# Legal and Institutional Aspects of Integrated Flood Management

# Case Studies

APFM




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WMO/GWP ASSOCIATED PROGRAMME ON FLOOD MANAGEMENT

Global Water Partnership

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ASSOCIATED PROGRAMME ON FLOOD MANAGEMENT

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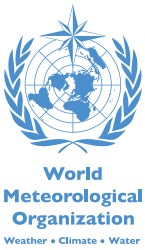
The Associated Programme on Flood Management (APFM) is a joint initiative of the World Meteorological Organization and the Global Water Partnership. It promotes the concept of Integrated Flood Management (IFM) as a new approach to flood management. The programme is financially supported by the Governments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




The World Meteorological Organization (WMO) is a specialized agency of the United Nations. It coordinates the activities of the meteorological and hydrological services of 187 countries and territories and as such is the centre of knowledge about weather, climate and water.


The Global Water Partnership (GWP) 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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India: Sunken temple of Varanasi at sunset; photo by Paul Beinssen
Japan: Flooding in Sanjo City, Japan, courtesy of Ministry of Land, Infrastructure and Transport, Japan
Serbia: Floods in the settlement of Jaša Tomić, Vojvodina, Serbia, April 2005; courtesy of Branislav Lučić, Novi Sad
Switzerland: Courtesy of Schweizer Luftwaffe



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NOTE

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# PREFACE

Integrated Flood Management (IFM) has evolved over recent years as a development policy concept with the aim of maximizing the net benefits from flood plains and minimizing loss of life due to flooding. It has been recognized that for the implementation of such a comprehensive and multi-disciplinary approach to flood management, the legal and institutional framework would have to play a key role. At the same time there is a lack of dialogue among the specialists and a resulting lack of understanding of the processes that influence the formulation of a flood management policy and its implementation. Flood managers and legal experts need to work together to address the issue at the interface of their professions and to adopt a flexible attitude.

In an effort to bridge the communication gap and provide guidance on this issue to these professional groups, the WMO/GWP Associated Programme on Flood Management (APFM), in collaboration with the International Water Law Research Institute at the University of Dundee, Scotland, United Kingdom, has published a policy paper entitled *Legal and Institutional Aspects of Integrated Flood Management*.* This effort has been enhanced by case studies from India, Japan, Serbia and Switzerland, provided by renowned experts in the field of water law and flood management. The publisher is grateful to Kamta Prasad, a renowned economist and flood policymaker from India; Kenji Sanbongi, a legal expert from Japan; Slavko Bogdanović, a water law expert from Serbia; and Armin Petrascheck, a flood risk management expert from Switzerland, for providing the case studies. The APFM, in an effort to make the full insight provided in these case studies available to the widest possible audience, has decided to issue them together in one publication.

It is important to note that the preparation of these case studies has been explorative rather than comparative in nature, in particular to bring out the wealth of experience in flood management in a number of countries with greatly varying law traditions. The result can be seen as one of the first attempts on an international level to focus on the specific legal and institutional arrangements relating to flood management. Some of the legal frameworks described in the case studies reflect the ongoing shifts in policy towards more integrated approaches and a broadened understanding of flood management within the context of sustainable development. Others indicate the need for, and possible areas of, reform within given legislative frameworks.

While serving their purpose in providing a "reality check" for the publication *Legal and Institutional Aspects of Integrated Flood Management*, the case studies provide a basis for further systematic research into the topic and serve as an inspiration and source for lawmakers and flood managers in joining forces for reforms to come. Significantly, the case studies point out the need for an in-depth analysis of extremely complex legal and institutional arrangements for flood management on various administrative scales, and give a warning against trying to transpose legislative approaches from one system to another.

Last, but not least, it is hoped that the publication of these case studies will inspire those readers with expertise in development related laws and flood management to further enhance their cooperation and make flood management a truly interdisciplinary endeavour.

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* WMO, *Legal and Institutional Aspects of Integrated Flood Management*, APFM Technical Document No. 2, Flood Management Policy Series, Associated Programme on Flood Management, World Meteorological Organization, Geneva, 2006.

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# INTRODUCTION

Floods are part of the natural cycle and provide definite benefits. Flood plains constitute fertile lands capable of supporting high-yield crops. By providing rich natural resources, flood plains have attracted humankind for centuries. Flood events can also benefit ecosystems by maintaining fish spawning areas, helping fish migration and flushing debris, sediment and salt.[1] However, population increase, urbanization, agricultural practices and deforestation have meant that society is becoming increasingly vulnerable to the adverse impacts that flood events can cause.[2] From 1992 to 2001 a reported 1.2 billion people were affected and 96 500 killed by flooding.[3] The adverse potential of flooding includes loss of life and property; disruption of economic activity; mass migration of people and animals; environmental degradation relating to the spreading of pollutants by means of floodwaters; and a shortage of food, energy, water and other basic needs.

