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PHASE II (August 2006 – March 2010)
FINAL REPORT

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The Associated Programme on Flood Management (APFM) is a joint initiative of the World Meteorological Organization (WMO) and the Global Water Partnership (GWP). It promotes the concept of Integrated Flood Management (IFM) as a new approach to flood management. The programme is financially supported by the governments of Japan and the Netherlands.

The World Meteorological Organization is a Specialized Agency of the United Nations and represents the UN-System's authoritative voice on weather, climate and water. It co-ordinates the meteorological and hydrological services of 187 countries and territories.

The Global Water Partnership is an international network open to all organizations involved in water resources management. It was created in 1996 to foster Integrated Water Resources Management (IWRM).

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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 the concept into practice. IFM recognizes the benefits of the annual floods (i.e. smaller and more frequent floods), the importance of floodplains and the increasing demands of development they are facing, while at the same time recognizing the disruptive nature of floods. An IFM approach aims at maximizing the net benefits from flood plains and reducing loss of life due to flooding, flood vulnerability and risks, and at the same time preserving ecosystems and their associated biodiversity within the overall framework of Integrated Water Resources Management (IWRM). It conceptualizes integration of land and water resources development activities in a river basin.

The aim of IFM can be realized through river basin flood management plans. There are a number of key elements that should be considered while preparing such plans. These are:

- Manage the water cycle as a whole: considering all floods, including both extremes;
- Integrate land and water management: as both have impacts on flood magnitudes and flood risks;
- Manage risk/uncertainty;
- Adopt a best mix of strategies: both structural as well as non-structural;
- Ensure a participatory approach: to develop a sense of ownership and reduce vulnerability; and
- Adopt integrated hazard management approaches: considering risks due to all related hazards such as landslides, mudflows, avalanches, storm surges, and tsunamis and creating synergies.

Therefore, IFM, like IWRM, advocates a multidisciplinary approach with participation of all stakeholders. The social, economic, environmental, legal and institutional aspects of flood management have been dealt with sporadically and in a limited manner. As a result, these aspects are hardly accounted for in the flood management planning and decision-making in a balanced manner. There is a need to facilitate, both technically as well as financially, particularly in the developing countries, realizing the IFM so as to:

- Prevent flood hazards turning into disasters;
- Incorporate risk management principles in water management;
- Alleviate poverty through preventive and response strategies for vulnerable sections;
- Increase multidisciplinary approaches in flood management;
- Factor environmental considerations in flood management; and
- Enhance community participation.

The APFM through the concept of IFM is therefore an attempt to streamline the multi-facets of flood management issues into the decision-making of policy makers, flood managers, and various other groups involved in the development planning process in river basins. The objectives of APFM are to:

- Establish the principles of Integrated Flood Management;
- Help assimilate principles of Integrated Flood Management within the overall Integrated Water Resources Management;
- Develop capacities in the countries to integrate flood management into sustainable development processes; and
- Provide a platform for a common strategic vision on integrated flood management issues, and to promote the implementation of effective policies and strategies worldwide.

The Phase I of the programme was launched in August 2001. After inception phase of 8 months, it entered the implementation phase in April 2002 (duration 4 years). It was extended for a period of 4 months and ended at the end of July 2006. The Phase II started immediately after the Phase I and ended at the end of March 2010. The programme was supported by the Government of Japan (Phase I, II) and the Government

of the Netherlands (Phase I) and the Government of Switzerland (Phase II). In addition, Switzerland, Spain, Italy and US contributed to APFM activities through indirect financial supports. The APFM Technical Support Unit (TSU), housed in the Climate and Water Department of WMO provides full technical backup to the programme.

The phase II of the programme (2006-2010) focused on implementation of the IFM concept on the ground and sought to develop capacities in the countries by supporting local and regional actions that advocate, support or demonstrate the IFM principles. The primary focus was on activities at the ground levels in supporting countries by providing guidance and organizing field demonstration projects to put the concepts of IFM, in its multidisciplinary approach, into practice. This was supported by a combination of training and awareness building at various levels addressing flood management issues within the overall framework of Integrated Water Resources Management. The advocacy for IFM was achieved through capacity development, implementation of field demonstration projects and providing long-term support in the form of HelpDesk and information services. Major outputs of the programme were:

- Field Demonstration Projects;
- Network of institutions supporting multidisciplinary approach;
- Training, awareness building and advocacy material;
- Capacity building through Training of Trainers, Regional Workshops and Seminars;
- Information services in form of a Reference Centre on Flood Management;
- Technical Tools in support of IFM; and
- Strategic advice on flood management projects in form of a HelpDesk.

This report is the Final Report of the Phase II of APFM, which documents the activities undertaken during the four year period (August 2006 to March 2010) of the Phase II. All of the outputs and summarised documents are attached as Products in a separate CD-Rom.

2. ACTIVITIES

2.1 Flood Management Policy Series

The '*Flood Management Policy Series'* has been established within the framework of the APFM. The series comprises of publications on various aspects of flood management policy, including economic, environmental, legal and institutional, and social aspects to facilitate the implementation of IFM principles into the development planning practice of river basins. The series are based on wide consultation process among experts from various disciplinary groups constituted for each publication, to guide and advise the preparation process. The preparation itself consisted of a wide review and consultation within the framework of conferences and direct correspondence with leading sector professionals in the area of natural resource management and development policy. Such quality assurance mechanism was a prerequisite to include a publication under this series. The series is published with a distinct design with the view to create a brand.

The publication "Legal and Institutional Aspects of Integrated Flood Management" has also been translated into Serbian, based on interest from partners in the region, in particular the Yugoslav Association for Water Law. The translation was undertaken through a License Agreement without resource inputs from the APFM. Efforts are also on to get these publications translated into other languages through regional/national partners. "Legal and Institutional Aspects of IFM – Case Studies" (English) was also published compiling four case studies from India, Japan, Serbia and Switzerland to provide the legal and institutional arrangements in each countries related to flood management.

The initial source and inspiration of the 'Flood Management Policy Series' has been in the 'Integrated Flood Management Concept Paper,' presenting IFM as a viable development policy option within the overall context of IWRM. Based on inputs of leading experts in the field of flood hazard research, it was first published in 2003 after a thorough consultation and review process, among others during the Third World Water Forum. The popularity of the paper required a reprint in 2004. The occasion was utilized to introduce a few modifications and was put out as the second edition. The second edition of concept paper has been published in English, French, Spanish, Russian and Japanese. Because of the needs for dealing with the emerging issues, such as risk management, urbanization, climate change and adaptive management, the third edition of Concept Paper was published in 2009. The IFM concept paper continues to play a central role in the outreach to flood managers, policy makers and development planners. In light of most recent catastrophic floods, the concept paper remains a valid and balanced source of inspiration for all target groups.

2.2 IFM Tools - General

During the process of compiling policy series papers, requirements for a range of tools to implement the concept of IFM in the field were identified. Therefore, an inventory of IFM Tools has been prepared. IFM Tools are guiding materials for flood management practitioners for various specific purposes, e.g. flood mapping, basin flood management planning, floodplain zoning and land use planning, flood loss assessment, flood forecasting and warning, environmental assessment, flood insurance and other burden sharing schemes etc. Those tools are intended to provide substantive guidance to the practitioners and provide a clear perspective of how the different tools fit together for an integrated approach to flood management.

Different IFM Tools have been developed on a wide range of subject matters related to IFM. Some of the tools provide an initial understanding of the issues while others provide detailed operational guidance. These are largely based on outputs from applied research undertaken in the field around the world and help the reader attain the multidisciplinary perspective. The tools serve as resource guides/materials for practitioners and not as academic state of the art papers. Other discipline specific tools, already available, will also be included for completeness and comprehensiveness. These tools can be categorized as follows:

Twelve tools were developed during this period. These tools are based on assessing readily available literature and findings from relevant works. References used are mostly available on the internet and

hyperlinks are provided in the "References" section. This approach corresponds to the needs of practitioners that may be confronted with immediate tasks such as flood loss assessment for easy access to relevant guidance materials. All these tools are disseminated on the APFM website. As the "Flood Management Tools Series" is not planned to undergo extensive peer reviewing, they are different from the "Flood Management Policy Series." These tools are living documents and will be updated periodically, on a needs-based basis and additional experiences gained through feed-back by users.

2.2.1 Formulating a Basin Flood Management Plan

This tool explains how to develop a basin flood management plan. It shows what kind of factors should be incorporated or taken into account in the planning process and what kind of analysis/assessments are to be undertaken to select the optimal options. It helps understand the requirement of IFM for basin flood management, which leads to identifying gaps in current practices towards an integrated approach to flood management. The user is encouraged to answer certain questions that are relevant in basin planning process. This process makes the reader more familiar with the issues. The tool is basically for the use of middle level policy makers and flood practitioners. It provides guidance to basic procedures in basin flood management planning. Various steps related to flood management planning such as national development vision/policy and enabling mechanism of planning are explained.

For basin flood management planning, identification of existing flood risks and issues related to floods and flooding is required. The analysis of beneficial aspects and negative socio economic impacts of floods and flooding become the basic information to formulate a future vision, policy, strategy and action plan for flood management. Such process has to be undertaken with the cooperation of all stakeholders in a basin such as communities, public sector, local, district and national governments to comprehend the issues comprehensively. It starts with identification of all relevant stakeholders and is particularly important as it provides the communities with a chance to express their preferences and concerns.

Because IFM forms a part of Integrated Water Resources Management (IWRM), basin flood management planning should align closely with the overall vision and policy of IWRM with focus on how flood issues should be dealt with. The process of basin flood management should preferably be incorporated in the planning process of IWRM.

2.2.2 Applying Environmental Assessment for Flood Management

The main objective of this tool is to explain various aspects of environmental assessment both at the strategic and project levels with special reference to flood management measures. This tool provides generic methodological approaches required to conduct Strategic Environmental Assessments (SEA) at the planning level and Environmental Impact Assessments (EIA) at the project design and implementation level. Environmental assessment helps identify, evaluate and document environmental impacts of flood management measures from the earliest stages to the project design and implementation stage. Steps of environmental assessment implementation for flood management at both levels consist of screening, scoping, identification and prediction of impacts, mitigation, review, decision-making, implementation and monitoring. These have been explained and described within the flood management context.

SEA is a proactive tool to explore the unforeseeable consequences and prevent environmental damages right at the stage of developing policy, plan or programme. Benefits of applying SEA can be summarized as supporting integrated decision-making, contribution to sustainable development, reinforcing environmental assessment at project level. Application of SEA from initial stages of decision-making prevents irreversible environmental damage that may be discovered at the later stage.

EIA has been useful in identifying the environmental and social impacts of proposed projects prior to decision-making in order to predict environmental impacts at an early stage in project design and implementation. Alternative proposals or minimization measures to prevent or reduce adverse impact must

be examined and incorporated into the project plan. In EIA more widespread public consultation and participation is required as compared to SEA.

Benefits of applying EIA can be summarized as better environmental planning and design of a proposal, ensuring compliance with environmental standards, saving in capital and operating costs, increased project acceptance by the public.

2.2.3 Conducting Flood Loss Assessments

This tool sets out to provide a lead-in on the available concepts and methods to assess flood losses. It would help the activation and facilitation of local and external help in the short term and the formulation of recovery plans as well as development planning and policy reform in the realm of flood management in the long run. The material seeks to contribute to a reduction of cases where flood loss assessments are undertaken arbitrarily due to a lack of readily applicable guidance and thus make flood management decision-making arbitrarily. As such the tool is considered useful for the:

- Flood managers, i.e. personnel from national and local specialized agencies, mostly with an engineering background;
- Public officials in charge of emergency response such as mayors; and
- Local groups and NGOs working in flood emergency response.

It is important to realize that flood loss assessments are undertaken with a variety of objectives, and that the different purposes determine the process and the outcome. The tool is divided into three sections depending on the objectives of flood loss assessments. The first section deals with the rapid assessment for emergency relief coordination during the flood. The second is assessment of damages in the first few weeks after floodwaters have receded with a view to inform and guide the recovery process, for example, in an insurance context, for allocation of recovery funds from national budget or for guidance to external aid agencies. The third section is a comprehensive assessment of flood losses 3 to 6 months after the flood to inform policy reform processes as well as the reconstruction efforts within national or sub-national planning.

2.2.4 Organizing Community Participation for Flood Management

This tool provides general guidelines to effectively organize community activities to ensure stakeholders' participation at various levels of decision making within the concept of IFM. Community activities play an important role in a front-line at each stage of flood management, which is briefly described below.

- Preparedness: Community participation contributes to building consensus among stakeholders and creating linkage with other activities. It is important to let the community people come up with a collective understanding on their own vulnerability and capacity assessment, such as through flood hazard mapping.
- Response: The accumulation of individual activities expects synergy effects in group. Raising awareness on flood disasters such as through the uniform flood signs is critical for sustainability on community response.
- Recovery: Community participation can enhance the sustainability and build synergies between actions done by individuals and support provided by external agencies especially at recovery stage. Local communities are in best position to understand the local situation and needs.

It has become apparent that top-down approaches to disaster risk management fail to address the specific needs of vulnerable communities. Principally, community participation for flood management can be organized by addressing community's needs, which enhances its effectiveness, and efficiency. Strategic approaches to organizing community participation comprise of three elements: maximizing resources through integrated use of local knowledge, understanding each stakeholder's expected role and degree of involvement, and motivating community participation through social-economic incentives and systematic

training. Six steps can be adapted for organizing community participation, that is, (1) process design, (2) risk assessment, (3) problem analysis, (4) goal setting, (5) drafting an action plan, and (6) implementation. Continual efforts through experimentation and following the basic principles are required as there is no single approach that suits all situations to organize community participation.

