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International Workshop

***Climate Change Impacts on the Water Cycle,
Resources and Quality***

Research-Policy Interface

25 - 26 September 2006

Scientific and policy report

edited by

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Climate Change and Natural Hazards series 8

Session 3:

Economic and social implications associated with changes in the water cycle and resources induced by climate change

Climate change and human dimension: Health impacts of floods

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Climate change affects health status of human populations in direct and indirect ways especially in the context of the World Health Organization definition as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”. [WHO, 1946]

The main focus of this presentation is water related health impact with special attention to floods.

There are essentially four main water-related transmission routes for infections. .

1. Water-borne infections; these occur when humans drink water containing infectious pathogens and consequently develop an infection, for example Cholera and Typhoid.
2. Water-washed infections (also known as water-scarce), are influenced by the quantity of water available. Within this category, we have Scabies and Trachoma.
3. Water based infections is where the pathogen spends its life-cycle in water, such as Schistosomiasis.
4. Water-related insect vector are those pathogens spread via insects which breed in water or bite near water. These include Malaria, Yellow Fever and Dengue.

Occurrence of disease is dependent on three factors, all which may be critically mediated by climate. First, exposure is the extent to which a person is exposed to a climate related hazard such as floods. Second, sensitivity is the extent to which health outcomes are sensitive to climate change. Third, adaptive capacity is the ability of the individual to resist the health effects of climate change.

The vulnerability of an individual to extreme events depends on individual status related to his own health, socioeconomic standing and demographic profile. It will also depend on community level factors such the robustness of community water and sanitation systems; access to information, for example the existence of early warnings and democratic institutions within the community (e.g egalitarian access to water). Another determinant of vulnerability to extreme events is geographical position, for instance the influence of El Niño cycle or disaster proneness. (e.g. population situated in cyclone paths, on earthquake fault lines or in low-lying coastal areas)

Focusing on water related disasters, the presentation emphasized increasing vulnerability to natural disasters which have in last 30 years have increased from less than 100 to a little

more than 400, representing a four-fold increase. Natural disasters result in immediate deaths and injuries and nonspecific increases in mortality and break outs of infectious and vector-borne diseases. The affected community can be exposed to toxic substances and develop problems with mental health. Flooding has experienced the greatest increase in the last decade, consequently, the greatest number of people have been affected. However, the impact of disease has been undocumented due to vector and environmental change. In the last 30 years, 2,156 floods were reported in EM-DAT project, resulting in the death of 206,303 people and affecting more than 2.6 billion. Furthermore, flooding causes extensive damage to infrastructure and crops. The affected area is usually immense, but this depends on topographical features.

Similarly, 1,864 windstorms have occurred in the last 30 years, causing the death of 293,758 individuals and affecting more than 557 million people. These are the most destructive disasters covering a wide area and causing significant deaths, injuries, agricultural and property loss. On average, each windstorm has affected close to 300,000 people,

Finally water scarcity, droughts and famines are frequent in many regions but tend to be seasonal. Higher temperatures (i.e. droughts) favour micro-organism proliferation and an increase in gastrointestinal infections whereas Scarcity promotes low sanitation practices leading to skin diseases, infections.

In conclusion the presentation summarized the main barriers to measuring the impact of climate change. Not enough field studies have been carried out which signifies missing data or errors in data, simplified relationships, preconceived notions, inappropriate spatial or temporal data and uncertainty about predictive ability of scenarios.

Proceedings of an expert workshop organised in Brussels on 25 and 26 September 2006 by the European Commission (Directorate-General for Research - *Environment-Climate Unit*; Directorate-General for Environment, *Protection of Water and Marine Environment Unit*; and the Joint Research Centre - *Institute for Environment and Sustainability, the Climate Change Unit, the Rural, Water and Ecosystem Resources Unit* and the *Land management and Natural Hazards Unit*).

Scientists, experts and policy makers discussed on climate change impacts on the water cycle, resources and quality. The workshop proceedings comprise a summary of the sessions, discussions held during the round tables as well as abstracts of the contributions to sessions from speakers. Contributions and discussions during the workshop are feeding the 7th Research Framework Programme and the European Policy on water and climate change. They are also a direct input to the International Symposium on “Climate Change and the European Water Dimension” organised under the German presidency of the European Union on February 2007.



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