

# Climate Change and Water Resources



Number 8/10

Fact Sheet

*Humanity faces increasingly serious problems with water quality and quantity. This will be exacerbated by climate change and global warming.*

Climate Change

## The current problem

Even without climate change humanity faces increasingly serious problems with water quality and quantity. Water is needed for rapid population growth, expanding economic activity, households, industries and farms - all these put pressure on water supply. Industrial wastes and concentrated fertilizers contaminate water supplies. Poor irrigation practices increase soil salinity and evaporation rates which affect the watertable.

Where countries share water resources countries need political understanding, especially when sharing hydrological basins and where rivers cross international boundaries.

## Changes to the water cycle

Climate change will probably alter regional precipitation and evaporation patterns. Models indicate that doubling CO<sub>2</sub> levels will raise average temperature between 1.5°C to 4.5°C by 2050. Temperature and wind changes affect the water cycle, although global models still lack the accuracy to make regional forecasts. Rainfall will rise in some areas and fall in others but even if rain increases, higher evaporation rates will reduce runoff. In cold regions warming reduces snow accumulation on mountains.

With climate change, water resources will become more vulnerable as:

- lower rainfall will reduce ground water reserves;
- yearly rainfall variation and extreme droughts and floods will affect the reliability of many water sources;
- reduced winter snow in mountains reduce spring runoff to replenish lakes and rivers;
- a temperature rise of 1°C to 2°C would cause a 10% fall in rainfall and reduce runoff by 40% - 70% in drier basins;

- droughts and over-exploiting water resources will cause salt to leach from soil and raise soil salinity between ground level and the underlying water table;
- a lowered water table in coastal areas will draw sea water into fresh ground water. On atolls, less freshwater in the water lens under the coralline soil will allow surrounding seawater to encroach on freshwater supplies;
- higher CO<sub>2</sub> levels in the atmosphere will raise photosynthesis in plants which increases evapo-transpiration into the atmosphere.

These combined effects on river watersheds, lake levels, aquifers and other freshwater sources will have extremely negative consequences, so that:

- ◆ less water supplies will put pressure and stress on people, agriculture and the environment;
- ◆ saltwater in fresh water supplies will make it unfit for agriculture and human consumption;
- ◆ lower rainfall and higher evaporation will damage food gardens, forests, mangroves and other ecosystems;
- ◆ poorer developing countries will find adjustment costs far too high; and,
- ◆ shortages of clean freshwater in developing countries will cause lower health standards and worsening epidemics, especially in densely populated areas such as atolls.

Better water management is needed to minimise the impacts of climate change. The catastrophic effects with the possible lower rainfall relate to the higher humans consumption of fresh water as the world's population grows, living standards rise, and industrial and agricultural needs rise. To respond to this threat water storage capacity must be improved and people must be educated about water conservation. A tax or levy on water use may also be needed to reduce water wastage.