2.2.5 Reservoir Operations and Managed Flows

This tool aims to provide guidance for reservoir operations and managed flows that optimize the benefits by reduction in flood peaks, maintaining benefits from ecosystems and ensuring sustainability of social and economic activities.

Reservoir operations for flood moderation, as one of flood management options, play an important role in protecting people and their socio-economic activities in flood plains from flooding. Reservoir operations, however, have the potential to alter flow regimes, fix river shape or separate river channels from its flood plains under new flow and sediment regimes. The need for sustainable development has highlighted the importance of minimizing the negative consequences of such flood control and protection measures on natural flow regimes that have the potential to threaten human security, including livelihoods, and food and health security.

The central concern of this paper is to raise the awareness about different aspects of reservoir operation as well as to show possibilities of how flows can be managed successfully to minimize their possible adverse impacts. Elements of the tools are:

- Understanding changes in flow and sediment regimes by reservoirs,
- Identifying the issues that need to design a managed flows programme,
- Introducing options to tackle these issues by modification of reservoir operations,
- Planning the managed flows, and
- Providing a framework for environment sensitive reservoir operations

2.2.6 Urban Flood Risk Management

The main objective of this tool is to explain urban flood risks as well as to show possibilities of how they can be managed successfully. The tool is based on the holistic paradigm that only the combination of spatial, technical and organizational measures will lead to a more sustainable and effective management of urban risks.

Urban flood risks result from a combination of risk elements, comprising hazard, exposure and vulnerability. The recognition of these elements in urban context is essential to facilitate the understanding of flood risks. Municipalities are well advised to spend adequate resources for comprehensive flood risk assessments. Only if there is information which clearly indicates which neighbourhoods are most at risk, successful measures can be planned. Information about existing flood risks forms the basis for decision-making. After assessment of flood risks, analysis of options for the management of flood risks is required, appropriately targeting reduction of all the three components, hazard, exposure and vulnerability.

- Hazards (e.g. storm drainage, multipurpose detention basin, dual drainage concept, upstream land use planning): Upstream and downstream interactions have to be factored in urban flood risk management. For example, a very efficient drainage may constitute a severe flood hazard for downstream settlements. Finding an adequate compromise between storm-water drainage and source control needs consideration through consultation with all stakeholders.
- Exposure (e.g. flood plain zoning with consideration of flood risk as an integral part of long-term urban planning): Land use plans should be based on a best mix of regulatory measures, economic incentives, knowledge enhancement, and public investment with the objective of reducing exposure of economic activities to flooding.

- Vulnerability (e.g. flood proofing for physical vulnerability, community-based organizations for constitutional/economic vulnerability, early warning system for informational/motivational vulnerability).

Urban flood risk management has to be undertaken within a well defined framework that recognizes and makes use of the potential synergies that could be achieved through coordinated actions and addresses the conflicting requirements. In this too, firstly, the general conceptual framework related to IFM, total water cycle management, and land-use planning are discussed. The implementation of multipurpose measures enables municipalities to achieve multiple goals (flood mitigation, water supply, space for recreational activities, groundwater recharge, improvement of urban aesthetics, etc.). Secondly, flood management measures have to be planned across administrative and sectoral boundaries. Institutionalized links between concerned authorities facilitate cooperative planning. Lastly, participatory planning as the basis for urban flood risk management is discussed.

2.2.7 Role of Land-Use Planning in Flood Management

The way land resources are utilized has decisive influence on development path of societies. In many places the most valuable land resources in terms of soil fertility, urban development space, infrastructure location (e.g. transport links) etc. are liable to flooding. The tool helps provide a closer look at the major aspects that connect land use and flooding:

- The location of values and key components of the economy on flood plains provides economic benefits (i.e. the primary reason for developments being placed there) and at the same time creates risks for the society in terms of flood loss potential.
- The development of land has consequences on the hydrological processes on the one hand, (e.g., either by accelerating runoff through reducing the infiltration capacity of soils or obstructing the natural drainage system) and generation of sediment and pollutants that increase the damage potential of flood waters on the other hand.

Better understanding of these processes helps improve planning practices in the different sectors, land use planning on the one hand and flood protection or flood risk management on the other. This tool aims to:

- Identify the processes and policy principles that necessitate a linkage of land use planning in IFM
- Provide an overview of land use planning instruments considered applicable in the flood management context
- Identify the challenges and opportunities to a closer linkage between the various sectors concerned
- Provide guidance as to how those sectors can work together

The tool is primarily written for flood managers at municipal and higher administrative levels to facilitate the necessary dialogue with land use planners on local, regional and catchment levels, urban and agricultural planners, transportation planners, developers of individual land parcels etc.

2.2.8 Risk Sharing in Flood Management

This tool defines risk sharing as allocation of financial and other costs for flood risk management. It explains the shared responsibility of each stakeholder within the physical, technical, economic and political contexts. It highlights the mechanisms for spreading the financial burden for flood management focusing on equity in flood risk management with economic effectiveness. It provides an overview on flood insurance and other forms of transferring risks of flooding and deals with the inter-relationship between flood insurance, building resilience in the effected communities and reducing risks. It takes a brief look at the alternative forms of sharing financial risks from flood, such as calamity and reconstructions bonds by government, or internal and external solidarity funds.

Flood risks are essentially comprised of the cost of risk reduction, cost of managing the residual risks and the cost of flood losses. There are three strategies for risk management: risk reduction, risk retention and as a last resort risk transfer. Risk reduction includes activities that contribute towards diminishing the probability of potential losses. An efficient solution requires combination of all the three. An equitable mechanism for sharing the costs of risk mitigation is based on providing basic protection against an agreed level of flooding that reduces vulnerability to floods and accelerates wealth generation. Government as the chief development agent in a country should generally be able to bear this cost. The costs of protection against higher floods can be distributed between the state and municipal authorities as they benefit direct revenue from economic activities. For any protection above basic minimum, they should share the cost of risk reduction through various financial instruments. Because protection against all floods is neither financially viable nor environmentally sustainable, residual risks are always present. Emergency preparedness plans, early warnings and disaster response actions are undertaken to keep the materialized risk to a minimum. Individuals also take the responsibility by reducing their own vulnerability and implementing proofing measures through retro-fitting etc. Transferring of flood risks physically by diversions of flood waters to less vulnerable areas is an important option for flood risk management.

With all the efforts in place, flooding results in losses due to damage to properties and interruption of economic activities. Some of the losses that are materialized are absorbed by the element at risk, as retained risks. Depending on the capacity and vulnerability of the elements at risk, such retained risk may impact the recovery from flood and may turn into a disaster. In order to share the cost of recovery, some of the materialized risk is transferred through insurance as the last step in a systematic risk management process. It protects capital, enhances solvency and allows recovery, and if designed carefully, it has the potential to encourage risk reduction behavior. Small scale floods are predictable so risk reduction methods are most suitable for dealing with such risks while low-probability and high-consequence events easily destroy the insurance market. As such, insurance instruments are most suitable for middle levels of risk. Re-insurers play a crucial role in low-frequency and high-impact events. Recently, non-traditional financial mechanisms have been developed for the facilitation and support of recovery from flood events. Index based insurance, catastrophe bonds, and micro-insurance are some of such financing instruments. Some of those mechanisms have almost exclusively been employed in developed countries and a developing country perspective needs to be brought into the financial risk sharing debate. The discussion on these financial mechanisms can contribute to relieving pressure on public finances for other development activities and governmental services, particularly in developing countries.

2.2.9 Flood Management in a Changing Climate

A major element of climate change impact assessments undertaken within the 4th Assessment Report of the WMO/UNEP Intergovernmental Panel on Climate Change (IPCC) was pointing at the possible changes in flood frequency, magnitude and subsequently flood risk. The central theme of this tool is to bring the different aspects of climate variability and climate change showing possibilities of how they can be managed successfully. It is argued that only the combination of spatial, technical and organizational measures lead to a more sustainable and effective management of increasing flood risks under climate change regime. Based on a holistic paradigm of IFM this paper is structured into three main chapters.

Audience targeted by this tool is broad as the implications of climate change and variability on flood risks has to be dealt by various stakeholders. However, since flood management is primarily a public task with full involvement of stakeholders the target group is primarily the staff of the respective municipal authorities, national flood planners, emergency response authorities and the public at large. The target includes flood managers, spatial planners, civil engineers, water supply and sanitation services, civil defense authorities and health and social services.

This tool should not be seen as a technical manual but rather a starting point for the adaptation to climate change through Integrated Flood Management. Wherever possible, references to more specific sources of information, predominantly online sources, are provided. As climate change impacts are better understood and experiences in dealing with them are gained, the tool will remain a living document in the true sense.

As a number of climate related terms can be easily misunderstood, Chapter 2 provides some essential concept on climate change which might be important for new-comers in this field.. However, the experienced reader may like to skip this chapter. Chapter 3 looks at various ways climate change will affect hydro-meteorological variables that determine the magnitude and duration of flooding and at the same time provides information on global changes other than climate that may determine changes in hydrological (flood) processes including flood risks. Chapter 4 addresses climate change and how its impacts are likely to increase the vulnerability of the society. Chapter 5 explores ways of containing the increased flood risks within an acceptable level and thereby helps sustainable development. Chapter 6 focuses on the approaches that can be taken to put IFM into practice as part of climate change adaptation strategies. The tool briefly presents some case studies to demonstrate the use of flood management practices in an environment of a changing climate.

2.2.10 Management of Sediment-Related Risks

Sediment related disasters such as debris flows and landslides are often combined with floods, particularly flash floods. The mechanism of their origin is complex with a multitude of triggering factors. Developing a sustainable strategy to deal with sediment disasters requires appropriate analytical understanding to formulate strategies combining structural and non structural measures. This tool addresses how these hazards can be addressed in conjunction with flood issues.

Sediment-related disasters are defined as the phenomena that cause direct or indirect damage to the lives and properties of people, inconvenience to the life of people, and/or the deterioration of the environment, through a large-scale movement of soil and rock. Debris flows and landslides have high damage potential to human activities and properties and cause the loss of lives at the worst case when they happen near human living-area. Since debris flows and landslides happen unexpectedly and are difficult to predict, it is difficult to take precautionary measures and to establish early warning systems. Integrating land use planning is a pre-requisite in this endeavor. Debris flows and landslides have become a major source of risk for human living as a result of population pressure and related land use changes in landslide prone regions, most notably hilly and mountainous regions around the world. Debris flows and landslides, on the other hand, have been essential sources of sediment to downstream morphology, ecology of rivers, and historical development of alluvial fans and floodplains. The primary objective of this tool is to demonstrate approaches to address risks posed by landslides and mudflows as well as to provide guidance of how they can be managed to minimize loss of lives and livelihoods through:

- Understanding characteristics of debris flows and landslides
- Identifying the benefits and losses through sediment phenomena in river basin
- Assessing sediment movement risks
- Introducing some historical experiences and options to tackle sediment-related disaster management
- Providing guidance for the management of debris flows and landslides

2.2.11 IFM as an Adaptation Tool for Climate Change: Case Studies

The tool “Flood Management in a Changing Climate” was developed in 2008-2009 to document different aspects of climate variability and change, showing ways how these can be addressed through appropriate management decisions in dealing with floods. The case studies are complementing the tool described in 2.2.9 above. Cases were collected from U.S., U.K., France, Germany, the Netherlands, China, Korea and Japan which have advanced experiences in the development of adaptation strategies to climate change. This tool elaborates the following aspects: how to assess flood risks for climate change and adapt to the risks; how legal and institutional framework support climate change adaptation; and roles and responsibilities for the adaptation. Case studies emphasize the variety of approaches towards climate change adaptation in flood management practices. Wherever possible, references to more specific sources of information, predominantly online sources, are provided.

A broad audience is targeted by this tool because the implications of climate change and variability on flood risks has to be addressed by various stakeholders differently. However, since flood management is primarily a public task with full involvement of stakeholders, the target groups are primarily the staff of the respective municipal authorities, national flood planners, emergency response authorities and the public at large. The target group includes flood managers, spatial planners, civil engineers, water supply and sanitation services, civil defense authorities and health and social services.

2.2.12 Flood Emergency Planning

Since absolute protection from flooding is a myth, flood emergency management is an integral part of flood risk reduction, which aims at managing and minimizing the damage of flooding. This tool addresses the issue in flood emergency management, the contents of a flood emergency management plan and the preparation of emergency response plans at various levels, including the community level. The tool explains how the flood emergency management intervenes in the framework of risk reduction by reducing exposure to flooding under each stage of flood risk management.

The target group of this tool is primarily flood managers and in particular those who are involved in formulating flood management strategies and policies, having engineering backgrounds and needing rapid access to information to interact with emergency response mechanisms as part of their overall flood management strategy. The staffs of the respective municipal authorities, civil defense authorities and emergency response authorities as well as the public at large will benefit from the tool.

In the context of IFM, decision-making in flood emergency management must take into account not only flood risk alleviation, but also humanitarian and civil protection issues. Planning at all levels must be integrated so that the government's strategy, implemented through different departments, is coherent and harmonized. It must be applied at all levels of public planning, whether national, regional or local, and involve all relevant public agencies. Hence, horizontal and vertical interactions are keys for emergency planning.

With all the efforts in place, the remaining losses should be transferred, shared, or retained properly. The efforts should be made to reduce the residual risks that involve flood emergency management, such as early warning, evacuation and preparation for disaster relief and flood proofing, along with land use and spatial planning. With all the efforts in place for reducing flood risks, the retained risk should be managed properly by each community comprised of many different entities including the government at district levels, business and industry, NGO, and individual citizens. No matter which principles and procedures they have, they need to keep up their respective operations and make decisions under risk based uncertainties.

