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## Introduction

The Task Force “Environment-Water” has been established by the EU-Commission in spring 1996 in order to:

- define water-research priorities in strict consultation with the various socioeconomic actors concerned,
- reinforce the coordination between relevant European, national and private research activities,
- stimulate an environment favourable to innovation in this sector.

Four different lines of actions have been defined, corresponding to the principal preoccupations of citizens as well experts:

- combatting pollution
- rational use of water.
- combatting chronic water deficits
- prevention and management of crisis situations.

A wide ranging consultation process took place in which *EurAqua* has been involved. As a result several reports have been set up by *EurAqua* in order to promote the Task Force:

- *EurAqua* - Proposal for the Task Force on Water, February 1996.
- *EurAqua* - Call for Ideas. Input by *EurAqua* for the Task Force on Water, February 1997.

The consultations have been carried out on the basis of the Task Force Preliminary Report of March 1996 which outlined the rationale for the “Environment-Water” Task Force. While *EurAqua* has also been involved as a Mirror Task Force, it has been decided that the 3. Technical Review of *EurAqua* should highlight the designated topics in more detail. However, the topic 4, prevention and management of crisis situations has been selected as a topic for the Technical Review.

Therefore the title of the Technical Review was titled “Management and Prevention of Crisis Situations: Floods, Droughts and Institutional Aspects“. The workshop was organized by IRSA and held up at the National Research Council, Rome, October 23 to 25, 1996.



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## Technical Review Overview

The 3. Technical Review of *EurAqua*, October 23 to 25, 1996, Rome titled "Management and Prevention of Crisis Situations: Floods, Droughts and Institutional Aspects" was initiated by the presentations of altogether fourteen different country-papers.

Additional, there were three different parts of workshops foreseen within the Technical Review. Each of the workshops were conducted by Chairman and Rapporteurs which have been nominated before:

### Workshop 1: Floods

Chairman: Dr. H. Gerhard, Germany

Rapporteur: F. Portmann, Germany

### Workshop 2: Droughts

Chairman: Jose Antonio Ortiz y Fernández de Urrutia, Spain

Rapporteur: Manuel Menéndez Prieto, Spain

### Workshop 3: Institutional Aspects

Chairman: Bernard Barraque, France

Rapporteur: Bernard Chastan, France

### Workshop 1 "Floods"

Chairman: Dr. H. Gerhard, Hessische Landesanstalt für Umwelt, Germany

Rapporteur: F. Portmann/BfG, Germany

The workshop showed that different aspects of floods were emphasized by the participants, determined also by their country's individual geographical characteristics.

The German Länder Working Group on Water (Länderarbeitsgemeinschaft Wasser, LAWA)'s Guidelines for Forward-looking Flood Protection stated ten points to be followed in practical flood-related management, adopted with minor formal changes also by the International Commission for the Protection of the River Rhine:

Hold back water, technical flood protection, maintain protective structures, recognise the limits, reduce the damage potential, make people aware of flood risks, warn against floods, enhance individual preventive measures, promote solidarity, act in an integral fashion.

Although these points being a good concept for practical targets, the *EurAqua* aims of

- promoting transfer of knowledge
- encouraging and facilitating scientific collaboration to identify and analyse opportunities for research and development
- making relevant expert advice readily available for use within the European Union

are met better by the **definition of important scientific issues with respect to floods** and by targeting **knowledge and expert advice transfer**.

These two general issues were subsequently the focus of the workshop discussion.

The scientific issues range from the question of separation of problems related with flood in large catchments vs. floods in small catchments, i.e. scale issues, over the respective priorities in management to those related with post-mortem flood disaster analysis, data needs, information presentation and dissemination, long-term water resources management, climate change, transboundary water bodies, and juridical aspects like the implementation and consequences of water related acts and ordinances, e.g. for land-use planning. The European Commission considered e.g. the application of remote sensing data being an open research issue.

The transfer of knowledge to action currently suffers from difficulties. The individual **research needs** were specified as follows, structured within a cyclic activity schema concerning once-a-time disasters such as floods (see figure 1), beginning with the time of the disaster event, ordered by their sequence of importance within each unit:

