Czech Republic

DROUGHT

In the last fifteen years, drought was not an essential issue for the Czech Republic although there were dry periods 1993 – 1995 and 2003 - 2004. On the contrary, large parts of the country were significantly affected by extreme floods in 1997 and 2002. While addressing the flood issues in national strategic documents, the opposite hydrological event – drought – is also taken into account.

The River Basin Management Plan (RBMP) of the Czech Republic 2007 - 2012 for the main river basins, which will be revised every six years, represents the long-term approach to water management and sets the framework for goals and programme measures. Then, individual *Regional River Basin Management Plans* provide specific goals and programme measures. The purpose of the Regional River Basin Management Plans is to compare the current status of surface water and groundwater to the target status, and resolution proposals for water management problems in regional river basins.

According to many studies, negative impacts of climate change include extreme hydrological events such as floods and related surface erosion dangers on the one side, and droughts with negative impacts on water quantity and quality on the other. The goal of adaptation measures must be not only to decrease hazardous exposure of people and their property to floods, but also to ensure a trouble-free supply of good quality water for people, without negative impacts on the environment.

Scenarios of climate change and assessments of its effects on agriculture, human health, and water and forest resource management in the Czech Republic were prepared in the framework of the National Climate Programme. *The National Programme for the Reduction of Climate Change Impacts in the Czech Republic* was approved in 2004, which, among others, emphasizes the need to develop and implement appropriate adaptation measures in the relevant sectors including the water resource management sector.

The common goal of the national policy in the area of water resources is to create the conditions for sustainable management of the limited water resources of the Czech Republic. This will allow for the harmonization of the requirements for all forms of water resources use with the requirements of the protection of water and aquatic ecosystems, while also taking into account the measures for the reduction of detrimental effects of water.

A specific goal in the protection against detrimental effects of water, including drought, is to retain water in the landscape by optimizing landscape structure and its exploitation, and taking preventive measures, both natural and technical.

Framework goals of water protection from detrimental effects of drought in the River Basin Management Plan of the Czech Republic are to:

a) implement adaptation measures specified in the National Programme for the Reduction of Climate Change Impacts in the Czech Republic, which is currently being updated;
b) integrate other resource management sectors and regions into long-term prognoses of demands for water resources with adaptations to presumed climate change;
c) prepare proposals of legislative measures to achieve cohesion in the development of regional river basin management plans with the comprehensive reparcelling (see the chapter LAND);
d) enforce the concept of handling rainwater in urban drainage areas, allowing for rainwater accumulation, infiltration and direct use;
e) enforce the requirement of „good agricultural and environmental condition“ and the requirement of „cross compliance“ in consideration of an increase in water infiltration;
f) create appropriate research and development programmes;
g) ensure restoration of existing water reservoirs by removing sediment;
h) ensure protection of localities suitable for artificial accumulation of surface water for the purpose of compensating for climate change impacts.

The Czech Hydrometerological Institute is responsible for the National Climate Programme. Studies of climate models and scenarios of climate change are also conducted by the Department of Meteorology, Climatology and Environmental Protection of the Mathematics and Physics Faculty of Charles University, which cooperates closely with the Institute of Atmospheric Physics and the Institute of Thermomechanics of the Academy of Sciences of the Czech Republic.

The main source of information for the construction of climate change scenarios are Global Climate Models (GCMs). Scenarios, based on model integrations, are entered into the GCMs at progressively increasing concentrations of CO_2. The scenarios determine changes in the average values of basic climate variables for a given time horizon into the future. The uncertainty of the climate model scenarios is given by the uncertainty in greenhouse gas emissions. However, changes in climate variables on a regional or local scale are needed as input into studies of climate change. The GCMs work on a grid 200 km x 300 km large, the Regional Climate Models (RCMs) have a 50-km grid, but an even greater resolution is needed for the Czech Republic, that is, a 10-km grid. This grid is being developed in the Czech Republic as a part of the European project CECILIA and results should be available by 2010.

The results of climate models form the basis of hydrological models. Atmospheric precipitation, air temperature and other climate variables are recorded and compared with run-off from the observed area. Modelling is based on a series of hydrological and climatological measurements. The resulting run-off for unchanged and changed climate are the basis for the determination of climate change impacts for a given hydrological variable.

The study of the relationship between climate change and the water regime is conducted by the T. G. Masaryk Water Research Institute. The decline in water run-off, especially the decline in the average long-term run-off elevation in the river basins, cannot be resolved without the use of simulation models and current climate change scenarios. In the Czech Republic to date, the effect of climate change on water reserves and compensation options of climate change impacts by means of water reservoirs have been assessed.

Concerning the forestry in the Czech Republic, drought has not been a limiting factor so far. The dry periods 1993 – 1995 and 2003 – 2004 caused an increased defoliation of tree species, and especially dieback of unoriginal spruce forests and *Pinus nigra*. Forests weakened by drought were consequently attacked by *Armillaria ostoyae* and bark-beetles.

The National Forestry Programme is currently being updated. After its approval by the Government by the end of 2007, it will become the key forestry policy document for a medium-term horizon. This document is expected to address extreme changes in the weather within one of its priorities "To mitigate the impacts of expected climate change and extreme changes in the weather". This should be achieved through the measures such as planting space and species differentiated forest stands while using natural forest regeneration and variability of silviculture methods, supporting species and ecotypes of forest trees adapted to climate change, considering possible changes of vegetation grades, preventing land degradation, taking measures which maintain high and stable wood production, focusing on subsidies to support adaptation measures mitigating the impacts of climate change, supporting environmentally appropriate afforestation of agricultural land, decreasing the rotation period of the forest trees most endangered by climate change, planting fast-growing tree species stands on agricultural land.