2.2.13 Conservation and Restoration of Rivers and Floodplains (in preparation)

Traditional flood management has been concerned primarily with providing flood protection to farmers, urban dwellings and industry. The concept of draining water as quickly as possible downstream has been ingrained in flood management policies for decades. The visible result of such policy are rivers that have been transformed into straight channels, without active floodplain, and without taking advantage of the natural morphology of rivers and the services that well functioning ecosystems provide for livelihood. The effects of such single purpose interventions in the river system include reduced ground water recharge, a loss of habitat for the species dependent on diversified aquatic environment, reduced in-stream storage and loss of ecosystem services. Social and economic values change in the course of development, so once the above effects become evident, e.g. after a phase of rapid growth, the floodplain communities demand not only flood control but also a healthy, livable, and scenic river environment. Reserving parts of the floodplain as active flood storage, as well as river restoration projects, has received a lot of local support in such situations.

While the value to biodiversity, scenery and local tourism of such projects is undisputed, flood management practitioners have been struggling to separate facts and fiction in the public debate about the particular type and magnitude of different ecosystem services, especially those pertaining to the effect of different

river/wetland restoration options on flood peaks. Experience has shown that retaining or restoring at least some of the natural structure and function of rivers and floodplains, and the wetlands associated with them, can be of great value in flood management programs, offering cost-effective solutions to some of the flooding problems, and also generating significant environmental, social and aesthetic benefits. Successful conservation and restoration projects serving multiple objectives are planned and designed with a broad set of stakeholders. The tool would assist practitioners through:

- Reviewing and describing options for conservation and restoration of rivers and floodplains that can potentially assist flood management practitioners in addressing various flood management objectives, such as reduction in peak flows and/or volumes, detention of flood peaks, retention of floodwaters and recharge of groundwater;
- Providing an overview of current practices that could help flood management practitioners in identifying and establishing the values of ecosystem services generated under different conservation, restoration and flood management scenarios;
- Providing ample reference to successful river and floodplain conservation and restoration projects that have helped in achieving flood management objectives or vice versa, and
- Providing examples of structures for the successful decision making processes and the tools and information required for integrating solutions across different objectives.

During APFM Phase II, administrative procedure for consulting outside expert was explored, and a contract was made with an external consultant for the development of the tool.

2.2.14 Guidelines on Flood Mapping (in preparation)

Flood Maps are tools to visually organize the flood information for decision makers and the public. They form the basis for developing flood risk scenarios based on various climate conditions, development alternatives, and social and economic conditions. In addition to the general objective of a flood map, special uses like tools for evacuation routes may be of utmost importance in case of tsunamis and floods in large flatlands. Some other functions of flood maps are (non-inclusive):

- Regulatory: Land use regulations and building codes
- Planning: Impacts of urbanisation, other land uses and climate change
- Rescue Operations: Building shelters and earmarking escape routes
- Flood Insurance
- Vulnerability Index
- Informational/Educational: record of flood magnitudes in an area

The decision making process does not end with the preparation of flood maps. It is only the first necessary step. The information regarding the risks needs to be communicated to the planners, flood managers and the public at large. Flood maps may be developed following various methodologies, but the final product should contain the necessary information that allows making sound decisions.

An “Expert Group Meeting on the preparation of Guidelines on Flood Mapping” was organized in Geneva, 24-26 April 2008. More than 20 international experts attended the expert group meeting. Experts were selected based on their contribution to or exposure in practice to flood mapping programmes and technologies. The meeting achieved its objectives in clarifying the scope, target audience and objectives of the undertaking, and to agree on a table of contents and work plan with all involved partners.
Scoping the document resulted in the broad areas to be covered:

- Development of the flood mapping strategy
- Describe various approaches for developing flood maps in brief (e.g. Geo-morphological, Historical, Remote Sensing, Hydraulic approaches)
- Methodologies/technologies of Hydraulic approach
- Development of different types of maps
- Social, economic, legal and other issues related to development and dissemination, including communication of flood maps with the user communities

In the months following the expert group meeting, contributions were received from various experts and compiled in an unedited draft. An Editorial Board was setup to review the contributions and make the necessary adjustment before starting an external review process of the Guidelines. Due to the fact that the effort is mostly based on voluntary inputs of the members of the expert group, the receipt of contributions sometimes required patience. The draft contributions were of good quality and the critical mass of contributions was sent to the Editorial Board.

2.2.15 Flash Flood Management (in preparation)

Flash floods are difficult to be managed only by traditional flood management measures because, compared with riverine floods, flash floods can cause rapid water level rise and high velocity flow sometimes combined with mudflow. In addition, flash floods tend to be phenomena of local range which are difficult to predict both in terms of location and magnitude of the hazard.

This tool introduces possibilities of non-structural measures which can reduce risks of flash floods. Flood forecasting and warning are expected to play an important role in flash flood management though there are difficulties to provide accurate and timely warnings. In order to deal with these difficulties there should be cooperation between National Meteorological and Hydrological Services (NMHSs) and local agencies and communities. Usually forecasting provided by NMHSs targets so large scale area that it cannot predict local events. A local hydrological model based on meteorological forecasts from NMHSs helps to narrow this gap. High resolution models like as Flash Flood Guidance developed by US national Weather Service also bring better forecasting. Flood warning also faces these difficulties. Warnings usually made by NMHSs and informed to local inhabitants through local agencies. If local agencies do not have proper authority and responsibility, they can not deliver their services to people appropriately.

Spatial planning and flood proofing can also reduce risk of exposures. These require flood hazard mapping to access the risk of flash floods and proper legal framework to integrate flood management planning and spatial planning.

In order to reduce damages caused by flash floods, reducing vulnerabilities is also important component of flash flood management. Participatory approach can identify areas at risk, facilitate the finding of acceptable solutions, increase the knowledge and awareness about flood risk and encourage the acceptance of the proposed solutions by the local populations. The degree of awareness raising and preparedness of local communities decides the effectiveness of flash flood management measures. Important steps to gain much effect through awareness raising plan are defining the target groups, specifying appropriate topics and choosing the most suitable methods.

Local activities should be focused strongly in flash flood management even though ensuring local community is usually time-consuming. Removing difficulties in local participatory approach requires following steps in the planning. Before tackling on planning process, local preparedness should be evaluated and if it is not sufficient local community should be educated through appropriate materials. Flood management team should consist of all stakeholders in flood affected area and the team should be opened to all members to raise opinions. In a planning process it is important to give the local community access to information on problems which directly involve them, and to work out evaluation procedures for the prepared estimates and plans.

2.3 National and Regional Support Activities

Supporting national and regional efforts in implementation of the IFM concept on the ground was one of the priorities of the APFM Phase II. Such activities were implemented in the form of

1. Technical support activities to help initiate and promote IFM in a country or region;
2. Continuous support for the pilot projects undertaken in APFM Phase I to enhance the outreach process of national and regional activities.

2.3.1 Kenya

APFM assisted Kenyan Ministry of Water and Irrigation to develop a Strategy for Flood Management for Lake Victoria Basin, Kenya in Phase I. APFM, in collaboration with the World Bank (WB), UNEP and Japan International Cooperation Agency (JICA), assisted the Government of Kenya in implementation of the recommendations and proposed activities envisaged within the Strategy.

In this regard, WMO, JICA and Kenyan Ministry of Water and Irrigation organized a national workshop, also inviting WB and UNEP, in August 2006 for the launching of "JICA Study on the Integrated Flood Management for Nyando River Basin." The main objective of the workshop was to seek a synergetic approach to flood management in the Lake Victoria Basin and to obtain inputs from stakeholders, policy makers and technical experts ensuring better cooperation and coordination amongst various stakeholders and technical and financial partners. The main recommendation of the workshop focused on the importance of community participation and the multi-sectoral approach of flood management. There was emphasis on the need for a comprehensive approach ensuring stakeholder involvement and utilization of knowledge and experience gained so far.

APFM has contributed to the progress of the above mentioned JICA activity by helping them incorporate the IFM concept and strategy into their project. Partners' consultation meeting was held in January 2007 in Geneva attended by WMO, JICA and Kenyan Ministry of Water and Irrigation to discuss the progress of the study and further requirement for the implementation of the Strategy. The Permanent Secretary of the Ministry of Water and Irrigation attended the meeting on behalf of Kenyan Government and expressed his appreciation of APFM's technical support and the coordination role among partners. Several recommended actions in the Strategy were discussed and, among others, the importance of institutional reform was highlighted in order to facilitate the implementation of actions. The Government of Kenya sought the ways to facilitate IFM implementation through JICA and World Bank projects in Nyando and Nzoia River Basins, respectively.

On 11 December 2008, JICA and Kenyan Ministry of Water and Irrigation organized a regional workshop, in collaboration with APFM, to finalize a master plan study on which APFM provided technical advices. This study was divided into three major components: formulation of master plan including structural and non-structural measures, capacity building through IFM workshops, and establishment of community-driven flood management. Five pilot projects were implemented under the study to examine the effectiveness of community-driven flood management, to develop local capacity for managing floods, and to review and prioritize projects in the master plan. The pilot projects showed the relationships between urgent needs and high satisfaction of flood management, and the effectiveness of "learning by doing" in a community flood management organization. From 2009, the next programme was launched based on the agreement between Kenyan Government and JICA. APFM continues to provide inputs to the JICA and facilitate the overall understanding of IFM concept for the central and regional officers in Water Resources Management Authority and Lake Victoria South Water Services Board, which are responsible for planning and implementation of flood management in the region.

2.3.2 Central and Eastern Europe

APFM's efforts in the Central and Eastern European pilot project set out to increase the preparedness and response capacity of local authorities and population in flash flood prone pilot communities in order to reduce the vulnerability of the affected population. Activities within the three pilot areas in Poland, Romania, and Slovakia were completed by summer 2006.

A number of innovative practices for integrating available information products on the local level as well as flash flood warnings into the social fabric of the pilot areas were developed together with approaches of adjusting institutional arrangements between the various levels of government, to clarify their respective roles in flood warning and emergency response. The project also provided the involved institutions with

means of educating the public to increase awareness levels about flash flood risks and to improve their flood preparedness and response capacity.

The project provided opportunity for the National Hydrometeorological Services to reach out to affected communities and work with mayors and crisis management groups to improve the effectiveness of existing technological warning components. It helped all actors to build a sense of trust and to understand the capabilities of the other. It also laid open the limitations of the current flood forecasting systems in coping with very short concentration times and risk awareness of the population. The project provided a platform for multiple stakeholders and groups with different levels of expertise to try and address the challenges involved in reducing the vulnerability of the affected population. The role of national chapters of the GWP, namely in the project components in Romania and Poland, greatly facilitated the implementation of the project and the involvement of a broad range of stakeholders.

From the outset of the pilot project, it was envisaged to provide feed-back derived from the three countries with pilot activities to the regional level. Based on the national reports and additional inputs from Romania and Slovakia, a synthesis report was prepared by the Office for Local Government Collaboration in the Polish Institute of Meteorology and Water Management. The Synthesis Report with the working title "Guidance on Flash Flood Management – Recent Experiences from Central and Eastern Europe" formed a central input to the "Regional Workshop on Community Preparedness and Public Participation for Flash Flood Management in Europe," held at the end of October 2007 in Krakow, Poland. The workshop was held under the patronage of the Mayor of Krakow and organized by WMO, GWP Central and Eastern Europe, the Institute of Meteorology and Water Management and GWP Poland. Some 40 participants from 12 countries attended, representing the National Hydrometeorological Services, municipal and district crisis services and water management institutions. The workshop was co-financed by APFM and the GWP (through its Facilitation Fund).

Workshop participants adopted recommendations for reducing the impacts of flash floods and are addressed to decision makers in the national and local administrations, and researchers and operational managers in the National Meteorological and Hydrological Services. APFM will continue to promote the implementation of these recommendations through various channels of WMO and GWP. Several participating countries from the region are considering translating the report "Guidance on Flash Flood Management" into their respective national languages. The full workshop proceedings are available on the APFM website.

2.3.3 Republic of Korea

South Korea was hit by a big typhoon in July 2006, which caused serious flood damages and claimed over 60 lives. This disaster was characterized by large debris flows and downstream inundation caused by aggradation of the channel bed, which involved the issues of land use management, forest management, emergency response, etc. Increasing such flood disasters in South Korea in recent years drew the attention of the Government of South Korean to give a fresh look at its flood management policies. To address the issues and get multi-disciplinary inputs, an international symposium on sustainable flood management with various stakeholder ministries, departments, institutions and civil society groups was organised on 28 November 2006 in Seoul. WMO, as one of the UN institutions working on flood issues, was invited the symposium by the Presidential Commission on Sustainable Development. APFM publications constituted the key background material for the symposium. APFM presentation elaborated the basic principles of IFM and pre-requisites for its implementation, stressed the need for adopting a river basin approach through multidisciplinary inputs, and emphasized the need for active involvement of various stakeholders.

This symposium formed the first milestone in the consultation process with various stakeholders. It was a clear indication of the government to move towards a sustainable flood management policy. APFM advised the necessary step to be taken by the Government of South Korea to ensure the development of flood management policy in an inclusive way.

2.3.4 Seychelles

In autumn 2006, the Ministry of Environment and Natural Resources of the Seychelles Government approached APFM for assistance in dealing with the flood management tasks assigned to the Ministry. The Ministry is responsible for the coordination, implementation and oversight of drainage and flood management.

Flooding poses a great challenge to the national economy, population and authorities responsible for flood management in the Seychelles. There is a growing concern that the frequency and severity of disasters are increasing. The Seychelles Ministry of Environment was in the process of establishing a "Drainage Unit" with key responsibilities for flood management. The flood problem, although largely confined to the coastal areas, had to be addressed through an integrated approach within the entire watershed. Therefore, there was need to establish a national level coordination mechanism in order to incorporate flood risk issues into the overall policy for water resources management and the flood management.

