



World Meteorological Organization



Global Water Partnership

**ASSOCIATED PROGRAMME ON FLOOD MANAGEMENT**



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APFM Report No. 9



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## 1. INTRODUCTION

The Associated Programme on Flood Management (APFM), a joint initiative of the World Meteorological Organization (WMO) and the Global Water Partnership (GWP), was established in order to promote the concept of Integrated Flood Management (IFM) and to show the practical steps for putting IFM concept into practices. IFM conceptualizes the integration of land and water resources development activities in a river basin and aims at maximizing the net benefits from flood plains and minimizing loss to life from flooding.

APFM was launched in August 2001 with originally intended period of 4 years and 8 months. The first eight months of the project period was allocated for the Inception phase, followed by the 4-year Implementation phase, which commenced on 1 April 2002. The reports of the APFM have been prepared on annual basis to serve for the members of its governing committees and the two donors. This report is the second report of the implementation phase of APFM, which mainly documents the activities undertaken during the last reporting period - i.e. from 1 April 2003 to 31 March 2004. The final section of the report lists the activities planned for the third year of implementation phase from April 2004 to March 2005.

During the reporting period, various outputs such as concept paper, flood management overview situation paper, manuals on community approach to flood management and flood management strategy paper have been produced. It is noted that these materials are attached as "sub materials" rather than as annexes to this paper, considering the convenience of handling this report.

## 2. ACTIVITIES

### 2.1 Concept paper on 'Integrated Flood Management (IFM)' and other supporting documents

#### *IFM Concept paper*

##### *Objectives*

Floods and Droughts are natural phenomena, each of which constitutes the two extremes of the natural water cycle. IFM is based on the concept that flood management should be looked at within the wider perspective - Integrated Water Resources Management (IWRM).

Within the context of international debate relating to the Integrated Water Resources Management (IWRM), little attention has been given to the flood issues. The perhaps is due to the fact that the concept of IWRM has been developed from the perspective of the need to solve water scarcity problem and the need of more efficient and equitable water resources development and management.

APFM strives to promote the Integrated Flood Management (IFM) which is flood management within the context of IWRM. However, when APFM was launched there was virtually no material available in this context. Therefore the need to develop the IFM concept paper was realized by the Steering Committee (SC).

##### *Compilation process of IFM concept paper*

In the early 2002, the Technical Support Unit (TSU) of the APFM commissioned Dr. Colin Green of the Flood Hazard Research Centre (FHRC), University of Middlesex, U.K., to provide a draft material for the IFM concept paper. The draft he provided was reorganized/modified by the TSU, and then presented and modified to reflect recommendations made at the Second Consultative Meeting held in



November 2002. The new version again was revised to incorporate discussion/comments made during the Session on IFM held during the 3<sup>rd</sup> World Water Forum (WWF3) in Kyoto in March 2003, followed by the review by the SC members of the APFM.

After final modification and editing by TSU, the text of the concept paper was completed in October 2003, which was then translated into French and Spanish. The publication of the IFM concept paper was finally made in December 2003. In March 2004, the Japanese translation was also completed in collaboration with the Japanese donor agency. Through and after the compilation process of this paper, the key messages out of this paper have been propagated by TSU through various channels and occasions. The excerpt of the paper is attached as Annex 1, and the full paper of 4 language versions are attached as Submaterial 1-1 to 1-4.

It is foreseen that the current version of IFM concept paper would necessarily be further modified as APFM will progress and cumulate the knowledge on how to incorporate the missing aspects of IFM, if any.

The targeted groups of this paper are supposed to cover a wide range from policymakers, lawmakers, flood managers to other stakeholders related to flood management, both in developed and developing countries.

### ***2.1.2 Need of supplementary papers of IFM concept paper***

While the IFM Concept Paper being the core to conceptualize the approach of IFM, it was felt necessary to also compile a set of supplementary papers focusing on different aspects of IFM that help to put the key aspects of IFM into practice. The APFM SC meeting held in June 2003 also supported this concept. The plan was developed to cover issues such as social, economic, environmental and legal issues in order to facilitate the implementation of IFM principles into the development planning practice of river basins.

#### ***Legal aspects paper***

During the reporting period the TSU has performed a baseline study of the legal requirements of IFM. The study served as an input to set the scope for an advocacy paper on “legal issues of IFM”, summarized in Annex 2. TSU has also built a network of partners in the field of water land and policy, contributing towards and advising in the compilation process of this advocacy paper, the International Water Law research Institute (IWLRI) at the University of Dundee, Scotland and FAO Legal Office playing the focal roles.

The paper aims at raising the awareness of policy makers about the need for an appropriate legal framework for IFM, thereby providing guidance to legal experts on how to incorporate IFM principles into legal practice. Additionally it intends to motivate and enable flood practitioners, stakeholder groups, including actors of the civil society involved in public opinion building such as NGOs and the media, to engage in dialogue with policy makers about the legal requirements and the best approach to a balanced legal framework for IFM.

It is envisioned that the main contents of this paper will be ready and will be presented at the International Conference on Disaster Reduction (UNICDR), which will be held in Kobe, Japan in January 2005.

#### ***Social aspects (community approach) paper***



During the reporting period, as one of the regional pilot projects, attempt was made in South Asia to collaborate with local community in order to compile a “manual on community approach to flood management”. (This will be introduced under section 2.3.1.)

Taking advantage of this output and incorporating further knowledge from various sources, IFM social aspects paper (focusing on community approach to disaster preparedness) is expected to be compiled by the end of the next reporting period. This paper would focus on how communities and various stakeholders of the communities can better cope with floods in more organized and integrated manner (see the draft-outline as Annex 3).

### ***Economic aspects paper***

Dr. Colin Green was also commissioned to undertake a study on the economic aspects of IFM that was titled ‘Making Better Choices: the Role of Economics in Integrated Flood Management’ was modified by him based on comments made at the Second Consultative Meeting. The summary is shown in Annex 4. This paper was introduced at the SC meeting in June 2003, where Dr QK Ahmad offered to modify it incorporating further knowledge and to the manner that it would be more practical and user-friendly paper. Dr Ahmad is currently revising the paper.

### ***Environmental aspects paper***

Another advocacy paper is planned to highlight and provide guideline on environmental/ecosystem considerations within IFM. A preliminary outline of the paper has been discussed with experts at the case study review meeting in May 2004, which also made recommendations on future studies with a focus on environmental aspects of IFM. The draft outline is shown in Annex 5, which will be further explained under section 4 – future activities. IUCN- the World Conservation Union has been identified as a potential key partner in the compilation process of this advocacy paper.

## **2.2 Compilation of good practices/lessons learned in Integrated Flood Management (IFM)**

### **2.2.1 Objectives**

In order to assess the current status of flood management practices, the APFM has been undertaking the collection of a number of case studies of flood management. The aim is to obtain information on relevant practices from countries in various regions of the world and taking into consideration regional distribution and different socio-economic conditions.

Focusing on the evolution of flood management practices in a given location/environment, the overall goal would be to help in identifying those tools required to implement the concept of IFM and feed these subsequently into the GWP’s Toolbox on IWRM. Therefore, the main objectives in collecting these case studies were to;

- (i) Identify the extent to which flood management has been carried out within the context of IWRM,
- (ii) Understand shortcoming in current flood management practices worldwide,
- (iii) Extract lessons learned/good practices in IFM,
- (iv) Catalogue the policy changes required to support IFM, and
- (v) Identify the institutional changes required to achieve IFM.

### **2.2.2 Collection process of case studies**

For the above purpose TSU identified some institutions and individuals active in flood management in various countries and requested them to compile case studies on integrated flood management, taking into consideration the geographical distribution, etc.



Identified authors were given guidelines to prepare the case study that was developed by TSU. After the receipt of the first draft from the authors, the description was checked by the TSU and as necessary the authors were requested to provide supplementary information on each case study to fully cover the requested items of description.

By February 2004 a total of 19 cases had been compiled to the level that they would be reviewed by the external reviewers. Their geographical coverage according to WMO regions, is shown in the following table.

<b>WMO Regional Association</b>	<b>Number of case studies received</b>	<b>Countries<sup>1</sup></b>
RA-I [Africa]	5	Cameroon[3], Ethiopia[6], Mali[11], Mauritania[12], Zimbabwe[19]
RA-II [Asia]	6	Bangladesh[1], China[5], India[8], Japan[10], Pakistan[13],[14]
RA-III [South America]	1	Brazil[2]
RA-IV [North and Central America]	3	Canada[4], USA[17],[18]
RA-V [South-West Pacific]	1	Fiji[7]
RA-VI [Europe]	3	Italy[9], Turkey[15], UK[16]



### 2.2.3. Review process of case studies

In parallel with the collection of case studies, six external reviewers were identified who are prominent in various field of flood management. All 19 case studies (as Submaterial 2-1) were reviewed by them in the field of: land and water related laws and regulations, institutional arrangements, cross-sectoral integration and conflict mitigation, risk and hazard mapping, flood forecasting wad warning, risk management strategies and environment and ecosystems. The names of case study authors, external reviewers are listed in the Annex 6.

For the convenience of the external reviewers, TSU, assisted by a consultant prepared and provided a draft table illustrating the coverage of IFM (Annex 7),an extended summary and synopsis of each case study (as Submaterial 2-2 and 2-3).

<sup>1</sup> Figures in brackets [ ] refer to the number of the case study



Mainly based on the comments from the external reviewers, a draft Overview Situation paper (OSP) was compiled by TSU,

which covers **Part I: Overall synopsis of the flood management situation and Part II: Level of IFM development and approaches needed for putting IFM into practice**. Below is an explanatory note from the OSP introductory part.

The purpose of **Part I** of this OSP is to provide: (i) an overall synopsis of floods, their nature, type and magnitude of damages caused; (ii) an overview of existing trends and approaches to flood management practices such as management measures, instruments, institutions responsible for flood management, and existing national policies; and (iii) the lessons learnt – in the case study countries – from current flood management practices. This information was extracted and summarized from all available case studies collected.

Based on the results of an review of the case studies undertaken by a number of external specialists, **Part II** contains findings and recommendations on: (i) the identified drawbacks and gaps in existing systems with respect to IFM implementation; (ii) the approaches required or recommended to be followed to adopt the IFM approach as outlined in the APFM Concept Paper; and (iii) issues and concepts identified and proposed to be developed in the future as part of the AFPM to further support the implementation of IFM.

A ‘Case study review workshop’ has been carried out from 4 to 6 May 2004 with the involvement of selected invited reviewers and case study authors (see list of participants and agenda of the meeting in Annex 8). The workshop has delivered a proposal for revision of the draft OSP including many practical suggestions for the further conceptual development and practical implementation of IFM. Furthermore 5-6 case study summaries have been recommended for publication in the GWP ToolBox.

#### **2.2.4 Compilation of the OSP**

Based on discussions/suggestions made in the case study review meeting, TSU has compiled a final draft of the OSP. The table of contents of OSP is attached as Annex 9 and the main text of the OSP is presented as Submaterial 2-4.

It is envisioned that several selected case studies as well as the OSP will be disseminated through the IWWM ToolBox in addition to many other channels. The OSP would also form one of the core materials in understanding the IFM. However, as the further knowledge of IFM accumulates, the OSP need revision.

