IV. The Politics of Water

The warming of the ocean, in particular its surface waters, and the feedback of heat to the atmosphere are changing rainfall patterns, affecting the availability of freshwater and food security, and health.

http://www.unep.org/geo/geo4/report/04_Water.pdf

"Human well-being and the ecosystem health in many places are being seriously affected by changes in the global water cycle, caused largely by human pressures." So begins the United Nations Environmental Programme's 4th annual report on water. At first sight, this reading may appear "fso" or for scientists only, but in fact it is highly accessible and contains information on how various human pressures contribute to the fresh water crisis (e.g., population, food and energy needs, industrial strains, global climate change, over-fishing). For example, solar energy drives the circulation of the globe's water. (Note: To read or download the entire report in English, French, or Spanish, go to the UNEP's Website at www.unep.org/geo/geo4/media.)

Questions

1. Look over "Figure 4.1 Global distribution of the world's water." Then compare the difference between ocean and freshwater availability (97.5 and 2.5 % respectively). Just think, 6 billion humans (and counting) and trillions of plants and animals are vying for 2.5 % of the fresh water available!

2. Reflect:

   Examine your behavior as it relates to your water use:

   a. Food consumption and water pollution (run off from animal processing and plant fertilizers)

   b. Household practices? (e.g. cleaners)

   c. Items you purchase related to water pollution? (including plastic water bottles)

   d. Lawn/garden water use related to availability and run off

   e. Personal hygiene (soaps, personal care products) and affects on the environment (i.e., Chesapeake Bay)

3. What can you do to lessen your impact on water use, water pollution, and water availability?

4. Given the fact that water migrates from one area to another (neighborhood, town, state, country, river, ocean etc.) what types of interventions are needed?

5. Which groups of people need to be involved: scientists; politicians; engineers; ecologists; researchers; educators; artists; the Environmental Protection Agency (EPA); or your local, state, or federal government?

6. How do you fit into this equation? Are you motivated to do anything that will improve water access and quality?

7. What impact does your chosen major (e.g. engineering, music, criminal justice, healthcare, TV/radio production, business, computer science, etc.) have on water quality and access issues?

8. How does a multidisciplinary approach enter into water issues? Are there dangers in leaving solutions up to one group? (E.g., media experts versus scientists; politicians versus the EPA; you versus your local water provider.)

Water

By Russell Arthurton, Sabrian Barker, Walter Rast, and Michael Huber

Main Messages

Human well-being and ecosystem health in many places are being seriously affected by changes in the global water cycle, caused largely by human pressures. The following are the main messages of this chapter:

Climate change, human use of water resources and aquatic ecosystems, and overexploitation of fish stocks influence the state of the water environment. This affects human well-being and the implementation of internationally agreed development goals, such as those in the Millennium Declaration. Evidence shows that implementing policy responses to environmental problems enhances human health, socio-economic growth and aquatic environmental sustainability.

The world's oceans are the primary regulator of global climate, and an important sink for greenhouse gases. At continental, regional and ocean basin scales, the water cycle is being affected by long-term changes in climate, threatening human security. These changes are affecting Arctic temperatures, sea and land ice, including mountain glaciers. They also affect ocean salinity and acidification, sea levels, precipitation patterns, extreme weather events and possibly the ocean's circulatory regime. The trend to increasing urbanization and tourism development has considerable impacts on coastal ecosystems. The socio-economic consequences of all these changes are potentially immense. Concerted global actions are needed to address the root causes, while local efforts can reduce human vulnerability.