APFM guided and supported a flood management workshop in the Seychelles in April 2007, which involved representatives of all relevant Ministries and Departments of the Seychelles Government, including the Land Transport Division, the Drainage Task Force, the Department of Risk and Disaster Management, and the Seychelles Meteorological Services. The workshop provided a platform for needs assessment of the involved Departments for adopting an integrated approach to flood management. It resulted in the formulation of a brief project note titled "Building Capacities for Sustainable Flood Management on the Seychelles."

The above-mentioned proposal was intended to address the capacity building needs for flood management in related Government Departments. APFM worked on generating interest of the international financial partners to provide funding for the development and implementation of the project proposal. The substantive elements contained in the proposal were presented to the Global Facility on Disaster Risk Reduction (GFDRR). Discussions on implementing certain elements of the proposal were initiated with the International Centre for Water Hazard and Risk Management (ICHARM), Tsukuba, Japan.

2.3.5 Zambia

APFM in close collaboration with a technical team of Zambian experts jointly prepared the Strategy for Flood Management for Kafue River Basin in Zambia. The work involved information gathering and interaction with regional stakeholders and policy makers through the organization of two workshops. The Strategy was finalized in consultation with the Project Steering Committee consisting of experts from different concerned departments of the Government of Zambia in 2007.

Hon. Kenneth Konga, Minister of Energy and Water Development launched the Strategy in August 2007 and acknowledged APFM's role in developing such important document for one of the most flood affected regions in the country. He confirmed his government's commitment to draw up an action plan for implementation within the available country resources without any delay or waiting for external support.

Based on engagement of WMO in Zambezi Basin to establish a Flash Flood Guidance System, several countries of the basin have voiced interest on jointly developing a comprehensive flood forecasting system for the basin. The readiness of the basin countries to politically commit to such process would be explored. Once this proposal is confirmed, APFM would initiate a process of formulating a project proposal and get the necessary buy-in from the financial partners.

2.3.6 Mali

An agreement to fund the implementation of a project for assessing the impacts of floods and droughts on agriculture was reached between Mali and the Italian Ministry of Foreign Affairs. The total contribution is €300,000. The goal of the project is to reduce the vulnerability to the impacts of droughts and floods in agriculture and to contribute to sustainable food security, poverty alleviation, rural development and quality

of environment. The project will be implemented over duration of two years with the participation of Malian national services (National Directorates for Meteorology, Hydrology and Agriculture, Institute of Rural Economy), regional centres (Centre Regional de Formation et d'Application en Agrométéorologie et Hydrologie Opérationnelle (AGRHYMET), African Centre of Meteorological Application for Development), international research institutions (Institute for Biometeorology, Florence, Italy, National Drought Mitigation Centre, Lincoln, Nebraska, USA).

As a result of a kick-off meeting in September 2009, with the participation of representatives from the National Directorates for Agriculture, Hydrology and Meteorology, and the Institute of Rural Economy, consensus was reached on the general principles for the implementation and management of projects, including the criteria for the identification of the pilot areas and the nomination of focal point in the partner institutions. Likewise, a training course on the evaluation of drought impacts on agricultural systems was organized in September 2009. In terms of the flood component, because of lacking an already established methodology for the assessment of flood impacts in agriculture, an expert mission in November 2009 discussed with the Malian counterpart the detailed implementation of this component, including identification of pilot area, inventory of flood events, analysis of vulnerability and the development of early warning system. Field activities on the flood component were expected to start in March 2010 upon signature of an agreement between WMO and Direction Nationale de l'Hydraulique (DNH).

2.3.7 Guinea

A brief project proposal of IFM in Guinea was formulated under the title "Enhancing flood preparedness of settlements at risk" with the National Directorate for Hydraulics in the Ministry of Hydraulics and Energy as the implementation partner. The proposed project sought the implementation of IFM on a pilot area, through flood risk assessment and risk management, in particular, focusing on the preparedness of the population settled in flood prone areas. The proposal was submitted to the African Water Facility for possible funding.

2.3.8 Mauritania

A fact finding mission was carried out to Mauritania in July 2008 with a goal to evaluate, with experts from National Meteorological Service (NMS), National Hydrological Service (NHS) and other concerned institutions, the present status and needs of national flood forecasting and management systems, and to elaborate a set of draft proposals for their improvement.
The following actions were envisaged:

- Organize a sensitization seminar addressed to national decision makers
- Develop a project to reinforce capabilities of NMS and NHS in order to produce and disseminate flood related information and warnings
- Provide scientific backstopping on IFM to the State-led study in late 2008on the need and feasibility of relocating inhabitants in the city of Tintâne, which is regularly subject to flood events.

In agreement with the national authorities, a priority was given to the organization participated in the sensitization workshop held in 2009.

On 1 and 2 July 2009 in Nouakchott, Mauritania a national workshop on IFM was held with the main goal to demonstrate the concept of IFM to the relevant state services, local administration and other stakeholders. The workshop was organized following a request by the Permanent Representative of Mauritania with WMO as an element of the general strategy to improve national capacities to cope with flood events. The workshop also offered the opportunity to provide the first short course on IFM in French language as APFM capacity building activities. The workshop was attended by experts and officers of the Ministry of the Interior and the Ministry of Infrastructure and Transport, members of the National Crisis Commissions, parliamentarian and local administrators of flood prone areas, representatives of the various relevant technical State services, UN Systems and NGOs. As a follow up to the workshop, a project document was developed to implement demonstration projects on IFM in selected areas, notably Tintâne and the catchments of Gorgol, Ghorfa and Niordé rivers. The focus is on improved flood forecast through the integration of meteorological and

climatological information and on strengthening the response capacity of the local communities. Funding was sought for the implementation of the projects.

2.3.9 Zambezi Basin

WMO in collaboration with USAID/OFDA developed a Strategy for Flood Forecasting and Early Warning in the Zambezi Basin. The proposed project is intended to assess the capacity for flood forecasting and early warning in the countries in the Zambezi River Basin and to formulate a strategy with consent. The project is implemented through five main activity areas including, 1) regional consultation meeting, 2) national consultations, 3) basin-wide meetings of riparian hydrometeorological and disaster management organizations, 4) implementation of a demonstration project on flood forecasting system, and 5) analysis, recommendation and proposal for Basin-wide Flood Early Warning Strategy. The regional consultation meeting was organized as the first activity of the project from 1 to 3 December 2009 at Maputo, Mozambique. The main objectives of the meeting were to bring together all interested parties to agree on a framework for flood forecasting and early warning system for the Zambezi Basin, to gather necessary information from the countries in the Zambezi Basin to support the development of the Flood Forecasting and Early Warning Strategy in the Zambezi basin and to agree on the implementation of the Demonstration Project. Based on the discussions at the meeting a regional consensus on development of a flood forecasting and early warning system for the Zambezi Basin was achieved. The process for confidence building among countries in the Zambezi River Basin for real-time sharing of flood information was initiated. A road map for activities to be implemented under the project until December 2010 (and tentatively up to 2012) was established.

2.4 Capacity Building

For the implementation of IFM in the field, capacity building of stakeholders is essential. In APFM Phase II major emphasis was placed on capacity building. Capacity building is undertaken at various levels and the contents and the applied methodologies differ accordingly. During APFM Phase I, policy series papers were developed to enhance knowledge required for flood management. Training courses and materials are available as a portfolio of capacity building measures on IFM. Progress during the Phase II is described in the section below:

2.4.1 Compilation of training material

The flood management policy series papers are primarily aimed at flood managers in order to enable them to understand the full range of issues involved in flood management. The introduction of these papers in form of power point presentations is considered as an entrance point to induce a multi-disciplinary approach to flood management. In addition to the Legal and Institutional, Environmental and Social Aspects, the slide presentation materials for Economic Aspects of IFM was developed and are now available online on the APFM website as a resource for flood managers, policy makers and students as well as trainers.

2.4.2 Partnerships for the delivery of a comprehensive portfolio of capacity building measures

2.4.2.1 Extended vocational training (in-service) together with Cap-Net

It is recognized that the first line of action in capacity building should be aimed at the professionals. They are water resources and flood managers (e.g. river engineers), planners and policy makers in the areas of water system management, land-use, infrastructure, urban drainage and spatial planning. Therefore the first element of the portfolio of capacity building in the APFM is targeted towards extended vocational training of in-service policy makers as well as flood and water resources managers.

Cap-Net was identified as one of partners for capacity building, for jointly developing and implementing training courses. The knowledge and experience gained in implementing the APFM combined with

considerable experience and financial support capacity of Cap-Net is strong assets in pursuit of the joint work programme of both institutions since 2007. Development of Training Material in collaboration with Cap-Net is being undertaken on three topics for different target groups, namely

- Water/flood managers or policy makers at national level *(IFM Policy Course)*:
  A modular course of three to five days was created, including the Lesson Plans, PowerPoint presentation, group exercises, and video material. The Flood Management Policy Series serve as the main background reading material. For each specific course a number of local case studies were prepared. A team of experts in South East Asia started to compile those materials for a consolidated regional training package to be published jointly with Cap-Net and others. Based on this development the final consolidation of the global training materials is considered by APFM and Cap-Net.

- National NGOs active in community outreach projects in water or disaster management, and subsequently district/municipal level authorities as well as community leaders in flood-prone areas, particularly rural areas (*Community flood management course)*:
  Under this component it was envisioned to develop training course and materials suitable for adaptation to varied community realities related to water hazards occurring, as well as the local economic and social structure. Content of the material focuses on the establishment of community flood management committees, responsible among others for community needs and capability assessment, flood awareness raising, flood management operations on the local level (flood preparedness, emergency response and rehabilitation), planning and interfacing with respective government institutions, etc. During Phase II the Bangladesh Centre for Advanced Studies served as a partner in reshaping the materials already available from the APFM regional pilot project on the "Community Approach to Flood Management" and shape it into a baseline training material that could be adapted to local circumstances.

- Municipalities of urban agglomerations, in particular units responsible for urban drainage, spatial planning, as well as warning and emergency services (*Urban Flood Management course*):
  After translating the course materials on "Urban Flood Management" by Carlos Tucci from Spanish into English, a CD with the full contents was published jointly with Cap-Net.

The advancement of collaboration with Cap-Net further led to a request by Cap-Net for WMO/APFM to play an active role in a Cap-Net led capacity building initiative with the title "IWRM as a Tool for Adaptation to Climate Change." APFM responded positively in assisting Cap-Net not only to shape the contents particularly from the point of flood management to promote IFM as an element of a climate change adaptation strategy, but also to serve as a hub to WMO climate-related divisions. Two training events with WMO/APFM's involvement as a co-facilitator were held in form of global training of trainers in August 2008 in Panama together with a Cap-Net affiliated regional capacity building network, Central American Network of Educational Institutions (REDICA) and in form of regional training of trainers in October 2008 in Cairo, Egypt.

2.4.2.2 Materials for Educators and Children with Project WET

In matters of sustainability of programme outputs of APFM, it was necessary to transpose those outputs for the use of younger generation. This activity was targeted at providing scientific concepts for children at an early stage to help avoid misconception about the nature of floods, available flood management options, thereby avoiding risky development behaviour. These outputs can also aid outreach to the public.

"Project-WET: Water Education for Teachers" is a US based non-profit foundation for water education program and publisher. The program facilitates and promotes awareness, appreciation, knowledge, and stewardship of water resources through the dissemination of classroom-ready teaching aids. Project WET has more than 20 years of experience in the field of water education for teachers and youths, and developed a global water education delivery network designed to reach children through educators in more than 20

countries. Project WET and APFM had a mutual interest in developing educational materials on floods for teachers and youths as this is a gap in the current portfolio of educational outputs. Educational materials were printed and disseminated through Project WET's Education Delivery Network. The first two core publications of the collaborative effort include:

- *"Discover Floods Educators Guide"* targeted at teachers for use as teaching material; and
- *"Discover Floods KIDs (Kids In Discovery Series) Activity Booklet"* for children/youth aged 8-12.

A third element is considered but as yet not taken up in form of learning materials for older students aged 16-18. USAID together with NOAA responded to a call to financial partners to join the project. A joint materials development workshop with Project WET was held in June 2008. These publications were printed and widely distributed within the Global Water Education Village during the World Water Forum in Istanbul in March 2009. Various requests for translation were received during the Forum and would be followed up in consultation between WMO, Project WET and its Education Delivery Network.

2.4.2.3 E-learning with Technical University of Hamburg-Harburg

While direct trainings through various mechanisms are considered the most effective means to build capacities for IFM in the field, the use of the Internet as a means of training dissemination is also considered as an important component. It is recognized that providing the APFM's outputs in a more accessible and well-developed manner through web-based learning (or e-learning) options would greatly enhance the outreach of the programme. A list of available flood management e-learning is maintained on the APFM website under "Capacity Building."

The E-learning systems for flood practitioners named "FLOWS – Living with Flood Risk in a Changing Climate" and "EU Flood Manager" developed at the Technical University of Hamburg-Harburg (TUHH) distinguish themselves from other projects as the philosophy is based on the IFM concepts. APFM and TUHH jointly upgraded the existing systems and incorporated the two systems into one, named "Flood Manager E-learning." A section on the IFM Policy concept was also added. Continuous inputs from APFM and TUHH are expected over time, but a formal mechanism for quality control needs to be established.

2.4.3 Training activities

2.4.3.1 JICA Training course in Japan

APFM participated and delivered lectures on IFM in two training courses – "River and Dam Management" and "Flood Hazard Mapping" organized by Japan International Cooperation Agency (JICA) for flood practitioners and water resources managers from governmental organizations. The "River and Dam Management" course, organized annually under the supervision of Infrastructure Development Institute of Japan, provided knowledge and skills of the planning and the design of river improvement and water resources management.

