

INTERNATIONAL FLOOD INITIATIVE

UNESCO • WMO • UNU • ISDR



United Nations
Educational, Scientific and
Cultural Organization



World
Meteorological
Organization
Weather • Climate • Water



UNITED NATIONS
UNIVERSITY



International Strategy
for Disaster Reduction
ISDR

EXECUTIVE SUMMARY

THE INTERNATIONAL FLOOD INITIATIVE (IFI) PROMOTES AN INTEGRATED APPROACH TO FLOOD MANAGEMENT TO TAKE ADVANTAGE OF THE BENEFITS OF FLOODS AND USE OF FLOOD PLAINS WHILE MINIMIZING THE SOCIAL, ENVIRONMENTAL AND ECONOMIC RISKS.



A Joint Initiative

The United Nations Education, Scientific and Cultural Organization (UNESCO) and the World Meteorological Organization (WMO), building on past cooperative successes, have launched the International Flood Initiative (IFI) to address existing management gaps through a holistic approach and to provide a platform for further collaborative efforts. The initiative will work in close cooperation with the United Nations University (UNU), the International Association of Hydrological Sciences (IAHS) and the International Strategy for Disaster Reduction (ISDR). UN agencies working on other aspects of flood management will also be invited to contribute to the initiative.

IFI will assist countries to meet the Millennium Development Goals (MDGs), contribute to the UN International Decade for Action "Water for Life" (2005-2015) and the UN Decade on Education for Sustainable Development (2005-2014), as well as address the issues identified in the Hyogo Framework of Action (2005-2025). In addition, the Johannesburg Plan of Implementation of the World Summit on Sustainable Development (WSSD) has highlighted the need to mitigate the effects of floods and droughts. The international community has committed to finding new approaches to risk management and addressing vulnerability, which include prevention, mitigation, preparedness, response and recovery.

OBJECTIVES The overall aim of the initiative is to build capacity in countries to understand and better respond to floods by taking advantage of their benefits while at the same time minimizing their social, economic and environmental risks.

STRATEGIC ACTIVITIES The initiative will focus on research, information networking, education and training, empowering communities and providing technical assistance and guidance.

SECRETARIAT The secretariat is located in the International Centre for Water Hazard and Risk Management (ICHARM) in Tsukuba, Japan.

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1. INTRODUCTION



1 Floods bring many benefits to floodplain areas, including, *inter alia*, the role that small floods play in the maintenance of floodplain fertility and the importance of regular flood flows to in-stream ecosystems. However, at the same time, floods can have devastating consequences for the communities at risk, usually those communities that can least afford the consequences. Strategic long-term approaches to and investments in floodplain management are therefore necessary to harness the benefits while at the same time safe guarding the impacted communities. Flooding is one of the greatest water-related environmental disasters known to humankind. Whether it is due to flash or riverine floods, coastal floods, snow melt, ice jams and mud flows, its human, material and ecological costs can be staggering. Floods affect an estimated 520 million people across the world yearly, resulting in up to 25,000 deaths in a single year. Along with other water-related diseases, they cost the world economy some US\$50 to US\$60 billion per annum. At the same time, both developed and developing countries have benefited from economic development in and around water bodies. Close to one billion people – one-sixth of the global population, the majority of them among the world's poorest inhabitants – now live on the flood plains. Developing countries with mainly agricultural economies depend largely on their fertile flood plains for food security and livelihood generation. The deltas of many river systems favor low-tech agricultural practices and provide livelihoods for millions. The wetlands in flood plains contribute to biodiversity and provide a number of essential ecosystem services to communities, as well as creating employment opportunities through recreational activities.

2 An estimated 96 percent of deaths related to all natural disasters, including floods, in the past decade

occurred in developing countries. The greatest potential flood hazard is in Asia, where, between 1900 and 2006, over 1200 floods claimed an average of 5300 lives per event and caused up to US\$207 billion in economic losses. The adverse effects of flooding are not restricted to the least developed nations. The 2002 floods in Europe claimed 100 lives and caused US\$20 billion in damage – but it is the least developed nations that suffer most from the adverse economic impact on development and the high human toll.

3 With the frequency and variability of extreme floods changing because of urbanization, along with population growth in flood-prone areas, land use changes, potential climate change and a rise in sea levels, the number of people vulnerable to devastating floods is expected to rise. Disaster risk reduction actions, in a non-stationary world, are therefore increasingly required to build up the capacity necessary to cope with floods.

4 Despite the long and largely successful history of international and national efforts to develop structural and non-structural systems and practices to reduce risks associated with flood hazards, many factors that draw people to live in flood-prone areas, such as poverty, have not necessarily been taken into account. These systems and practices have been applied mainly through largely isolated sectoral approaches. The problem is further exacerbated by the lack of a clear understanding of how the impact of development, the magnitude of flood hazards, the shortage of resources and political will – factors that require enhanced coordination and engagement across disciplines – are in balance with each other. There is a lack of application of integrated flood management approaches worldwide.