Traditionally, flood management has focused on defensive and reactive practices but it is widely recognized that a paradigm shift is required towards proactive management of flood risks. The need for this paradigm shift is the inspiration behind the concept of Integrated Flood Management (IFM), which seeks to integrate land and water resources development in river basins within the context of Integrated Water Resources Management, and manage floods based on risk management principles in order to maximize the net benefits from flood plains while minimizing loss of life from flooding.

IFM aims to create resilient communities through a best mix of short-term and long-term strategies comprising structural and non-structural flood management measures implemented through the active involvement of all stakeholders and the community at large. Being an interdisciplinary pursuit, IFM calls for seamless interaction between various disciplines, government departments and various sectors of society. It calls for a change in the sectoral outlook of development to facilitate synergies between the actions of various development agencies. For an effective implementation of an IFM approach various institutions and agencies, within and outside government, have to cooperate and bring coherence and synergy to their policies, development plans and activities. This in turn requires coordination at all levels of administration and decision-making. Therefore, IFM can be successfully built upon a strong but flexible legal framework and supporting institutional arrangements. There are a number of key roles that a legal framework plays in the implementation process of flood management policies, namely:

- To define institutional roles and responsibilities;
- To determine and protect rights and obligations; and
- To provide mechanisms for dispute management.

The case studies provided in the following chapters have been prepared taking into consideration the broad outlook that the IFM concept provides. They show a clear picture of how the above-mentioned roles of law are reflected in the legal frameworks and practice of states.

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1 See The Associated Programme on Flood Management, 2004. *Integrated Flood Management: Concept Paper*, APFM Technical Document No. 1, second edition, available at http://www.apfm.info/pdf/concept_paper-e.pdf.

2 See especially United Nations Economic Commission for Europe, 2000. Guidelines on Sustainable Flood Prevention, available at http://www.unece.org/env/water/publications/documents/guidelinesfloode.pdf.

3 International Federation of Red Cross and Red Crescent Societies, 2002. *World Disasters Report: Focus on Reducing Risk,* Geneva, Switzerland.

The case studies reflect how flood related laws have evolved in different societies with differences in climatic conditions, development characteristics, legal systems and traditions as well as socio-political set-up. The four case studies provide a kaleidoscopic insight into this important element of the IFM approach.

The case study from India provides insight into a federally organized system where responsibilities of various development issues are well defined within the Constitution, and yet where "flood management" as such does not get a very clear slot. It brings into focus the wealth of legislative approaches chosen on the level of various states as well as the ongoing challenge to distribute powers between Central and state Governments within the constitutional framework. As such, the flood management issues continue to veer around the legislative competence of the Centre and state. Different states have enacted different laws, with different scope for their interpretation and applicability. Flood management activities are being governed through acts that are applied indirectly. The authors have also pointed out that even though there are direct laws relating to flood management, they are not adequately applied in legal practice. Although the National Flood Commission gave a new direction to the flood management policy in 1980 with a holistic approach, the laws remained the same. The recent disaster related legal framework appears to have given an impetus to the required reforms.

The Japanese case study reflects legislative approaches of a country with scarce land resources and highly developed flood plains that are exposed to a multitude of different natural hazards, such as floods, earthquakes, tsunamis, landslides and mudflows; disaster management legislation dates well back into the nineteenth century and extends to legislative action in the twenty-first century. The case study provides an example of legislation that addresses various structural and non-structural flood and disaster management measures, leading to perhaps one of the highest levels of disaster preparedness in the world. The case also reflects the interesting interaction between the occurrence of natural disasters and political action through the legislator.

The case study of Serbia provides valuable insight into legal and institutional arrangements that have emerged within a country that has been undergoing major societal changes in recent decades. The case study brings out the heavy dependence on soft law. It provides a particularly clear account of the diverse institutional arrangements and draws into the picture various types of detrimental effects of waters that the legislative framework on flood management seeks to address. It also accounts for the transboundary dimension of flood management reflected in the bilateral and multilateral agreements with the co-basin states, in a country that shares all of its main river systems with neighbouring states.