### **2.3 Development and implementation of regional pilot projects**

#### **2.3.1 Objectives**

The TSU has been collaborating with some WMO and/or GWP regional counterparts in implementing project projects (PPs). The objective of this exercise is to try out various aspects of IFM in the real field.

The amount of fund has unfortunately not been sufficient to support wide-scale implementation of the project – e.g. conducting detail designs, feasibility studies. Therefore it has been agreed that regional PPs supported by TSU fund would rather be providing a seed fund or specified on the upstream of the project cycle such as formulation of strategies, or community/grass-roots activities that could be done with less funding.



### **2.3.2 South Asia: Community approach to flood management**

This PP has been implemented in Bangladesh, India and Nepal. One implementing partner in each country has been identified namely BUP (Bangladesh Unnayan Parishad), IRMED (Institute for Resource Mobilization and Education Development in India), and JVS (Jarslot Vicas Shansya in Nepal) with BUP as a key partner.

The objective of the project is to reduce flood vulnerability in South Asia with a particular emphasis on enhancing people-centred activities and measures towards flood management within the general framework of IWRM on the level of communities and including their interaction with district-level government authorities.

The core of the project is a strong recommendation to formulate a community flood management committees/cells (CFMCs), which would form a basis to integrate activities to be borne by each member of communities.

#### *Activities taken*

This project was kicked-off in November 2002 at the meeting in Dhaka, and altogether seven communities representing different flood management problems and ethnic groups were selected.

after rapid move in each country, intermediate findings of the study teams were presented at the joint session on ‘Integrated Flood Management and People, flood and vulnerability reduction: the case of South Asia’ conducted during the 3<sup>rd</sup> World Water Forum in Kyoto, Japan.

Since the endorsement of the activity plans at the last SC meeting (June 2003), the following activities have been taken by three partners:

- The draft manuals on ‘Community approaches to flood management’ were prepared that could be used as training and reference material for flood vulnerability reduction at the community level.
- Field visit and interaction with people in the pilot communities
- Preparation of a sample constitution for the Flood Management Committee (CFMC) and distribution to the key persons in the communities
- Preparation of the Manual on Community Approaches to Flood Management incorporating the comments of various line agencies and communities.
- Translation of the Manual into local language
- Presentation of the Manual by organizing a discussion programme to the communities
- Presentation of the Manual by organizing a workshop including relevant agencies, NGOs, etc.

The three implementing partners have been successful to produce the manuals on community approach to flood management in each country, through strong interaction with selected community members. The table of contents of the manual (Indian version) is attached as Annex 10 and the three versions of CFMMs are attached in full as Submaterial 3-1, 3-2 and 3-3.

It is now proposed to extend the project for the monsoon season in 2004. Efforts would be made to bring awareness in these participating communities about the integrated flood management and make use of the manual. Efforts would also be made to gather additional knowledge and undertake appropriate activities to strengthen self-help capacity of community for improved integrated flood management. It is envisaged that a working teams consisting of an engineer, sociologists and field staffs will act as facilitators to the affected communities throughout the monsoon season 2004.

### **2.3.3 Africa (Kenya)**



In April 2003, a request was made to TSU from the Ministry of Water Resources Development and Management (MWRMD) in developing flood management strategy in lake Victoria Basin. In this basin as many as 130 people were killed due to severe floods in 2002.

In the last SC meeting it was decided that APFM would support Kenyan government up to compiling the integrated flood management strategies for targeted area.

#### *Activities taken*

The following activities had been taken from the official launch of the project

- Employment of an international consultant and assignment of MWRMD counterpart
- The formation of local steering committee (Dec. 2003)
- A local stakeholder workshop has been organized and was held from 10-12 March 2004 in the town of Kisumu, Kenya. It was attended by 60 different Stakeholders from the Lake Basin region in Kenya. Participants identified major issues to be considered in developing a flood management strategy using IFM concept and discussed actions required for implementing the Strategy. Among other materials, inundation maps prepared by the Dartmouth Flood Observatory, have been used as baseline information, to study the flood problem in the Lake Victoria Basin.
- A policy makers' workshop to obtain an input from the policy perspective representing the various sectors of development in the country was organized in Nairobi on 23rd April 2004. The Minister, the Permanent Secretary and a number of officials attended the workshop from the Ministry of Water Resources Management and Development.
- A "Strategy for Flood Management for Lake Victoria Basin, Kenya" has been submitted to the Kenyan Ministry of Water Resources Management and Development in May 2004.
- A project proposal for the preparation of an integrated flood management strategy for the Kenyan part of the Lake Victoria Basin was submitted to, and subsequently approved by, the Kenyan Ministry of Water Resources.
- Inundation maps, to be used as baseline information, to study the flood problem in the Lake Victoria Basin are under preparation by the Dartmouth Flood Observatory.

The table of contents of strategy paper is attached as Annex 11, and the main text is presented as Submaterial 3-4.

It is expected that this strategy paper would seriously be followed up by the MWRDM to try to put higher status on the paper, so that the strategy would become a common strategy incorporating roles and responsibilities of relevant Ministries and parties. It is expected that some donor agencies would take up relevant activities specified in the strategy paper.

#### **2.3.4 South America**

This plan on implementing this pilot project on "Integrated Flood Management in the river Cuareim/Quarai basin" was discussed and approved by the SC in June 2003. The targeted basin is the sub-basin of La Plata River Basin and is shared between Brazil and Uruguay. The National Directorate of Hydrography (DNH) which is the water authority of Uruguay, and the Institute of Hydraulic Research (IPH) of the federal University of Rio Grande do Sul have been assigned as key partner organizations in both countries.

The objective of this project is to establish a flood management plan in this river basin in order to better manage flooding within a framework of IFM.

At the same time, the project seeks to improve the quality of life of the local population affected by flooding, minimizing material losses, maximizing benefits and taking advantage of the increase in



water available during periods of flooding. Several structural and non-structural measures will be studied, including the design and implementation of a system for predicting floods, the planning and design of an emergency plan, and review of land use and measures that can be effective for management of floods in a water basin shared by Brazil and Uruguay.

#### *Activities taken*

The activities that were finished or have been carried out in this reporting period are:

1. Coordination meetings held in Montevideo in August and December 2003 with participation of the Institute of Fluid Mechanics and Environmental Engineering (IMFIA) of the University of the Republic of Uruguay
2. Local Seminar was held as a launch of the project in August 2003
3. On 13 September 2003 a day on “Clean banks of the river” was organized by the local committee of the Joint Committee of this project, involving a lot of local people. A video in digital format was prepared showing the actions held for the preparation and implementation of the day.
4. Collection of information in relation to topo-bathimetry of the basin and the cities of Artigas and Quarai.
5. Preparation of the project data base
6. Meetings with the National Administration of Primary Schools of Uruguay and preparation of future action plan.
7. Coordination meetings with the Water Resources Department of the Rio Grande do Sul State, for their participation in the present stage of the project and in the follow-up stage
8. Coordination with the Salto Grande Technical Commission (CTM) on a preliminary warning system and emergency management based on the existing hydrometeorological network
9. Meeting DNH-IPH 11-12/2/2004
10. Meeting CTM-DNH-IPH 12/2/2004
11. Video in digital format on floods in the river Cuareim basin

The first progress report of this project is attached as Submaterial 3-5.

#### **2.3.5 Central and Eastern Europe**

The territory of the Central and Eastern Europe (CEE) is almost every year jeopardized by flooding by both large-scaled floods and flash floods. Effects of flash floods, as a short-term event, occurring in a given community vary greatly depending on location, types of watersheds, socio-economic conditions, etc. However there is a great source of knowledge in this region on good practices to be exploited for flood management, from both scientific and practical viewpoints. However, up to now this knowledge has not been properly collected, analyzed and synthesized, especially from IFM viewpoint. It is expected that this study will give a clear picture on the situation regarding the flood management in CEE region with special reference to flash floods. It will promote the institutions and public to be prepared to cope with flooding based on the lessons learned from the previous flash floods.

#### *Activities taken*

The study is titled “Study on historical floods from IFM viewpoint”. Since December 2003, APFM has been collaborating with the 8 CEE countries with the Slovak Hydrometeorological Institute as a key partner. Most of them also have the status of GWP’s focal points in respective countries.

Items under study are as follows,

- a) prior status of the catchment
- b) hydrometeorological aspects of the floods
- c) interaction of the natural resources
- d) flood control measures



- e) warning and rescue behavior
- f) population behavior
- g) flood damages
- h) the flood damages removal
- i) flood protection measures adopted

This study is supposed to be completed by August 2004. The results will serve for providing key inputs in conducting phase 2 of the pilot project currently titled “Forward (Pro-active) integration of flood warning in flashy areas”.

## 2.4 Dissemination of information

APFM has started to produce various outputs. Therefore it is also an important task of TSU to develop mechanisms to disseminate the knowledge to various users who are in need of information on IFM. Having this in mind TSU has undertaken following activities.

### 2.4.1 APFM Newsletters

The newsletters serve to briefly introduce the activities carried out by the project during the preceding 4-month period and to highlight future activities. The newsletter is sent electronically to all contacts on the APFM contact list with access to e-mail facilities. During the reporting period three Newsletters were produced and disseminated as attached as Submaterial 4-1, 4-2 and 4-3.

### 2.4.2 Upgrading of APFM webpage

The upgrading of the APFM webpage is now going on with a view to provide more interactive and user-friendly information to those who need information on IFM. In addition to the expected change in the display styles, etc., several useful functions will be added as follows;

- Newsletter Module: this enables users to quickly and timely obtain APFM Newsletters and relevant information
- Forum Module: this enables TSU to organize a Virtual Conference/Session of IFM
- Content Management System (CMS): this enables TSU and partners to revise the contents of webpage from remote areas

It is expected that the new APFM webpage will be in operation in the middle of 2004.

### 2.4.3 APFM Poster

With the completion of the IFM concept paper, it was decided to prepare a poster with standard panel size, which addresses the key elements included in the IFM concept paper (submaterial 4-4). In December 2004 the poster with portable function has been completed. This poster was first used at the Pan African Partnership Conference on Water held in Addis Ababa.

### 2.4.4 IWRM ToolBox

As explained above APFM is committed to contribute for enriching the flood-related contents/tools accommodated in the ToolBox system. For this purpose TSU had meetings with GWP ToolBox team three times during the reporting period, which were, in Stockholm in August 2003 (APFM and GWP), in Stockholm in November 2003 (organized by GWP with the aim to establish linkages between APs), and in Delft in March 2004 (also organized by GWP for the same purpose).

Through these discussions APFM is now assisted by the GWP to take care of the development of ToolBox contents related to “floods and droughts” button.



In addition TSU has sent the IFM concept paper to GWP for inclusion at an appropriate place in the ToolBox website, which is under process.

#### **2.4.5 Participation in the meetings, conferences**

APFM participated in several conferences/meetings during the reporting period and promoted IFM and APFM activities, as follows.

- Participation in ASFPM(Association of State Floodplain Managers) General Meeting from 11 to 16 May 2003 in St. Louis, Missouri, USA
- Participation in the Pan-African Implementation and Partnership Conference on water, held in Addis Ababa, from 8to 13 December 2003.