5 It is in this context that a new approach to flood management has evolved. The approach has recognized that flood management is an integral part of water resource management. It also needs to take into account economic and social welfare and to ensure that resources are shared in an equitable manner without compromising ecological sustainability. Flood management – through investment and redirection of resources – offers significant economic benefits to society and potentially reduces loss of life and environmental damage from flooding.

6 UNESCO and WMO, aware of both the significant achievements made in flood management in recent years and of the existing opportunities to develop practical solutions within this context, have launched the International Flood Initiative (IFI). IFI will work in close collaboration with UN agencies working on other aspects of flood management. The initiative will develop a comprehensive set of activities that will define the programme to be implemented.

7 The concept of the IFI builds on the successful record of cooperation between UNESCO, WMO and other partner organizations in conceptualizing, designing and implementing flood management actions and activities within their individual areas of expertise. It will provide a stepping-stone for targeted joint activities aimed at building on past successes, while addressing existing gaps through a holistic approach.

8 This initiative, based on the integrated flood management policy, aims to ensure that an end-to-end process of flood management is put in place, balancing development needs and flood risks, considering structural and non-structural measures, as well as the positive and negative impacts of floods. By applying this approach, which includes risk management and a multi-hazard operating framework, IFI will promote the mobilization of resources and will also encourage networks of the UN system, non-governmental organizations (NGOs), donor agencies, and the insurance industry. The result will be assistance to communities and governments in the development of flood management strategies that are adapted to the socio-economic, environmental and cultural conditions of individual cases, and that

provide a clear vision of how flood management contributes to the principle of sustainable development.

9 This initiative will be a major UNESCO and WMO-led contribution in meeting the Millennium Development Goals (MDGs), addressing the issues



identified in the Hyogo Framework of Action (2005-2025), and contributing to the UN International Decade for Action "Water for Life" (2005-2015) and the UN Decade on Education for Sustainable Development (2005-2015). In addition, the Johannesburg Plan of Implementation of the World Summit on Sustainable Development (WSSD) has highlighted the need to mitigate the effects of floods and droughts. The international community has committed to finding innovative approaches to addressing vulnerability and risk management that include prevention of flood disasters, mitigation of negative consequences of flooding, flood preparedness, and response and recovery. It is important to provide the means to carry forward and implement this commitment.

10 The second section of this brochure outlines the concepts behind IFI. It begins by defining integrated flood management as the central thematic approach and outlines its mission and objectives. As requested by partner organizations, the principles that will guide implementation are also delineated.

11 The third section of this brochure builds on this concept and focuses on the modes and mechanisms of implementation. IFI strategic activities are laid out and a list of performance indicators to monitor the initiative's progress is identified. This section concludes with a description of institutional arrangements and expected funding considerations.

2. THE CONCEPT

2.1 Integrated Flood Management

12 Integrated flood management (IFM) is a process that promotes a holistic risk-based approach to flood management. IFM is aimed at minimizing the human and economic losses from floods while at the same time maximizing the social, economic, and ecological benefits from floods and the use of flood plains. It integrates land and water resources development within a river basin, addresses institutional challenges, and recognizes the critical importance of stakeholder participation and cultural diversity.



2.2 IFI's Mission

13 IFI aims to implement WSSD recommendations - taking into consideration the physical parameters of flooding, its socio-economic conditions and the risk a society is prepared to take in order to achieve its development objectives.

MISSION STATEMENT

THE INTERNATIONAL FLOOD INITIATIVE
PROMOTES AN INTEGRATED APPROACH TO FLOOD
MANAGEMENT TO TAKE ADVANTAGE OF THE BENEFITS OF
FLOODS AND USE OF FLOOD PLAINS WHILE REDUCING
SOCIAL, ENVIRONMENTAL AND ECONOMIC RISKS.

2.3 IFI's Objectives

14 The mission will be accomplished by focusing on an overall objective, a set of specific objectives and guiding principles.

