.mx/home/show_docs.asp?lan=

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. Back issues of* ***InfoResources Focus*** *can be ordered or be downloaded from the address given on page 2.*