#### **2.5 Collaboration with other APs and flood data holders**

TSU participated in a meeting organized by GWP secretariat aiming to deepen collaboration between APs in November 2003 in Stockholm. There APFM held discussions with several other active APs such as CapNet (Capacity Building Network in IWRM) and Gender and Water Alliance. Taking this opportunity, APFM initiated activities to compile a plan to develop IFM training module in collaboration with CapNet (see section 4.5).

In collaboration with the Dartmouth Flood Observatory (DFO), Flood Inundation Map of Kenyan side of Lake Victoria Basin has been prepared, taking the full merit of DFO in compiling the information from NASA satellite imagery. It was completed in February 2004, which was effectively used at the Local Stakeholders's workshop of Kenyan Pilot Project held from 10 to 12 March 2004 in Kisumu, Kenya. The preparation of this map shows one possibility to share the real knowledge on past flood situation, which would highly benefit the agencies/local communities who are in need of such data, and where ground-monitored data are missing.

### **3. PROGRAMME PERFORMANCE**

#### **3.1 Progress of activities**

##### **3.1.1 Compilation of advisory material**

###### *Compilation of concept paper and supplementary papers*

As expected, IFM Concept paper was completed and published during the reporting period. In addition to the expected original English version, French, Spanish and Japanese versions were also made available.

As proposed in the SC meeting in June 2003, the plan to compile four supplementary papers was developed. Regarding the legal paper, by drafting the scope of the paper and submitting it to the network of partners, the advocacy paper on “Legal Issues of IFM” has clarified the further role of the activity. A timeline has been proposed, targeting the World Conference on Disaster Reduction in January 2005 in Kobe, Japan for the presentation of a draft of the advocacy paper and to receive comments from participants.

The compilation of remaining 3 documents was not targeted to be compiled during the reporting period. However some basic activities has been started.

Progress: 90%

###### *Collection of case studies and extract lessons learned/good practices*



In addition to 8 case studies that had been collected during the previous reporting period, 11 new case studies were collected (originally the number was intended to be 15). Thus totally 19 case studies were reviewed in organized and synthesized manner. For the convenience of the future readers of the case studies, the extended summaries and synopsis of each case study were created by TSU. Furthermore the Overview Situation Paper (OSP) has been successfully compiled which covers not only the existing situation on flood management, but also indicating “ how to put IFM into practices” from various key contexts, thus it is expected to serve practical material for flood managers and practitioners, etc.

Progress: 100%

### **3.2 Implementation of regional pilot projects**

In South Asia, as expected through close interaction with local stakeholders in selected communities, in addition to the model institutionalization of model communities to cope with floods, the manual on Community Approach to Flood Management was prepared in three countries, which could be a baseline material for communities to know how better to institutionalize themselves to develop self-help capacity for flood management.

Progress: 100%

In Kenya, in close contact with the Ministry of Water Resources Development and Management (MWRDM) and through involving local stakeholders and relevant governmental agencies, a paper was compiled on “Integrated Flood Management Strategy on lake Victoria Basin”, which was submitted to the Minister of MWRDM in mid-May 2004. It is highly expected that this paper would be adopted as a common strategy with high political agenda in Kenya. This activity thus would serve to facilitate the real government policy formulation process towards adopting IFM.

Progress: 100%

In South America, the pilot project is ongoing regarding “the Integrated Flood Management in river Cuareim/Quarai basin”. This project was started in the end of March 2004 and is expected to continue until March 2005.

The reason of the delay in the start of this activity is due to WMO’s administrative process which took more-than-expected time to conclude agreement with supporting agencies and to transfer funds. It is however expected that with no cost escalation relevant activities would be finalized by the the end of the next reporting period.

Overall Progress: 20%

In Central and Eastern European countries, by leadership of the key counterpart in Slovak Hydrometeorological Institute, flood studies are being carried our in 8 countries, which is expected to serve as baseline information in consolidating plans and implementing the second phase of activities – forward integration of the flash flood management.

Progress: 90%

Overall progress on activities related to pilot projects: 90%

### **3.3 Establishing linkages with others**

APFM developed partnership with CapNet, one of the most active APs on the development of IFM training module, which is expected to be compiled during current project life of APFM.

APFM established close cooperation with DFO - prominent Flood Data Holder and Manager through collaborative works in compiling a Flood Inundation Map covering Kenyan side of Lake Victoria Basin, which was used as a precious material at the local stakeholders’ workshop.

Progress: 90%



### **3.4 Dissemination of information**

IFM concept paper has been disseminated through various channels (e.g. APFM web, distributed at various meetings, sent to WMO regional associations). APFM Newsletter was issued three times as scheduled. TSU participated various occasions where IFM concept was promoted.

Progress: 80%

### **3.5 Financial Performance**

During the reporting period, CHF 660,000 was contributed from Japan and The Netherlands to APFM in the following manner.

1 <sup>st</sup> instalment from Japan:	CHF 240,000	Oct. 04
2 <sup>nd</sup> instalment from Japan:	CHF 120,000	Dec. 04
Instalment from The Netherlands:	CHF 180,000	Jan. 04
3 <sup>rd</sup> instalment from Japan:	CHF 120,000	Mar. 04

In addition to the above, a sum of the CHF 455,159 was carried over from the period 2002/03, therefore a total of CHF 1,115,159 was the amount available during the period.

As of end-March 2004, a sum of CHF 141,875 was the balance available and was carried over to the next reporting period.

It might be an argument, however, that while the reporting period of APFM has been set from April to March, if APFM would accomplish expected tasks and would spend all the allocated funds accordingly, it would leave APFM with no funds at the beginning of April to carry/continue its activities. The contributions from the donors cannot be made available at the beginning of April.

This requires APFM to have some carried over funds from the previous year in order to maintain the level of activities, including the salary of the consultants, travels to attend important meetings and the organization of the Governing committees (Advisory committee and Management committee).

Taking the above fact in mind, the fund has been managed so that the certain minimum fund could be available at the end of March.

The financial statement of the APFM Trust Fund with WMO, as of 31 March 2004, is given in the following Table.



**APFM TRUST FUND FINANCIAL STATEMENT**  
**(as of 31 March 2004)**

**Income and Expenditure from January 2004 to March 2004**

	CHF
<b>1-1. Opening balance</b>	<b><u>55,474 (a)</u></b>
<b>1-2. Income</b>	
Contributions	420,000
Interest	576
<b>Total Income</b>	<b><u>420,576 (b)</u></b>
<b>1-3. Expenditure (including support costs)</b>	
Actual Expenditure (Liquidated)	109,737
Unliquidated (Future Obligation)	142,656
Requisition (Future Obligation)	81,851
Prior years income/expenditure	(67)
<b>Total Expenditure</b>	<b><u>334,177 (c)</u></b>
<b>1-4. Carry forward from this period</b>	<b><u>(a) +(b) - (c) 141,874 (d)</u></b>

**2. Income and Expenditure from January 2002 to December 2003**

<b>2-1. Opening balance</b>	<b><u>66,107 (e)</u></b>
<b>2-2. Income</b>	
Contributions	1,597,989
Interest	7,995
<b>Total Income</b>	<b><u>1,605,984 (f)</u></b>
<b>2-3. Actual Expenditure (including support costs)</b>	<b><u>1,616,617 (g)</u></b>
<b>2-3. Closing balance carried forward to the 2004-2005 biennium</b>	<b><u>(e)+(f) - (g) 55,474 (a)</u></b>

*Certified correct*

*Tomiji Mizutani  
Chief, Budget Office  
WMO*



## **4. ACTIVITY PLAN (2004-2005)**

The activities to be undertaken during 2004/2005 are classified as follows:

- Integrated Flood Management (IFM) Concept Paper and supporting documents
- Compilation of good practices/lessons learned in flood management
- Implementation of regional pilot projects
- Establishment of linkages and cooperation with other Associated Programmes (Aps) and initiatives
- Capacity building
- Dissemination of information

### **4.1 IFM concept paper and supporting documents**

#### ***4.1.1 IFM Concept paper***

The concept paper constitutes the “flagship” of a whole series of papers that will follow later to supplement the concept paper in more specific subject areas. It will be distributed at the conferences and workshops like the World Conference on Disaster Reduction (WCDR) (January 2005 in Kobe, Japan) to disseminate the concept of IFM. There is no need for changing the concept paper and slight modifications on the present version will be made during the second edition after the printed copies of the first edition are exhausted.

#### ***4.1.2 IFM Legal aspect paper***

Compilation of this paper will be one of the core activities taken by Technical Support Unit (TSU) for the current reporting period. It is expected that this paper would serve the policymakers in formulating well-integrated and balanced legal framework for IFM. This paper is being developed in collaboration with International Water Law Research Institute (IWLRI), Dundee, UK and Food and Agriculture Organization (FAO), and it is proposed to be presented for discussions during the WCDR where high-level policymakers are expected to gather. This conference would also provide precious opportunity to collect views from high-level policy makers on the contents of the paper and other activities of APFM.

#### ***4.1.3 IFM Social aspect (Community approach) paper***

This social aspect paper would largely focus on Community Participation in Flood Mitigation Measures and will extract and synthesize the essence of pilot projects and at the same time provide generic guidance. The synthesized manual on community approach to flood management will be finalized after the monsoon period in 2004 in South Asia and it will be integrated in the social aspect paper. This paper is also proposed to be completed during the current reporting period.

#### ***4.1.4 IFM Economic aspect paper***

The input material prepared by Dr Collin Green is proposed to be modified from the viewpoint of making it more practical and useful material in the real situations. The TSU will at the same time prepare a brief outline paper on other economic issues not covered under this material and submit it to be included in the agenda of the GWP Technical Committee (TEC) meeting during the Stockholm Water Week Meeting this year for further support and guidance from the GWP network. It is expected that this paper will be finalized by March 2006.

#### ***4.1.5 IFM Environmental aspect paper***

The advocacy paper on “Environmental issues of IFM” is in an early stage of development. Discussions are being held with potential partners International Union for the Conservation of Nature



and Natural Resources (IUCN) on the way forward. It is planned to further study this subject and elaborate on the contents and to continue to build a network of partners that play an advisory role and contribute towards the compilation of the paper. This paper will be finalized by March 2006.

#### **4.2 Compilation of good practices/lessons learned in IFM**

Through the compilation of the Overview Situation Paper (OSP), it was suggested in the Advisory Committee Meeting and Management Committee Meeting (Geneva, 21-22 June 2004) that there were certain gaps in the case studies with respect to the geographical coverage as well as certain subject aspects like trans-boundary basin coverage. So a few (5 to 8) more case studies will be collected to cover these gaps. The evaluation process of the additional case studies will be similar to the one carried during the last reporting period and will result in the revision of the OSP so that it would become more comprehensive and better-serving document explaining the current situation of IFM and steps to be taken to put IFM into practices.

#### **4.3 Implementation of Regional Pilot Projects**

##### ***4.3.1 South Asia***

The synthesis meeting of three sub-projects in India, Bangladesh and Nepal will be held in July 2004 in Dhaka, aiming to extract common knowledge out of 3 country versions of the manual, and compile a synthesis manual on Community Approach to Flood Management, where TSU will participate. During the monsoon season in 2004, the manual is being field-tested in the selected communities, and may be revised according to the experience gained in its application.

