

## WORLDWIDE WATER SCARCITY

Worldwide water scarcity and its constant increase represent a recurring topic in the debate over climate change, intensified agriculture and potential water conflicts. In the context of its Decade for Action “Water – Source of Life”, which runs from 2005–2015, the UN is picking up on further aspects concerning water. Clean water was recently recognised by the United Nations as a human right (Auswärtiges Amt 2014). In Germany and Europe, the recent droughts of 2003 and 2006 have brought water scarcity into the public spotlight. Such droughts are also a recurring problem in the United States, which would seem to imply that water is a scarce resource, even in developed countries.

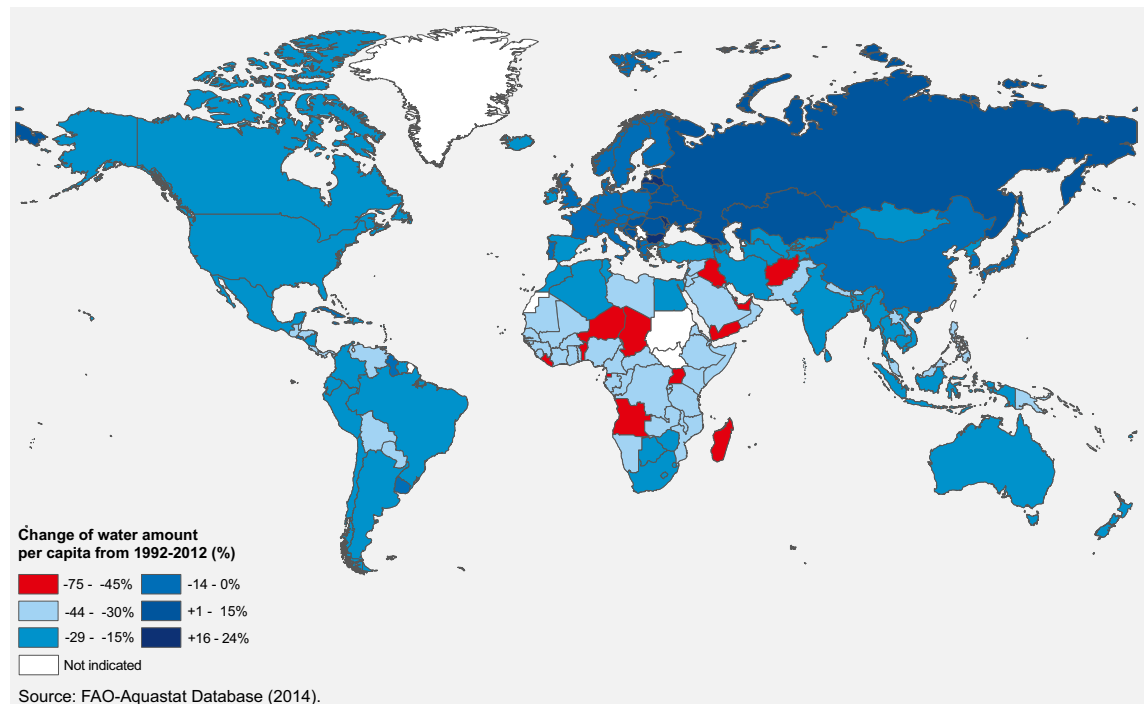
At three percent, global fresh water resources only represent a small fraction of the world’s water quantities. These amounts include those stored in ice caps and glaciers (69 percent), groundwater (30 percent) and the surface water of land mass, which only comprises 0.3 percent of fresh water (United States Geological Survey 2014). The principal factors affecting the availability of fresh water are physical conditions on the one hand and the intensity of use, on the other hand. The physical conditions mainly include the number of rivers, lakes and wetlands in a country, as well as the occurrence of drought periods due to natural climatic variation and, in the future, possibly also due to climate change. Factors concerning the intensity of use specifically include water consumption due to global population growth, changing living habits and nutrition, as well as increasing urbanisation (UN-Water & FAO 2007). Furthermore, the state of urban infrastructures (e.g., pipelines, treatment plants), the diversion of rivers, the destruction of natural wetlands, as well as the salinisation of districts due to incorrect irrigation and rising sea levels are of particular importance. In many regions groundwater levels have already sunk below a critical level due to the overconsumption of private and commercial consumers. This permanently affects groundwater recharge and can promote the salinisation of coastal areas due to penetrating seawater (Handelsblatt 2013). In industrialised countries, additional factors like soil sealing and pollutants may reduce groundwater recharge and affect their quality (Umweltbundesamt 2014).

What does water scarcity mean exactly? In general, this term is divided into three categories: Annual water availability below 1,700 m<sup>3</sup> per capita is called water

stress. If this value drops under 1,000 m<sup>3</sup> per year it is already called water scarcity and a level below 500 m<sup>3</sup> is related to absolute water scarcity (UN-Water 2014). Worldwide, about 700 million people are affected by water scarcity, this figure is likely to increase to about 1.8 billion people by 2025. Furthermore, two-thirds of the world’s population may live in areas with acute water stress (UN-Water 2014). Most of the affected countries are located in Sub-Saharan regions. In the face of this lack of water, global water consumption is currently 1,200 m<sup>3</sup> per person and year (Frankfurter Rundschau 2014). Apart from physical water scarcity, there is also economic water scarcity, which is related to the possibility of water supply, especially in terms of infrastructure, water management and policy. For example, people living in slums often have to pay five to ten times more for bottled water than people with access to water pipes (UN-Water & FAO 2007). A growing problem that is further intensifying the general shortage of water is related to the progressive privatisation of water stocks. This is influenced by large corporations in the food and beverage industry, which are taking advantage of poor water quality in many places and providing clean water at inflated prices (Tagesschau 2013).

