Executive Summary

International Survey of Flood Intervention Plan (FIP) Activities for Flood Mitigation and Assessment

October 2006
Bucharest, Romania

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International Survey of Flood Intervention Plan (FIP) Activities for Flood Mitigation and Assessment

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1. INTRODUCTION

Between 1998 and 2002, Europe suffered over 100 major damaging floods, including the catastrophic floods along the Danube and Elbe rivers in 2002. Since 1998, floods have caused some 700 fatalities, the displacement of about half a million people and at least € 25 billion in insured economic losses.

The assets at risk of flooding can be enormous. For example, more than 10 million people live in the areas at risk of extreme floods along the Rhine, and the potential damage from floods amounts to € 165 billion. Coastal areas are also at risk of flooding. The total value of economic assets located within 500 meters of the European coastline, including beaches, agricultural land and industrial facilities, is currently estimated at € 500 to 1,000 billion.

In addition to economic and social damage, floods may have severe environmental consequences as for example when waste water treatment plants are inundated or when factories holding large quantities of toxic chemicals are also affected. Floods may also destroy wetland areas and reduce biodiversity.

Floods are natural phenomena which cannot be prevented. However, human activity is contributing to an increase in the likelihood and adverse impacts of extreme flood events.

Many Member States are already taking flood protection measures but concerted and coordinated action at the level of the European Union would bring a considerable added value and improve the overall level of flood protection. Given the potential risk to human life, economic assets and the environment, we cannot afford to do nothing; Europe's commitment to sustainable development could be severely compromised if we do not take appropriate measures.

2. DEALING WITH FLOODS

2.1. Diagnosis of the Problem

River floods may occur whenever the capacity of the natural or man made drainage system is unable to cope with the volume of water generated by rainfall or when flood defenses fail. Experience has shown that local flood protection measures taken in one place will have a knock-on effect for upstream/downstream areas. For example, if one area implements engineering solutions to evacuate the water from its stretch of the river as quickly as possible, this simply means that the water arrives faster to their downstream neighbors. Therefore it is imperative that flood protection is dealt with in a concerted and coordinated manner along the whole length of the river.

River floods vary considerably in size and duration. In the case of large rivers such as the Danube, the Rhine and the Elbe, floods can occur a considerable time after the rainfall and last for days, weeks, or even months. On the other hand, flash floods are usually due to highly localized, very intensive rainfall. Flash floods can cause widespread destruction, especially if they occur at the same time as other natural events such as landslides/mudslides. Flash floods are fairly common in the Mediterranean and in mountain areas; they are a particular danger to people since they happen suddenly and with little warning.

Flooding of coastal areas can result from storms at sea with winds pushing high tides onto the land. In many areas, susceptibility to floods has increased due to coastal erosion. If marine storms coincide with high waters in river estuaries then there is the potential for extensive damage.

The root causes of floods (rainfall and sea levels) are natural phenomena and essentially uncontrollable. However, whether or not a given rainfall event, storm or high tide, results in flood damage is very much influenced by human actions such as: clearing of forests in the upper catchment area, straightening of rivers and suppression of natural flood plains, inadequate drainage practices and most importantly, extensive building in high risk, flood areas.

Two trends point to an increase of flood risk in Europe. Firstly, the magnitude and frequency of floods are likely to increase in the future as a result of climate change [3] (higher intensity of rainfall as well as rising sea levels). Secondly, there has been a marked increase in the number of people and economic assets located in flood risk zones.

There is also a growing awareness of the significance of river flooding on human health, both physical and psychological. Substantial health implications can occur for example when floodwaters carry pollutants, or are mixed with contaminated water from drains and agricultural land. There will be mental health consequences as well: in addition to the considerable stress of extensive damage, the threat of repeated floods, sometimes coupled with possible withdrawal of insurance cover can make properties impossible to sell.