##### ***4.3.2 Africa***

The substantial works (official tasks) regarding this Pilot Project has been completed with the submission of the strategy paper to the Ministry of Water Resources Management and Development (MWRMD) in mid-May 2004. It is expected that the Ministry will take up the contents of the strategy paper and formulate and adopt the strategy incorporating the roles and responsibilities of all relevant agencies. It is also expected that the Kenyan Government will approach the donors to support the follow up on the strategy through preparation and execution of an action plan. Support would be provided to Kenyan Government for the purpose.

##### ***4.3.3 South America***

This pilot project will be continued up to March 2005. By the end of the pilot project, an integrated flood management plan in the trans-boundary river Curai/Curreim basin will be compiled, together with other useful results such as increased awareness of communities to flood management and synthesis of flood-related data for the basin. This will be the first trans boundary effort under the Programme and is likely to provide important inputs for Trans-boundary work in future.

##### ***4.3.4 Central and Eastern Europe***

The first phase of the activities under the pilot project which focuses mainly on flash floods is expected to be compiled by August 2004 when the flood study paper will be submitted to TSU. By this time the finding of the pilot basin(s) in Slovak republic will also be made available. The second phase of the project will start in succession with the first phase. It is expected that the second phase "forward integration of flash flood management" will be started in the selected model small basin(s).

#### **4.4 Establishment of linkages and cooperation with other APs and initiatives**



Establishing a network is one of the essentials in the dissemination of the concepts generated and experienced during the APFM. Efforts are being made in finding and seeking for collaboration with qualified institutes/individuals in accomplishing the expected activities of APFM. As APFM is entering the latter half of the implementation phase, it would continue to work with and identify the key partner agencies with the aim to deepen and produce tangible key outputs through collaborative activities in this regard. APFM has started collaboration with Dartmouth Flood Observatory (DFO) and Capacity Building Network (Cap-Net). The collaboration with IWLRI will continue in compilation of the IFM legal paper. Similar such opportunities like collaboration with the proposed centre for water hazard research and management at Tsukuba is foreseen and would continue to be explored.

#### **4.5 Capacity Building**

While there are a number of training courses/modules available or under development for IWRM, there are virtually no contents/modules available for training courses focused on flood management. Therefore it was felt that IFM training courses would need to be prepared by APFM in collaboration with competent partners in this field of education and capacity building. Having this in mind, APFM and Cap-Net would cooperate on developing IFM training Module, targeting that by the end of the APFM period (March 2006), the course module and materials and other arrangements to implement the IFM training would be made available. Some of the outputs of APFM, with some modifications, are expected to be converted into IFM training materials.

#### **4.6 Dissemination of information**

The TSU, being housed within the WMO Secretariat, has the ideal opportunity to incorporate IFM principles in strategic advice provided to flood managers in WMO Member countries. All efforts will be made to optimize utilizing this opportunity. Further, the process could be moved further through WMO participation at the United Nation level meetings.

A strategy for dissemination of APFM outputs is now being prepared and would be implemented starting next year after approval from the Advisory Committee and the Management Committee. For the current year, the activities to be undertaken in disseminating project output would also include the following:

Modification of APFM web page will be finalized and operational in the middle of 2004. All APFM outputs, where electronically available, will be put on the webpage and made available (downloadable) to those who are in need. APFM also encourages regional focal points to prepare and maintain regional pages of the APFM web page, including the information from the pilot projects and the progress in implementing the IFM principles.

APFM continues to feed the outputs into IWRM ToolBox as soon as they are matured enough to be input on the ToolBox. Further, the APFM Newsletter will be continue to be published four times a year. Outlines of relevant/related publications will be included in the newsletters.

The concept of IFM will be introduced at all possible related meetings, international workshops, seminars or meetings convened on the subject of 'floods' that APFM would be able to participate. One of the most important opportunities may be the World Conference on Disaster Reduction in Jan. 2005 in Kobe.



## Annex 1

### IFM CONCEPT PAPER -EXCERPT

## Integrated Flood Management (IFM)

#### *(Definition)*

Integrated Flood Management (IFM) is a process promoting an integrated, rather than fragmented, approach to flood management. It integrates land and water resources development in a river basin within the context of integrated water resources management (IWRM) and aims at maximizing the net benefits from floodplains and minimizing loss to life from flooding.

#### *(Challenges of flood management)*

##### **Flood plains and securing livelihoods**

Population and economic growth exert considerable pressure on the natural resources of a system. Enhanced economic activities in flood plains due to increased population pressure and the construction of infrastructure increase the risk of flooding. On the other hand flood plains provide excellent, technically easy livelihood opportunities in many cases. In developing countries, with primarily agricultural economies, flood plains contribute substantially to flood production and thus provide nutrition to the people of these countries.

##### **Need for a basin approach**

A river basin is a dynamic system in which there is a series of interactions between the land and water environment. These interactions involve not only water but also soil/sediment and pollutants/nutrients. The system is dynamic over both time and space. The functioning of the river basin as a whole is governed by the nature and extent of these interchanges.

##### **Absolute safety from flood is a myth**

Absolute protection from flooding is neither technical feasible nor economically or environmentally viable. Thinking in terms of setting a design standard of protection is both a trap and a delusion. It is a delusion because estimates of the magnitude of extreme floods are very inaccurate and, due to climate change, likely to get modified over time.

##### **Preserving ecosystems**

Riverine aquatic ecosystems – including rivers, wetlands and estuaries – provide many benefits to people such as clean drinking water, flood, materials, water purification, flood mitigation and recreational opportunities. Variability in flow quantity, quality, timing and duration are often critical to the maintenance of river ecosystems. A trade-off between competing interests in the river basin is required to determine the magnitude and variability of the flow regime needed within a basin in order to maximize the benefits to society and maintain a healthy riverine ecosystem.

##### **Climate variability and change**

General circulation models predict that changes to monsoon patterns with respect to both intensity and duration are likely to occur as a result of climate change. This could mean increased flash floods and seasonal floods but necessarily uniformly.

##### **Changes in decision making**

Flood risk conventionally was expressed in terms of the exceedence probability of a flood of a given magnitude on a particular stretch of river. Today, emphasis is placed on analyzing the sequence of



events and associated probabilities that result in a flood based on the meteorological event itself and the antecedent conditions.

### ***Risk management***

Risk management is a necessary component of the development process essential for achieving sustainable development. Flood risks are related to hydrological uncertainties. Hydrological uncertainty is perhaps subordinate to social, economic and political uncertainty. Therefore, balancing development needs and risks is essential. People will not, and in certain circumstances cannot, abandon flood-prone areas. There is a need to find ways of making life sustainable in the flood plains – even if there is considerable risk to life and property.

### ***(Justification of IFM)***

#### **How can a flood manager address these challenges?**

Globally, both land – particularly arable land – and water resources are scarce. Most productive land is located on flood plains. Most productive arable land is located on floodplains. When implementing policies to maximize the efficient use of the resources of the river basin as a whole, efforts should be made to maintain or augment the productivity of floodplains. On the other hand, economic and human life losses due to flooding cannot be ignored. Treating floods as problem in isolation almost necessarily results in a piecemeal localised approach.

**There is a need for a paradigm shift from the traditional fragmented approach of flood management.**

**Integrated Flood Management represents such a paradigm shift.**

### ***(IFM)***

Integrated Flood Management (IFM) recognizes the river basin as a dynamic system in which there are many interactions and fluxes between land and water bodies. In IFM the starting point is a vision of what the river basin should be. Starting from the vision of the river basin and incorporating a sustainable livelihood perspective means looking for ways of working towards identifying opportunities to enhance the performance of the system as a whole. The flows of water, sediment and pollutants from the river into the coastal zone - often taken to extend dozens of kilometres inland and to cover much of the river basin - can have significant consequences. As estuaries form overlaps between the river basin and the coastal zone, it is important to integrate coastal zone management as a part of integrated flood management.

The attempt is, therefore, to try to improve the functioning of the river basin as a whole while recognizing that gains and losses arise from changes in interactions between the water and land environment and that there is a need to balance development requirements and flood losses. It has to be recognised that the objective in Integrated Flood Management is not only to reduce losses from floods but also to maximise the efficient use of the floodplains - particularly so where the land resources are limited. However, while reduction of loss of life should remain the top priority, the objective of flood loss reduction should be secondary to the overall goal of optimum use of floodplains. In turn, increases in flood losses can be consistent with an increase in the efficient use of the floodplains in particular and the basin in general.

### ***(Elements of IFM)***

An integrated flood management plan should address the following five key elements:

- 1) Manage the water cycle as a whole
- 2) Integrate land and water management



- 
- 3) Adopt a best mix of strategies
  - 4) Ensure a participatory approach
  - 5) Adopt integrated hazard management approaches

### **1. Manage the Water Cycle as a Whole**

- Flood management plans must be intertwined with drought management through the effective use of floodwater and/or by maximising the "positive" aspects of floods.
- Need to manage all floods and not just some. For example, how to manage floods greater than the design standard needs to be addressed.
- Seek multi-beneficial solutions that serve several different purposes simultaneously.

### **2. Integrate Land and Water Management**

- Land use planning and water management must be combined in one synthesized plan, through coordination of land and water management authorities to achieve consistency in planning.
- The three main elements of river basin management (water quantity, water quality, and the processes of erosion and deposition) should be linked in planning.
- Effect of land use changes on the various elements of the hydrological cycle need to be taken into consideration.

### **3. Adopt a Best-Mix of Strategies**

- Flood management strategies should involve a combination of complementary options
- A layered strategy, appropriate to given socio-economic and geo-climatic conditions and adaptable to changing conditions, should be adopted
- An appropriate combination of structural and non-structural measures must be evaluated, adopted and implemented, recognizing the merits and demerits of both types of measures.

### **4. Ensure a Participatory Approach**

- IFM should be based on a participatory approach involving users, planners and policy-makers at all levels and should be open, transparent, inclusive and communicative.
- Decentralization of decision-making is necessary, with full public consultation and involvement of stakeholders in planning and implementation.
- Gender, religious and cultural differences must be taken into consideration
- An appropriate combination of both the "bottom-up" and "top-down" approaches needs to be adopted.
- Coordination at the highest level to promote coordination and cooperation across functional and administrative boundaries needs to be ensured.

### **5. ADOPT INTEGRATED HAZARD MANAGEMENT APPROACHES**

- Flood management should be integrated into a wider risk management system of 'all hazard' emergency planning and management.
- Experts from all sectors, involving different disciplines, should be involved in the implementation of disaster management plans.
- Consistency in approaches to natural hazard management in all relevant national or local plans should be ensured.
- Early warnings and forecasts, that are key inputs for the reduction of the social and economic impact of all natural hazards - including floods, should be strengthened.

#### **(Putting IFM into practice)**

Integrated flood management requires certain basin inputs and a conducive environment for its effective implementation. These requirements are a function of the specific hydro-meteorological and physical conditions of the basin coupled with cultural and socio-economic interactions and existing development plans for the location.