"Flood Hazard Mapping" training under the supervision of the International Centre for Water Hazard and Risk Management (ICHARM) was organized in 2006 and 2007. The lectures covered various aspects of flood management including environmental, social, legal and economic ones based on the issues within the context of flood management activities in participant's respective countries. APFM publications were used as a basic material. APFM pilot projects were also introduced, and explained to show real practices in the field.

APFM continues to contribute to the JICA training courses to bring the concept of IFM to flood practitioners from developing countries particularly from Asia. Through such trainings, participants are able to extend their knowledge base to develop multi-disciplinarily approaches to flood management activities.

2.4.3.2 Workshop on IFM in Bolivia

The workshop was held in Cochabamba, Bolivia from 3 to 7 March 2008, co-organized by the Cochabamba Municipality, SENAMHI (Bolivia's National Meteorological Service), Centro Agua from the Universidad Mayor de San Simon and WMO. The workshop was addressed to the municipal chief technical officers of several Bolivian municipalities who are responsible for flood management in their jurisdiction. The workshop, inaugurated by the Honourable Mayor of Cochabamba, was attended by over sixty professionals, who decided to issue a statement declaring their willingness to adopt IFM and agreeing on a series of actions to be undertaken to achieve a rational flood management policy in Bolivia. The statement included four project profiles, two of a general scope and two more specific. The latter two include one for the Rocha River Basin which includes the municipality of Cochabamba and one for the city of Trinidad, affected by the extensive floods of the River Mamore during 2007 and 2008. Advice was given during the workshop on how to better address the study of the necessary aspects to be able to apply the IFM concept. It was also requested to analyse a report that was being prepared on the River Mamore.

2.4.3.3 Regional Training of Trainers for Latin America, Peru

A Regional Training of Trainers course on IFM for Latin America was held in Lima, Peru from 6 to 10 October 2008, co-organized by WMO, SENAMHI (the National Meteorological and Hydrological Service of Peru) and Cap-Net. The modules tested in a course in Spanish language in Cochabamba, Bolivia, in April 2008 were used. The workshop with 10 Latin American countries served as the basis to conduct roving seminars at the national level as a follow up. This course was supported by a dedicated fund managed by WMO on behalf of the Spanish Government for the Ibero-American countries.

2.4.3.4 Regional Training of Trainers for South-East Asia

APFM together with the Collaborative Knowledge Network Indonesia (CKNet- INA), and AquaJarring, both Cap-Net affiliated capacity building networks in Indonesia and Southeast Asia, held a regional training of trainers on IFM in Jakarta, Indonesia, from 24 to 28 February 2009. The course was financially supported by Cap-Net, the Netherlands Organization for International Cooperation in Higher Education and Research (NUFFIC) and the World Bank. APFM made its training materials on IFM available and provided facilitation for the Training of Trainer. The day before the course was used as an open network conference on IFM, with attendance from central government, donor organizations, NGOs, academia and the media. The training itself was attended by 16 participants from the region. As a direct follow up of this training, a request was received to conduct a national training for Malaysia in collaboration with the Malaysian Department for Irrigation and Drainage.

2.4.3.5 Training Workshop on IFM for Countries in Western Asia and Arab Region

The training workshop, jointly organized by UN-Water Decade Programme on Capacity Development (UNW-DPC), WMO and the Regional Centre on Urban Water Management (RCUWM) - Tehran took place from 11 to 14 May 2009 in Tehran, Iran. More than 29 participants, including top and mid-level managers and professionals in water resources management, disaster management, land-use management and spatial planning, met in Tehran to share their experiences and best practices regarding the national situation of IFM in their countries. The main objective of the training workshop was to familiarize participants with the concept of IFM and to make them identify possible paths of action towards implementation of the concept in their own field of work. The technical presentations and the practical exercises were designed to provide the participants with an in-depth exposure to the social, economic, environmental and institutional dimensions of flood management and to allow them to develop an integrated perspective on floods, floodplains and the development process in their own country.

2.4.3.6 Malaysia

Co-organized by the Department of Irrigation and Drainage (DID) of the Government of Malaysia, WMO and Cap-Net, the IFM Capacity Building Programme for DID took place from 10 to 14 August 2009 in Kuala Lumpur, Malaysia. About 50 top managers and senior engineers of DID, together with experts from other departments and NGOs participated in the training programme. Key issues of the training were to introduce the concept of IFM into existing flood management and mitigation plans and to identify necessary measures to implement IFM in river basin planning. Aiming to test IFM practices in the context of flood management in Malaysia, participants agreed to develop and implement pilot projects. Back-to-back with the training course, a seminar was organized in which around 200 people participated from central government, federal states of Malaysia, local authorities, NGOs, consulting companies and universities. In lively interactions between the presenters and participants, the requirements for the implementation of the IFM approach from legal and institutional, environmental, social and economical aspects were introduced by APFM and resource persons of Cap-Net.

2.4.3.7 Introductory seminar on IFM, Turin, Italy

On 9 November 2009, an introductory seminar on IFM was organized in Turin, Italy, in the premises of the Regional Museum of Natural Sciences, in response to a request submitted by the Piedmont regional authorities. The purpose of the seminar was to present the IFM concept to a broad audience composed by officer of the regional administration in charge of environment, land-use planning, flood forecasting and civil protection as well as other professional practitioners' (engineers, geologists) involved in the same activities. After a general introductory presentation of the multidisciplinary requirements for IFM, the theoretical presentation was complemented by case studies of IFM principles in Switzerland (by the Swiss Federal Office for the Environment) and by a presentation on the uncertainties of hydrological modelling (by Turin Polytechnic University and Piedmont Regional Agency for Environment Protection). The presentations were followed by an animated question and answer session in which various topics were further debated, such as legal implication of forecasting uncertainties, flood risk mapping, perception of flood hazards in the media and in the public, and social implications of land use planning for flood management.

2.4.3.8 Nile Basin

Collaborated with the Federal Office for the Environment, Cap-Net, Nile Basin Capacity Building Network (NBCBN) and UNESCO-IHE, the Training of Trainers workshop on IFM was held in Nairobi, Kenya from 23 to 27 November 2009. The workshop was hosted by IGAD Climate Prediction and Application Center with the support of Kenya Meteorological Department. Considering the importance of flood issues in the Nile Basin countries, WMO in response to a request from NBCBN agreed to organize in close collaboration with partners this workshop within IWRM concept for the Nile Basin. The workshop was developed to familiarize participants from Nile Basin countries with the concept of IFM and to identify possible actions towards implementation of IFM in their own field of work. The workshops provided participants with in-depth views of the social, economic, environmental and institutional dimensions of flood management and lead them to develop an integrated perspective on floods, floodplains and development process in their own countries. Around 30 experts from Burundi, Democratic Republic of Congo, Egypt, Eritrea, Kenya, Rwanda, Sudan, Tanzania and Uganda agreed to coordinate the establishment of a group of experts to develop a programme for promoting and applying the IFM approach in their countries.

2.4.3.9 Iran

A training course on IWRM for Iran was organized jointly by JICA and the Japan Water Agency from 24 November to 18 December 2009 in Tokyo, Japan. As part of the training course, a lecture on "Floods and IWRM" was held on 9 December 2009. The lecture to introduce the concept of IFM and activities of APFM was made to 11 participants from semi-governmental organizations dealing with water management. In the training, activities related to flash flood management and community approaches to flood management

were also emphasised. Participants voiced their satisfaction with the lecture and their interest to adopt IFM approach in their flood management activities.

2.5 Flood Management Reference Centre

Researchers, social scientists, hydrologists, engineers and development planners have been working over a number of years on various aspects of flood management. There is no dearth of research findings, good practices and strategies. However, these activities have been carried out by the specialists in disciplinary isolation with little or no cross-disciplinary interactions. The result is that the available information tends to be confined to the realms of particular discipline without ready accessibility, which is essential for an interdisciplinary approach. The reference centre plays a vital role in establishing linkages among various disciplines, institutions, and actors involved in flood management. The Flood Management Reference Centre currently consists of three databases, such as Flood Management Institutions, Literature, Policy and Law. These databases are being continuously updated. The number of countries and entries in each database during Phase II is as follow.

Number of countries

	2006-2007	2007-2008	2008-2009	2009-2010
Institutions and Agencies involved in Flood Management	110	111	112	112
Literature on Flood Management	49	50	45	45
Flood Management Policy and Legislation	27	42	50	50
Flood Prone Areas	22	24	-	-

Number of entries

	2006-2007	2007-2008	2008-2009	2009-2010
Institutions and Agencies involved in Flood Management	345	381	383	388
Literature on Flood Management	207	228	241	263
Flood Management Policy and Legislation	140	228	228	232
Flood Prone Areas	27	30	-	-

2.6 Dissemination of information and advocacy activities

2.6.1 APFM Newsletters

APFM Newsletters have been published since June 2002 to disseminate APFM activities. The newsletter is disseminated in two formats: the PDF version and HTML version. The HTML version is sent electronically to subscribers (the number of subscribers is approximately 1,200) via email for a quick look. The subscribers can also download the PDF version in a printable format, if they want to go through and know about APFM activities in detail. Information about the outcomes of events and conferences, which APFM participated in or organized, can be obtained on the APFM web site. During Phase II, 11 newsletters (No.12 – No. 22) were published.

2.6.2 Meetings and conferences

The staff of APFM and WMO participated in various conferences, workshops, and seminars to promote the concept of IFM and APFM activities. Major events are listed as follows.

Month	Place	Name
2006		
August	Dhaka, Bangladesh	International Conference on Water and Flood Management
November	Bucharest, Romania	International Conference on Hydro-geological Hazards
November	Bonn, Germany	Meeting of the Parties to the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes
2007		
October	Sacramento, USA	International Commission for Irrigation and Drainage Conference
November	Tuxtla Gutierrez, Mexico	Course-Workshop: Vulnerability and Management of the Risk Produced by Flooding
December	Beppu, Japan	1st Asia Pacific Water Summit
2008		
May	Toronto, Canada	4th International Symposium on Flood Defence
		High-level Expert Panel on Water and Disaster
2009		
March	Istanbul, Turkey	5th World Water Forum
April	Geneva, Switzerland	Workshop on Transboundary Flood Risk Management
June	Geneva, Switzerland	2nd Global Platform on Disaster Risk Reduction
August	Stockholm, Sweden	World Water Week
September	Geneva, Switzerland	3rd World Climate Conference

International Conference on Water and Flood Management, Dhaka, Bangladesh, 2006
APFM participated in the International Conference on Water and Flood Management, which was held from 12 to 14 August 2006 in Dhaka, Bangladesh. The conference focused on the integrated approach to water and flood management that addresses the needs of the development goals. APFM made presentation on "Integrated Flood Management for enhancing resilience of society toward socio-economic development," which focused on social aspects of IFM in risk management principle and stakeholder involvement. The pilot project in Bangladesh, which was undertaken during Phase I of APFM, was also introduced in order to present the effectiveness of community approach to flood management.

International Conference on Hydro-geological Hazards, Bucharest, Romania, 2006
Romania recently experienced numerous floods and flash floods for several years, which overshadowed the historical floods of the 1970s in terms of material damages and human losses. The Ministry of Environment and Water Resources of Romania was in the process of adopting a new National Strategy for Management of Flood Risks based on an integrated approach. The International Conference on Hydro-geological Hazards held in Bucharest, Romania, from 6 to 8 November 2006 provided an opportunity to illustrate and advocate the concept of IFM and to present the major outcomes and results of this joint WMO/GWP-Romania pilot project. The APFM worked with Romania on the pilot project in Cheia area to put the IFM principles into practice particularly with reference to flash floods.

Meeting of the Parties to the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes, Bonn, Germany, 2006
APFM made a poster presentation on "Transboundary Flood Management" at the 4th Meeting of the Parties to the United Nations Economic Commission for Europe (UNECE) Water Convention, held in Bonn, Germany, 20-22 November 2006. The Meeting of the Parties adopted the "*Model Provisions on Transboundary Flood Management.*" APFM followed the development process of the above-mentioned Model Provisions as an observer in the Legal Board under the Convention. The participants were presented

with the policy paper on the "Legal and Institutional Aspects of IFM." The Model Provisions set out riparian countries' obligations that can be included in legal instruments on transboundary waters or on flood management. For riparian countries wishing to jointly address flood issues with their co-riparians, these Model Provisions can provide an important basis and starting point of cooperation and negotiation. An integrated approach can only be recognized if considering the full range of legal instruments developed on the platform of the UNECE (e.g. taking into account the UNECE Water Convention, its Protocols, The Aarhus Convention and other instruments). APFM made suggestions accordingly.

The Parties also decided to focus their future joint work on water and climate change and to develop a *Strategy for the UNECE region on Water and Climate Adaptation*. The Strategy will address possible impacts of climate change on flood and drought occurrences, health related aspects as well as practical ways to cope with the transboundary impacts through adaptation. APFM plans to continue its collaboration with UNECE in seeking where appropriate to mainstream the IFM policy concept into the outputs of the UNECE Water Convention.