2.3.1 Overall objective

15 IFI's overall objective is to build the necessary in-country capacity to gain and advocate for a better understanding and handling of hazards, vulnerabilities and benefits associated with floods, by promoting all measures through the following guiding principles:

- Living with floods
- Equity for all stakeholders
- Empowered participation
- Inter-disciplinarity and trans-sectorality
- International and regional cooperation

2.3.2 Specific objectives

16 IFI's specific objectives will enable the countries to:

- Improve data collection and analysis for flood management
- Broaden the knowledge-base with respect to the risks and benefits of floods
- Take advantage of the benefits of floods and flood plains
- Build on and improve institutional frameworks for flood management
- Develop area-specific adaptation strategies
- Develop approaches to assess and reduce vulnerability
- Improve floodplain management in rural and urban areas
- Optimize a mix of structural and non-structural approaches to flood management
- Improve flood forecasting and early warning for both urban and rural areas

- Increase the effectiveness of forecasts and people-centered early warning systems
- Improve community responses to flood hazards
- Strengthen coping capacity to deal with flood risks under climate change
- Develop participatory approaches to be used in a variety of contexts and cultural settings
- Increase flood awareness and preparedness with a focus on rural settings
- Incorporate flood management into school and university curricula
- Improve in-service training in all aspects of flood management
- Develop financial mechanisms for transferring risks and sharing losses from floods

2.4 Guiding Principles

17 The implementation will be guided by five principles:

2.4.1 Living with floods

18 This principle recognizes that while it is neither possible, nor desirable, to completely eliminate floods, the negative impacts can be reduced by better understanding the risks and by working towards modifying the risk-generation processes in a holistic manner. Flood risks result from a combination of flood hazards and societal vulnerabilities, hazard modification and amplification, and vulnerability enhancement due to various social processes and factors. This approach should also draw on resources at the community level and benefit from its traditional knowledge, as well as training and incentives to reveal and use the benefits from floods.

19 IFI will assist communities and governments in developing culturally-sensitive and sustainable flood management strategies as well as provide support in harmonizing structural and non-structural measures for “living with floods” – through an integrated approach to flood management

2.4.2 Equity for all stakeholders

20 The distribution of both the costs and benefits of flood management must receive special attention since it has both ethical and legal dimensions.



Equity issues arise because of national borders and jurisdictions (transboundary flood management), upstream and downstream riparian rights, rural and urban interests and more broadly, between those bearing the costs and those receiving the benefits. Integrated flood management must therefore promote policy processes and outcomes that strive to be fair and legitimate to all stakeholders. Since these also include future generations, flood management strategies must also promote intergenerational equity.

2.4.3 Empowered participation

21 The importance of empowering individuals and communities that are directly affected by floods through participatory decision making processes is now widely recognized as important to successful implementation of integrated flood management throughout the world.

22 Thus the coordinated participation of all stakeholders – through appropriate institutions and innovative governance frameworks – will be a key mechanism at all levels of flood-related activities, noting that flood management is a part and parcel of social development.

2.4.4 Inter-disciplinarity and trans-sectorality

23 IFI will develop and enhance knowledge systems on all flood-related activities, both structural and non-structural. The initiative will also focus on assessing community vulnerabilities, as along with their respective causes – poverty, migration to urban centers and mega-cities, population growth, environmental degradation and lack of experience and norms. As such, managing floods requires skills that span the technical, social, economic, political, and ecological disciplines and requires consideration



for natural resource utilization which is interlinked within the river basin unit. Inter-disciplinarity will thus be the core philosophy of all

activities undertaken by IFI. It will be carried out in a holistic manner in the context of the totality of river basins by managing the water cycle at the catchment scale through the promotion of integrated land and water management to mitigate the effects of not only floods but also droughts. All scientific knowledge, including the economic and social sciences, and new technologies, particularly remote sensing and Informational and Communication Technologies (ICT), will be harnessed as appropriate.

24 IFI will emphasize the involvement of all stakeholders in flood management. Development activities within a basin that affect and are affected by floods are carried out under different sectors and administrative jurisdictions. Inter-disciplinary and inter-sectoral coordination and understanding is essential for designing and implementing institutional reforms and participatory stakeholder processes that promote fair and effective flood management policies. The initiative will establish links between the scientific community, decision-makers at all levels of government, relevant UN bodies, national and international organizations and NGOs. This multi-sectoral approach will increase the effectiveness of processes and the acceptance of flood management decisions, therefore striving towards sustainability.

2.4.5 International and regional cooperation

25 The exchange and management of data, information and knowledge will be facilitated through existing cooperative networks at international, regional and national levels under the participating partners. Cooperation in technical and scientific capacity building will be facilitated through programmes, initiatives and projects that are undertaken in association with the participating partners. The development, promotion and transfer of appropriate technologies in flood management will also be undertaken within these arrangements.