The case from Switzerland provides an outstanding synthesis of the legal arrangements that have evolved within a changing policy context, that was earlier determined by a drive to control floods within the process of the country's development, and is shifting towards comprehensive risk management that takes into account the accumulation of economic assets on flood plains, environmental sustainability and transboundary cooperation within international river basins. The Federal Law on Flood Control and supplemental Ordinance on Flood Control occupy centre stage in this legal framework for flood management, supported by a number of related federal laws on land-use planning, forests, agriculture, environmental protection, etc. The case from Switzerland is embedded in the realities of the various types of natural hazards affecting the country and a "base-democratic" political system, where a number of powers have been allocated to lower administrative levels in the context of subsidiarity.

India

# LEGAL AND REGULATORY FRAMEWORK FOR FLOOD MANAGEMENT IN INDIA

by Kamta Prasad
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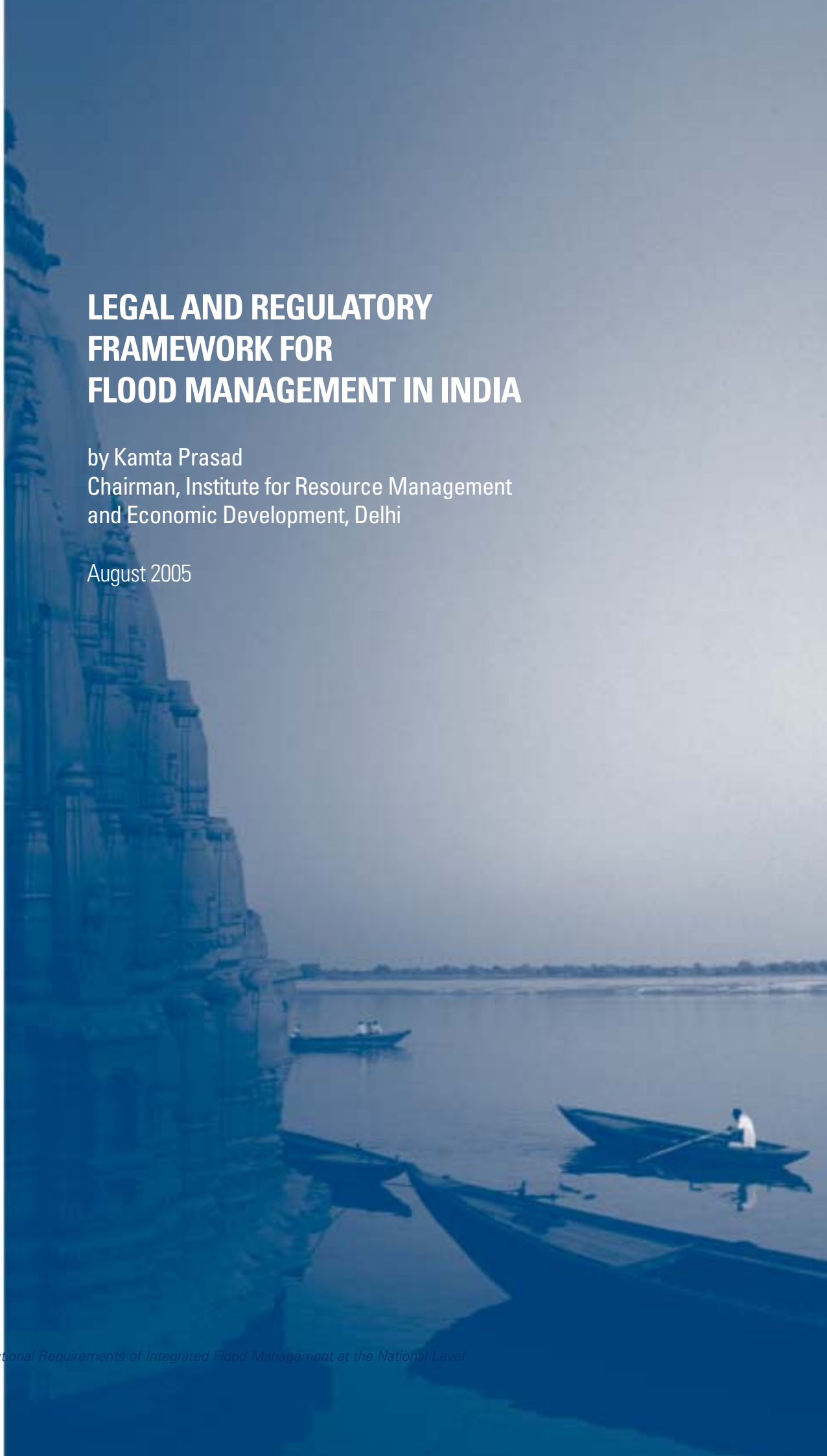
August 2005