### **What is necessary to implement IFM?**

- 1) Clear and objective policies supported with legislation and regulations
- 2) Institutional structure through appropriate linkage
- 3) Community based institutions
- 4) Information management and exchange
- 5) Appropriate economic instruments

**Annex 2**

## Legal Aspects of Integrated Flood Management

### *DRAFT Scoping Paper*

#### **Introduction**

Part of the activity of the Associated Programme on Flood Management (APFM) is dedicated to the compilation of advocacy papers for institutions, groups and individuals involved in the development planning process of river basins, the so called 'IFM Concept Paper' being the core to conceptualize the approach of Integrated Flood Management (IFM).

It is now planned to compile a set of supplementary papers focusing on specific aspects of IFM, such as socio-economic, environmental and legal issues in order to facilitate the implementation of IFM principles into the development planning practice of river basins. The following paragraphs outline the aims, target group, contents and preparation process of the paper on "Legal Aspects of IFM".

#### **Target group and objective**

The advocacy paper on legal aspects of Integrated Flood Management mainly addresses to four groups of readers:

- Policy makers on international (shared river basins), national (for countries with a centralized approach to flood management) and sub-national levels (for countries with a decentralized approach to flood management)
- Legal experts
- Flood practitioners
- Members and representatives of various stakeholder groups of a river basin

The paper aims at raising the awareness of policy makers about the need for an appropriate legal framework for IFM, thereby providing guidance to legal experts on how to incorporate IFM principles into legal practice. Additionally it intends to motivate and enable flood practitioners, stakeholder groups, including actors of the civil society involved in public opinion building such as NGOs and the media, to engage in dialogue with policy makers about the legal requirements and the best approach to a balanced legal framework for IFM.

In its endeavour APFM plans to incorporate a series of policy makers and legal experts on natural resources law in order to provide for a sound legal background and closeness to practice in flood management.

APFM and the Hydrology and Water Resources Department at WMO are also involved in the preparation process for a flood seminar organized by Germany under the auspices of UNECE in June 2004. This seminar is intended to review the UNECE Guidelines on Sustainable Flood Prevention and to explore the possibilities of drawing up a legal instrument with regard to floods under the UNECE Water Convention. It is expected that participation in this process will provide valuable inputs to the preparation of the APFM legal paper with regard to the form and applicability of legal instruments for flood management in trans-boundary river basins.

#### **Scope of the paper**

The following enumeration of key messages is provided to contribute to set a scope for the content of the legal paper:

- Legal coverage of flood issues is underdeveloped in a wide range of countries.



- The development of IFM including the setup/assignment of institutions in the flood management sector needs sound legal backing.
- Legal issues related to floods should be addressed in the wider framework of Integrated Water Resources Management. In fact in many countries legal arrangements for water resources management have been made with IWRM as an underlying concept. This represents the starting point for addressing legal issues of IFM.
- These legal issues need to be addressed at various levels i.e. community, local self-government, provincial, national and international, and in various fields of law such as land and water, environment, coastal protection, building and construction, insurance etc. Furthermore it should be recognized that there is a need for a distinction between legal issues that need to provide for situations before, during and after floods. Thus it is a challenge to setup a legal regime built to facilitate IFM.
- It should be recognized that the introduction of a legal instrument in one sector might have consequential effects on related sectors. Therefore, there is a need for harmonization of the legal framework related to flood management, which is indirectly related to development activities in the river basin.
- Legal regimes are extremely site specific and need a critical analysis of the prevailing institutional, social, and economic set up.

### **Issues to be considered**

It is apparent that a paper on legal issues of IFM needs to be carefully balanced between proposing uniform detailed regulations, which might be applicable only to a limited number of cases, and providing general guidance for the legal backing of IFM. Differences in legal systems around the globe as well as in the level of development of institutional structures, including law enforcement capacities, need to be adequately addressed. Clearly the issue of harmonizing different (sector specific) acts and regulations that affect the flood regime of a river, needs to be accounted for, e.g. related to: Flood (fighting), Disaster Mitigation / Civil Defence, Coastal Protection, Water Works, Surface- and Groundwater, Land Use (planning) (incl. Agricultural, Forestry), Irrigation and Drainage, Environmental Protection, Public Health, Fishery, Navigation, Compulsory Purchase, Civil Liability and Flood Insurance. The issue of harmonization also needs to be accounted for between community, provincial, national (federal) and international levels.

In order to ensure the applicability of the paper in the highest possible number of cases, it is envisioned that it rather generally elaborates on a number of core issues to be considered in creating a legal framework for IFM and avoids to suggest specific formulations of laws and regulations. Where applicable, real examples should illustrate the practical relevance and application of specific legal issues related to IFM. A non-exclusive list of legal issues related to Integrated Flood Management is outlined in *Annex I*.

The following list specifies some *options for additional content* of the legal paper:

- Chapter on different systems of law around the world and some practical examples how this reflects in water/flood law, including an elaboration on the distinctions between
  - Common law, statute law, community law, customary law etc.,
  - Usage of hard law and soft law instruments/usage of different levels of formality in legal arrangements.
- List of international law that could be applied to questions of flood management, such as the *UN-Convention on the Law of Non-navigational Uses of International Water Courses* and the *RAMSAR Convention* etc., or respective applicable regional law instruments. Specific reference in a transboundary context should also be made to different resolutions passed and protocols developed by various international agencies like WMO Resolutions No. 25 and 40 on the exchange of meteorological and hydrological data and others. Specific attention could be given to successful mechanisms to ensure compliance with international law.



- Development of a common set of steps that countries should take if they want to address the legal requirements of IFM (e.g. critical analysis of existing (fragmented) legislation, legal needs assessment including a representative range of stakeholders, process of draft legislation, ratification in the national context, entry into force, enforcement, harmonization/consolidation).
- Development of a “rapid assessment tool” for the status of legal “backing” for IFM, consisting of a set of ~20 questions that authorities can ask themselves in order to assess their need for further development of IFM in legal terms.

### Compilation process and formation of an expert group

It is planned to incorporate a group of law and policy experts into the compilation process to provide for a sound legal background, to ensure closeness to practice and to provide inputs from various perspectives. The compilation process could comprise the following steps:

- Preparation of a draft outline of the paper (table of content with short description of chapters)
- Discussion of the draft outline at a kick-off meeting of the expert group
- Preparation of a first draft of the full paper based on the agreed outline and discussions and linked to the APFM case studies<sup>2</sup>.
- Circulation of the first draft and compilation of a second draft.
- If needed a second meeting of the expert group to review and finalize the second draft could be held.

It is envisioned that the International Water Law Research Institute at the University of Dundee will coordinate the content of the paper and APFM will provide for the logistics of the compilation process.

The timing for the compilation process is based on the target to present a revised draft of the paper at the World Conference on Disaster Reduction in January 2005. A preliminary planning is shown in the below table:

Step	Timing
Preparation of draft outline/formation of the Expert Group	June 2004
Kick-off meeting of the Expert Group meeting to discuss draft outline	Mid July 2004
Preparation of the draft paper	July - September 2004
Circulation of the first draft and revision	September - November 2004
(If required: Second Expert Group Meeting to finalize the second draft)	November 2004
Editing of the paper	December 2005
Presentation of the paper at the WCDR in Kobe	January 2005
Finalization and if required translation of the paper	February 2005
Printing	March 2005

<sup>2</sup> The case studies should be used to set the scene for the legal paper.



The following non-exclusive list of items could be elaborated on in the paper on “Legal issues of IFM”. The issues are grouped according to their relevance for the situation before, during and after a flood event.

<i>Relevancy for</i>	<i>Issue</i>
<i>Pre-flood</i>	<p><b>General arrangements between nations, administrative units or institutions</b></p> <p>Arrangements for information and exchange of data and for data transmission systems</p> <p>Arrangements for the preparation of surveys, investigations and (joint) studies</p> <p>Arrangements for consultation and cooperation in matters of flood mitigation</p> <p>Arrangements for the planning and implementation of flood mitigation measures</p> <p>Arrangements for general maintenance and clearing operations</p>
	<p><b>Institutional setup</b></p> <p>Creation of authority</p> <p>Assignment of task and responsibilities (legal competencies) for land and water management (also for non-structural flood management options such as flood forecasting and warning)</p> <p>Funding arrangements for the assigned responsibilities</p> <p>Ways and means how to create a legal backing for individuals or bodies that facilitate public participation (e.g. flood committees on the lowest appropriate level). This should also include a notion on how arrangements for public participation can be embedded in basic legal frameworks (e.g. the constitution).</p>
	<p><b>Private rights and duties</b></p> <p>Discharge of water into a water course (examples could be given about the control of point source inputs through in-house flood storage)</p> <p>Maintaining channels of a water course</p>
	<p><b>Conflict resolution mechanisms</b> How can mechanisms such as facilitation, mediation, fact-finding, and arbitration be incorporated into legislation</p>
	<p><b>Land use planning controls:</b> Which types of instruments can be applied and need legal backing? Real examples. E.g.: Floodplain zoning, Provisions related to dispossession, Afforestation, Urban planning, Building regulation/ construction permits</p>
<i>During the flood</i>	<p>Individual obligations with regard to flood fighting and avoidance of practices with detrimental effects on flood situations</p> <p>Arrangements for information and exchange of data</p> <p><i>Evacuation: clear assignment of responsibilities, particularly on the local level, including the securing of property, and arrangements for funding, assignment of coordination mechanisms between different administrative levels and agencies</i></p> <p><i>Relief: clear assignment of responsibilities, arrangements for funding, assignment of coordination mechanisms between different countries, administrative levels and agencies</i></p>



<i>Post-flood</i>	Arrangements for information and exchange of data
	Arrangements concerning liability for flood damages and mechanisms for compensation
	<i>Relief: clear assignment of responsibilities, arrangements for funding, assignment of coordination mechanisms between different administrative levels and agencies</i>
	Rehabilitation: arrangements for reconstruction of infrastructure, private and commercial property, etc. such as the installation of a bank for reconstruction that provides the financial resources to flood affected communities e.g. by offering cheap credits to flood victims.
	Provisions for post-flood assessment of impacts, policies and institutional structures
	Legal arrangements for a system of flood insurance



## Annex 3

# Draft-Outline of the APFM paper on Social Aspects of Integrated Flood Management (with special emphasis on Community Approaches to Flood Management)

### Introduction

As part of APFM's series of advocacy papers it is planned to compile a paper, which specifically addresses social issues related to flood management. Among others it intends to specifically address the question of how local communities can better cope with flood situations under the IWRM framework by increasing their self-help capacity. This is required since Government intervention in many parts of the world is often characterized by delay and inadequacy in terms of supply of goods and services.

In this context the outcomes of a regional pilot project undertaken by APFM together with flood prone communities in South Asia will enable APFM to derive generic and practical approaches towards increasing the self-help capacities of local communities.

Other aspects that could be addressed by the social paper(s) are:

- Participatory decision making and conflict mitigation – measures, tools and examples that can be applied/adapted to flood management.
- How to address informal sectors of society in flood policy

### The APFM Pilot Project in South Asia

The broad objective of the project is to find out ways and means for strengthening the self-help capacity of communities for improved flood management under the IWRM framework. The project's study area included Bangladesh, India and Nepal under a common and collaborative research design.