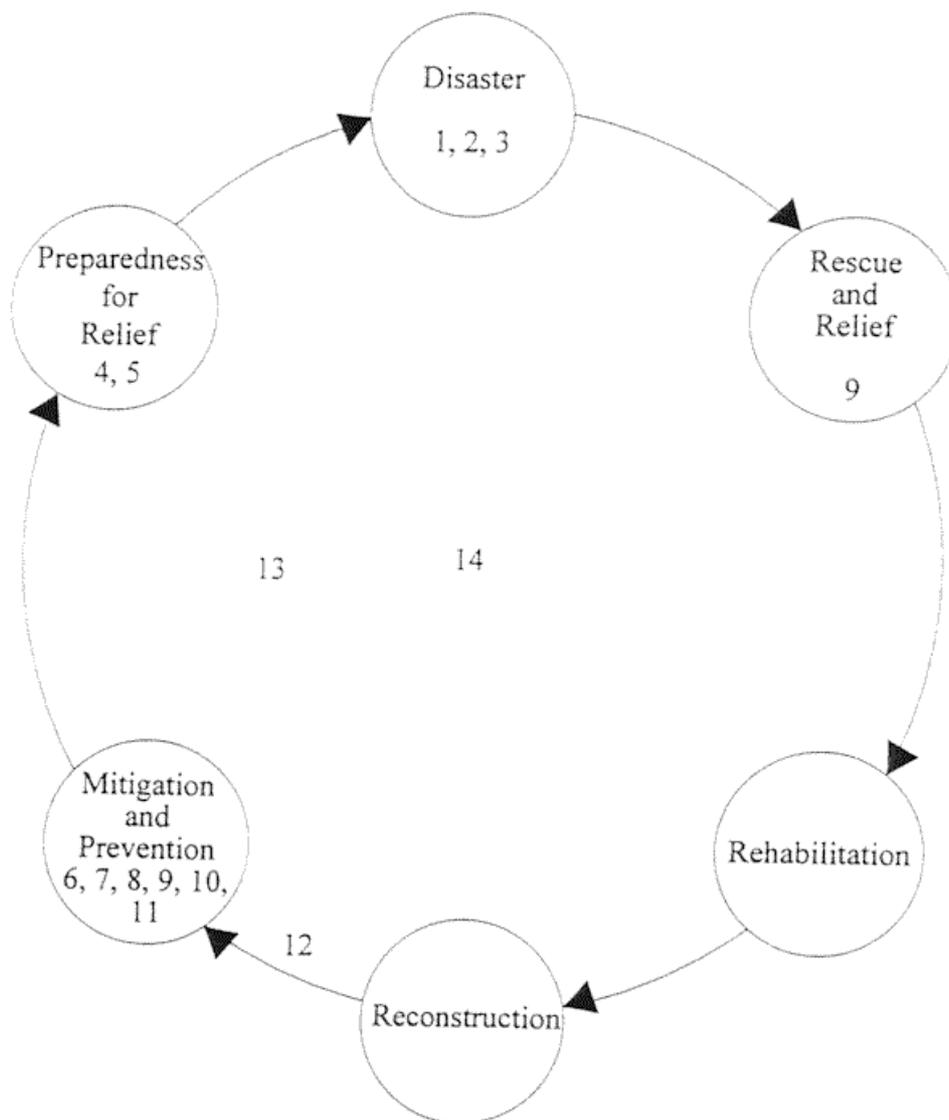


Fig 1 Research issues associated with the cycle of disaster



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**Disaster:**

- 1 Improvement of flood warning in real time considering
  - monitoring of pre-flood conditions (soil moisture, frost, snow)
  - weather radar
  - other remote sensing techniques
  - network or model improvements
  - insecurity of forecasts
  - flood warning decision making process
- 2 Emergency management scheme
- 3 Flash floods and capacity of solid material transport: This point was of special relevance for Spain and Greece.

**Preparedness for Relief:**

- 4 Delineation of flooding areas and ecological impacts of structural measures:  
The focus of this point is on environmental land-use planning and its impacts.
- 5 Insurance ethics, private responsibility:  
How do we cope with losses, who is responsible to pay for them ?  
How can individual self-provision be enhanced in contrast to the sometimes experienced insufficient care of individual persons for damage risk or danger, relying themselves on assistance by the public or insurance neglecting own contributions to reducing the damage potential.

**Mitigation and Prevention:**

- 6 Links of hydrological and hydrodynamic models with socio-economic models
- 7 Analysis of the need of technical structures vs. non structural measures.  
The implementation of coupled real-time flood forecasting and continuous flow simulation management tools can deliver valuable information on e.g. performance of technical structures and the required management, design needs at confluences, results of multiple scenarios (cf. [4]).
- 8 Sustainable development and human influence on flood regimes
- 9 Financial aspects / taxation:  
Financial subsidiary should be available for the mitigation of the effects of the losses for individuals and companies strongly affected by floods.  
With taxation and billing targeted developments may be enforced.
- 10 More physically based modelling
- 11 Estuarine modelling

**Rescue and relief:**

- 12 Financial aspects / taxation

**Disaster / Preparedness:**

- 13 Implementation of measures

**General / Prevention / Preparedness:**

- 14 Limitations of floods protection  
Technical flood protection does not guarantee absolute safety. A flood risk beyond the limit of the design flood remains.