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# LEGAL AND REGULATORY FRAMEWORK FOR FLOOD MANAGEMENT IN INDIA

*by Kamta Prasad*

## 1. Introduction and scope

A series of international conferences and declarations over the last decade or so has emphasized the need for a comprehensive approach to flood management, including not only the strengthening of structural measures, but also "non-structural measures such as land-use regulation and guidance, disaster forecasting and warning systems and national risk management systems, in harmony with the environment and different water uses".[1] This holds true for India. The need for a comprehensive approach had been highlighted in India by the *Rashtriya Barh Ayog* (National Flood Commission) as early as 1980. In this regard it could be instructive to look into the nature of legal liabilities and state obligations in pre-flood, flood and post-flood situations. The pre-flood preparedness may range from data collection on land and rivers, establishing or streamlining flood forecasting[2] and warning systems at different levels, taking suitable structural measures and carrying out efficient land-use planning before any havoc is caused. During floods, there may be a need to take immediate measures, such as the evacuation of people and their belongings, including animals, and arranging temporary flood shelters and relief to those affected. After the flood, ascertaining the damage caused, adequate compensation and rehabilitation of affected persons as well as land restoration may become important. Ideally, the law should have provisions to deal with all three situations.

The concept of flood management that we have in view is one of Integrated Flood Management as conceptualized by the Technical Support Unit of the Associated Programme on Flood Management, a joint initiative of the World Meteorological Organization (WMO) and the Global Water Partnership.[3] The integrated approach is based on the recognition that "a single intervention has implications for the system as a whole".[4] Accordingly, river basins are regarded as integrated systems. "Socio-economic activities, land-use patterns, hydromorphological processes, etc." are "recognized as constituent parts of these systems".[5] Such an approach increases the range of legal issues to be considered. These would go far beyond the traditional activities relating to moderating the volume of floodwater through technologies such as runoff storages and embankments.

Keeping in view the above approach encompassing a whole range of issues, both the available and desirable legal instruments in the Indian context are examined closely in the present paper. The existing laws, especially of those states that that are more prone to floods, such as Assam, Bihar, West Bengal, Uttar Pradesh and Orissa, are discussed to see how they provide for the various issues relating to floods in India.[6] However, floods also occur in other states, many of which have enacted laws dealing with some aspects of flood management which are not covered even in the above-mentioned more flood prone states. Such laws are also examined in this report. The annex provides a list of laws dealing with flood management. As laws work within the framework of the Constitution, we begin with a discussion on the constitutional issues relating to flood management in India.

## 2. The constitutional context of flood management

As stated in the Constitution of India, "water, that is to say water supplies, irrigation and canals, drainage and embankments, water storage and water power" is a state subject and thus only state legislature is competent to enact laws on these matters.[7] The National Flood Commission also noted that even while the subject of flood control does not figure in the three legislative lists in the Constitution, two forms of flood control, that is, drainage and embankment, are specifically mentioned in the State List; it concluded thus that the "primary responsibility for flood control lies with the states".[8] However, flood control and management goes beyond drainage and embankment and is now widely viewed as including a host of other measures, especially non-structural measures as referred to above.

In situations where flood is due to the rising waters of an international or interstate river, and where the post-flood devastation runs across the borders of more than one state, it would be inappropriate to hold the view that flood management is the exclusive responsibility of one state. If there is a law to be mooted to deal with such situations the Union could be deemed to have the competence to do so, on the basis that it is the Union Parliament that has the exclusive power to make laws with respect to any matter not enumerated in the Concurrent List or the State List, with flood control being one such subject.[9] Moreover, it is to be noted that even while embankments and drainage works lie within the realm of states' legislative powers, the regulation and development of interstate rivers and river valleys falls under the Union List.[10] The Union can also legislate on adjudication of any dispute or complaint with respect to use, distribution or control of the waters in any interstate river or river valley.[11]

There have been suggestions that "disaster management" as a legislative subject should find an explicit mention in the Constitution, particularly as a number of pieces of legislation on this subject are being envisaged both at the level of the states and the Centre, and with states like Gujarat and Bihar having already come up with their Disaster Management Acts (discussed in detail below). If this is to be done, the subject would ideally be placed in the Concurrent List, thereby empowering both the Centre and the states to legislate on the subject. Each state can legislate for disaster management, including flood management, within the territorial jurisdiction of the state, while the Union can do so for disasters that run across states.