Support for developing country participants to attend 4th International Symposium on Flood Defence, Toronto, Canada, 2008

As part of the efforts to strengthen the capacity of flood managers from developing countries, APFM facilitated participation of five persons from developing countries to attend the 4th International Symposium on Flood Defence (ISFD4) held in May 2008 in Toronto, Canada. The Symposium is an exclusive triennial event that constitutes a unique gathering of flood managers, scientists and development managers. The theme of this symposium focused on the management of flood risk, reliability and vulnerability. The support from APFM was intended to provide an opportunity for such participants to present to global audience opportunities, constraints and good practices of flood management in their countries, and to facilitate discussion at the symposium about various available flood management options for countries with different socio-economic framework conditions. The conference provided a unique opportunity to bring the interdisciplinary group of flood experts to share critical knowledge from regional and international perspective. A presentation was made on behalf of APFM at the plenary session on the main-streaming climate variability and change in flood management. One of the major outputs at the session was that the Symposium decided to rename itself into "International Symposium on Flood Management." The Symposium also requested the International Flood Initiative, which adopted propagation of IFM approach, to incorporate this event into its activity plans. The next symposium in the series is organised by the International Centre for Water Hazard and Risk Management in Tsukuba, Japan in September 2011.

High-Level Expert Panel on Water and Disaster, 2008

The High-Level Expert Panel on Water and Disaster was established based on the Hashimoto Action Plan at the 4th World Water Forum, aiming at two objectives. The first is to establish clear global-level goals to reduce loss of life and livelihood caused by water-related disasters with coordination of UN/ISDR and the Japan Water Forum. The second is to provide adequate and safe water and sanitation during and after disasters with coordination of the World Water Council. After several meetings since September 2007, the final paper was presented at the 5th World Water Form, titled "Prevention and Action to Minimize Death and Destruction" with six urgent imperatives. One of the imperatives emphasized to incorporate disaster risk reduction and climate change adaptation into development planning, which was strongly advocated by the integrated approach towards disaster management.

International Commission for Irrigation and Drainage Conference, Sacramento, USA, 2007

The International Commission for Irrigation and Drainage (ICID) is a technical NGO with representatives from the irrigation and drainage organizations of 120 countries. A majority of them are also responsible for flood management at the federal level. Concurrent with the bi-annual meeting of the Commission called Congress, the Working Group on Flood Management organises a symposium where flood managers from the countries exchange experiences and develop guiding material. The Group usually takes a mono-disciplinary approach. A presentation on IFM was made on behalf of APFM during the last session of the Flood Management Group held in Sacramento in October 2007. Various publications of APFM were distributed and warmly accepted in the symposium.

Course-Workshop: Vulnerability and Management of the Risk Produced by Flooding, Tuxtla Gutierrez, Mexico, 2007

The course on *Vulnerability and management of the risk produced by flooding* was organized by UNESCO and Mexican National Commission on Water (CONAGUA) in Tuxtla Gutierrez, State of Chiapas, Mexico, from 12 to 15 November 2007. The course was attended by more that 50 participants from Mexico, Argentina, Bolivia, Chile, Costa Rica and Guatemala. WMO participated in the workshop as part of faculty and delivered lectures on topics: “Vulnerability and Flood Management” and “Governance and participation in flood management”. WMO explained the concept of Integrated Food Management (IFM). WMO had the opportunity of informing the group various aspects of IFM. Due to the simultaneous flooding events in the south of Mexico, the media participated very actively in the workshop.

1st Asia Pacific Water Summit, Beppu, Japan, 2007

The 1st Asia Pacific Water Summit (APWS) was held from 3 to 4 December 2007 in Beppu City, Japan, where high-level policymakers and various notable guests were invited to discuss and share views on the ways to better manage water-related issues, thus contributing to concrete actions. One of the main issues raised was adverse effects of projected climate change on water resources and flood management. APFM contributed to one of the main themes titled "Water-related Disaster Management" organized by the International Centre for Water Hazard and Risk Management. The "Policy Brief" was issued as key messages and recommendations to the participants, recognizing integration of water-related disaster risk reduction into national development plans, and adaptation to increasing risks from climate change as a “highest” priority. APFM also participated in the symposium titled "Integrated approach to water-related disaster management" held just before the Summit. It was agreed that adaptation is as important as mitigation in coping with climate change, and that flexible adaptive measures are necessary to realize an integrated approach to water-related disaster management.

5th World Water Forum, Istanbul, Turkey, 2009

The 5th World Water Forum (WWF5) was held from 16 to 22 March 2009 in Istanbul, Turkey, where high-level policymakers and various notable guests were invited to discuss and share views on the ways to better manage water-related issues, thus contributing to concrete actions. One of main issues raised were projected adverse effects of climate change on water resources, including flood management. After the remarks offered by the Secretary General of WMO, APFM chaired one of the main themes of WWF5 titled "Managing Water Related Risks in Changing Climate" organized by ICHARM and Japan Water Forum. The "Policy Brief" was issued as a key message and recommendation to the participants, that is, incorporating integrated water-related disaster risk reduction into national development plans, and recognizing adaptation to increasing risks from climate change as a “highest” priority issue. Major issues to be bridged included water-related disaster risk and poverty reduction. The example of flood plains was mentioned as a main source of livelihoods in the agriculture-oriented economies. Augmenting the productivity of those floodplains through IFM strategies is a major tool to work towards disaster risk reduction, and food and livelihood security. APFM also participated in the side event of International Flood Initiatives organized by ICHARM and in the Global Water Education Village titled "Discover floods" co-organized by Project WET. APFM also supported two exhibitions by WMO and UN-Water.

Workshop on Transboundary Flood Risk Management, Geneva, Switzerland, 2009

As floods do not recognize borders, transboundary flood risk management is imperative in shared river basins, involving both governments and their people. However, transboundary flood management is not easy to implement, because joint monitoring, forecasting and early warning, coordinated risk assessment, joint planning of measures, and appropriate legal and institutional frameworks are all necessary. Transboundary flood management has been at the core of the work under the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) since its entry into force in 1996. Although the Convention does not address floods in detail, most of its provisions are fundamental to the management of transboundary floods. Above all, the Convention obliges Parties to prevent, control and reduce transboundary impacts, including those resulting from floods and from unilaterally decided flood protection measures such as dams. Since the Convention came into force, these core obligations have been elaborated in more detail and expanded in a number of guidelines. Several capacity-building activities were

implemented for strengthening capacity in the region and exchanging knowledge and experience. The European Union (EU) Directive 2007/60/EC on the assessment and management of flood risks also raised an issue for transboundary aspects. Since then, efforts in the areas of flood management mostly focused on exchanging experiences and knowledge between EU and non-EU countries.

In this context, a Workshop on Transboundary Flood Risk Management was organized from 22 to 23 April 2009 in Geneva by UNECE, the Governments of Germany and the Netherlands, and APFM. The workshop aimed to take stock of current problems, recent progress and remaining challenges in transboundary flood management, all on the basis of concrete examples. The workshop was prepared in close cooperation with Parties and non-Parties, who elaborated the case studies by analyzing in depth flood management problems in the different basins. Moreover, a background study was prepared to guide the discussions.

2nd Global Platform for Disaster Risk Reduction, Geneva, Switzerland, 2009

The HelpDesk for Integrated Flood Management was officially launched at the Global Platform for Disaster Risk Reduction on 17 June 2009. In their key note addresses, Michel Jarraud, Secretary-General of WMO and Margareta Wahlström, Assistant Secretary-General for Disaster Risk Reduction of the United Nations welcomed the establishment of the IFM HelpDesk and stressed the importance of an integrated approach to flood management in disaster risk reduction, specifically by addressing the underlying socio-economic conditions that exacerbate flood risks. His Excellency, Mr. Shinichi Kitajima, Ambassador of the Japanese Permanent Mission to the United Nations in Geneva introduced the comprehensive experience in flood management in Japan and expressed the willingness of his government to support the IFM HelpDesk. A panel discussion on how the IFM HelpDesk contributes to the reduction of disaster risks including climate change was held and the panel members expressed their expectation from the IFM HelpDesk.

World Water Week, Stockholm, Sweden, 2009

As part of the annual Stockholm World Water Week, a side event titled "Country Assistance for Robust Flood Management Policies: The HelpDesk for Integrated Flood Management" was organized in August, 2009 together with the partners of GWP, Cap-Net/UNDP, the Stockholm International Water Institute (SIWI) and the Dundee Centre on Water Law, Policy and Science. The side event helped further raise awareness amongst water professionals about the available support mechanism under the HelpDesk for countries and river basin organizations. As part of the 'Water and Climate Days," APFM, Cap-Net and a series of other actors organized a seminar "Integrated Water Resources Management (IWRM) as a practical approach to climate change adaptation." During the seminar, the Training Manual and Facilitator's Guide on the same topic was published. This training manual is useful to assist capacity builders in developing training and educational programmes on the use of IWRM tools and instruments for adaptation to climate change impacts. The material is intended to increase our understanding of climate change impacts and what we can do now through better water resources management.

3rd World Climate Conference, Geneva, Switzerland, 2009

A special side event for the IFM HelpDesk was held on 1 September 2009 during the World Climate Conference-3 (WCC-3). WCC-3 was convened to provide nations with the opportunity to jointly consider and appropriate global framework for climate services that would help every country access and apply climate information. The event was moderated by Dr. Eugene Stakhiv, US Army Corps of Engineers, with five panellists representing academia, technical experts, policy makers and development agencies. The main theme of panel discussion was "Role and Potential of Climate Information in Support of Flood Management and the Role of the IFM HelpDesk." The discussion recognized that climate variability and change may affect current flood management practices and called for innovative approaches. The event provided an excellent opportunity to promote HelpDesk services and activities.

2.6.3 Website

During the Phase I of APFM, the APFM website was established as the central access point for information on flood management in order to:

- promote the IFM concept;
- disseminate APFM activities in adopting IFM, such as field demonstration projects (i.e. pilot projects) and compilation of good practices and lessons learned from various regions of the world;
- provide reference centre on flood management (i.e. a set of databases).

The APFM website is continuously updated to fulfil these objectives. All the publications and materials produced so far, information of latest events and flood management reference centre are made available on the website. Since the launch of APFM website in December 2004, the number of visitors has been steadily increasing. As seen in the figure below, the gap of the number of visitors in July 2007 was due to different statistical measures applied by different companies hosting the APFM server. APFM changed the hosting server company because the new company had better service at a cheaper overhead cost. Several peaks of hits are observed after major events such as international conferences and issuance of new APFM newsletters. The steady rise in number of visitors is a clear indicator that visitors tend to revisit the page, otherwise the peaks after events would recede back to original values.

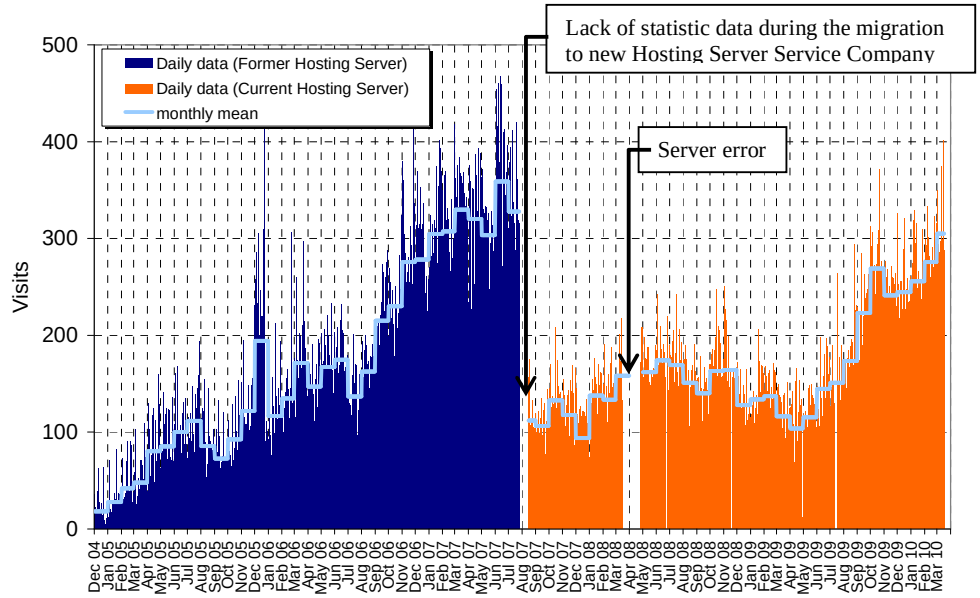

Figure 1: Website visits from 1 December 2004 to 18 March 2010

2.6.4 Distribution of publications

During the Phase II, the publications of Flood Management Policy Series (Legal and Institutional Aspects of IFM, Social Aspects and Stakeholder Involvement in IFM, Environmental Aspects of IFM and Economic Aspects of IFM) in English were delivered to several universities and institutions with curriculum relevant to IWRM or IFM. The publications were also delivered to NGOs and government organizations. French version and Spanish version of publications were dispatched to French and Spanish speaking countries. At the international conferences or workshops these publications were also distributed. APFM CD which includes all APFM website contents was also distributed. The number of countries and institutions to which APFM sent publications, and the number of copies dispatched is as follow;

Number of countries

	2006-2007	2007-2008	2008-2009	2009-2010
Legal and Institutional Aspects of IFM	18	130	133	134
Social Aspects and Stakeholder Involvement in IFM	21	130	134	135
Environmental Aspects of IFM	26	130	134	134
Economic Aspects of IFM	-	-	31	37

Number of institutions

	2006-2007	2007-2008	2008-2009	2009-2010
Legal and Institutional Aspects of IFM	79	365	415	429
Social Aspects and Stakeholder Involvement in IFM	88	373	439	439
Environmental Aspects of IFM	104	389	423	455
Economic Aspects of IFM	-	-	49	61

Number of copies dispatched

	2006-2007	2007-2008	2008-2009	2009-2010
Legal and Institutional Aspects of IFM	157	728	962	1191
Social Aspects and Stakeholder Involvement in IFM	238	808	1050	1229
Environmental Aspects of IFM	285	855	1003	1315
Economic Aspects of IFM	-	-	176	438

2.7 Linkage to other activities

2.7.1 International Centre for Water Hazard and Risk Management

The International Centre for Water Hazard and Risk Management (ICHARM) was established at Public Works Research Institute (PWRI) in Tsukuba, Japan under the auspices of UNESCO in March 2006. The objectives of this centre are to promote research, training and information networking activities, focusing on the issues related to water hazards and water-related risk management. The centre assists implementation of best strategies in localities, nations, regions, and the globe to manage the risk of water related disasters. The centre also serves as the secretariat of the International Flood Initiative (IFI), in which UNESCO and WMO are the key participating organizations. WMO is closely collaborating with IFI through APFM and is also represented at its Board of Governors. APFM had a number of meetings and workshops with ICHARM in August 2007 in Tsukuba to discuss future cooperation activities about developing IFM tools and training for capacity building.

