

## Water – available in abundance yet still so scarce

### How water shortages threaten food security

No. 21/June 2011

#### Overview

*Every school child knows that without energy from the sun, water and plant biomass, man cannot survive. We have interfered on an alarming scale in our natural ecosystem with the climate change, and this has had dramatic effects on man and on biodiversity and water availability. Water is irreplaceable. Contaminated water or water shortages are life-threatening for people. Water is key to agricultural production and therefore food security. But times have changed and water is no longer a commodity that is readily available everywhere and at all times. The struggle for resources began a long time ago and decisions about access to and the distribution of water are controversial and highly political. Today, successful water management is more important than ever before in resolving the socio-economic and environmental problems that we face all over the world. The way we handle water resources today will decide whether we will be able to overcome hunger and poverty and pave the way towards a truly sustainable way of life.*

#### Water scarcity and food security

Theoretically, global food production could supply the entire world population with an average of 2700 calories a day. And yet almost one billion people on our planet are hungry or undernourished. Freshwater resources are also available in sufficient quantities to supply all users globally, in other words people and ecosystems, even if the world population increases. Access to water, however, presents a different story: according to the United Nations, three billion people of a projected future world population of 8.5 will be affected by water scarcity<sup>1</sup>. Over 80% of these people will live in developing countries – primarily in rural regions – where 900 million still have no access to fresh drinking water even today. 1.5 million die of the consequences of impure drinking water annually, and 2.5 billion people have no access to adequate sanitary facilities.

Viewed regionally, access to food and water is often disastrously poor. While significant achievements have been made in food security in Southeast and Eastern Asia, the situation in many parts of Africa has deteriorated. Here, the absolute number of hungry people has risen dramatically in the past twenty years. Water availability also differs greatly from region to region. Particularly in arid parts of the world (no less than 41% of the Earth's surface with over two billion people, mainly in developing countries), water scarcity and extreme weather events intensify the population's vulnerability and poverty and can lead to local conflicts and migration. Vulnerability in these countries is particularly critical: this is the result of extreme climatic conditions, on the one hand, and on dependency on agriculture and natural resources, on the other, as well as a low (and declining) level of adaptability to change.

Water scarcity is often the result of overuse and profligate use of resources. Water is wasted, in particular, in agriculture. Ineffective irrigation methods, inappropriate production techniques and an ailing infrastructure are the causes of

<sup>1</sup> When over 1700 m<sup>3</sup> of drinking water is available per country, annum and capita, we speak of **relative water sufficiency** (problems are rare and limited to certain regions). If availability is between 1000 and 1700 m<sup>3</sup>, we speak of **water stress**, i.e. water shortage is widespread. **Water scarcity** exists when there is less than 1000 m<sup>3</sup>, i.e. water shortage is chronic. **Absolute water scarcity** exists when less than 500 m<sup>3</sup> is available (quoted by Fröhlich, p.33).



In Kenya, people often have to walk for hours to fetch fresh drinking water. Photo: Mädje/Welthungerhilfe.

enormous waste. The number of regions in which total water consumption exceeds water replenishment through inflow is increasing constantly.

In parts of India, China, North Africa and the Middle East, overuse has become an acute problem. Groundwater levels are sinking several metres every year, in some areas, holes up to 300 metres deep (where 10 metres was once sufficient) have to be dug to obtain water.

Another problem is that the struggle for this scarce commodity is triggering more and more conflicts. In Kenya, Tanzania and the Ivory Coast, tensions are escalating between sedentary farmers and herdsman (nomads) over water sources. In many countries, the latter represent the majority of the population.

### Blue and green water

Of all the water that is available on our planet, only 2.5% is drinkable and less than 1% is available as useable freshwater. The rest exists in the form of glaciers or eternal ice (69%) and as groundwater (30%) under the earth. A distinction is made between "blue" water, i.e. freshwater that is present as

groundwater or in lakes and rivers, and "green" water, that is part of the soil and vegetation. Globally, 70% of water (in arid countries up to 90%) is used for irrigation in agriculture. This makes it clear just how dependent food production with its high irrigation requirements is on water availability. Although food security is influenced by other factors, such as lack of purchasing power, global market prices, natural disasters, overuse or inadequate farming techniques, increasing water scarcity remains one of the most critical factors.

#### Conflict over water in Kenya

"One example ... are the violent conflicts between the ethnic Kikuyu and Massai groups in Kenya in January 2005. The sedentary Kikuyu fought with nomadic Massai herdsman over resources in the Rift Valley. The nomads traditionally migrate with the rainy season; with increasing water scarcity, however, their range of migration became limited and they stayed for longer periods in areas often occupied by the Kikuyu. This triggered distribution disputes and conflicts about entitlement to land and water resources. Similar feuds exist between the Pokot nomads and the sedentary Luhya in northwestern Kenya and between the Garre and Murle tribes in the northeastern part of the country."

(from: Fröhlich, p.33).