SELECTION OF MAJOR FLOODS WORLDWIDE (2006)



- | | | | |
|--------------------------|--------------------------|--------------------------------|----------------------------|
| 1. Afghanistan, 8 floods | 12. Greece, 3 floods | 23. Nepal, 2 floods | 32. South Africa, 2 floods |
| 2. Algeria, 2 floods | 13. India, 14 floods | 24. Pakistan, 3 floods | 33. Sri Lanka, 2 floods |
| 3. Australia, 7 floods | 14. Indonesia, 11 floods | 25. Pakistan, 6 floods | 34. Tasmania, 2 floods |
| 4. Brazil, 3 floods | 15. Iraq, 2 floods | 26. Papua New Guinea, 4 floods | 35. Thailand, 5 floods |
| 5. Myanmar, 3 floods | 16. Israel, 2 floods | 27. Philippines, 8 floods | 36. Turkey, 2 floods |
| 6. Cambodia, 2 floods | 17. Japan, 2 floods | 28. Romania, 4 floods | 37. USA, 21 floods |
| 7. Canada, 7 floods | 18. Kenya, 2 floods | 29. Russia, 3 floods | 38. Vietnam, 4 floods |
| 8. China, 22 floods | 19. Maldives, 3 floods | 30. Sudan, 2 floods | 39. Yemen, 2 floods |
| 9. DRCongo, 3 floods | 20. Mongolia, 5 floods | 31. Somalia, 2 floods | |
| 10. Ethiopia, 6 floods | 21. Mexico, 3 floods | | |
| 11. Fiji, 7 floods | 22. Mauritius, 2 floods | | |

Data from Dartmouth Flood Observatory



3. IMPLEMENTATION

26 The initiative will be implemented in an inter-disciplinary, participatory and cooperative manner, and will be characterized by projects of trans-sectoral scope, as outlined in the previous section. This implementation will be carried out bearing in mind that flood management is an integral part of water resources management and should aim to increase the resulting social and economic welfare in an equitable manner without compromising sustainability of vital systems. The section builds on these concepts and will outline the strategic activities and plan that will dictate the preliminary actions of the initiative. Following this, performance indicators to support and monitor implementation are described. Finally, the administrative and funding mechanisms are outlined.

3.1 Strategic Activities

27 Both the overall and strategic objectives in the preceding section have set forth the broad, long-term changes that will result from the implementation of the initiative. The achievement of these objectives will ultimately depend on the successful implementation of five interlinked strategic activities aimed at building capacities in countries through: research, information networking, education and training, empowering communities with good governance, and technical assistance. Like the objectives, these strategic activities are guided by the principles outlined above. Assessment of their progress will require monitoring and coordination.

Research focused on all aspects of flood management in an inter-disciplinary manner will promote and support the sustainable development and management of river basins as well as serve the needs of local communities. This will require close cooperation at different scales between various sectors and research communities. Close coordination and synergy with other on-going international programmes, such as those of IFNet, IAHS-PUB,

Global Earth Observation System of Systems (GEOSS), Global Energy and Water Cycle Experiment (GEWEX), Flow Regimes from International Experimental and Network Data (FRIEND), International Geosphere-Biosphere Programme (IGBP) and others is foreseen.

Information networking which incorporates both existing networks and/or disciplinary areas not yet networked will be developed between various stakeholders, to provide open access to data, information, knowledge and best practices. These will, *inter alia*, provide clearing house services for flood management-related technologies – at the household or regional level – and provide access to flood data as well as to multi-lingual international bibliographic databases. Metadata networks to link all stakeholders – connecting the technical, relief and insurance communities – will also be developed.

Education and training related to all aspects of flood management will focus on formal and non-formal education at all academic levels – from primary school to graduate seminars. The initiative will also assist with on-the-job training. These activities are intended for a wide audience and not only the technical community. The scope of training will help educate community leaders, opinion makers, journalists and media professionals, while also helping to sensitize policy makers, diplomats dealing with international water issues, law-makers, and politicians to flood management issues. The training agenda will be designed to form part of the UN Decade on Education for Sustainable Development. Knowledge institutions, which are part of the educational arm of the UN system, notably ICHARM, will be encouraged to take part in this endeavor.

Empowering communities with good governance and ensuring participatory approaches in all decision-making will provide the final link in achieving the initiative's objectives, and will entail promoting and mobilizing individual and community resources.

The aim will be to apply networking strategies and practices which improve the governance of flood management in both rural and urban communities.

Technical assistance will develop local capacity and provide help where it is needed. Technical assistance activities will range from local support for empowering communities to assisting national governments in establishing comprehensive national flood management plans, as part of the overall national integrated water resources management strategy.

28 To design the details of the initiative, the following focal areas will be considered, which encompass both the above-mentioned strategic activities as well as activities that correspond to areas of competency:

Vulnerability

- Methodologies to account for multiple stressors
- Estimating social, political, health, and ecological impacts
- Estimating economic impacts including benefits of floods
- Mechanisms (including financial) to increase coping capacity and resilience
- Indicator development

Flood Risk Management

- Multi-hazard analysis
- Data for risk assessment
- Hydrologic, hydraulic and economic modeling
- Flood hazard mapping
- Structural and non-structural measures

Governance and participation

- People networking
- Institutional reform
- Developing stakeholder processes
- People-centered early warning and emergency management
- Effective forecasting and early warning
- Effective communication
- Preparedness
- Response to warning

29 The timeframe of IFI's Initial Plan of Action (IFI-IPOA) is ten years, coinciding with the timeframe for the UN Decades.