Apart from the above, speedy acquisition and requisition of land, restriction and regulation of land use, including for flood plain zoning, are critical for the execution of an effective flood control programme and it is important to ascertain the legislative competence of the Union and the states in this regard. First, "acquisition and requisition" of land falls under the Concurrent List and thus both Centre and states can legislate on the said subject.[12] As regards land use, this is part of the management of land which comes within the states' legislative jurisdiction included in the broadly worded State List "Land, that is to say, rights in or over land, land tenures…land improvement and agricultural loans".[13]

## 3. Laws addressing flood management

A review of the legal regime seeking to address various aspects of flood management drives home the point that different states have different laws, dealing with a whole range of issues, from land-use planning, compulsory evacuation of land in case of floods, suitability of lands for construction of flood works, remission and suspension of land revenue in cases of agricultural calamity caused by floods, to levying of betterment levy for recovering the cost of flood control work. These various laws are discussed in detail below.

### 3.1 Review of irrigation and drainage laws with implications for flood management

In many states, laws relating to flood management are grouped with laws relating to irrigation and/or drainage. There is no uniform pattern across the states. All the state legislations invest the state machinery with the duty to identify the areas that can be affected by floods and thus require drainage or embankment works. The state has been provided with powers to acquire the land, should it be satisfied that such work is required, subject to the procedural safeguards such as notice to the affected people, enquiry into objections or compensation for losses suffered as a result of survey work and execution of the scheme. A review of some of the important irrigation laws with their specific implications for flood management is presented below.

The Bengal Irrigation Act, 1876:[14] the Act mainly provided for the construction, maintenance and regulation of canals and for the supply of water from them, including the fixing of a levy on water for this purpose. The Act included provisions for construction of flood embankments and other drainage works.[15] Under the Act the Canal Officer or any other person authorized by the Canal Officer is also empowered to enter upon the land for examination and inquiry in connection with an existing or projected canal and flood embankment.[16] In the case of an accident happening or being about to happen to a canal or flood embankment, the Canal Officer is authorized to enter upon the land adjacent to such a flood embankment or canal and may execute any work necessary for the purpose of preventing such an accident, or of repairing any damage done.[17] During the entry or survey of the Canal Officers, if any damage is done to a crop, tree or building or other property, the Canal Officer will tender compensation to the proprietors or occupiers.[18] The Act also provides for prohibiting the obstruction of any river, stream or natural drainage course[19] whenever the state government believes that the obstruction has caused, or may cause, injury to the public health, inconvenience to the public, or damage to a canal or to any land irrigated by such a canal.

The Bengal Embankment Act, 1882: this Act was applicable to the states of West Bengal, Bihar[20] and parts of Orissa.[21] It provided for the construction, maintenance and management of embankments and watercourses. The Act vests certain powers in the Collector[22] such as:

- Removal or alteration of any embankment or obstruction of any kind which is likely to cause loss of property by interfering with the general drainage or the flood drainage of any tract of land;
- Construction of any sluice or water course, or alteration or improvement of any public water course for the improvement of public health or protection of any village or cultivable land;
- Alteration of any road which interferes with the drainage of any tract of land or construction of any watercourse under or through such a road.

The Collector is required to prepare estimates of the cost of such works, including the cost of establishment charges.[23] Before execution of the work, a public notice to this effect must be given.[24] After hearing the parties and making the appropriate inquiries, the Collector is required to submit a report to the Commissioner.[25] The state government may consider the report put up by the Commissioner and notify its orders in the official gazette;[26] in the case of imminent danger to life and property, the work may begin, pending the above proceedings.[27]

The Act also provides that any person desiring a sluice to be made in any public embankment for the purposes of drainage or irrigation, or a new embankment to be erected, or existing ones to be improved, repaired or enlarged may make an application to the Collector, who decides whether the said work should be executed or not.[28] An interesting feature of the Act is the appointment of embankment committees at the district level. The state government may direct that such a

committee shall be consulted by the Collector in the discharge of any function. In the case of a difference of opinion with the committee, the Collector is required to submit the matter to the Commissioner of the division for a decision.[29] The Act also contains elaborate provisions for recovery of costs of works from persons benefited or protected by the works or repairs executed.