The risk of floods will continue to be present in the European Union and may increase considerably during the coming decades. The challenge is to anticipate these changes now and to protect society and the environment from the negative effects of floods.

2.2. Managing the Risk of Floods

Flood risk management aims to reduce the likelihood and/or the impact of floods. Experience has shown that the most effective approach is through the development of flood risk management programmes incorporating the following elements:

– **Prevention:** preventing damage caused by floods by avoiding construction of houses and industries in present and future flood-prone areas; by adapting future developments to the risk of flooding; and by promoting appropriate land-use, agricultural and forestry practices;

– **Protection:** taking measures, both structural and non-structural, to reduce the likelihood of floods and/or the impact of floods in a specific location;

– **Preparedness**: informing the population about flood risks and what to do in the event of a flood;

– **Emergency response**: developing emergency response plans in the case of a flood;

– **Recovery and lessons learned**: returning to normal conditions as soon as possible and mitigating both the social and economic impacts on the affected population.

3. WHAT IS ALREADY BEING DONE, FUTURE INITIATIVES AND PERSPECTIVES

3.1. At European Level

3.1.1. European Research Policy

The European Commission has been supporting research on floods since the early 1980's through its successive Framework Programmes (FP) for research and technological development. European research has been successful in improving our understanding of floods and their consequences as well as our capacity to estimate the likelihood and extent of floods in given areas.

Research results have also highlighted the limits to technical methods of flood prevention and the need for providing opportunities for restoration and protection of highly valuable ecosystems.

Appropriate methods and tools for forecasting and managing floods and their associated risks have also been developed. Some of these tools and techniques are already being used in catchments throughout Europe. The new € 10 million Research Project FLOOD site has just been launched and contributes to the improvement of integrated flood risk analysis and management methodologies.

Flood forecasting, flood risk mapping and scenario modeling are important components of the envisaged contribution of the Joint Research Centre in the field of floods. Future research will be adapted to climate change impact analysis, mitigation and adaptation strategies.

There is a clear need to continue research activities directed towards flood protection. Instead of considering flood management in river basins in isolation, it is necessary to see flood protection as part of an integrated and comprehensive approach to river basin management.

Future environmental research [7] will *inter alia* address issues such as quantifying and forecasting environmental changes (e.g. on climate), assessing the full range of their impacts and supporting the assessment, prevention and mitigation of natural and industrial risks. In this context, flood protection will clearly have a high priority.

3.1.2. Regional Policy and Floods

The Structural Funds, in particular the European Regional Development Fund and the Cohesion Fund can fund preventive (infrastructure) investments including for flood protection. The European Regional Development Fund can also contribute to financing infrastructure related research and technological development.

The INTERREG initiative under the European Regional Development Fund, has supported improved cross-border cooperation on flood protection. The IRMA project ('INTERREG Rhine-Meuse Activities') is a successful example of cross-border cooperation and an integrated approach to combating floods. The devastation caused by the floods of the Rhine and Meuse rivers in 1993 and 1995 prompted the establishment of a trans-national prevention programme between the Netherlands, Belgium, France, Luxembourg, Germany and

Switzerland. IRMA has a total budget of € 419 million, a third of which comes from INTERREG.

The SCALDIT project, another INTERREG initiative, was launched in 2003 and concerns the Scheldt/Escaut river basin. It involves France, the Netherlands and the Belgian regions and tackles the issues of river basin planning and flood protection.

In its recently published Third report on economic and social cohesion, the Commission proposes that actions supported by cohesion policy should focus on investment in a limited number of priority themes, reflecting the Lisbon and Gothenburg agendas, where Community intervention can be expected to bring about a leverage effect and significant added value. The theme of "environment and risk prevention" is one of the core issues identified for future cohesion policy action. The future objective "European territorial cooperation" will preserve and strengthen required trans-national cooperation activities and build on achievements of INTERREG in this field.

