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ECONOMIC COMMISSION FOR EUROPE

**MEETING OF THE PARTIES
TO THE CONVENTION ON THE PROTECTION AND
USE OF TRANSBOUNDARY WATERCOURSES AND
INTERNATIONAL LAKES**

Working Group on Water Management

**REPORT ON THE WORKSHOP ON EXTREME FLOODS
AND DAM SAFETY**

Helsinki, 28 April 2003

1. In conjunction with the fourth meeting of the Working Group on Water Management, the workshop on extreme floods and dam safety was held in Helsinki on 28 April 2003 at the invitation of the Finnish Environment Institute.
2. The workshop was attended by representatives of the following countries: Estonia, Finland, Georgia, Germany, Hungary, Italy, Netherlands, Norway, Poland, Republic of Moldova, Slovakia, Sweden and Switzerland.
3. Mrs. Sirkka Haunia (Finnish Environment Institute) welcomed the participants and chaired the workshop. In his opening statement Mr. Kai Kaatra (Finland), Ministry of Agriculture and Forestry, recalled Finland's exposure to spring floods and rain floods, and underlined the importance of being prepared for such events even during a drought year as the current one.

4. The workshop programme is contained in Annex I. The presentations are summed up in the annex II. In its final discussion the workshop agreed the conclusions summarised below.

MAJOR CONCLUSIONS OF THE DISCUSSION

5. The vulnerability to extreme events is increasing due to climate change, environmental impacts of land-use modification, the construction of large infrastructures, improved watercourse navigability, etc. The lack of information and the uncertainty still surrounding climate change effects forecasting are a further obstacle.

6. Cooperation is extremely important. Flood prevention and management programmes can be developed only on a river basin scale and close cooperation is needed between upstream and downstream countries.

7. Many programmes and activities have been and are being carried out throughout the UNECE region, and there is a need to share the results obtained and to make a synthesis of the available knowledge and experience.

8. Cooperation is also needed at the local level, between different local authorities acting in the same area and between local areas where the protection and remediation activities are taking place.

9. Every flood event is unique and therefore the preventive and protective methods should be suited to the situation; structural and non-structural measures should be used according to the conditions. Measures applicable to plain areas, such as the use of flood plains, are not adequate for mountainous areas.

10. There is a close link between dams and flood management: dams are as important for flood management as flood management is important for dam safety.

11. There is a need for a sound scientific approach to forecasting and decision-making. Tools to organize and transmit the information to decision makers and the public, such as simulation programmes and GIS (flood risk mapping), are extremely useful.

12. The complexity of the water cycle requires a comprehensive approach, studying floods and droughts together.

13. Early warning systems are very important, especially in the event of flash floods.

14. However, the effectiveness of these systems depends heavily on the level of information and training of the population. An aware and informed population reacts better. There is therefore a need to design ways and means to educate the population, and at the same time to learn from its experience. The role of the mass media, especially local mass media, in this respect is very important; they should become a partner in this task. At the same time, the mass media often lack scientific expertise on the issue and should be provided with tailored information. Other channels, from the traditional ones, such as schools, to modern means of communications, such as the Internet, should also be used.

Annex I

**PROGRAMME OF THE WORKSHOP
ON EXTREME FLOODS AND DAM SAFETY**

Opening of the workshop	Mr. Kai Kaatra Finnish Ministry of Agriculture and Forestry
Proposals of the Finnish Working Group on extreme floods	Mr. Risto Timonen Finnish Ministry of Agriculture and Forestry
Information by the participants on flood problems in their countries	
Research on floods in the EU framework programmes	Ms. Lea Kauppi Finnish Environment Institute
Presentation of the European Network for Floods and Droughts	Mr. Markku Puupponen Finnish Environment Institute
Climate change scenarios and their effect on floods in Sweden	Mr. Phil Graham Swedish Meteorological and Hydrological Institute
Investigation on the effect of climate change on dam safety	Mr. Bertel Vehviläinen Finnish Environment Institute
Dam safety aspects in Sweden	Mr. Klas Cederwall Royal Institute of Technology, Stockholm
EU - Rescdam project	Mr. Mikko Huokuna Finnish Environment Institute
Overview of extreme ice floods, simulation tools and sandbags	Mr. Peter H. Reiter PR Water Consulting Ltd
Information by Germany on the preparation for the Conference in 2004	Mr. Thomas Stratenwerth German Federal Ministry for the Environment, Nature Protection and Nuclear Safety
Final discussion	