The Northern India Canal and Drainage Act, 1873: this important legislation is intended to regulate irrigation, navigation and drainage of all rivers, streams flowing in natural channels and all lakes and other collections of still water in the states concerned.[30] The Act applies to flood control as is evident from the definition of drainage works, which includes escape channels from canals, dams, weirs, embankments, sluices, groynes and other works for the protection of lands from flood or from erosion, constructed or maintained by the state.[31] The Act empowers the state government to prepare schemes for drainage works necessary for the improvement of any land, or for the protection from flood or other accumulations of water or from erosion by a river. Such a scheme is required to be published, along with the estimate of its cost, the cost that the state is proposing to bear and the schedule of the land which it proposes to make chargeable in respect of the scheme.[32] The state is also empowered to prohibit the formation of, or remove, any obstruction in any river, stream or drainage channel, whenever it appears that it has caused or may cause any damage to any lands or to the public heath, or inconvenience to the public.

The Assam Embankment and Drainage Act, 1954: the Act deals specifically with construction, maintenance and management of embankments and drainage works. The Supreme Court has held that under the said Act it is possible for the state government to undertake all necessary measures for flood control and construction of embankments, "without arrogating to itself the power to acquire private property without payment of adequate compensation".[33] The Act authorizes the Embankment Officer to initiate a scheme for constructing any embankment or drain.[34]

The Bihar Irrigation Act, 1997: in 1997 the state of Bihar enacted the Bihar Irrigation Act to consolidate the laws relating to irrigation, embankment, drainage, levy and assessment of water rates, betterment contribution and connected matters.[35] The definition of drainage works includes flood embankments.[36] The Act provides for the preparation and execution of schemes for drainage works, including those for protection from floods or erosion by a river, and embankment works, which may be taken up by the state government whenever it appears necessary.[37] The Act has provisions whereby the state government may prohibit the formation of an encroachment on the river, stream or natural drainage course. The state is also empowered to remove the encroachments so formed. The Act empowers the Divisional Officer to execute works for removal or alteration of any embankment or any obstruction which endangers the stability of a public embankment or the safety of any town or village, or which is likely to cause loss of property by interfering with the flood drainage or general drainage.[38]

The Orissa Irrigation Act, 1959: the definition of "drainage works" under this Act is wide enough to include works for protection of lands from flood and erosion.[39] Similar to other state laws, this Act also empowers the government to prohibit or remove obstructions to any river, stream or drainage works.[40] The Act provides for the classification of irrigation works (including drainage works), for the levy of water cess and for the maintenance and repair of such works.[41] Damage to or interference with the irrigation work, or diversion of the current of a river, spring, stream or canal and where there is a flood embankment,[42] is an offence punishable under the Act.

The Orissa Public Embankment Construction and Improvement Act, 1951: this Act provides for construction and improvement of public embankments for the prevention of floods in Orissa. The term "embankment" has been defined to include all types of flood control structures. There is no provision in the Act for acquisition of land, survey work or payment of compensation.[43]

Other drainage laws with implications for flood management: the responsibilities of municipal bodies with respect to proper drainage assume importance in respect of flood management, if the area damaged or likely to be damaged by floods falls within the domain of a municipality. Here it is useful to look at the Asansol Municipal Corporation Act, 1990. The Act makes it obligatory for the Municipal Corporation to make provisions for the construction and maintenance of drains and sewerage and drainage works.[44] The Corporation is required under the law to prepare a draft development plan for Asansol in consultation with the District Planning Committee. The said draft development plan is to provide for schemes for future land-use control by way of filling in insanitary water courses, the provision of drainage networks and outfalls, and the protection of land surfaces through which subsoil water sources are recharged.[45] Similar provisions can be seen in the Delhi Municipal Act of 1951 and, in this context, in the Patna Municipal Corporation Act, 1951. This contains elaborate provisions regarding the construction and maintenance of drains in the municipal areas. The Act empowers the Chief Executive Officer (CEO) to control all municipal drains belonging to or run by the Municipal Corporation.[46] The CEO is required to maintain and repair the drains and construct new drains when authorized by the Corporation,[47] and may cause the municipal drains to empty into any place and may dispose of the sewage at any place. Furthermore, the CEO's permission is mandatory for erecting a new building, wall or structure or for the construction of a street or railway over a municipal drain.[48]

In the context of drainage and sanitary improvement, the Bengal Agricultural and Sanitary Improvement Act, 1920, contains certain important provisions. It was enacted as a response to the growing need for the execution of drainage projects for sanitary as well as agricultural purposes.[49] The Act was developed on the premise that although legal provisions for the above projects were contained in various laws such as the Bengal Embankment Act, 1882, the Bengal Drainage Act, 1880, and the Land Improvements Loans Act, 1883, the Acts were "neither sufficiently suitable or effective in every case, nor simple enough in case of small schemes".[50] The Act therefore consolidated and amended the laws relating to the construction of drainage and other works for the improvement of the agricultural and sanitary conditions of certain areas in Bengal.[51] The Act invests important powers for carrying out various improvement works in the Collector. However, the Act makes the construction of embankments and dams, and other connected works of reconstruction, clearing, alteration or enlargement of the outlets and water channels included in a scheme under this Act, subject to the laws in force regulating the construction and maintenance of public embankments, rivers, channels or outlets.[52]