Water is not only important for food production, it is also needed in industry (20%) and private households (10%). Water is also indispensable for protecting biodiversity and preserving the functionality of ecosystems, such as forests, wetlands and water catchment areas. These factors intensify competition for water while food production simultaneously needs to be increased.

### Climate change intensifies water shortages

Food production relies primarily on the availability of water and this, in turn, is guaranteed by precipitation. The climate change, however, is affecting the global water cycle and regionally is causing an increase but

also a decline in rainfall. Particularly in Sub-Saharan Africa, agriculture is heavily dependent on the seasonal availability of water. Higher temperatures and the change in volume and seasonal distribution of precipitation, however, will lead to water shortages in arid and semi-arid regions. The risk of drought is increasing because the quantity and frequency of rainfall are fluctuating more and more.

The increasing variability of precipitation, which frequently takes the form of heavy rainfall, causes life-threatening flooding every year. In parts of Africa, models project a decline in cereal harvests of up to 50% (by 2050). There is still considerable uncertainty about precipitation predictions and sometimes even conflicting trends, but this does not reduce the problem, rather it makes it even more difficult to adapt to the new situation.

The quantities of water stored in inland glaciers and polar ice caps are also influenced by climate change. Although melting glaciers initially increase water volumes, water availability declines drastically after melting. Examples of this can be found in the Bolivian Andes, where the surface area of glaciers shrank by one third between 1983 and 2006. Triggered also by strong population growth in La Paz, conflicts erupted between the government and the population because privatisation of the water industry and higher prices made access to water even more difficult for the local population.

The melting of the polar ice caps has caused the sea level to rise and is changing the water quality on flat islands and in coastal regions where salinisation of groundwater and farmland is occurring. The consequences of this, namely that livelihoods are undermined and people are being forced to uproot, represent significant potential for regional conflict.

### Water as a human right

In international politics, the global water crisis is a controversial subject which is intensifying from year to year despite an urgent need for action. It was not until 2005 that the United Nations announced a "Water for Life" decade with the aim of halving the number of people without access to fresh and affordable drinking water and basic sanitation by 2015, in accordance with the Millennium Goals.

Later still, in July 2010, the subject was addressed from a human rights perspective. The General Assembly of the United Nations explicitly recognized the right to water and sanitation in a resolution. The UN Human Rights Council confirmed this decision in its resolution in September 2010.

However, the resolutions are not binding by international law, in other words, they are not legally enforceable. However, the large majority of governments (no votes against, 41 abstentions, 29 states not present) acknowledge that this human right is set down in Articles 11 and 12 of the International Covenant on Economic, Social and Cultural Rights (ICESCR) and is therefore binding, at least for the states that ratified this Covenant. The aim must therefore be to anchor this human right in the national legal systems of the states.

But even without this direct binding legal force, recognition of this human right is important because access to drinking water and basic sanitation is now being discussed within the framework of human rights and government decisions are examined regarding violations of this human right. Moreover, Millennium Development Goal 7(c) also endorses and extends the recognition of this human right<sup>2</sup>. Human rights have universal validity and must be enforced correspondingly.

### Water or land grabbing?

A growing number of foreign investors are buying up farmland, especially in Africa. In 2009 alone, according to the World Bank, 45 million hectares of land were sold to foreign investors in this way. The four main countries were Sudan, Mozambique, Liberia and Ethiopia. This land was purchased first and foremost because of the availability of water in these countries. Purchasing land is associated with the right to use available water resources – as a bonus gift, as it were. One problem for the traditional groups of users is that investors are sometimes better protected by special international legislation than the users on the purchased land. In this way, subsequent dispossession without compensation is often prohibited. On the other hand, there is inadequate protection on a national level, the consequence of which is that the people are no longer able to use local water supplies. This means that in the medium and long term, national claims and the development efforts of national governments are undermined. The struggle for the right to water will therefore be continued to the point of absurdity.

Some countries with scarce or already depleted water resources move some of their water consumption abroad in order to have cereal grown there, for example, or to cultivate flowers for

---

<sup>2</sup> "Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation."

export. But this is often part of a devastating adaptation strategy. A World Bank report quotes one investor: If a country imports a ton of grain, it would save 1300 cubic metres of its own water resources. Economists refer to this as "virtual water" that is used for farming and the production of goods.

### Virtual water trade

Virtual water trade is indeed considered one possible adaptation strategy in overcoming the water crisis. It is based on the notion that arid countries satisfy their needs for agricultural products by importing more goods from water-abundant countries rather than producing



Welthungerhilfe helps the Massai people of Kenya build rainwater reservoirs. Photo: Grossmann/Welthungerhilfe

themselves. This brings about a geographical shift in water-intensive agricultural production. The aim of this targeted trade with virtual water is to balance the different water availabilities in individual countries. However, this approach presupposes that food prices on the global market are kept artificially low with farming subsidies so that arid developing countries have an incentive to import food rather than produce it domestically. The fact that developing countries continue to make themselves dependent on imports conflicts with national poverty reduction strategies which usually focus on promoting domestic agricultural production, also because of the job-creating possibilities this involves. Moreover, food price trends in the last few years have shown that the weak purchasing power of the majority of the population in developing countries means that the people cannot afford to pay these prices. The international civil society, in particular, is also demanding an abolition of such agricultural subsidies on the grounds of trade justice.