The expected outputs from this pilot project are (1) manual(s) on community approaches to flood management, and (2) establishment of some organized communities aware of improved integrated flood management and ready to make use of their respective manual.

The first version of the manuals are finalized and outlined in a detailed manner activities, which should be undertaken on the community, household and individual level, before, during and after flood events. Furthermore, steps have been suggested on how to operationalize the recommended activities within the given institutional structures such as (1) creation of "Community Flood Management Committees (Cells)" with clearly defined roles and responsibilities, (2) community-based monitoring and warning system, and (3) provisions of emergency relief, flood fighting, evacuation, etc.

The recommendations posed in the manuals will be field tested during the next monsoon season and revised after further discussions with representatives from the local communities.



## ***“Economic Aspects of Integrated Flood Management”***

### ***Summary of the Economic Study on ‘Making “better” choices: the role of economics in Integrated Flood Management’***

The process of choosing, or “choice”, is indispensable in the face of conflicts among stakeholders and uncertainty for the future. Economics can contribute to improving decisions regarding the choice made by:

- (i) Defining the economic objective of integrated flood management,
- (ii) Providing tools for appraising alternative projects, programmes and policies,
- (iii) Assessing alternative means for recovering the costs of interventions, and
- (iv) Analyzing the possible use of economic incentives in flood management as opposed to other policy instruments.

#### **1. Defining the economic objective of integrated flood management**

Globally, both land – particularly arable land - and water resources are scarce. Most productive arable land is located on floodplains and historically such land has been the centre of human settlement. When implementing policies to maximize the efficient use of the river basin as a whole, efforts should be made to maintain or augment the productivity of floodplains.

On the other hand, economic and human life losses due to flooding cannot be ignored. There is, and obviously will continue to be, a need to determine future flood losses in order to try to reduce those losses. However, the objective of flood loss reduction should be subordinate to the overall goal of maximizing the efficient use of the river basin, and, given the inherent uncertainty of the world, it is necessary to consider how to manage all floods and not just some.

#### **2. Providing tools for appraising alternative projects, programmes and policies**

The river basin is a spatially and temporally dynamic system consisting of processes of erosion and deposition of sediment, runoff and flows, pollutant release, capture and storage, etc. In managing and adapting to these variations, we gain value from withdrawals from and discharges to water bodies. The interventions required to support these withdrawals and discharges often change the form of those water bodies (e.g. channel deepening and widening) and their flow regimes (e.g. through storage or reduction in flows). The extent and value of “environmentally provided” goods and services such as recreation and fisheries depend on the regime and state – defined by water quantity, water quality and morphology - of these water bodies. Therefore, when evaluating a project, it is necessary to assess all resulting changes in terms of their desirability.

In the past, flood alleviation was problem driven: after a severe flood, a project was usually quickly constructed and the problem seemed self-evident. The general advantage of problem definition, backward in time, is that it is quite concrete and specific. However, any definition both excludes and includes critical issues. By specifying an issue in terms of a problem there is a risk of implicitly excluding other issues (i.e. all those issues not defined as part of the problem). Therefore, it is important to explicitly consider those that are excluded. In IFM the starting point is a vision of what the river basin should be. As a result, there are no problems but a variety of opportunities that can move us in the direction of achieving that vision. One has to make choices between given alternatives by project appraisal techniques.



The primary purpose of the adoption of project appraisal techniques is to help us make choices. The appraisal technique should be such that as the design is developed the appraisal can be refined. If a decision is first made and then appraised, the process of project appraisal is simply being applied as a means of justifying the choice that has already been made on other considerations. The second reason for using a project appraisal technique is to audit decisions. If funds are being transferred from one place to another for the implementation of projects, there is a need to monitor whether such funds are being spent properly.

The two main project appraisal techniques are: Benefit-cost analysis (BCA); and Multi-criteria analysis (MCA). Both techniques are comparative and involve impacts that can differ markedly across three dimensions:

- (i) *Who* is affected,
- (ii) *How* are they affected or *What* are the impacts, and
- (iii) *When* the effect take place?

Benefit-cost analysis and Multi-criteria analysis differ in the extent and the way in which they handle these three dimensions.

BCA conventionally considers only those benefits and costs falling within a given project and takes no formal account of who gains or who loses from such a project. BCA is based upon the assumption that the desired situation is already known and only an option that satisfies that situation needs to be chosen. In other words, the objective is known beforehand and only activities that meet that objective are chosen.

MCA looks at what option should be preferred by seeking to identify the key parameters. MCA is a means to learn what situation is desirable and to choose the options accordingly. In other words, MCA provides the tools for developing objectives and the activities necessary to achieve that object, and provides for the modification of objectives as a project matures.

Neither BCA nor MCA is superior to the other. BCA cannot address conflicts about objectives and MCA has no rigorous way of incorporating resources constraints. Therefore, the best procedure to adopt in project appraisal or in making a particular choice is to:

1. Identify all the major impacts of each option
2. Quantify these impacts where possible
3. Execute a preliminary MCA
4. Conduct an MCA if at least one of the options differs from the others markedly in terms of an important criterion which is outside of economic efficiency
5. Conduct BCA, in order to capture the significant benefits and costs of the different options, if the options do not differ markedly

MCA should be used as a scoping study when undertaking projects under integrated flood management. In simple choices, such as in the implementation of part – e.g. construction of detention basins - of a basin-wide plan, BCA is adequate to capture the critical conflicts that make the choice necessary. It has the advantage that it can explicitly include the external constraint of resource scarcity. In difficult choices, such as whether development on flood prone land should be limited, stakeholder deliberations will need to be supported primarily by MCA. Thus, the arguments, debates and negotiations can be focused upon those conflicts that make the choice necessary.

### **3. Assessing alternative means for recovering the costs of interventions**

With the adoption of IFM, funding raised for and tied to specific functional purposes such as flood alleviation will need to be abandoned. Using functional budgets to undertake multi-functional projects



such as wetland conservation presents numerous difficulties - for example, those who are taxed for a specific purpose will reasonably object if the tax revenue is spent on different purposes.

Economics has, in the past, emphasized competition and ignored the efficiency of cooperation. As a consequence, those who operated flood management systems and designers and contractors competed with each other and the relationships between each party were essentially conflictual. As projects were bid separately, economies of scale and scope could not be achieved.

An alternative approach to cost recovery is to achieve cooperation between the different parties involved, with each party sharing in any gains – for example, in the context the IFM, the increased productivity of flood prone land – made as a result of cooperation. Cooperation would result in economies of scale as collective provision is cheaper than the total cost that results from each individual taking individual action. As river basins are complex and dynamic systems, options best suited in the local context may be sub-optimal from the perspective of the river basin as a whole. Cooperation would prevent the adoption of such sub-optimal solutions.

#### **4. Analyzing the possible use of economic incentives in flood management as opposed to other policy instruments**

Where development results in many positive and negative externalities, if a charge is adopted for one externality and development patterns change as a result, then total externalities may increase rather than decrease. For example, if a charge is imposed for the additional runoff - a probable negative externality of urbanization - action may be taken to develop detention basins and other forms of local storage to curtail such runoff. Such types of local source control could result in increased downstream flooding by delaying discharges on some tributaries so that flood peaks from different tributaries reach a given point on the main stem of the river simultaneously.

Therefore, before introducing any charge for one externality an analysis should be undertaken of the relative magnitudes of the different externalities that will result from development taking place in different locations. Simulation studies need to be undertaken to ensure that the system of charges, taken as a whole, does not result in a pattern of development that will lead to a new externality for which a charge has not been levied.

In countries where farming is heavily subsidized, the only way at present to change the behaviour of farmers is to introduce yet another subsidy. Such subsidies may then be given to provide buffer strips along the margins of watercourses or to farm in ways that reduce runoff, sediment load and farming pollutants such as fertilizers and pesticides. Farmers may also be paid for the use of their land to store floodwaters and for the re-conversion of part of their lands to wetlands.

Flood insurance could be a powerful tool in locations where a reduction in, and compensation for, economic losses due to flooding is the main objective of flood management policy. Decisions on whether there is a role for commercial insurance companies and whether individuals should be made

to pay the premiums need to be made prior to initiating a flood insurance programme. Unless there is a public-private partnership between the government and the industry - whereby the government acts as the reinsurer of last resort - flooding is considered an uninsurable risk. Who should bear the risk depends on the relative wealth of the insurance industry and the country. In developing countries, where flood losses could amount to a significant proportion of a country's Gross Domestic Product (GDP), the government may not be able to act as the reinsurer of the last resort. Furthermore, those at risk may not be able to afford the insurance premiums.



## Annex 5

### Draft outline of the IFM Environmental Paper

#### ***Introduction***

Part of APFM's activity is dedicated to the compilation of advocacy papers for institutions, groups and individuals involved in the development planning process of river basins, the so called 'IFM Concept Paper' being the core to conceptualize the approach of IFM.

It is planned to compile a set of supplementary papers focusing on specific aspects of IFM, such as socio-economic, environmental and legal issues in order to facilitate the implementation of IFM principles into the development planning practice of river basins.

#### ***Advocacy paper on environmental aspects of IFM***

The paper on environmental issues mainly addresses to the following groups of readers:

- Policy makers on international, national and sub-national levels
- Experts in nature conservation, aquatic ecology and poverty alleviation
- Flood practitioners and water sector specialists, especially in the field of reservoir operation
- Members and representatives of various stakeholder groups of a river basin

The paper aims at raising the awareness of policy makers about the links between flood management interventions and the ecology of rivers, floodplains and river deltas and the wider consequences on people's livelihoods and the long-term productivity of the floodplain. Furthermore it aims at presenting an indicative set of strategies and tools to mainstream environmental considerations into flood management practices. It intends to provide flood practitioners, stakeholder groups, including actors of the civil society involved in public opinion building such as NGOs and the media, with guidelines to take practical steps in order to harmonize IFM principles and ecosystem considerations.

#### ***Potential issues to be considered***

The following is a non-exclusive list of items that could be key issues targeted by IFM environment paper.

- Principles of ecosystem approach that can be interpreted in the IFM context (e.g. through modification of 12 principles developed under the Convention of Biological Diversity)
- Outline of the link between products of floodplain ecosystems (arable land, fisheries, grazing land) and income generation of (rural) livelihoods
- Proposed strategies to avoid negative consequences of floods on the environment and public health such as pollution from emissions of hazardous substances into floodwaters, drinking water deterioration and water borne diseases.
- Outline of the link between structural flood management measures and the destruction of geological features and archaeological sites.
- Means/practical steps to fulfil both the requirement of ecosystem consideration (e.g. environmental flow) and Integrated Flood Management
- Managed floods<sup>3</sup>
  - Appropriateness and feasibility
  - Design of appropriate flood flows including stakeholder participation

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<sup>3</sup> See: Acreman, M.C., Water Resources and Environment, Technical Note C.3, *Environmental Flows: Flood Flows*, The World Bank, 2003



- 
- Assessment of the impacts of flood options on livelihoods, the environment and public health
  - Implementation aspects of managed flood release programmes

**Annex 6**

## **List of case study authors and reviewers**

### **1. List of case study authors**

#### **BANGLADESH: FLOOD MANAGEMENT**

Location of the study: Bangladesh

Author: A.N.H. Akhtar Hossain, Bangladesh Water Development Board (BWDB)

#### **BRAZIL: FLOOD MANAGEMENT IN METROPOLITAN CURITIBA AREA**

Location of the study: The Metropolitan Area of Curitiba (RMC), in the State of Paraná, Brazil.