### 3.2 Requisition and speedy acquisition of land for flood control

The establishment of dams, embankments and drainage works requires huge areas of land. The area requiring flood control works may or may not be in a government's possession; however, this should not be an obstacle when undertaking any such work. There is a central enactment empowering the Centre and state governments to acquire land for any public purpose, namely the Land Acquisition Act, 1894. Most state laws, like the Bihar Irrigation Act, 1997, the Orissa Irrigation Act, 1959, and the Assam Embankment and Drainage Act, 1954, dealing with the establishment of dams and embankments, have references to the Land Acquisition Act for the purpose of acquiring land. To make the process speedier, the Act invests special powers in the District Collector to take immediate possession of any land in cases of emergency.[53] The Supreme Court and High Courts have endorsed these special powers. The apex court has held that while departing from the normal procedure and invoking special provisions for acquisition, the District Collector should record the reason for such a departure and only then can use be made of these special provisions.[54]

The Assam Land (Requisition and Acquisition) Act, 1964, and the Nagaland Land (Requisition and Acquisition) Act, 1965, give the respective states special powers to requisition land, if, in the opinion of the state government, it is necessary:

(a) For flood control and anti-erosion measures including embankment and drainage;
(b) For providing land individually or in groups to landless, flood affected or displaced persons;
(c) For giving such land to a registered society working for the rehabilitation of flood affected or displaced persons.[55]

Likewise, for all three purposes above, the state government of Nagaland is also empowered under the Act to speedly acquire land, if it is considered necessary by the state government.[56] The Assam Land (Requisition and Acquisition) Act, 1964, on the other hand, specifically lays down that the state can speedily acquire land for the purpose of "flood control and anti-erosion measures including embankment and drainage".[57]

Another relevant state act here is the United Provinces Acquisition of Property (Flood Relief) Act, 1948. The Act aims to provide immediate relief to flood affected areas. For that purpose it contains detailed provisions regarding immediate requisition and acquisition of land for building sites and building materials and for the purpose of rehabilitation of flood affected people. The Act has a direct relevance both during floods and in post-flood situations. Under the Act a Requisitioning Authority is constituted, comprising the Collector and an Assistant Collector. The Act empowers the said Requisitioning Authority with a number of discretionary functions, which "may" be taken for public purpose. Here, "public purpose" for land acquisition and requisition has been given a very specific meaning, including only "provision of village sites or repair or construction of houses for persons affected by floods".[58] Under the Act, the Authority may take the following measures:

- Order the requisition of any land or building material, by serving proper notice on the owner or the person in possession of the land or building material. However, the land requisitioned[59] under the said Act can be used only for the construction of houses or village sites for flood affected people. The United Provinces Acquisition of Property (Flood Relief) Rules, 1949, specifies that while ordering the requisition of land, the land used for religious purposes or containing monuments shall be, as far as possible, avoided;[60]
- Where the land or building has been requisitioned under the Act, the Authority may order the acquisition of such land or building material. The acquired land may be retained or utilized by, let on hire, leased out, sold or disposed of to any person affected by floods;[61]
- The Requisitioning Authority may also release the land so acquired under the Act, after making inquiries as to the person entitled to the possession of such land or building material.

The Act specifically provides that no order made in exercise of the powers conferred by or under this Act shall be called in question in any court.[62] Furthermore, no suit, prosecution or other legal proceedings may be laid against the Requisitioning Authority or the Compensation Officer or any other person for anything which is done or intended to be done in pursuance of this Act.[63]

Here it is pertinent to mention the Bihar Amendment[64] to the Land Acquisition Act of 1894, wherein flood erosion has also been listed as one of the emergencies during which the District Collector can take possession of the land immediately after the declaration that such land is required for public purposes under the Act.[65]

The above acts equip the state officials with wide powers during emergencies like floods. There are no specific qualifiers built into these statutes and judicial review is also circumscribed to a great extent. Besides, they also lay down an essentially "may" regime, leaving ample scope for administrative discretion. However, it cannot be said there is no check on this administrative discretion; the administrative agencies are required to act in a fair, just and reasonable manner. The Patna High Court, in a case[66] where land had been acquired for flood affected people who were rehabilitated elsewhere, held that if the purpose for which the land is to be acquired is not fulfilled the acquisition is held to be incomplete. Such a case is subject to section 48 of the Act and persons whose land is the subject matter of the acquisition are liable for compensation even if the proceedings are not completed. These provisions can help enable the administrative agencies to act diligently in a fair manner during floods or in post-flood situations, though its sparse use in the Indian context is especially notable.