The Annex provides a framework for the implementation of the IFI-IPOA.

The Annex provides examples of the expected products or outputs resulting from the initiative's activities, covering various time frames. In accordance with the UN programming cycle, short-term is defined as a two-year programming and budget period, while medium-term signifies a six-year strategic planning period, and finally long-term covers 10 years. Subsequent and more detailed plans of action concerning the above items will be developed through a consultative process among IFI partners and member countries.



3.2 Performance Indicators

30 Performance indicators to measure IFI's success at the end of the decade will relate to the overall objective and will be developed in relation to the following:

- reduction in human flood casualties
- reduction in flood economic losses
- improvements in the benefits of flood plain use
- improvement in the functioning of flood plain ecosystems

31 The indicators will need to be designed to reflect the variability in the magnitude and frequency of disasters, population movements and other risk related drivers.

32 Qualitative performance indicators that could be monitored during the decade include:

- increase in coping capacity
- improvement in institutional effectiveness and governance
- increase in stakeholder involvement



33 In relation to the specific objectives of the initiative, performance indicators for activities under the initiative may include measures of:

- The availability of products (such as guidelines, workshops, courses and tools) developed under the initiative
- The uptake/application of products developed under the initiative
- The ability of the products to reduce the loss of life and property damage associated with flood disasters
- Increased information available on social, economic and environmental aspects of flood events
- Increased awareness of the social, economic and environmental aspects of floods
- Enhanced flood preparedness and community response to flood hazards
- Established effective forecasting and early warning systems
- Improved quality of flood warnings (lead time and accuracy)

3.3 Administration

3.3.1 The International Flood Initiative Management Committee (IFI-MC)

34 The Management Committee (IFI-MC) consists of representatives from the secretariats of the constituent organizations, as well as representatives of the scientific community participating in the initiative, including IAHS, IAHR, IIASA, river basin commissions, civil society, the private sector and the insurance industry, to jointly implement the flood management agenda and action plans. The constitution and the terms of reference of the Management Committee can be found in the Annex. The Management Committee will support the Advisory Committee (IFI-AC). The Committees will meet concurrently.

3.3.2 The International Flood Initiative Advisory Committee (IFI-AC)

35 In order to provide effective coordination at the international level, an IFI Advisory Committee (IFI-AC) has been established, which is comprised of elected representatives of the IHP Inter-governmental Council (through the IHP Bureau), the WMO Commission for Hydrology (through its Advisory Working Group), UNU and ISDR. The Director of ICHARM will act as its Secretary (see Section 3.3.3) and provide support services to the Committee. IFI-AC members will report to their respective constituent bodies. The constitution and the terms of reference of the Advisory Committee are outlined in Annex.



3.3.3 The IFI secretariat

36 To coordinate IFI activities, a small secretariat will be located in the International Center for Water Hazard and Risk Management (ICHARM), in the Public Works Research Institute (PWRI) in Tsukuba, Japan. The Secretariat will report to the IFI-AC.

others) and are developed under the new cross-cutting WMO Programme on Natural Disaster Prevention and Mitigation (DPM) that was endorsed by the 13th session of the WMO Congress in May 2003.

39 Once IFI has a more detailed work plan, it will be strongly placed to seek extra budgetary funding which will support a wider range of activities. Funding agencies, such as the World Bank, regional banks, Official Development Assistance (ODA) and other donors could make contributions and benefit from IFI's activities.

3.4 Funding

37 It is essential to note that this initiative is not an entirely new programme. In its initial stages, activities will be those already being undertaken under existing budgetary constraints.

38 Furthermore, in the case of WMO, the activities that will be undertaken include those which also fall within other technical areas of WMO related to flood management (such as Quantitative Precipitation Forecasting (QPF), Radar Rainfall Estimation, and



THE FOLLOWING PUBLICATIONS WERE USED IN DEVELOPING THIS CONCEPT PAPER

- (1) UNU, *Two Billion People Vulnerable to Floods by 2050; Number Expected to Double or More in Two Generations Due to Climate Change, Deforestation, Rising Seas, Population Growth*, News Release, 2004.
- (2) International Federation of Red Cross and Red Crescent Societies, *World Disasters Report: Focus on Reducing Risk*, 2002.
- (3) IPCC, *Climate Change 2001: The Scientific Basis. Contribution of Working Group 1 to the Third Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, United Kingdom and New York, 2001.
- (4) United Nations General Assembly, Resolution A/RES/58/217.
- (5) United Nations, Dept. of Public Information, *Johannesburg Declaration on Sustainable Development*. The final text of agreements negotiated by Governments at the World Summit on Sustainable Development, Johannesburg, 2003.
- (6) WMO, *Integrated Flood Management Concept Paper*, the Associated Programme on Flood Management, Geneva, 2004.