3.1.3. European Union Solidarity Fund

Following the 2002 flood events in central Europe, the EU created the European Union Solidarity Fund [10] (EUSF) as a specific financial instrument to grant rapid financial assistance in the event of a major disaster (defined as direct damage in excess of € 3 billion or 0.6% of Gross National Income) to help the affected areas return to living conditions that are as normal as possible.

The EUSF may only intervene for emergency operations. It was not set up with the aim of meeting all the costs linked to natural disasters and the EUSF does not compensate for private losses or damage covered by insurance. Long-term action – reconstruction, economic redevelopment, prevention – can qualify for aid under other instruments, most notably the Structural Funds.

3.1.4. Agricultural Policy and Floods

The way agricultural and forestry areas are used, is important for flood prevention and protection; it is decisive for the capacity of soil and plants to retain water. The CAP-reform of 2003 will contribute positively to flood protection through the mechanisms of de-coupling and cross compliance; for example by promoting soil protection and the maintenance of permanent pastures and thereby improving the capacity of soils for water retention.

The reformed Common Agricultural Policy can also contribute to reducing the likelihood of floods by addressing Climate Change. Measures which involve e.g. the promotion of biomass for growing energy crops, or the reduction of GHG-emissions by promoting less intensive stocking rates, will have direct benefits for flood protection.

In the reform of the CAP, an additional € 1.2 billion is estimated to be made available for Rural Development in 2007. Besides improving the use of agricultural and forestry areas, these measures can also contribute to mitigating floods by giving aid for restoring agricultural and forestry production damaged by natural disasters (including floods) and introducing appropriate prevention instruments.

3.1.5. Environmental Policy and Floods

By adopting the Water Framework Directive (WFD) the EU has thoroughly restructured its water protection policy. The directive requires that integrated management plans be developed for each river basin in order to achieve good ecological and chemical status. Whilst the WFD will contribute to mitigating the effects of floods, this is not one of the principal objectives of the directive.

In order to promote the coherent implementation of the WFD across the EU, the Water Directors from the 25 Member States [11] and the European Commission meet regularly to work on a common implementation strategy. In response to the flood events of summer/autumn 2002, the water directors and the Commission started an action on flood protection which gave rise to a manual of best practice which was agreed in June 2003. The group of water directors has expressed its interest in continuing to work on the flood protection issue.

To improve the preparedness of the national civil protection authorities in relation to disasters, the Commission has developed a series of monitoring instruments, which provide for forecasting and monitoring floods at pan-European level. In the case of a possible flood event, the results will be delivered to the competent national authorities and civil protection services, as well as to the Commission's Monitoring and Information Centre [12,13]. This centre coordinates mutual assistance interventions whenever such help is requested. In addition the Commission organizes training courses for national intervention teams and major exercises.

The Commission will continue to promote concerted approaches to the reduction of risks associated with catastrophes such as floods, fires and major industrial accidents. One of the tools which will be common to dealing with all such challenges is risk mapping. Risk maps provide essential information to the public but are also important tools for planning authorities and the insurance industry. The development of risk maps will be closely linked to related EU initiatives for the collection, storage and exchange of environmental data.

3.2. Activities by Member States

The character of floods and the degree of flood risks vary throughout Europe. In some Member States such as Hungary, Austria, Czech Republic and Slovakia flooding is exclusively from rivers. Other Member States such as the United Kingdom, Germany and the Netherlands face both river and coastal flooding.

To deal with flood risks, several Member States e.g. Austria, Finland, Spain, Ireland and the Netherlands have defined levels of protection against floods in official guidelines or legal texts.

In general, the levels of protection are based on the number of people and the economic and cultural values in flood risk areas. In other Member States, the authorities responsible for flood protection have extensive powers to undertake the works necessary for flood management. However, there are no statutory rights to a particular level of protection.