Author: Carlos E.M. Tucci, Institute of Hydraulic Research – Federal University of Rio Grande do Sul

#### **CAMEROON: INTEGRATED FLOOD MANAGEMENT IN RIVER LOGONE FLOOD PLAIN**

Location of the study: Northern extreme of Cameroon.

Author: Daniel Sighomnou, Centre de Recherches Hydrologiques, CRH/IRGM, Yaoundé, Cameroun

#### **CANADA: FLOOD MANAGEMENT IN THE RED RIVER BASIN, MANITOBA**

Location of the study: Canada

Author: Slobodan P. Simonovic, Professor and Research Chair, Department of Civil and Environmental Engineering, Institute for Catastrophic Loss Reduction, University of Western Ontario, London, Ontario, Canada

#### **CHINA: FLOOD MANAGEMENT**

Location of the study: China

Author: Zhang Hai-lun, Institute of Hydrology and Water Resources, Nanjing Hydraulic research Institute, Nanjing, China

#### **ETHIOPIA: INTEGRATED FLOOD MANAGEMENT**

Location of the study: Ethiopia

Author: Kefyalew Achamyeleh

#### **FIJI ISLANDS: FLOOD MANAGEMENT - REWA RIVER BASIN**

Location of the study: Viti Levu Island, Fiji

Author: Rishi Raj, Director, Suva Water Supplies, Samabula, Fiji

#### **INDIA: FLOOD MANAGEMENT IN DAMODAR RIVER BASIN**

Location of the study: India

Author: Suresh Chandra, Chairman , ISO/TC-113 & Former Chairman , Central Water Commission, New Delhi

#### **ITALY: PIEMONTE REGION METEO-HYDROLOGICAL ALERT AND THE REAL-TIME FLOOD FORECASTING SYSTEM**

Location of the study: Piemont Region, Italy

Author: D. Rabuffetti and Secondo Barbero, Piemont Region's Technical Service for Prevention



---

**JAPAN: TOKAI HEAVY RAIN (SEPTEMBER 2000)**

Location of the study: Shonai river system in the Tokai region, Japan

Author: Ministry of Land, Infrastructure and Transport (MLIT), Japan

**MALI: FLOOD MANAGEMENT - NIGER RIVER INLAND DELTA**

Location of the study: The Niger River Inland Delta, Mali

Authors: Samuel Diarra, Direction nationale de l'hydraulique (DNH), etc.

**MAURITANIA: MANAGED FLOOD RELEASES AND LIVELIHOODS - LOWER DELTA  
SENEGAL RIVER**

Location of the study: Diawling National Park, the lower delta of the Senegal River, Mauritania

Authors: Olivier Hamerlynck, the World Conservation Union (IUCN) and Stephanie Duvail, the Centre for Ecology and Hydrology, Wallingford, U.K.

**PAKISTAN: FLOOD MANAGEMENT - RIVER CHENAB FROM MARALA TO KHANKI**

Location of the study: Chenab River - a major tributary of the Indus River – in Pakistan.

Author: Shaukat Ali Awan, Flood Forecasting Division, Pakistan Meteorological Department

**PAKISTAN: LAI NULLAH BASIN FLOOD PROBLEM ISLAMABAD – RAWALPINDI  
CITIES**

Location of the study: Pakistan

Author: Ahmed Kamal, Federal Flood Commission, Government of Pakistan

**TURKEY: RECENT FLOOD DISASTERS IN NORTHWESTERN BLACK SEA REGION**

Location of the study: Black Sea region, Turkey

Authors: Ibrahim Gurer, Professor, Gazi University, Faculty of Engineering and Architecture, Department of Civil Engineering, and Hamza Ozguler, Hydrological Expert, General Directorate of State Hydraulic Works (DSİ), 06100, Yucetepe, Ankara, Turkey

**UNITED KINGDOM: PARRETT CATCHMENT PROJECT**

Location of the study: Parrett River Basin, U.K.

Author: Humphrey Temperley, Parrett Catchment Project

**USA: FLOOD MANAGEMENT – MISSISSIPPI RIVER**

Location of the study: Mississippi Basin, USA

Author: General Gerry Galloway, U.S. Army Corps of Engineers; International Joint Commission - Canada/USA

**USA: NO ADVERSE IMPACT: A NEW DIRECTION IN FLOODPLAIN MANAGEMENT  
STRATEGY**

Location of the study: U.S.A.

Authors: Larry Larson and Doug Plasencia, Association of State Flood Plain Managers (ASFPM)

**ZIMBABWE: FLOOD MANAGEMENT PRACTICES - SELECTED FLOOD-PRONE AREAS  
ZAMBEZI BASIN**

Location of the study: Zimbabwe

Author(s): EK Madamombe, Zimbabwe National Water Authority, Research and Data Department, Harare, Zimbabwe



## 2. List of case study reviewers

### **Coordinator (WMO Consultant)**

Mr Dieter Kraemer, Ex-Director, Hydrology and Water Resources Dept., World Meteorological Organization

### **Expert on “Risk management strategies”**

Dr Dennis Parker, Pro Vice-Chancellor, Middlesex University and Dean of Middlesex University Business School, UK

### **Expert on “Risk and hazard mapping”**

Mr Tadahiko Nakao, Executive Director, Foundation of River & Basin Integrated Communications (FRICS), Japan

### **Expert on “Cross-sectoral integration and mitigation of conflict management”**

Mr Bastien Affeltranger, Ph.D. Candidate in Geography, Laval University, Quebec, Canada

### **Expert on “Land and water related laws and regulations, institutional arrangements”**

Mr Paul Roberts, Ex-Strategic Advisor, Water Resources, Dept of Water Affairs and Forestry, South Africa

### **Expert on “Environment and ecosystems”**

Dr Mike Acreman, Head of Hydro-ecology and Wetlands Section, Centre for Ecology and Hydrology, Wallingford, UK.

### **Expert on “Flood forecasting and warning”**

Dr Syed Moin, Senior Hydrologic Engineer, Boundary Water Issues Division Water Issues Div., Meteorological Service of Canada



Case study	ELEMENTS/ASPECTS OF INTEGRATED FLOOD MANAGEMENT *														Category of IFM Development**		
	WATER CYCLE AS A WHOLE			INTEGRATION OF LAND AND WATER MANAGEMENT			BEST MIX OF STRATEGIES	PARTICIPATORY APPROACH				INTEGRATED HAZARDS IMPACT MITIGATION					
	Flood / drought management plans	Effective use of floodwater by maximizing positive aspects of floods	Groundwater/Surface water treated as linked resources in flood plains	Land use planning and water management	Laws and regulations for flood and water mgmt	Multi-functional solutions (engineered wetlands, water quality treatment, flood alleviation)	Integrated river basin management approach to flood management	Appropriate combination of structural and non-structural measures	Stakeholder involvement at all levels in decision making	Community-based approach	Effective linkage between existing institutions	Consideration of gender-based and cultural requirements	Cross-sectoral integration of disaster management strategies	Flood plain maps and zoning	Early warnings and forecasts	Tools to support decision-making	Free and open exchange of data
[1] Bangladesh (preliminary)	✓ (MG)	✓		✓	✓		✓	✓	✓	✓	✓			✓	✓	✓	III
[2] Brazil (Urban Flooding)				✓	✓		✓	✓						✓	✓		III
[3] Cameroon (Fleuve Logone) (preliminar)		✓		✓		✓											I
[4] Canada (Red River Basin) (preliminar)		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	IV
[5] China	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	IV
[6] Ethiopia				✓			✓			✓			✓				II
[7] Fiji Islands (Rewa River)				✓						✓	✓			✓	✓	✓	II

\* Some of the aspects listed in Box 1 have been grouped in this Table

\*\* As defined/established in Figure 5



Case study	ELEMENTS/ASPECTS OF INTEGRATED FLOOD MANAGEMENT											Category of IFM Development **	
	WATER CYCLE AS A WHOLE			INTEGRATION OF LAND AND WATER MANAGEMENT			BEST MIX OF STRATEGIES	PARTICIPATORY APPROACH			INTEGRATED HAZARDS IMPACT MITIGATION		
	Flood / drought management plans	Effective use of floodwater by maximizing positive aspects of floods	Groundwater/Surface water treated as linked resources in flood plains	Land use planning and water management	Laws and regulations for flood and water mgmt	Multi-functional solutions (engineered wetlands, water quality treatment, flood alleviation)	Integrated river basin management approach to flood management	Appropriate combination of structural and non-structural measures	Stakeholder involvement at all levels in decision making	Community-based approach	Effective linkage between existing institutions	Tools to support decision-making	Free and open exchange of data
[8] India (Damodar river basin)	✓ (MG)	✓		✓	✓		✓		✓	✓		✓	III
[9] Italy (Piemonte region)				✓	✓		✓		✓	✓		✓	IV
[10] Japan (Tokay)	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	IV
[11] Mali (Inner Niger Delta) (preliminar)	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	II
[12] Mauritania (Senegal river) (preliminar)		✓		✓		✓		✓	✓	✓			II
[13] Pakistan (Chenab river)		✓ (MG)	✓	✓	✓			✓	✓	✓		✓	I
[14] Pakistan (Lai Nullah Basin)				✓	✓			✓	✓	✓		✓	II

\*\* As defined/established in Figure 5



Case study	ELEMENTS/ASPECTS OF INTEGRATED FLOOD MANAGEMENT															Category of IFM Development **	
	WATER CYCLE AS A WHOLE		INTEGRATION OF LAND AND WATER MANAGEMENT			BEST MIX OF STRATEGIES	PARTICIPATORY APPROACH			INTEGRATED HAZARDS IMPACT MITIGATION							
	Flood / drought management plans	Effective use of floodwater by maximizing positive aspects of floods	Groundwater/Surface water treated as linked resources in flood plains	Land use planning and water management	Laws and regulations for flood and water mgmt	Multi-functional solutions (engineered wetlands, water quality treatment, flood alleviation)	Integrated river basin management approach to flood management	Appropriate combination of structural and non-structural measures	Stakeholder involvement at all levels in decision making	Community-based approach	Effective linkage between existing institutions	Consideration of gender-based and cultural requirements	Cross-sectoral integration of disaster management strategies	Flood plain maps and zoning	Early warnings and forecasts	Tools to support decision-making	Free and open exchange of data
[15] Turkey (North Western Black Sea Region)				✓	✓			✓	✓		✓				✓	✓	
[16] United Kingdom (Parrett Catchment Project)	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
[17] U.S.A. (Mississippi)				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
[18] U.S.A. (NAI)				✓	✓		✓	✓	✓				✓	✓	✓	✓	
[19] Zimbabwe (Zambezi basin)				✓						✓	✓			✓	✓	✓	
Total number of case studies covering IFM aspects	5	10	1	19	14	7	12	13	9	16	14	2	6	9	14	4	12