ANNEXES

ADVISORY COMMITTEE INTERNATIONAL FLOOD INITIATIVE

TERMS OF REFERENCE

- Provide a forum for the identification of the activities of the participating organizations that will comprise IFI
- Guide the integration of these activities in a manner that reflects the principles of IFI
- Identify gaps and future requirements in relation to the objectives of IFI
- Make recommendations to the participating organizations on additional activities that should be considered to be undertaken by those organizations
- Review and report back to their respective constituent bodies on the effectiveness of IFI against the agreed performance indicators

MEMBERSHIP

- Representative of the UNESCO IHP Inter-governmental Council
- Representative of the WMO Commission for Hydrology
- Representative of ISDR
- Representative of UNU

SECRETARIAL SUPPORT

International Centre for Water Hazard Risk Management (ICHARM), Tsukuba, Japan.

FRAMEWORK FOR THE IMPLEMENTATION OF IFI

TOPICS		INITIAL PARTNERS AND LEAD	RESEARCH	EDUCATION AND TRAINING	INFORMATION NETWORKING	EMPOWERING COMMUNITIES	TECHNICAL ASSISTANCE
VULNERABILITY	Methodologies to account for multiple stressors	UNU	UNU, WWAP, IAHR	IAHR, UNU	UNU, WWAP		
	Estimating social, political, health, and ecological impacts		IAHR, IHP, UNESCO-IHE	IAHR, IHP, UNESCO-IHE	ISDR, IHP	ISDR	ISDR
	Estimating economic impacts including benefits of floods		UNESCO-IHE	UNESCO-IHE	UNESCO-IHE, ISDR	ISDR	ISDR
	Mechanisms (including financial) to increase coping capacity and resilience		IAHR, UNU, ICHARM	IAHR	ISDR		ISDR
	Indicators		UNU, WWAP, ICHARM	UNU	UNU, WMO, WWAP, ISDR		ISDR
FLOOD RISK MANAGEMENT	Multi-hazard analysis	IAHS, ICHARM, UNESCO, WMO	IAHS, UNESCO, FRIEND, UNU	WMO, IAHS, UNESCO, FRIEND, UNU	WMO, IAHS, UNESCO, FRIEND		WMO, IAHS
	Data for risk assessment		IAHR, IAHS, UNESCO, FRIEND, ICHARM, UNU	IAHR, IAHS, UNESCO, FRIEND, ICHARM, UNU	IAHR, IAHS, UNESCO, FRIEND, ICHARM, ISDR		IAHR, ISDR, IAHS, UNESCO
	Hydrologic, hydraulic and economic modeling		IAHR, IAHS, ICHARM, UNESCO, UNU	IAHR, WMO, IAHS, ICHARM, UNESCO, UNU	IAHR, WMO, IAHS, ICHARM, UNESCO		IAHR, WMO, IAHS, UNESCO
	Flood hazard mapping		IAHS, ICHARM, UNU	IAHS, ICHARM, UNU	WMO, IAHS, ICHARM	WMO	WMO, IAHS
	Structural and non-structural measures		IAHR, IHP, (ICHARM), UNU	IAHR, IHP, WMO, ICHARM, UNU	IAHR, (ICHARM)		IAHR, WMO
GOVERNANCE AND PARTICIPATION	People networking			ISDR	ISDR, UNU		
	Institutional reform			ISDR	ISDR, WMO		WMO
	Developing stakeholder processes			ISDR	ISDR		

FRAMEWORK FOR THE IMPLEMENTATION OF THE IFI-IPOA

TOPICS	INITIAL PARTNERS AND LEAD	RESEARCH	EDUCATION AND TRAINING	INFORMATION NETWORKING	EMPOWERING COMMUNITIES	TECHNICAL ASSISTANCE	
PEOPLE-CENTRED EARLY WARNING AND EMERGENCY MANAGEMENT	Effective forecasting and early warning	WMO, ISDR, ICHARM	IAHR, UNESCO-IHE, IHP, UNESCO, FRIEND, ICHARM	UNESCO-IHE, UNU, WMO, ICHARM, IAHR	ISDR/PPEW, UNU, WMO, IAHR	ISDR/PPEW, WMO	IAHR, WMO
	Effective communication		ICARM	WMO	ISDR/PPEW	ISDR/PPEW	
	Preparedness			UNU, (ICARM)	ISDR/PPEW, (ICARM)	ISDR/PPEW	
	Response to warning			UNU, (ICARM)	ISDR/PPEW	ISDR/PPEW	