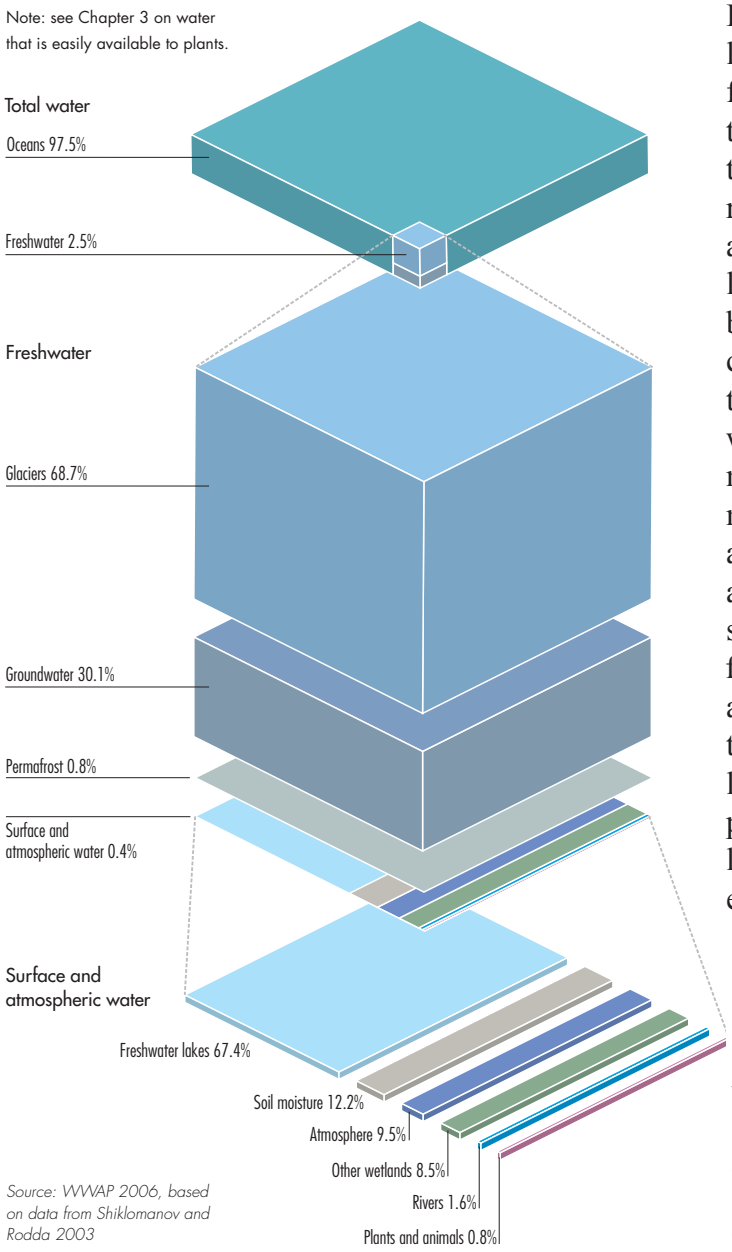
Freshwater availability and use, as well as the conservation of aquatic resources, are key to human well-being. The quantity and quality of surface- and groundwater resources, and life-supporting ecosystem services are being jeopardized by the impacts of population growth, rural to urban migration, and rising wealth and resource consumption, as well as by climate change. If present trends continue, 1.8 billion people will be living in countries or regions with absolute water scarcity by 2025, and two-thirds of the world population could be subject to water stress.

Practical implementation of Integrated Water Resource Management (IWRM) at the basin scale, including consideration of conjunctive groundwater aquifers and downstream coastal areas, is a key response to freshwater scarcity. Because agriculture accounts for more than 70 percent of global water use, it is a logical target for water savings and demand management efforts. Stakeholders who pay attention to increasing the productivity of rain-fed agriculture and aquaculture, which can contribute to improved food security, are proving to be successful.

Water quality degradation from human activities continues to harm human and ecosystem health. Three million people die from water-borne diseases each year in developing countries, the majority of whom are children under the age of five. Pollutants of primary concern include microbial pathogens and excessive nutrient loads. Water contaminated by microbes remains the greatest single cause of human illness and death on a global scale. High nutrient loads lead to eutrophication of downstream and coastal waters, and loss of beneficial human uses. Pollution from diffuse land sources, particularly agriculture and urban run off, needs urgent action by governments and the agricultural sector. Pesticide pollution, endocrine-disrupting substances and suspended sediments are also hard to control. There is evidence that IWRM at the basin scale, improved effluent treatment and wetland restoration, accompanied by improved education and public awareness, are effective responses.

Aquatic ecosystems continue to be heavily degraded, putting many ecosystem services at risk, including the sustainability of food supplies and biodiversity. Global marine and freshwater fisheries show large scale declines, caused mostly by persistent overfishing. Freshwater

Figure 4.1 Global distribution of the world's water



Source: WWAP 2006, based on data from Shiklomanov and Rodda 2003

stocks also suffer from habitat degradation and altered thermal regimes related to climate change and water impoundment. Total marine catches are being sustained only by fishing ever further offshore and deeper in the oceans, and progressively lower on the food chain. The trend of fish stock degradation can be reversed when governments, industry and fishing communities work together to reduce excess fishing effort, subsidies and illegal fishing.