**General:**

- 15 Gaps in flood management and implementation of measures and knowledge

**Outside Disaster Cycle:**

- 16 Climate change



The overall assessment of importancy resulted in five topics of key interest, ordered by elements of the disaster cycle:

- Improvement of flood warning in real time (disaster)
- Delineation of flooding areas and ecological impacts of structural measures (preparedness)
- Links of hydrological and hydrodynamic models with socio-economic models (prevention)
- Gaps in flood management and implementation of measures and knowledge (general)
- Climate change (outside cycle).

Regarding knowledge and expert advice transfer, the following individual notes were made:

- The EU Environmental Ministers' Conference, with consent of Switzerland, decided in February 1995 to install an Action Plan "Floods" for the River Rhine catchment within the ICPR. Preliminary results were published in late 1995. The Working Unit on "Announcement Services/Flood Forecasting" nearly completed its work by October 1996.
- The European Union has installed the RIBAMOB (RIVER BASIN MODelling) Concerted Action focussing on concerted research of modelling issues of big basins. The first expert meeting has taken place in October 1996 and the first workshop on river basin modelling, management and flood mitigation is scheduled for 13-15th of February 1997.
- The exploitation of research results should include the classification of short-term and long-term research issues. This was not yet done in the *EurAqua* workshop session.
- Recommendations to several actors were made by the LAWA in 1995 for politicians, authorities, urban and local authorities, industries and business, agriculture and forestry, citizens, science and technology, the media, and the whole society.

## **Workshop 2 "Droughts"**

Chairman: Jose Antonio Ortiz y Fernández de Urrutia, Spain  
Rapporteur: Manuel Menéndez Prieto/Cedex, Spain

The different contributions that were made during the session, brought to light the complexity that is inherent to the drought phenomenon. Amongst other aspects, and unlike floods, it is difficult to evaluate or quantify a drought and, in fact, droughts of the past have been identified with different starting and finishing dates, depending on the criteria used in analysing them. In some cases, aspersions have even been cast upon whether or not they have actually occurred. It would thus be advisable to bear the following in mind:

- Clear and consistent criteria for drought identification ought to be established, which would, among other things, allow for a differentiation of concepts that are often confused: drought, desertification, water shortage, scarcity.



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- In most cases, droughts are identified as such too late, and emergency measures are taken which will no longer be effective. The approach to a definition of the phenomenon must therefore aim to identify droughts as and when they are taking place, rather than trying to characterise past manifestations.

The state of the art as regards climatic and hydrological modelling, does not permit the exact prediction of a drought situation. It would be advisable to:

- Make a greater in-depth prediction of droughts, relating them to other physical phenomena, for example, linking them to the changing water temperatures of the oceans, as is the case with "El Niño".
- Consider the possible effects of a climatic change by generating different scenarios which take into account a potential reduction in rainfall. Such scenarios would have to be borne in mind in water resource planning.

Drought prevention is closely linked to water resource planning. It is essential to take the following into account:

- Integrated studies must be undertaken using climatic, hydrological and economic models, a series of alternatives to cost-benefit type analyses being used to determine choice.
- The aspects which are related to quantity and those pertaining to quality must be regarded as inseparable.
- It should be borne in mind that the hydrological cycle is not limited by political boundaries, so river basins which are divided by such frontiers have to be jointly managed.
- Water must be regarded as a finite resource, its price must be real and, for example, in agriculture, crops must adapt to the existing soil, and not the other way around.
- When planning, greater examination must take place relative to the evaluation techniques for certain magnitudes that have to be estimated, given that currently, some of these, e.g. water-use efficiency and aquifer recharge values, are often badly quantified.

Although it is difficult to clearly establish a distinction between emergency and pre-emergency situations, where droughts are concerned, it would be well worthwhile taking the following into account:



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- A suitable response to a drought, largely depends upon adequate management of the water resource system. At present, hardly any “technical guidance for reservoir-management” exists.
  - An adequate study of “short-term decision-making”, is required, and this should include an analysis of the “insurance and other non-structural measures vs. increasing water quantity” type.
  - Human response in the face of drought, should also be taken into consideration. Information must be improved and campaigns undertaken and, where appropriate, saving should be encouraged.

### **Workshop 3 “Institutional Aspects”**

Chairman: Bernard Barraque, Laboratoire Techniques, Territoires et Societes, France

Rapporteur: Bernard Chastan/Cemagref, France

The management of water resources and associated risks cannot ignore the framework of regulations and incentives applied to them. Neither can this management be carried out without any regard to the social and economic status of water, which can be considered as a private, a public or a common good, according to the countries and the situations.

In this context, *EurAqua* network might clarify in what extend its members should deal with institutional aspects, could define priorities or produce some recommendations for future water-related research in this field.

If so, important topics to be considered are :

- insurance mechanisms : comparative approach
- compensation of easements and/or land use regulations : comparative approach.