EXPECTED OUTPUTS OF IFI's RESEARCH AGENDA

RESEARCH AGENDA OUTPUTS		AGENCIES CURRENTLY INVOLVED
SHORT-TERM PRODUCTS	1. Risk assessment methodologies, risk management tools and risk communication (for objective and subjective risks)	IAHR, UNU, IAHS, WMO, ISDR, ICHARM
	2. Enhanced understanding, forecasting and management of flash floods in urban areas and arid zones as well as those resulting from dam breaks and dike breaks	IAHR, IAHS, WMO, ISDR, ICHARM, UNU
	3. Improved methodologies for estimating flood benefits and flood damages for various land uses (agriculture, urban, peri-urban, industrial)	IAHR, UNU
	4. Establishment of flood susceptibility indicators based on community vulnerability and resiliency	UNU
	5. Comparative assessment of institutional models for flood management	WMO
MEDIUM-TERM PRODUCTS	1. Methodologies for reliable inundation mapping	IAHR, IAHS, WMO, UNESCO, ICHARM
	2. Probabilistic laws for non-stationary extreme events under changing environment (climate variability and change, land use and population change)	(IAHR), IAHS, UNESCO
	3. Understanding trade-offs between structural and non-structural flood management measures under different socio-economic conditions	UNESCO
	4. Improvement of combined physical and stochastic distributed hydrologic models for more reliable real-time runoff forecasting	IAHR, IAHS, UNESCO
	5. Improved methodologies for estimating flood benefits and flood damages for various land uses (agriculture, urban, peri-urban, industrial)	UNESCO, UNU
	6. Tools for group-based multi-objective decision-making with multiple stakeholders	IAHR
	7. Comparative analysis of socio-economic incentives and instruments in flood management	
	8. Understanding flood anthropology for the description of traditional technologies (nature for nature) in flood management	UNESCO
	9. Improved communication strategies for effective flood warning and forecasting	(UNU), IAHR, WMO, (ISDR), ICHARM
	10. Enhanced understanding of psycho-social impacts of flooding on individual and family responses	
	11. Strategies for effective flood mitigation investment scheduling	
LONG-TERM PRODUCTS	1. Improved medium-term flood forecasting incorporating medium- and long-term weather prediction	IAHR, IAHS, WMO, UNESCO
	2. Understanding trade-offs between structural and non-structural flood management measures under different socio-economic conditions	
	3. Tools (data assimilation, downscaling, remote sensing) for warning and forecasting of ungauged basins	UNU, (IAHR), IAHS, UNESCO, ICHARM
	4. Tools for hydro-meteorology triggered land-slide prediction	WMO
	5. Improved management of floods caused by ice jams	WMO
	6. Procedures for ecologically-sound flood management	
	7. New design criteria for non-stationary flood computation	IAHS
	8. Strategies for effective flood mitigation investment scheduling	

EXPECTED OUTPUTS OF IFI's EDUCATION AND TRAINING AGENDA

EDUCATION AND TRAINING AGENDA OUTPUTS		AGENCIES CURRENTLY INVOLVED
SHORT-TERM PRODUCTS	1. Synthesized flood preparedness guidelines on flood emergency for communities (country-specific)	WMO, ISDR
	2. Training courses and manuals for community leaders, decision makers, technical persons on various aspects of flooding, such as preparedness planning, flood fighting and flood recovery	UNU, (IAHR), WMO, UNESCO-IHP-IHE, ISDR, ICHARM
	3. Post-evaluation conferences/lessons learned of case studies highlighting best practices on all aspects of flood issues	UNU, IAHS, ISDR
	4. International network of flood-related institutions to cooperate on producing training materials for various user groups	UNU, UNESCO-IHE, ICHARM
MEDIUM-TERM PRODUCTS	1. Production of teaching material for training courses at various levels	IAHS, UNESCO-IHE, ICHARM, UNU
	2. Training courses and manuals for community leaders, decision makers, technical persons on various aspects of flooding, such as preparedness planning, flood fighting and flood recovery	UNU, WMO, UNESCO-IHE, ICHARM
	3. Post evaluation conferences/lessons learned of case studies highlighting best practices on all aspects of flood issues	UNU, IAHS
	4. International network of flood-related institutions to cooperate on producing training materials for various user groups	(UNU), (IAHR), ICHARM
	5. Popularized publications, books, videos and public education programs dealing with different aspects of flood preparedness, flood fighting and flood recovery in different cultural and socio-economic settings	WMO, UNESCO-IHP, ISDR
LONG-TERM PRODUCTS	1. Introducing the concept of living with floods in school programs through text books and teaching materials	WMO, UNESCO-IHP, ISDR
	2. Curricula for undergraduate disciplinary programs and integrated curricula for inter-disciplinary graduate programs promoting inter-disciplinary thinking	WMO, UNESCO-IHE, ICHARM
	3. Enhanced public awareness through various international events on various aspects of flood management (campaign, media, web)	(UNU), WMO, UNESCO, ISDR, (ICHARM)