Another argument against virtual water trade is that it destroys the agricultural sector. In developing countries, much of the population works in farming. Outsourcing production would lead to rural exodus, increasing unemployment and further urbanisation.

For poor developing countries with economies that rely primarily on agriculture, virtual water trade is not a solution.

### Climate adjustment in the water sector

To effectively save water resources and simultaneously help eliminate poverty in a meaningful and sustainable way, other adjustment measures have to be considered. **In its project work, Welthungerhilfe implements adaptation measures and also campaigns for the sustainable management of natural resources as part of its poverty elimination efforts.**

### Infrastructural measures

In water-scarce regions, the efficiency of water usage can be significantly improved by developing water infrastructure in a targeted way. Welthungerhilfe calls for the development and improvement of infrastructure for drinking water supplies, waste water and service water treatment and irrigation as further elements of poverty elimination. In the drought-plagued regions of Kenya, Welthungerhilfe is committed to collecting groundwater and rainwater, building shallow wells, and collecting water from rock catchment systems and roof raintraps. These efforts not only contribute towards food security, they also help reduce vulnerability to climate fluctuations both today and in the future. By cooperating with governmental structures and working with local irrigation committees, Welthungerhilfe helps reinforce these structures. Welthungerhilfe supports a total of 30 water-related projects with a total volume of 20 million euros.

### Integrated water resource management (IWRM)

Welthungerhilfe pursues the concept of integrated water resource management (IWRM) with the aim of sustainably managing interdependent surface waters and aquifers. It contributes towards social and economic development and helps preserve the functionality of vital ecosystems. Integrated irrigation systems are indispensable if the needs of all users of a water catchment area are to be considered.

**Looking towards the Rio+20 summit on sustainable development in 2012, Welthungerhilfe calls for:**

**1. Implementation of the right to water**

The right to food and latterly to water implies an obligation on the part of governments to respect, protect and enforce human rights and to guarantee non-discrimination. Recognition of the right to water as a human right allows people to refer to and demand the implementation of these guarantees. As part of their hunger and poverty elimination measures, national governments must develop and implement local, regional and national water usage strategies in order to fulfil these rights. This requires competent and assertive institutions that are free of corruption.

**2. Strengthening institutional conditions**

Institutional and political conditions are key to sustainable resource and water management. Donors and national governments must ensure that sustainable use of water is guaranteed, that equitable use of water is promoted, that water management is decentralised as far as possible and that the involvement of water users is ensured. Rights of use must be clarified and enforced. Apart from guaranteeing access to water, incentives must be created to use water-saving technology which changes water-intensive consumption and eating habits. When prices are determined, it must be ensured that the necessary price adjustments are accompanied by efforts to support the poor. Mention should be made of models in South Africa where a minimum quantity of water is supplied free of charge in order to satisfy basic requirements. Only requirements beyond this basic amount are subject to a charge.

**3. Reinforcing sustainable farming concepts**

Land and water grabbing is a potential cause of social and ecological conflict. As a result of "land grabbing", there is often not enough land left for people living in the affected regions to find work and food. The kind of agricultural practice pursued on the basis of "land grabbing" is not sustainable, nor does it contribute towards global food security in poor countries on a long-term basis. Large-scale monocultures that rely heavily on the use of fertilizers and pesticides are a potential threat to biodiversity, long-term soil fertility and natural water supplies. Donors and national governments have to implement agricultural policies which involve local smallholder farmers in the process of eliminating hunger and poverty and which correspond with social and ecological criteria. The

multi-functionality of agriculture plays a key role here. Agriculture is not just about producing food, it helps preserve livelihoods and protects water as a natural resource. The German government and other donor countries must shift the focuses of poverty elimination to site-oriented agriculture and rural development.

**Sources**

Fröhlich, Christiane: Zur Rolle der Ressourcen Wasser in Konflikten, in: Aus Politik und Zeitgeschichte, 25/2006, p. 32-37.  
Manual of World Nutrition, published by Deutsche Welthungerhilfe, among others, Frankfurt 2011.  
Hoff, Holger; Kundzewicz, Zbigniew: Süßwasservorräte und Klimawandel, in: Aus Politik und Zeitgeschichte, 25/2006, p. 14-19.  
Miserior, Müncher Rück Stiftung (publisher): Global aber gerecht. Klimawandel bekämpfen, Entwicklung ermöglichen, Munich 2010.  
Water in a changing world. The 3rd UN World Water Report, 2009.

**Author**

Michael Kühn  
Adviser Climate Change  
German Welthungerhilfe e.V.  
Friedrich-Ebert-Straße 1  
D-53173 Bonn  
Tel.: +49 / (0) 22 8 / 22 88-323  
Email: michael.kuehn@welthungerhilfe.de