Since its establishment, ICHARM was developing its activities and APFM contributed to ICHARM by providing IFM inputs, for example, delivering the lecture at the “Flood Hazard Mapping” training course supervised by ICHARM as explained in 2.4.3.1. Recognizing the importance of incorporating IFM concept into the activities of IFI and ICHARM, greater synergy was developed through cooperative activities by APFM and ICHARM.

ICHARM supervised one-month training course on flood hazard mapping to provide high level knowledge and skills to the technical managers and engineers who worked for the flood management in public sector. Based on this training, and considering the recent increase of flood disaster and resulting need for capacity building to mitigate such disaster, ICHARM and Japan International Cooperation Agency (JICA) launched the master course for "Water-related Risk Management," which was accredited by the national Graduate Institute for Policy Studies. This course was designed to provide the knowledge and experiences of risk management and to improve the capacity of trainees to promote IFM in each country. Students are awarded master's degree after one year of intensive course works, research and on-site training. During the initiation process of this master course, APFM contributed to the formulation of basic idea and structure of this course to facilitate the trainees to understand IFM. APFM continuously supports this activity under the overall cooperation between APFM and ICHARM for capacity building.

2.7.2 Japan Institute of Construction Engineering

The Japan Institute of Construction Engineering (JICE), a Japanese non-profit foundation, conducts comprehensive and effective research and develops of new construction technologies with a view to improve construction engineering practices. One of their focuses is flood management and water resources development including coastal management. WMO and JICE recognized mutual interests in promoting integrated approaches to flood management, through cooperative activities in developing concepts and operational tools for implementation of IFM and thereby contributing to the prevention and mitigation of natural disasters. JICE has been working with WMO and supporting APFM based on comprehensive agreement signed on May 2007 and yearly agreements between the two parties that specify the activities and the contributions of resources for the activities. Since then, valuable collaboration was made between JICE and WMO, particularly in the preparation of advocacy materials to disseminate IFM concepts to policy makers, flood managers, disaster management authorities, local administrations and NGOs and through translation of these materials into Japanese. In 2008, two APFM Policy Series, "Legal and Institutional Aspects of IFM" and "Environmental Aspects of IFM" were translated into Japanese and shown in the website, based on the License Agreement under the comprehensive agreement.

For further strengthening the relationship between WMO and JICE to build on the gains of the existing collaboration and entering into a strategic partnership, both parties agreed to establish a mechanism for providing necessary expertise and services for further development of the concepts and operational tools for the planning and implementation of IFM. Areas of cooperation include:

(a) Development of the tools;
(b) Promote scientific research, in flood management and related areas through the promotion of joint studies;
(c) Strengthening the existing channels of cooperation and communication to further exchange scientific knowledge and skills; and
(d) Publications of material on flood management and their transfer to the countries in need.

2.7.3 Swiss Federal Office for the Environment

The collaboration between APFM and the Swiss Federal Office for the Environment (FOEN) was substantially strengthened during the Phase II period. FOEN has been working with WMO and supporting APFM based on comprehensive agreement signed on 16 July 2008 and yearly agreements between the two parties that specify the activities and the contributions of resources for the activities. Being recognized that Switzerland has long and successful experiences in dealing with floods and other natural hazards through an integrated and holistic approach, FOEN and WMO recognized mutual interest in promoting integrated approaches to flood management. The cooperative activities include:

- help assimilate and implement the principle of IFM within IWRM;

- provide guidance on flood-related issues to countries that want to adopt the IFM concept including formulation of flood management policies;
- facilitate technical inputs into flood management projects and programmes implemented in those countries; and
- share experience in IFM implementation.

The partnership is intended to strengthen the operations of APFM in support of flood prone countries, both financially and technically. The scope of activities includes development of IFM tools, implementation of the HelpDesk, training and workshops in IFM, and sharing expertise for guidelines on flood mapping.

2.7.4 Global Risk Identification Program

In collaboration with Global Risk Identification Program (GRIP), a joint initiative between UNDP and Prevention Consortium, Flood Risk Assessment methodologies are proposed to be developed. The main objective of GRIP is an improved evidence base for disaster risk management to enable the application and prioritizations of effective disaster risk reduction strategies at the national, regional and global scales. The activities supported by GRIP consist of a set of projects, falling into five outcome areas:

1. Demonstration projects that integrate disaster risk analyses into decision-making in high-risk countries;
2. Capacity development for risk and loss assessment;
3. Improved risk assessments in high-risk countries;
4. An enhanced global database on disaster losses; and
5. Global Risk Update.

APFM proposes to work with GRIP to develop the risk assessment methodologies and subsequently developing the capacities in the countries for flood risk assessment.

2.7.5 Moscow State University

Opportunity for collaborative activity for the Russian speaking countries has been established through the Moscow State University for Environmental Sciences. The IFM Concept Paper was made available in Russian with courtesy of the Moscow State University and a session is scheduled during the conference titled "Managing Floods for Sustainable Development and Climate Change Adaptation." Opportunity is being further explored to launch a capacity building initiative for Integrated Flood Management for the Russian speaking countries.

2.8 IFM HelpDesk

2.8.1 Outline of IFM HelpDesk Concept

There is an overwhelming need to facilitate the adoption of the IFM approach at the field level, and the capacities at the international level to provide competent, impartial and balanced guidance backed with adequate human and financial resources needs strengthening in form of a clear and accessible mechanism – The HelpDesk for Integrated Flood Management (IFM HelpDesk).

The experience in the field of IWRM has shown that acceptance of IWRM philosophy has not automatically translated into its implementation at the field level. One critical factor identified was the lack of a comprehensive knowledge base. It is realized that there is need for an international institution, which can be approached by a country requiring working guidance on comprehensive issues of flood management in an integrated manner. In order to help in adopting IFM approaches on the ground, the IFM HelpDesk was established. During the reporting period relevant constituent bodies of WMO took the following steps in relation to the establishment of the HelpDesk:

WMO Congress

WMO Congress during its Fifteenth Session "appreciated the activities under the Associated Programme on Flood Management, which had helped achieve the objective of disaster risk reduction and provided technical support to countries in flood management policy formulation. It welcomed the establishment of the Help Desk services as a tool for providing support on flood management policy issues in collaboration with other partners." Under Resolution 20 (Cg-XV) Congress decided "That WMO should continue its advocacy for a widespread adoption of an Integrated Flood Management approach at the basin, national and international levels"

WMO Executive Council

WMO Executive Council recognizing at its sixtieth session the "growing demand for continued scientific and technical inputs of the hydrological, meteorological and climatological communities into flood management policies and practices. It appreciated the efforts being made by the Secretariat through the implementation of the Associated Programme on Flood Management to support the countries in developing flood management strategies."

WMO Commission for Hydrology

Under Res. 4 (CHy-XIII) the Commission decided "To assist setting up of a HelpDesk for Integrated Flood Management for the benefit of Members in the areas of flood management policy and strategy, and capacity building in support thereof."

The IFM HelpDesk is a facility that provides guidance on flood management policy, strategy and institutional development related to flood issues to countries that want to adopt the IFM concept. It is based on close partnership with the country and tailored to their specific needs, with the aim of assisting in IFM implementation.

The IFM HelpDesk, coordinated by WMO is based on a multi-disciplinary network of institutions with required expertise in various facets of Integrated Flood Management. The IFM HelpDesk:

- Provides quick access to relevant flood management information;
- Provides guidance and momentum for reform in favour of IFM in countries or river basins in developing long-term flood management policies, strategies and institutional arrangements;
- Serves as a link between flood management practitioners and decision-makers and multi-disciplinary scientific expertise and best practice in various fields such as hydrology, river engineering, legal and institutional development, ecology, sociology and development economics.
- Provides a continuous and sustainable capacity development mechanism in support of IFM implementation.

The IFM Help Desk is hosted at WMO and is closely linked to a strong decentralized network of experts and specialized institutes. This is necessary because integrated flood management depends on various inputs and Tools, excellence of which cannot be provided by one single organization. The mechanism is illustrated in Figure 2.

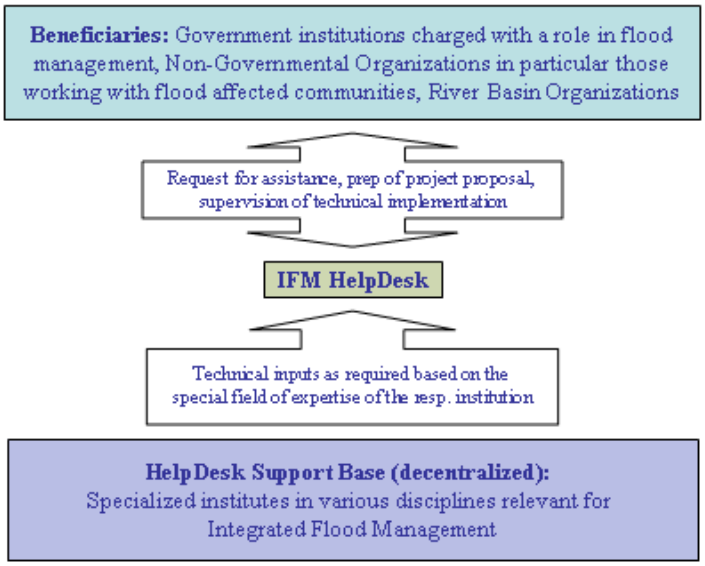

Figure 2: Overview of the IFM Help Desk

As illustrated in Figure 3, the HelpDesk functions in two modes: the autodidactic mode (Self Help) and the interactive mode (Get Help).

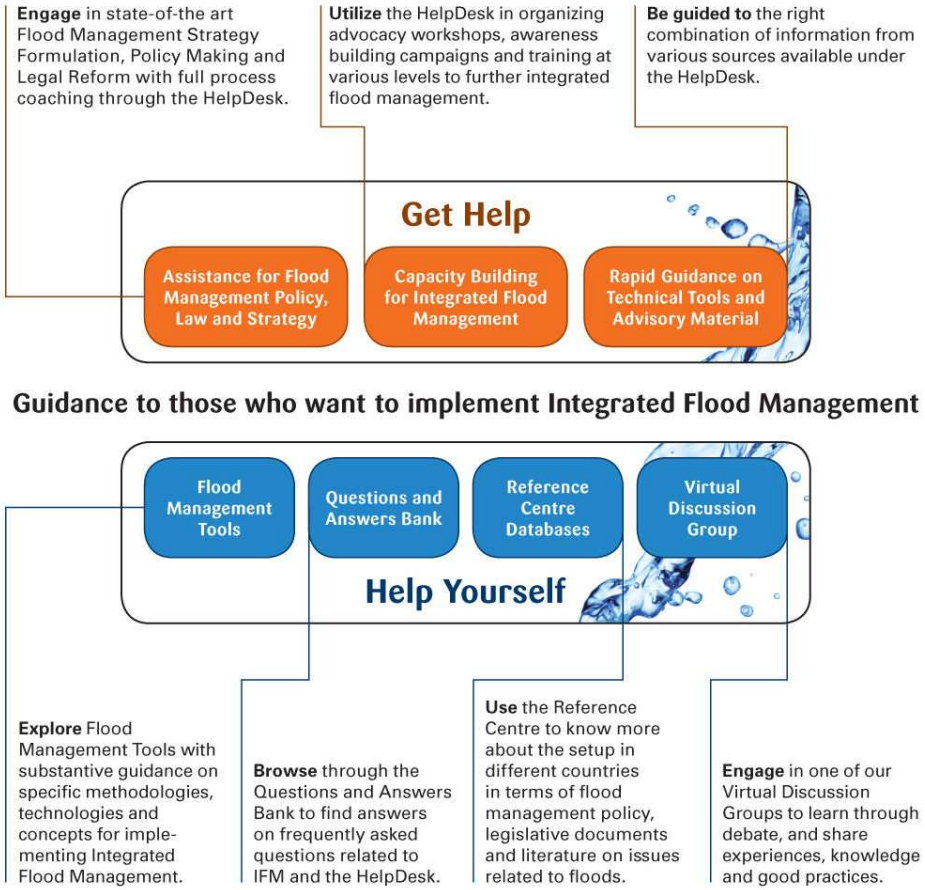

Figure 3: Overview of the IFM Help Desk

The target audience of the HelpDesk includes the following groups:

- National, provincial and local government agencies involved in decision making charged with a role in flood management (policy makers, flood management practitioners, development planners, disaster managers, National Hydrological and Meteorological Services, etc.);
- River Basin Organizations;
- Bi- and Multi-lateral Organizations involved in Technical and Financial Cooperation;
- Non-Governmental Organizations, in particular those working with flood affected communities;
- Voluntary Organizations and Community-based Organizations ; and
- Universities.

Requests from the latter two groups would need to be considered in light of number of requests received and the political environment in which proposals for intervention by the HelpDesk are made.