EXPECTED OUTPUTS OF THE IFI's INFORMATION NETWORKING AGENDA

INFORMATION NETWORKING AGENDA OUTPUTS		AGENCIES CURRENTLY INVOLVED
SHORT-TERM PRODUCTS	1. Global hydrological database on extreme flood events	IAHS, ICHARM, UNU
	2. Database for the description of the various aspects of floods (physical, economic and social)	IAHS, ICHARM, UNU
	3. Open access multi-lingual CDS/ISIS-based international bibliographical database on flood literature and reports (published and informal)	IAHS, ISDR
	4. Open access and reviewed depository of proven methodologies and tools for flood prediction, analyses and management	IAHS, WMO, ISDR
	5. Network between IFI and relief and humanitarian agencies	ISDR
MEDIUM-TERM PRODUCTS	1. Database of data-type relevant to the various aspects flood management	IAHS
	2. Compilation of available DEM data and other spatial datasets (land use) in the appropriate resolution for flood management	(IAHS), UNU
	3. Open access international depository of flood-related legal instruments, policies and comparative studies	WMO
	4. Cooperative network between IFI and the insurance industry	UNU
	5. Network between IFI and relief and humanitarian agencies	ISDR
LONG-TERM PRODUCTS	1. Global hydrological database on extreme flood events	IAHS, ICHARM
	2. Compilation of available DEM data and other spatial datasets (land use) in the appropriate resolution for flood management	(IAHS)
	3. Cooperative network between IFI and the insurance industry	UNU, ISDR

EXPECTED OUTPUTS OF THE IFI's TECHNICAL ASSISTANCE

TECHNICAL ASSISTANCE OUTPUTS		AGENCIES CURRENTLY INVOLVED
SHORT-TERM PRODUCTS	1. Help design cooperative agreements for flood-related activities in transboundary watersheds 2. Flood emergency management manuals and procedures 3. Flood relief and recovery manuals and procedures	WMO WMO, ISDR ISDR
MEDIUM-TERM PRODUCTS	1. Facilitation of jointly coordinated flood fighting in transboundary watersheds 2. Design and construction of appropriate methodologies for flood mitigation measures at local scale 3. Assessment of individual and community flood vulnerability exposure 4. Provide assistance to governments in designing national strategies for flood reduction	WMO WMO UNU (case by case) UNU (case by case), WMO
LONG-TERM PRODUCTS	1. Provide assistance to governments in designing national strategies for flood reduction	UNU (case by case), WMO

Acronyms

APFM	Associated Programme on Flood Management	IIASA	International Institute for Applied Systems Analysis
CSD	Commission on Sustainable Development	IPCC	Intergovernmental Panel on Climate Change
DESD	UN Decade on Education for Sustainable Development (2005-2014)	ISDR	International Strategy for Disaster Reduction
DPM	WMO's programme on Natural Disaster Prevention and Mitigation	IWRA	International Water Resources Association
FRIEND	Flow Regimes from International Experimental and Network Data	IWRM	Integrated Water Resources Management
GEOSS	Global Earth Observation System of Systems	JPOI	Johannesburg Plan of Implementation
GEWEX	Global Energy and Water Cycle Experiment	LDC	Least Developed Countries
GWP	Global Water Partnership	MDGs	Millennium Development Goals
HELP	Hydrology for Environment, Life and Policy	NEPAD	New Partnership for African Development
IAHR	International Association of Hydraulic Engineering and Research	NGOs	Non-Governmental Organizations
IAHS	International Association of Hydrological Sciences	NMHSs	National Meteorological and Hydrological Services
IAHS-PUB	Predictions in Ungauged Basins	ODA	Official Development Assistance
ICHARM	International Centre for Water Hazard and Risk Management	PWRI	Public Works Research Institute
ICID	International Commission on Irrigation and Drainage	QPF	Quantitative Precipitation Forecasting
ICLR	Institute of Catastrophic Loss Reduction	UN	United Nations
ICT	Information Communication Technologies	UNU	United Nations University
IFI	International Flood Initiative	UNU-EHS	Institute for Environment and Human Security
IFI-AC	IFI's Advisory Committee	UNESCO	United Nations Educational, Scientific and Cultural Organization
IFHPOA	IFI's Initial Plan of Action	UNESCO-IHE	UNESCO Institute for Water Education
IFI-MC	IFI's Management Committee	UN-Water	United Nations Committee on Fresh Water
IFM	Integrated Flood Management	WBI	World Bank Institute
IFNet	International Flood Network	WCP	World Climate Programme
IGBP	International Geosphere-Biosphere Programme	WMO	World Meteorological Organization
IHP	UNESCO's International Hydrological Programme	WSSD	World Summit on Sustainable Development
		WWAP	World Water Assessment Programme
		WWC	World Water Council

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