MG = marginally

NA = not applicable

NM = not mentioned

\*\* As defined/established in Figure 5



## AGENDA AND PARTICIPANTS FOR THE CASE STUDY REVIEW MEETING

4-6 May 2004 at Room 6 JURA, WMO Secretariat, Geneva

### **1. Agenda**

#### ***Day 1 (Tuesday - 04/05/2004)***

- 09.30-09.45 Opening address, Self introduction
- 09.45-10.00 Introduction to APFM and IFM
- 10.00-12.30 Discussion on the Draft Overview Situation Paper - Part I
- 12.30-14.00 Lunch
- 14.00-17.00 Discussion on the Draft Overview Situation Paper – Part II

#### ***Day 2 (Wednesday - 05/05/2004)***

- 9.30-12.00 Discussion on Conceptual ideas of IFM
  - IFM Development Model and Assessment tools
  - Missing aspects in the IFM Concept
- 12.00-13.30 Lunch
- 13.30-16.00 Discussion on Practical Steps for putting IFM into practice
  - How to advance IFM in developing countries
  - Development of practical tools
- 16.00-18.00 Advices on APFM future activities

#### ***Day 3 (Thursday - 06/05/2004)***

- 09.30-12.00 Follow-up of previous discussions
- Any other business
- 12.00-12.15 Close of meeting

### **2. Participants**

#### **From case study authors**

- Dr Slobodan P. Simonovic
- Mr Hamza Ozguler

#### **From case study reviewers**

- Dr Dennis Parker
- Mr Bastien Affeltranger
- Mr Paul Roberts

#### **Others**

- Mr Avinash Tyagi (Director HWR Dept., WMO and Head of TSU)
- Mr Dieter Kraemer (WMO consultant)
- Mr Katsuhito Miyake (TSU)
- Mr Joachim Saalmueller (TSU)
- Mr Hisaya Sawano (TSU)
- Ms Chie Yoshimura (TSU)



## Overview Situation Paper of Flood Management

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## **PART VI SUPPORTING INFORMATION**

- Appendix I Flood Situation in Lake Victoria Basin**
- Appendix II Water Availability and Demand in Lake Victoria Basin**
- Appendix III Status of Development in Lake Victoria Basin**
- Appendix IV Institutional Arrangements in Water Sector in Kenya**

## **References**

## **Abbreviations**



## PROJECT PROPOSAL: 2nd phase of the pilot project in CEE region

**Title:** Forward Integration of Flood Warning in Flashy Areas

**Location:** Central and Eastern Europe

It is anticipated that good practices/lessons learned from the 1<sup>st</sup> Phase –Study on past floods in CEE region, the following project proposal would be further enriched.

### 1. Objectives of the pilot project

#### 1.1 Overall objective

Introduce the Integrated Flood Management in the flashy areas to enhance prediction of flash flood and development of long term strategies for flash flood controls based on the river basin approach.

#### 1.2 Direct objectives

Furthermore, the objectives are as follows:

- to develop a local flash flood warning system in selected river basins, which can be used to provide accurate flash flood forecasts and warnings based on telemetry data, grid-based meteorological data as radar imagery, satellite imagery and meteorological models coupled with the hydrological models,
- to enable local-municipalities/communities in selected river basins to establish integrated flash flood management system by actively involving community/local stakeholder participation
- to raise the flood awareness of the citizens

### 2. Recent floods in CEE region

Recently several flash floods occurred in the **Czech Republic**, for example on 15 July 2002 at the catchment boundary between the Svatka a Svitava rivers in the middle of Moravia (Olesnice, Crhov, Stepanov,...). The rain gauging station in Olesnice on that occasion recorded an unprecedented daily rainfall total of 171.7 mm.

In July 2001, the 118 mm/day rainfall generated devastating flash flood in the region of Gdansk in **Poland**.

In **Romania** very numerous severe flash floods developed in small basins encompassed either in large areas affected by regional floods or produced by local heavy rainstorms that brought about immense damages and lost of human lives.

Flash floods in **Slovakia** typically occur in the summer time. Some of those, which have been recorded recently, were extreme in the view of precipitation intensity and flood effects.

The flash floods, which occurred on July 20 1998 as a consequence of extreme storms, struck about 30 villages in the eastern part of Slovakia in the Hornád River catchment. The losses were catastrophic. Flood damages were estimated at 25 million USD, human losses were unprecedented in recent history - fifty people died.

The summer 2001, mainly the northern part of Slovakia, abounded in destructive flash floods. In 399 villages and settlements, 8039 houses were inundated and 19 828 inhabitants were being directly affected.

During the heavy rain period both material that is stored in the river basin can be washed down and some areas as waste disposal sites, other depose can be flooded and subsequently water quality may be deteriorated very strongly.

### 3. Findings of Earlier Activities



Nowadays, in Europe one can find only flood warning systems for large river basins, for example like Rhine, Danube, Elbe, etc. In many cases the warning systems are not directly accessible by the public. The main reason for missing such warning systems in the small catchment areas is that key concepts getting an early and reliable prediction on floods are not available. There is an experience from the functioning of the local flood warning systems in USA. Recently, in the Czech Republic Pilot Local Warning System was put in to operation for the village Olesnice in Orlicke Mountains. Similarly in the Slovak Republic, within the project POVAPSYS, concept of local flood warning system is planned to be developed and built up in the two small catchment areas, which are frequently jeopardized by the flash floods.

Flash floods mainly results from the combination of both specific climate variability and specific morphologies of the river basins. Great effort was already dedicated by researchers and water manager to understand these processes and to develop a proper and suitable strategy for flash flood control. In this project the findings from the EU Research Programmes, national and international projects will be used to develop strategy for flash flood control based on the IWRM.

#### **4. Proposed activities**

- Description of two small model basins/catchments in CEE region (including socioeconomic aspects)
- Collection of necessary information/data
- Development of the local flood warning system
- Validation of applicability of proposed local flood warning system at selected sites
- Meetings with local municipalities/communities with the aim to compile the plan to make the local flood warning system smoothly working in selected site. Roles and responsibilities of local stakeholders will be defined (including evacuation plans, etc.). During this stage local peoples' participation will be ensured.
- Draw-up a set of scenarios of flood mitigation strategies (including risk and hazard)
- Training workshop of local people how to behave before, during and after flooding (socioeconomic and psychological impacts)
- Dissemination of results through various channels (outreach process)

#### **5. Outputs**

The main expected outputs may be as follows:

- Local flash flood warning system in model river basins
- Dissemination of forecasts in user-friendly format
- Analysis of different scenario, use and assessment of flood mitigation strategies with respect to specific climate variability and specific morphologies of the river basins
- Well-institutionalized flash flood management system in model river basins
- Increased capacity of the local municipalities for flash flood management
- Guidance on public behaviour and flash floods

#### **6. Breakdown of prices**

It is expected that 160 000,- USD should be used to cover expenses necessary for fulfilment of the defined objectives (to carry out 2 Pilot River Basins). The contribution from the WMO should be 60 000,- USD, the difference will be covered partly by the country in charge and partly by GWP. Sustainability is one of the selection criteria for Pilot Project (River Basin).

#### **7. Implementation schedule**

The project should start in August 2004 and to be finalized in July 2005.





## Annex 13

### **Scoping Paper on Development of IFM Training Module/Course**

#### **Background**

Various IWRM training courses have been developed/ongoing in which flood issue is rarely included. Therefore IFM (standard) training module/course in line with IWRM perspective should be prepared.

#### **Target groups of training**

- Policymakers (incl. Flood practitioners)
- Multipliers or trainers (staffs at training institute, researchers or academic field)

#### **Key partners**

CapNet (Capacity Building Network for IWRM)

1. It was mentioned by Cap-Net that it is an important step to differentiate clearly between different target groups of the training course, e.g. between policy makers and local stakeholders. This might lead to the creation of different materials/methodologies of teaching for each of the identified target groups
2. Participants agreed that an IFM TM would have to be adaptable to local conditions, e.g. by changing examples.
3. After a short presentation of APFM's idea about the planning of the IFM TM it was mentioned by Cap-Net that the dissemination of the Training Materials could be organized via the existing network of partner organizations to Cap-Net.
4. It was agreed that APFM's focus with relation to the IFM TM at the current stage would be on content, i.e. on the completion of basic materials (esp. the case study review results and on the community based flood management manual), while clear key messages of the IFM TM would be derived by APFM.
5. It was further agreed that Cap-Net would try introduce experts to be assembled in a task team to look at the development of the IFM TM. Cap-Net would introduce 2-3 potential members of this task team from its network of partner institutions. It was agreed that Cap-Net would send an information mail to its network members, asking for assistance and ensuring early involvement of the partners in the regions. The first meeting of this task team will be end-June/early July after the analysis of the basic inputs and the key messages by APFM.

#### **Objectives**

For trainees to;

- be able to familiarize IFM concept
- enable them to translate IFM into practice

#### **Types of training**

- Interactive
- Participatory
- Ideal mix of theory and practice
- Guest lectures/from various fields
- Include field case study – interview with policymakers, stakeholders



## Mix of Lecture Module + Exercise Module

- Lecture module
  - (1) IWRM in general, (2) IFM and IWRM, (3) Case study introduction
- Exercise module
  - (1) Each trainee do pre-program exercise on respective countries,
  - (2) present country situation with analysis in terms of policy and system
  - (3) choose some model cases
  - (4) trainees be broken into some groups to discuss each model case
  - (5) presentations and discussions on future policy formulation, etc.

### ***Practical approach***

- It might be very efficient if this is to be held in succession to existing IWRM training course
- From both financial and administrative viewpoints, it is necessary to find institute(s) which will volunteer to mobilize their own resources.

### **What CapNet can do**

- Introduction of an appropriate educational specialist who can be a member of task team
- Suggestion of training institution(s) (1) where IFM training will be implemented, (2) with which IFM training material will jointly be developed.
- Suggestion on IWRM training course organizer(s) so that developed IFM training module/course would be implemented in synthesized manner.

### ***Rough timeline***

Feb.04	Respond to CapNet asking for cooperation
By March 04	Reply from CapNet
April 04	Formulation of expert group
May 04	First expert group meeting (perhaps 2 people from outside)

June 2004 to March 2005 (preparation stage)

- Identification of training institute(s)
- Identification of a main training coordinator
- Modification of APFM material into teaching material, etc.
- Specification of countries from which trainees will be selected, etc

April to Sep. 2005 (test implementation stage)

- Implementation of IFM training course(s) in a few locations
- Collect reflection points
- Further incorporate outcomes out of APFM

Oct. 2005 to March 2006 (Modification stage)

- Modification of training based on reflections from test training
- Implementation of IFM training course second stage.  
(the same cycle to be continued)

### ***What APFM can put into IFM training course?***

- IFM concept paper



- Supplementary papers (legal, environmental(earlier stage), social and economic(later stage))
- Overview analysis paper of flood management
- Examples from collected case studies
- Experiences gained from regional pilot projects
  - Manual on Community approach to flood management, etc.