Annex II

SHORT SUMMARY OF THE PRESENTATIONS

I. PROPOSALS OF THE FINNISH WORKING GROUP ON EXTREME FLOODS

Mr. Risto Timonen, Finnish Ministry of Agriculture and Forestry

The presentation summarized the conclusions of the Finnish Working Group on extreme floods established after the severe flooding in Europe in the 1990s to assess the possibilities for mitigating damage caused by extreme floods. To reduce flood damage, the Working Group identified the following targets: reduce flood damage in existing settlements; avoid building in flood-prone areas; guarantee the safety of dams; effective flood defence and rescue operations; effective use of modern techniques; flood risk management at basin level. Each target includes a list of recommendations. A programme should be developed over 12 years; total cost are not estimated as they depend on local assessments and plans. The report of the Working Group will be published and translated into English.

II. INFORMATION BY THE PARTICIPANTS ON FLOOD PROBLEM DEVELOPMENTS IN THEIR COUNTRIES

A. *Hungarian experience*

Mr. Arpad Szentivanyi, National Water Authority

Hungary has been heavily affected by floods: every year between 1998 and 2001 was marked by an extreme event in the Tisza basin. As a downstream country (96% of its water is generated outside the country), it is more vulnerable. Therefore, in recent years, the country has strongly improved its flood management policy, introducing new methods for flood protection to reduce peak levels and creating large flood plains with a capacity up to 1.5 billion cubic metres. At the same time, cooperation with its neighbours on flood prevention has been reinforced through different initiatives: establishment of agreements on cooperation in flood management, creation of the Tisza River Forum, preparation of a flood management plan under the International Commission for the Protection of the Danube River, and launching of the Budapest Initiative. As a result, the country was better prepared for the extreme events of the summer of 2002 and suffered less damage than the other affected countries.

B. *Slovak experience*

Mr. Milan Matuska, Ministry of the Environment

Slovakia has also strengthened cooperation with its neighbours, is deeply involved in the Tisza River Forum and has launched different cooperation projects with upstream and downstream countries. The specific issue of early warning of the population in the event of

flash floods is currently dealt with within a project supported by the EU and the Joint Research Centre of the European Commission.

A general problem undermining flood management is the sharing of responsibility between the Ministry of the Environment and the Ministry of Soil Management.

C. *Polish experience*

Mr. Roman Konieczny, Institute of Meteorology and Water Management

After the major floods in 1997, which caused 55 victims and US\$ 0.5 billion worth of damage, different actions have been taken. National legislation was reviewed and a law on natural disasters was adopted in 2002. Furthermore, a comprehensive programme has been launched with a loan from the World Bank. The programme includes the modernization of monitoring and forecasting systems, the preparation of flood maps and the development of local mitigation plans. Some of the lessons learned in carrying out the programme are the importance of non-structural measures and of the action taken at the local scale.

D. *Norwegian experience*

Mr. Dan Lundquist, Glommen's and Laagen's Water Management Association

Norway's mountainous character requires flood management through dam regulation, and therefore emphasizes the importance of dam safety.

A recent study comparing data on precipitation and corresponding flooded areas show that the results are homogeneous throughout Europe and would make it possible to use data from all over Europe to design flood protection systems.

III. RESEARCH ON FLOODS IN THE EU FRAMEWORK PROGRAMMES

Ms. Lea Kauppi, Finnish Environment Institute

The presentation gave an overview of the research activities on floods funded during the fifth EU Framework Programme covering research, technological development and demonstration activities. Overall 17 research projects and accompanying measures focusing on floods have been funded with a total EU contribution of about €17 million. Possibilities for funding flood-related activities under the sixth Framework Programme were also presented, in particular the activities and instruments addressed in the first call for proposals published in December 2002 and closed in April 2003.