A continuing challenge for the management of water resources and aquatic ecosystems is to balance environmental and developmental needs. It requires a sustained combination of technology, legal and institutional frameworks, and, where feasible, market-based approaches. This is particularly true where efforts are designed to share the benefits of water-related ecosystem services rather than merely sharing the water resource alone. In addition to capacity building, the challenge is not only to develop new approaches, but also to facilitate the practical, timely and cost-effective implementation of existing international and other agreements, policies and targets, which can provide a basis for cooperation on many levels. Although many coastal environments are benefiting from existing Regional Seas agreements, there is a paucity of international agreements addressing transboundary freshwater systems, a significant source of potential conflict in the future. A range of perverse subsidies also hampers the development and implementation of effective management measures at many levels. The benefits of tackling well-understood problems, especially those at the basin scale, are likely to be greatest when efforts are coordinated effectively among different levels of society.

Challenges and Opportunities

As the Earth's primary integrating medium, water has a wide potential to reduce poverty, increase food security, improve human health, contribute to sustainable energy sources, and strengthen ecosystem integrity and sustainability. These water-related goods-and-services represent significant opportunities for society and governments to jointly achieve the goals of sustainable development, as recognized in the Millennium-Declaration and at the World Summit on Sustainable Development, in the context of the MDGs. summarizes the relative effectiveness of existing responses.

Water for Poverty and Hunger Eradication

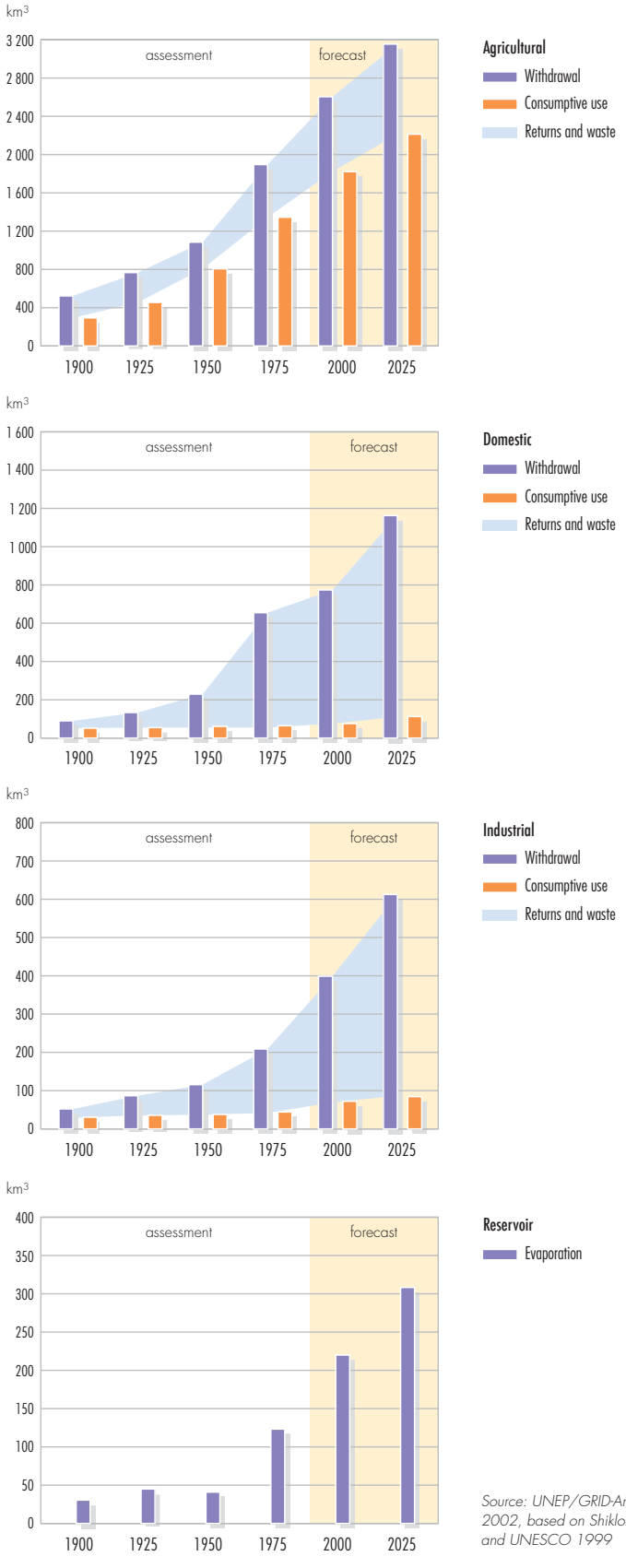
There is compelling evidence that a substantial increase in global food production is needed to feed growing populations, and to reduce or eliminate situations where people have insuffi-