Figure 1 shows the long-term change in global renewable water resources available per capita over the last 20 years (1992–2012). The renewable amounts of fresh water are those stemming from rainfall, recharged groundwater and surface influx from neighbouring countries. Worldwide a clear pattern emerges. As expected, African countries have the lowest amount of water available, however, in the same period, the available amounts decreased by up to 50 percent in countries like Niger, Uganda and Liberia. Another example of a region affected by water scarcity is the Arabic peninsula: Here the renewable water resources have decreased by up to 75 percent (United Arab Emirates, Qatar, Bahrain), while Afghanistan has seen a decline of water amounts of over 50 percent during the same period. Globally, the Emirates are among those countries with the highest water consumption. Here, besides the extraction of groundwater, the desalination of seawater is accessed to meet water requirements (United Arab Emirates – Ministry of Environment and Water 2011).

Also the Americas, Europe and Australia have recorded significant reductions of water amounts. In Eurasia and most parts of Eastern Europe, however, there has been a reverse trend. Within the last 20 years there has been an increase of the available water amounts of up to 24 percent (e.g., Moldova and Georgia). These coun-

**Figure 1: Development of total renewable water resources**

tries have experienced a significant decline in population over the same period. This was mainly caused by decreasing birth rates and higher emigration rates after the collapse of the Eastern Bloc as well as taking advantage of freedom of movement and residence within the EU since the accession of Eastern European countries (Bundeszentrale für politische Bildung 2013; BMFSFJ 2004). The data shown above only represent mean values. That is because larger countries in addition to dry areas often consist of water-rich regions with regular flooding events and consequently are less or not at all affected by water shortages. From the data it becomes apparent that the demographic development (see also FAO Aquastat Database) has a significant impact on the development of water availability.

Although more and more people are consuming much more water, domestic water consumption is not the biggest problem. Regarding the different consumer sectors, agriculture is globally responsible for the bulk of water consumption. An average of more than 70 percent of the available freshwater is used in this sector (UN-Water & FAO 2007). Due to the annual increase of food demand, water demand is expected to double within the next 50 years. According to the International Energy Agency (IEA 2014), worldwide energy supply is responsible for 15 percent of the global water consumption and is

ranked in second place along with the rest of industry (both a total of 20 percent). Consumption is expected to rise by another 20 percent by 2035. Ways of overcoming this problem may be the increased use and treatment of rainwater, wastewater and the desalination of seawater. The latter, however, is a financially and energetically very complex procedure. Far simpler solutions may generally be seen in the field of saving water, raising public awareness for this precious commodity and in political framework concerning management and distribution of water.

Jana Lippelt

## References

- Auswärtiges Amt (2014), Menschenrecht auf Wasser und Sanitärversorgung, [http://www.auswaertiges-amt.de/DE/Aussenpolitik/Menschenrechte/MRVN-Wasser\\_node.html](http://www.auswaertiges-amt.de/DE/Aussenpolitik/Menschenrechte/MRVN-Wasser_node.html).
- BMFSFJ - Bundesministerium für Familie, Senioren, Frauen und Jugend (2004), Gender Datenreport, <http://www.bmfsfj.de/doku/Publikationen/genderreport/4-Familien-und-lebensformen-von-frauen-und-maennern/4-1-Einleitung/4-1-1-geburtensziffern-im-europaischen-vergleich.html>.
- Bundeszentrale für politische Bildung (2013), Mittel- und Osteuropa: Folgen der Auswanderung, <http://www.bpb.de/gesellschaft/migration/newsletter/154192/mittel-und-osteuropa-folgen-der-auswanderung>.

Frankfurter Rundschau (2014), Wasserknappheit trifft viele, <http://www.fr-online.de/klimawandel/klimawandel-wasserknappheit-trifft-viele,1473244,25924100.html> (accessed 16 June 2014).

Handelsblatt (2013), Wem Nestlé das Wasser abgräbt, <http://www.handelsblatt.com/unternehmen/handel-dienstleister/lebensmittelkonzern-wem-nestle-das-wasser-abgraebt/7782074.html> (accessed 17 June 2014).

IEA (2014), Water for Energy, <http://www.worldenergyoutlook.org/resources/water-energynexus/>.

Tagesschau (2013), Das Geschäft mit dem Wasser, <http://www.tagesschau.de/ausland/nigeria-wasser100.html>.

Umweltbundesamt (2014), Regenwassernutzung, <http://www.umweltbundesamt.de/themen/wirtschaft-konsum/umweltbewusstleben/regenwassernutzung>.

United Arab Emirates - Ministry of Environment & Water (2011), UAE State of the Water Report, <http://www.arabwatercouncil.org/AWF/Downloads/Sessions/Topic1/P2-3-Mohamed-AlMulla-UAE-State-of-Water-Report.pdf>.

United States Geological Survey (2014), The Water Cycle: Freshwater Storage, <http://water.usgs.gov/edu/watercyclefreshstorage.html>.

UN-Water (2014), Water Scarcity, <http://www.un.org/waterforlifedecade/scarcity.shtml>.

UN-Water & FAO (2007), Coping with Water Scarcity. Challenge of the Twenty-first Century, <http://www.fao.org/nr/water/docs/escarcity.pdf>.