IV. PRESENTATION OF THE EUROPEAN NETWORK FOR FLOODS AND DROUGHTS

Mr. Markku Puupponen, Finnish Environment Institute

Mr. Puupponen gave an overview of the project proposal submitted to the sixth Framework Programme following the call for the development of a European (virtual) centre for flood and droughts studies. The proposal was presented by a network of 7 core participants and 22 partner organizations from 12 EU countries. The network programme includes integrating activities, jointly executed research activities, activities to spread excellence and management activities. It aims at strengthening scientific and technological excellence on hydrological floods and droughts, and spreading excellence beyond the boundaries of the partnership.

V. CLIMATE CHANGE SCENARIOS AND THEIR EFFECT ON FLOODS IN SWEDEN

Mr. Phil Graham, Swedish Meteorological and Hydrological Institute

The presentation outlined the difficulties encountered with climate change scenarios for hydrological predictions due to the prediction scale and the model dependence: results obtained on temperature increase and on precipitation trends are different according to the model used for the emissions trends.

VI. INVESTIGATION ON THE EFFECT OF CLIMATE CHANGE ON DAM SAFETY

Mr. Bertel Vehviläinen, Finnish Environment Institute

The presentation focused on the importance of climate change scenarios for decision-making, in particular for dam regulation.

VII. DAM SAFETY ASPECTS IN SWEDEN

Mr. Klas Cederwall, Royal Institute of Technology, Stockholm

The intervention linked safe dam management and effective flood mitigation, highlighting that dam safety and flood management required both structural and non-structural measures. Risk awareness, effective implementation of emergency plans and rescue operations are fundamental features. The role of universities and research centres is of the outmost importance to respond to the need of scientifically based understanding of the complex water resources systems to manage variability under uncertain conditions.

VIII. EU – RESCDAM PROJECT

Mr. Mikko Huokuna, Finnish Environment Institute

The Rescue Actions Based on Dam-Break Flood Analysis (RESCDAM) project was developed with a European Commission contribution, between June 1999 and March 2001. Its main purpose was to develop emergency action planning for dams. A dam break hazard (flood) analysis was necessary for this. A risk assessment analysis was also included in the project work. The pilot project of RESCDAM was the embankment dam of the Kyrkösjärvi reservoir located in Seinäjoki in western Finland. Because dams and especially the consequences of a dam failure are quite similar in different countries, the results and activities of the RESCDAM project should benefit EU and associated countries. The project yielded the following major results:

- The risk analysis methodology has been studied and refined on the basis of literature and Finnish experience and, as an application example, the risk analysis of Kyrkösjärvi dam was conducted;
- The numerical flow models (1- and 2-dimensional) were applied to Kyrkösjärvi dam and the results of the different models compared;
- An emergency/rescue action plan for Kyrkösjärvi dam was drafted;
- Recommendations to update the Finnish Dam Safety Code of Practice (guidelines) concerning emergency and rescue activities were made.

IX. OVERVIEW ON EXTREME ICE FLOODS, SIMULATION TOOLS AND SANDBAGS

Mr. Peter H. Reiter, PR Water Consulting Ltd

The presentation gave an overview of ice floods, including river-ice survey methods, river-ice modelling tools and equipment for remedial measures. The flood management training simulator River Flood and Accident (RIFA), developed by the Norwegian hydropower industry together with water resources management organizations, was presented. Some information on sandbags used for flood protection was also provided.

X. INFORMATION BY GERMANY ON THE PREPARATION FOR THE CONFERENCE IN 2004

Mr. Thomas Stratenwerth, German Federal Ministry for the Environment, Nature Protection and Nuclear Safety

Mr. Stratenwerth briefed the participants on the organization of a conference on sustainable flood management to be held in 2004 under the Convention on the Protection and Use of

Transboundary Watercourses and International Lakes. The conference would build on the Five-Point Programme of the Federal Government adopted following the 2002 floods in Germany and aim at drawing up common internationally coordinated and integrated approaches to flood control and flood defence, at the scale of the catchment area. The conference would also take advantage of the European initiative on flood prevention and its best practice document, and provide a framework for involving other non-EU or accession countries from the UNECE region in order to incorporate their specific experience, needs and approaches.