Recent flood events have encouraged Member States to develop plans or strategies for flood protection. In the United Kingdom, plans are being developed in order to encourage a holistic and sustainable approach to flood risk management. Funding in the UK to support construction and maintenance of defenses and improvements in flood warning systems is currently in the region of £ 500 million per annum: the development of Catchment Flood

Management Plans in the UK is estimated to cost about € 45-55 million. Hungary recently launched a sustainable flood management and regional development programme for the Tisza Valley.

In addition, many Member States have developed, or are developing, flood risk maps. The objectives and structure/character of these maps vary, but in general they are used to raise awareness of the areas at risk and for spatial planning. In France, through an amendment of the law in 1995, the Zoning Risk Exposure Maps have been improved by establishing 'preventive plans for foreseeable risk'.

The examples given above are not exhaustive but serve to illustrate the variety of initiatives currently being undertaken at the national level.

3.3. International Co-operation in Transboundary Rivers

In the past, flood protection was addressed largely at a local level, without upstream-downstream co-ordination, frequently just shifting the problem from one area to another.

However, in river basins such as the Rhine, Oder, Meuse, Danube, Saar, Moselle and Elbe, the countries bordering these rivers have established bodies to ensure a coordinated approach to river basin management. In many of these river basins flood protection plans have been developed, or are being developed.

In the context of the Rhine Action Plan on Flood Defense, it is estimated that the total investment in flood protection measures during the period 1998 to 2020 will reach € 12.3 billion. In addition, to draw the attention of the inhabitants of the Rhine valley to the risk of flooding, a Rhine atlas has been developed. The atlas includes maps which represent the danger of flooding (basic maps) and visualize the flood danger for man and material assets in cases of extreme floods. The costs for developing the atlas amounted to around € 270,000.

4. A CONCERTED EU ACTION PROGRAMME FOR FLOOD PROTECTION

4.1. EU Action Program

Flood events have the potential to undermine the EU's drive towards sustainable development. Moreover, the frequency and severity of severe flood events is likely to increase significantly in the future due to global warming. The problem can only be tackled comprehensively through concerted action in each affected river basin and coastal area. The transboundary nature of many of Europe's most important river basins, means that co-operation at EU level can bring important added value to the efforts of individual Member States.
It is therefore proposed that the Member States and the Commission work together to develop and implement a coordinated flood prevention, protection and mitigation action programme.

The essential features of this action programme would include:
a) improving co-operation and coordination through the development and implementation of flood risk management plans for each river basin and coastal zone where human health, the environment, economic activities or the quality of life can be negatively affected by floods;

b) developing and implementing flood risk maps as a tool for planning and communication;
c) improving information exchange, sharing of experiences and the coordinated development and promotion of best practices;
d) developing stronger linkages between the research community and the authorities responsible for water management and flood protection;
e) improving co-ordination between the relevant Community policies;
f) increasing awareness of flood risks through wider stakeholder participation and more effective communication.

4.2. How the Member States, the Commission and Other Stakeholders Can Work Together

To develop and implement such an action programme would require actions at different levels:

Member States working through the relevant river basin, national, regional and local authorities, will be responsible for the flood risk management plans and the development of the flood risk maps. The essential features of these plans and maps are set out in the Annex.

The **Commission** will facilitate co-ordination and information exchange on flood protection and the promotion of best practice. The Commission will also ensure that all relevant EU policies contribute, where appropriate, to flood protection. Under the Framework Programmes for Research, Technological Development and Demonstration, the Commission will carry out direct and indirect research on flood related issues.

The **Member States** and the **Commission** together, will, in the context of the regular meetings of the water directors and the representatives of the Commission, be responsible for the overall co-ordination of the action programme.

Other stakeholders will be fully involved in the development and implementation of the flood risk management plans and any technical discussion organized by the Commission.