cient food for their daily needs. This increase in production will require more water (see Figure 4.4). On a global scale, the agricultural sector uses the vast majority of freshwater resources, and so is a logical target for economizing water use and developing methodologies for growing more food with less water (more crop per drop). Because agriculture and healthy ecosystems can be compatible goals, the major challenge is to improve irrigation for food production by increasing water and and productivity, supporting ecosystem services and building resilience, while mitigating environmental damage, especially within the context of ecosystem-based IWRM approaches.

Since groundwater levels are falling, and aquifer water stores are shrinking in many highly-populated countries, much of the additional water required for agricultural production must come from dammed rivers. While acknowledging the environmental damage and socio-economic dislocation associated with construction of some dams, the building of more dams cannot be dismissed, since they can provide significant sources of water. But, more attention must be directed to understanding and balancing the environmental and socio-economic impacts associated with dam construction and operation against the benefits to be derived from them. Augmenting the resources of water-scarce regions by interbasin transfer is another established option, although proposed schemes must demonstrate the social, environmental and economic benefits to both the donating and the receiving basins.

While the impacts of increasing water demand for agriculture may be acceptable in countries with ample water resources, the escalating burden of water demand will become intolerable in water-scarce countries. Such situations can be alleviated to some degree by water-scarce countries shifting their food production to "water-rich" ones, deploying their own limited water resources into more productive economic sectors. This would address the need for energy and technology intensive transport of water to distant areas of demand. Although globalization in the agriculture and related food production sectors

Figure 4.4 Changes in global water use by sector



Source: UNEP/GRID-Arendal 2002, based on Shiklomanov and UNESCO 1999

already facilitates such changes, these approaches require close cooperation between producing and receiving countries.

Better management of marine, coastal and inland waters and their associated living resources improves the integrity and productivity of these ecosystems. Although there is little scope to expand or develop new fisheries, there is considerable opportunity to improve the management of existing fisheries and food production. Governments, industry and fishing communities can cooperate in reducing fish stock losses by making much needed changes to reduce excess fishing effort, subsidies and illegal fishing. Aquaculture currently helps to address the issue of food security, and has the potential to contribute further both by increasing fish supplies cost effectively, and by generating foreign income by exporting increased fish production, which can improve local livelihoods. But, aquaculture development to meet food security needs must include species that are not dependent on fish meal and fish oil, and that are palatable to a wide range of consumers.

Credit: UNEP/Still Pictures
Safe drinking water saves lives.
Credit: I. Uwanaka – UNEP/
Still Pictures

Combating Water-borne Diseases

Although safeguarding human health ranks first among the priorities of water resources management, direct human consumption and sanitation are among the smaller uses of freshwater in terms of volume. Even though the percentage of the world's population with access to improved water supply rose from 78 to 82 per cent between 1990 and 2000, and the percentage with access to improved sanitation rose from 51 to 61 per cent during this same period, contaminated water remains the greatest single cause of human sickness and death on a global scale. In 2002, then UN Secretary-General, Kofi Annan, on the use of specific technological measures, the maintenance or restoration of aquatic ecosystems, and public education and awareness. Technological approaches, such as the construction and operation of cost-effective water treatment plants and sanitation facilities for treating human wastes, provide effective measures against water-borne diseases. Many industrial water pollutants with human health implications also are amenable to treatment with technologies that capture materials from water. These technologies can sometimes recover useful products (such as sulphur) from waste streams. Ecosystem restoration may reduce the incidence of some water-borne diseases, but it can also lead to an increase in the incidence of others. This negative aspect may be countered by improved understanding of the ecological requirements of disease vectors, and incorporating this knowledge into restoration projects. Traditional approaches, such as rainwater harvesting, can provide sources of safe drinking water, particularly in water-scarce areas or locations that experience natural disasters andother emergencies. Properly managed fish farms have much potential to address food security and improve local livelihoods.