2.8.2 Institutional arrangements and mechanism for IFM HelpDesk

The TSU places emphasis on the establishment and consolidation of the support base of the HelpDesk, namely, those partner institutions expected to actively support the operation of the HelpDesk. This set of partners is derived from the expected needs under the HelpDesk, as well as the experience made by TSU in collaborating with various partners throughout the project term of the APFM. The approach taken in establishing the support base is based on the recognition that a small group of partners that have proven to be in the position to effectively deliver together in IFM policy and implementation should be established first. Based on the operational capacity of the HelpDesk after its launch, additional partners were considered for integration into the HelpDesk Support Base. The formal process of becoming a HelpDesk Support Base Member consists of signing a “Letter of Engagement”. This instrument is designed to formalize to a certain degree the relationship between the APFM and the respective partner and to ensure a minimum contribution in-kind or otherwise to the HelpDesk. The institutional arrangements under the HelpDesk were the main subject of a dedicated Workshop on the establishment of the HelpDesk with the intended Support Base partners, held 13-14 November 2008 in Geneva, Switzerland. The HelpDesk proposal was discussed in detail with 25 partners attending and their input was incorporated into the further planning. The workshop provided also an opportunity to receive the principal consent of the support base partners with the HelpDesk proposal which could be achieved.

The partners of the HelpDesk Support Base include the following:

- Asian Disaster Preparedness Centre (signed)
- AGRHYMET
- Australian Bureau of Meteorology
- Cap-Net/UNDP (signed)
- Centro de Estudios y Experimentacion de Obras Publicas (signed)
- Czech Hydrometeorological Institute (signed)
- EUROAQUAE (signed)
- Deltares (signed)
- DHI Group (signed)
- Global Water Partnership (in process)
- Hamburg University of Technology (signed)
- International Association of Hydraulic Research
- International Association of Hydrological Sciences (signed)
- Japan Ministry of Land, Infrastructure Transport and Tourism (APFM Financial Partner)
- Korea Water Forum (signed)
- Korea Water Resources Association (signed)

- Nile Basin Capacity Building Network
- RAMSAR
- Regional Centre on Urban Water Management (signed)
- The International Centre for Water Hazard and Risk Management (signed)
- Stockholm International Water Institute (signed)
- Swiss Federal Office for the Environment (APFM Financial Partner)
- UN/ISDR
- UNECE
- UNESCO-IHE (signed)
- University of Dundee (signed)
- University of Idaho (in process)
- University of Nice Sophia Antipolis (as part of EUROAQUAE) (signed)
- UNOSAT (signed)

The World Water Forum 5 in Istanbul in March 2009, the World Water Week in Stockholm in August 2009, the World Climate Conference-3 in Geneva in August 2009 provided opportunity to sign a number of the above Letters of Engagement and to start the HelpDesk promotion. It is important to note that some of those partners are foreseen as technical partners and some as technical and financial partners. Further, efforts would need to be made to broaden the linkages of the HelpDesk to the bi- and multilateral development agencies. In pursuit of satisfying this need a regular event between WMO and its technical and financial partners, the "WHYCOS International Advisory Group" (WIAG), was used to present the HelpDesk to a number of existing financial partners of WMO (especially AFD and AWF) in February 2009 at the WIAG VIII Meeting in Geneva, Switzerland. Immediate commitments could neither be expected nor obtained. Further efforts towards these as well as further financial partners would be required.

2.8.3 Launch of IFM HelpDesk

The formal linkages were completed between the partners to be able to officially launch the IFM HelpDesk at the UN-ISDR Global Platform on Disaster Risk Reduction on 17 June 2009. This was an important event to make the availability of the HelpDesk known to the water and disaster management community. During 2009 further efforts were undertaken to make the availability of the HelpDesk known to the foreseen beneficiaries. The World Water Week in Stockholm was used as an additional forum to make the HelpDesk known to the water professionals in form of a side event. The period between June 2009 and spring 2010 was the period in which the operation of the helpdesk was fine-tuned with the aim of being fully operational at the end of the APFM Phase II. The central domain name for the Helpdesk is "www.floodmanagement.info", which helps visitors to remember its name easily.

2.8.4 Operational status of IFM HelpDesk

Since the official launch of the IFM HelpDesk at the UN-ISDR Global Platform on Disaster Risk Reduction on 17 June 2009 and up to the end of Phase II, the number of requests for "Get Help" part and the state of response is shown below.

Request No.	Institution Country	Request Category	State of response	Status
1	University of Benin Benin	Rapid Guidance	A request for training information. TSU provided training modules with necessary website.	Completed
2	Progress and Business Foundation Poland	Rapid Guidance	A request for information on reservoir operation for flood control. TSU provided related IFM policy series and tool.	Completed
3	Sao Carlos School of Engineering-University of Sao Paulo	Capacity Development	A request for the collaboration with the university. TSU proposed a training course/workshop, but no institutional	Discarded

	Brazil		counterpart to support the implementation could be found.	
4	Ministry of Environment, Bayelsa State Nigeria	IFM policy, Law and Strategy	Responded to a question of the status on drainage plan in the Niger-Delta region was sent with necessary information for further HelpDesk assistance. However no institutional counterpart was found to support further implementation of an IFM strategy.	Discarded
5	Nile Basin Capacity Building Network Egypt	Capacity Development	A ToT Workshop was held in November 2009 in Nairobi for the Nile Basin countries - See 2.4.3.8 for details	Completed
6	Council for Scientific and Industrial Research South Africa	Rapid Guidance	A request for information on flood risk research and electric platform. TSU provided capacity building resources available on the websites of WMO and others.	Completed
7	ARPA Piemonte Italy	Capacity Development	A one day introduction to IFM was held in November 2009 - See 2.4.3.7 for details	Completed
8	Global Water Partnership-Caribbean Trinidad & Tobago	Rapid Guidance	A question about HelpDesk scheme. TSU explained the process of requesting support from HelpDesk.	Completed
9	Victoria Institute for Research on Environment and Development Kenya	Capacity Development	The organization of a training activity has been put on hold until resources have been mobilized.	Not implemented (lack of funding)
10	University of Kerman Iran	Rapid Guidance	A request for articles on flood risk management. TSU provided IFM tools and data sources on APFM website.	Completed
11	Water Resources Section, Planning Commission Pakistan	Capacity Development	A workshop on IFM concept and flood forecasting/warning will be held early 2011.	In process
12	International Relief and Development, Inc., Ministry of Energy and Water Afghanistan	Rapid Guidance	A request for information on national flood policy. TSU provided policy-related resources available on the websites of APFM and others.	Completed
13	International Centre for Integrated Mountain Development (ICIMOD) Nepal	Capacity Development	A ToT Workshop will be held in October 2010 in Katmandu for the Hindu Kush Himalayan countries	In process

Besides the requests received through the HelpDesk, a series of other requests have been received by the TSU either through direct contacts from the requesting party, or through other WMO channels, as summarized in the following table:

Requests received by TSU members through direct contact				
Request No.	Institution Country	Request Category	State of response	Status
1	Japan International Cooperation Agency (JICA)	Technical supervision	Follow up of strategy development in Phase I. See 2.3.1 for details	In process

	Kenya			
2	Japan International Cooperation Agency (JICA) Japan	Rapid Guidance Capacity Development	Annual training of IFM related issues. See 2.4.3.1 for details	In process
3	JICA and Japan Water Agency (JWA) Japan	Capacity development	Training on IWRM for Iran, with lecture on IFM. See 2.4.3.9 for details	Completed
4	Regional Centre on Urban Water Management (RCUWM) Iran	Capacity development	Workshop held in May 2009. See 2.4.3.5 for details	Completed
5	Department of Irrigation and Drainage (DID) Malaysia	Capacity development	Workshop held in August 2009. See 2.4.3.6 for details	Completed
6	University of Gezira Sudan	IFM Policy, Law and Strategy Capacity Development	A request to organize a training workshop has been proposed for the development of national IFM implementation plan to be presented to high level policy makers. The request was not fulfilled due to the lack of an official counterpart to support implementation.	Discarded
7	Bahir Dar University Ethiopia	IFM Policy, Law and Strategy Capacity Development	Workshop held in June 2010. Strategy to be developed.	Completed (training) Ongoing (strategy)
8	Directorate of Water Resources Management Uganda	IFM Policy, Law and Strategy Capacity Development	Workshop planned in early 2011.	In process
9	Sava River Basin Commission (SRBC)	IFM Policy, Law and Strategy Capacity Development	Workshop planned in late 2011	In process
10	UNECE and OCHA (Office for the Coordination of Humanitarian Affairs)	Capacity development	Workshop planned in late 2011	In process
11	Mekong River Commission (MRC)	Capacity Development	Workshop scheduled for February 2011	In process

Requests received by HelpDesk through other WMO departments				
Request No.	Institution Country	Request Category	State of response	Status
1	Ministry of Energy and Water Afghanistan	IFM Policy, Law and Strategy	A request to develop a national IFM strategy and legal framework for implementation was received. The request was not fulfilled due to the lack of an official counterpart to support implementation.	Not implemented
2	Direction Nationale de l'Hydrologie (DNH) Mali	Technical supervision	See 2.3.6 for details	In process
3	USAID/OFDA Zambezi basin	Technical supervision	See 2.3.9 for details	In process
4	Permanent Representative of Mauritania with WMO Mauritania	Capacity development Technical supervision	See 2.3.8 for details	Completed (training) In process (tech. sup.)
5	International Federation of Red Cross and Red Crescent Societies (IFRC) SADC Region	Capacity Development	Request for a training workshop received, organization on hold due to internal problems in IFRC SADC region.	On hold
6	NHSs Argentina and Uruguay	Capacity Development	Workshops held in April and May 2010.	Completed
7	Dirección de Meteorología e Hidrología de la DINAC Paraguay	Capacity Development	Workshop planned in early 2011.	In process
8	European Commission Directorate General for Enlargement	Capacity Development	Workshop held in September 2010.	Completed

3. FINANCIAL RECORD

Activities

During Phase II, CHF 1,960,193 (including due last contribution from Switzerland CHF 40,000) was contributed by Japan and Switzerland. The consolidated APFM trust fund financial statement (August 2006 to March 2010) is given on the following page. In addition to the above, what does not appear on the financial statement is WMO's contribution to the phase II of APFM through logistic support and the human resources.

Activities under the programme were defined on a yearly basis under the guidance of the Advisory Committee which consisted of two participants of WMO constituent bodies representing the member countries, representatives of GWP, and one representative each from the financial partners. The yearly budget allocation to various activities was made by the Management Committee consisting of one representative each from the two donor countries. Both the committees were chaired by Mr. Torkil Jønch-Clausen, from GWP and served by Director, Climate and Water Department WMO, as secretary. The performances both physical and financial were regularly reviewed by the two Committees who have largely been satisfied by the performance (Refer to the Reports of the Steering Committee and Advisory committee).

The expenditures under the APFM Trust Fund were spent under the strict rules and regulations of WMO and all the transactions were carried out in most cost-effective manner.

CONSOLIDATED APFM TRUST FUND FINANCIAL STATEMENT
(July 2006 to March 2010)

1. Income (contributions + interest)

1) July 2006 to March 2007

• Contribution from Japan		408,110	
• Interest		2,765	
	Total Income	410,875	(a)

2) April 2007 to March 2008

• Contribution from Japan		388,294	*1
• Contribution from HWR		12,000	
• Interest		5,263	
	Total Income	405,557	*1 (b)

*1 not including the last instalment after March 2008

3) April 2008 to March 2009

• Contribution from Japan		471,841	
• Contribution from Switzerland		79,615	*2
• Interest		3,997	
	Total Income	555,453	*2 (c)

*2 not including the last instalment after March 2009

4) April 2009 to March 2010

• Contribution from Japan		448,090	
• Contribution from Switzerland		100,000	*3
• Interest minus bank charge		218	
	Total Income	548,308	*3 (d)

*3 not including the last instalment after March 2010

5) April 2010 to July 2010

• Contribution from Switzerland		40,000	
	Total Income	40,000	(e)

Total Income (July 2006 to July 2010) (a)+(b)+(c)+(d)+(e)		1,960,193	(f)

2. Expenditure

1) July 2006 to March 2007			
• Expenditure		196,382	
• Adjustment of payment period		126,777	
	Total Expenditure	323,159	(g)
2) April 2007 to March 2008			
• Expenditure		319,242	
• Adjustment of payment period		70,466	
	Total Expenditure	389,708	(h)
3) April 2008 to March 2009			
• Expenditure		358,121	
• Adjustment of payment period		67,640	
	Total Expenditure	425,761	(i)
4) April 2009 to March 2010			
• Expenditure		337,896	
• Adjustment of payment period		(23,087)	
	Total Expenditure	314,809	(j)
Total Expenditure (July 2006 to March 2010) (g)+(h)+(i)+(j)		1,453,437	(k)

Certified correct
Luckson Ngwira
Chief, Finance Division
WMO

4. PERFORMANCE REVIEW

During Phase II the Advisory Committee, which consisted of the representatives of the donors along with the ones from the two parent partner organisations, GWP and WMO, reviewed APFM activities during its annual meeting. Some of the excerpts from the proceedings of the Advisory Committee Meetings of June 2010 are reproduced below:

"…The Committee expressed satisfaction with the quality of the tools developed so far, with a link to be made to the revised IFM Concept paper. The Committee reconfirmed the concept of "living documents" for the tools with appropriate disclaimers that no formal process is applied for academic peer review."

"…The Committee expressed its appreciation for the efforts undertaken to upscale the capacity building outreach and emphasized the monitoring of these activities. The Committee noted that efforts would be undertaken by TSU to establish a database of past trainees and distributing the APFM newsletter to them."

"…The Committee was satisfied with the current collaboration with several partners, including CapNet, TUHH, and suggested further networking through GWP and Japan (Asia Pacific Water Forum) would be sought for possible linkage with climate change adaptation."