4.3. The Costs and the Expected Benefits of Concerted EU Action

It is difficult to quantify in monetary terms the added value/additional benefits of the concerted actions proposed in this Communication. In qualitative terms the added value of EU action will include:

a) more cost-effective and sustainable flood risk management measures through better co-ordination of actions across the EU;
b) a comprehensive approach to reducing the risks to Europe's sustainable development associated with flood damage;
c) improved levels of protection resulting from sharing of experiences and information and the joint development of best practice;
d) a better focusing of research actions and a stronger interface between the research community and policy makers;
e) a coherent approach towards the development of flood risk management plans and their linkages to EU funding programmes;
f) a greater awareness and involvement of the public in flood protection issues.

5. US EXPERIENCE IN FLOOD INTERVENTION PLAN PREPARATION

One goal of the Federal Emergency Management Agency (FEMA) is to develop, in partnership with State and local governments, a national emergency management system that is comprehensive, ris**k**-based, and all-hazard in approach.

Crucial to this system are **emergency operations plans (EOP)**, which include the chapter for flood intervention and which describe who will do what, as well as when, with what resources, and by what authority--before, during, and immediately after an emergency.

This State and Local Guide (SLG) provides emergency managers and other emergency services personnel with information on FEMA's concept for developing risk-based, all-hazard emergency operations plans.

These Guides (national and local) clarifies the preparedness, response, and short-term recovery planning elements that warrant inclusion in State and local EOPs. It offers FEMA's best judgment and recommendations on how to deal with the entire planning process-from forming a planning team to writing the plan. It also encourages emergency managers to address all of the hazards that threaten their jurisdiction in a single EOP instead of relying on stand-alone plans.

This Guide should help State and local emergency management organizations produce EOPs that:

- serve as the basis for effective response to any hazard that threatens the jurisdiction;
- facilitate integration of mitigation into response and recovery activities; and
- facilitate coordination with the Federal Government during catastrophic disaster situations that necessitate implementation of the Federal Response Plan (FRP).

EOP Guide is meant to aid State and local emergency managers (also called "emergency management coordinators") in their efforts to develop and maintain a viable all-hazard emergency operations plan. **The Guide is a "toolbox" of ideas and advice, not a sample EOP.** Each community's EOP must reflect what *that community* will do to protect itself from *its* hazards with the resources *it* has or can obtain. This Guide is intended primarily for use by personnel responsible for EOP development and maintenance in State and local emergency management agencies. It is strictly a guide. **It establishes no requirements, and its recommendations may be used, adapted, or disregarded.**

For the Federal Government, Congress defines a role that includes providing "necessary direction, coordination, and guidance" (Sec. 601) for the Nation's emergency management system, to include "technical assistance to the States in developing comprehensive plans and programs for preparation against disasters".

In parallel with this federal regulation, there are hazard-specific planning guidance issued by the Radiological Emergency Preparedness (REP) Program of FEMA and the Nuclear

Regulatory Commission (NRC), the Chemical Stockpile Emergency Preparedness Program (CSEPP), or the National Response Team (NRT) for flooding.

In July 1995, FEMA convened a group of local, State, and Regional planners to offer suggestions on making all-hazard EOP guidance more useful given "conditions in the field."

The new Guide reflects many of their ideas. In fact, FEMA's planning guidance had to reflect three basic changes:
(1) Congress eliminated emphasis on the nuclear attack hazard and restated Federal Civil Defense Act authorities in the Stafford Act;
(2) FEMA and the Federal Government have acquired a broader role in disaster response; and
(3) emergency management planning in the States and many localities has matured beyond the sample plans FEMA provided in earlier planning guidance. Also, FEMA has taken a new approach to dealing with the States: Performance Partnership Agreements (PPA). With

Performance Partnership Agreements, FEMA trades increased flexibility "up front" for increased attention to results.

In USA system of emergency management, local government must act first to attend to the public's emergency needs. Depending on the nature and size of the emergency, State and Federal assistance may be provided to the local jurisdiction. The local EOP focuses on the measures that are essential for protecting the public. These include warning, emergency public information, evacuation, and shelter.

Mitigation actions involve lasting, often permanent, reduction of exposure to, probability of, or potential loss from hazard events. They tend to focus on where and how to build. Examples include: zoning and building code requirements for rebuilding in high-hazard areas; floodplain buyouts; and analyses of floodplain and other hazard-related data to determine where it is safe to build in normal times, to open shelters in emergencies, or to locate temporary housing in the aftermath of a disaster. Mitigation also can involve educating businesses and the public on simple measures they can take to reduce loss and injury.

Cost-effective mitigation measures are the key to reducing disaster losses in the long term. In hazard-prone areas, mitigation can break the cycle of having to rebuild and rebuild again with every recurrence of floods, hurricanes, or earthquakes. Where there is a willingness to mitigate, opportunities can be found. Ongoing efforts might include: educating the private sector about what it can do to mitigate at home and at work; reaching out to planning, zoning, and development agencies to ensure that hazard conditions are considered in comprehensive plans, construction permits, building codes, design approvals, etc.

Preparedness involves establishing authorities and responsibilities for emergency actions and garnering the resources to support them: a jurisdiction must assign or recruit staff for emergency management duties and designate or procure facilities, equipment, and other resources for carrying out assigned duties. This investment in emergency management requires upkeep: the staff must receive training and the facilities and equipment must be maintained in working order.

To ensure that the jurisdiction's investment in emergency management personnel and resources can be relied upon when needed, there must be a program of tests, drills, and exercises. Consideration also must be given to reducing or eliminating the vulnerability of the jurisdiction's emergency response organizations and resources to the hazards that threaten the jurisdiction.

Accordingly, preparedness measures should not be improvised or handled on an *ad hoc* basis.

A key element of preparedness is the development of plans that link the many aspects of a jurisdiction's commitment to emergency management.

Response actions include notifying emergency management personnel of the crisis, warning and evacuating or sheltering the population if possible, keeping the population informed, rescuing individuals and providing medical treatment, maintaining the rule of law, assessing damage, addressing mitigation issues that arise from response activities, and even requesting help from outside the jurisdiction.

Recovery is the effort to restore infrastructure and the social and economic life of a community to normal, but it should incorporate mitigation as a goal. For the short term, recovery may mean bringing necessary lifeline systems (e.g., power, communication, water and sewage, and transportation) up to an acceptable standard while providing for basic human needs (e.g., food, clothing, and shelter) and ensuring that the societal needs of individuals and the community are met (e.g., maintain the rule of law, provide crisis counseling, demonstrate that people do care and that help is becoming available). Once some stability is achieved, the jurisdiction can begin recovery efforts for the long term, restoring economic activity and rebuilding community facilities and family housing with attention to long-term mitigation needs.

6. CONCLUSION

The ability to mitigate and respond to the effects of any hazard is largely determined by the social structures and processes in place when a community is impacted. Equally important as its physical infrastructure is the strength of its institutions and organizations, including the viability of local government, businesses, churches, schools, social organizations, and families, as well as the social processes in place to promote coordination, cooperation and effective decision-making. Keeping these organizations informed is the key to any successful mitigation effort.

The local response to the floods has to be strong, well organized, and coordinated. That coordination was created in the process of linking all of the different emergency response units in the context of the LMS. The prioritization tool reduced conflicts, and allowed communities to communicate their needs and interests. Increased communication meant a more coordinated response when the floods occurred. With the prepared response in place, mitigation proponents are able to use the floods as an opportunity to push for the immediate implementation of mitigation initiatives and projects.

For the European Union area, to increase the emergency reaction capacity in case of floods, the European Commission invites the Member States to develop the following actions in the near future:

a) support the assessment made by the Commission concerning the importance of flood protection;
b) take note of the actions ongoing, or planned, at EU, national, regional and international level;
c) support the need for a concerted EU action on flood prevention, protection and mitigation;
d) endorse the essential features of the concerted EU action as presented by the Commission and to agree on the steps which should be taken to develop and implement such a concerted action.

Taking into account the inventory we made for different emergency planning, we identified the following strategies as key to any success:

- Be persistent; never give up. Keep stepping over obstacles; just because you are turned down once doesn't mean that you won’t be successful a second time or under different conditions.
- Plan and execute for the long term to achieve lasting results of benefit to the community.
- Think as broadly as possible with regard to potential partnerships; look at individuals as well as community-based and faith-based groups.
- Enable others to feel a sense of ownership in the project of the emergency plan.
- **Visibility is important. Once people become aware of a success of any rescue action, they are more willing to help in that plan.**

ANNEX

Guidelines for the Development and Implementation of Flood Risk Management Plans and Flood Risk Maps

A. PRINCIPLES

1. The flood risk management plans should be developed on the basis of the following general principles:

a) Transboundary rivers: Member States should agree to co-operate in the development and implementation of these plans. For river basins shared with non-EU countries existing co-ordination mechanisms will be used or new ones will be developed,

b) Flood risk management plans: for rivers, to be fully integrated with the river basin management plans and programmes of measures developed in accordance with the Water Framework Directive. Coastal flood risk management plans should be developed within the same time frame,

c) Long term strategic approach: developments need to be included which are expected in the long term (50 – 100 years),

d) Interdisciplinary approach: all relevant aspects of water management, physical planning, land use, agriculture, transport and urban development, nature conservation need to be considered at all levels (national, regional and local),

e) Solidarity principle: flood protection measures should not compromise the ability of other, upstream or downstream regions/Member States to achieve the level of protection the regions/Member States themselves consider to be appropriate. The appropriate strategy consists of a three-step approach: retaining, storing and draining,

f) All elements of flood risk management need to be covered: see section 2.2.

B. OBJECTIVES

The overall objectives of flood risk management plans will be:
– To reduce the adverse impact of floods and the likelihood of floods,
– To promote sustainable flood risk management measures,
– To look for opportunities to work with natural processes and to deliver –if possible- multiple benefits from flood risk management,
– To inform the public and competent authorities about the flood risk and how to deal with it.

C. KEY OUTPUTS

The key outputs from a flood risk management plan should be:
– Insight into and understanding of the size, the nature and the distribution of current flood risks, and scenarios for future flood risks,
– Understanding of flooding processes and its sensitivity to change,
– List of cost-effective flood risk management measures which will be taken,
– Flood Risk Maps (see section D)

– Long-term flood risk management policies that satisfy the objectives of the river basin,
– A prioritized set of further actions/studies for the river basin if appropriate.

D. FLOOD RISK MAPS

1. One of the key outputs of the flood risk management plans will be flood risk maps at river basin level.

2. The purpose of a flood risk map is to:
– increase public awareness of the areas at risk of flooding,
– provide information of areas at risk by defining flood risk zones to give input to spatial planning,
– support the processes of prioritizing, justifying and targeting investments in order to manage and reduce the risk to people, property and the environment.

3. Flood risk maps should:
– Be developed through co-ordination at river basin level,
– Include both fluvial and flash floods and if appropriate coastal floods,
– Provide reliable, sufficient and easily understandable information,
– As a minimum distinguish three levels of risk:
    a. Areas with frequently occurring flood events,
    b. Areas with less frequently occurring flood events,
    c. Very rare flood events, including where appropriate dyke failures,
        – Address both the water/flood depth and the potential damage,
        – Address both the current situation and scenarios for future flood risks, and
        – Take other objectives in the river basin into account.

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SEPIC Project/ Chemonics Office in Romania

15 Unirii bdv, block 3, entrance 2,
floor 3, apt. 34, sector 5,
code: 040106, Bucharest
Tel: ++4 – 021.335 9580
Fax: ++4 – 021.335 9582

www.chemonics.com