The above overview shows that, like the central Land Acquisition Act, the state laws on acquisition also provide monetary compensation in lieu of the land acquired for flood control works. The judicial deference to the legislature in this regard is also notable. For instance, the Guahati High Court in one case held that "it is up to the legislature to lay down any principle for determination of the compensation. But the principle may be such as may result in payment of compensation which is just equivalent of what the owner has been deprived of".[67]

### 3.3 The legal position on construction of flood control works

In the post-independence period, India has witnessed expansion in the scale of development of all types of flood control projects. A close look into specific state laws dealing with flood control works would be useful to understand the nature of the legal obligations cast on the government in this regard.

The Orissa Hydro-Electric Projects & Flood Control Works (Survey) Act, 1961, provides for the survey and investigation of the suitability of lands required for the establishment of flood control works. The Act defines "flood control work" as including all works and constructions for the purpose of controlling floods.[68] No other state has enacted such a specific legislation. However, the respective irrigation and drainage laws of the states having provisions for construction of dams and embankments do provide for the identification of areas where such works are required. Besides, even the Orissa 1961 Act is not couched in mandatory language. The state is not under an obligation to carry out a survey or investigation every time a flood control or hydro-electric work is undertaken. Such surveys are done "whenever it appears to the state government that for the purpose of any hydro-electric project or flood control work it is necessary to carry on [a] survey or preliminary investigation in respect of lands in any locality to ascertain the suitability of such land…"[69] The notifications specifying the location where such surveys are taken are to be made publicly, and not just in the official gazette. After the surveys are completed, if the government proposes to execute the flood control or hydroelectric project, it is required to publish the description and situation of the project, along with the details as to the areas likely to benefit or be adversely affected. Any person can file suggestions or objections to such a proposal within the specified time to the District Collector. As per the rules framed under the Act, descriptions of proposed works are published in the Orissa gazette, and on the notice boards at the offices of the Collector, the Sub-Divisional Officer, the *Panchayat Samiti* and the *Gram Panchayat,* within the limits of any land which is likely to benefit from or be affected by the proposed work.

Apart from ascertaining the suitability of lands, it is also important to see the possible impact of such projects on the environment. The Environment Impact Assessment[70] regulations issued under the Environment Protection Act, 1986, make it mandatory to obtain environmental

clearance from the Ministry of Environment & Forests (MoEF) for undertaking a new project or the expansion or modernization of an existing project in certain specified industries.[71] "River valley projects, including hydel power, major irrigation and their combination including flood control" are among the specified projects.[72] Furthermore, the project authorities are also required to intimate the location of the project site to MoEF when initiating any investigation and survey. This provision strengthens the control of the Centre over the development activities in states and also ensures that there is uniformity on procedural aspects across all the states.

### 3.4 Betterment fees and enhanced land revenue due to flood control works

In certain states, there is legislation providing for the levy of betterment contributions from the owners of lands who are benefited by flood protection works constructed by the government, such as the Bihar Irrigation & Flood Protection (Betterment Contribution) Act, 1959, and the Andhra Pradesh Irrigation (Levy of Betterment Contribution) Act, 1955. The Bihar Act defines "flood protection work" as including embankments, groynes, spurs, dams, barrages, sluices and other work constructed or maintained by the state government for the protection of buildings from floods and erosion. Interestingly, the Act makes a distinction between flood protection works in rural and in urban areas. In rural areas if the cost of the flood protection work is less than 500 000 rupees then no betterment contribution is to be charged. In the Andhra Pradesh Act the sum is as low as 150 000 rupees.[73]

The fact that benefits accruing as a result of flood control works on a piece of land would lead to greater revenue assessments is also made clear by certain state land revenue regulations. For example, the Assam Land and Revenue Regulation, 1886, makes clear that "water courses and embankments shall be considered attached to the land for the benefit of which they were originally made."[74] With an identical provision the Manipur Land Revenue and Land Reforms Act, 1960, also makes this aspect clear.[75]

### 3.5 Flood plain zoning regulations

The use of flood plains for human habitation, roads, industries, public buildings, etc. causes more damage. In order to restrict these activities,[76] the state of Manipur has enacted a specific piece of legislation for this purpose, namely the Flood Plain Zoning Act, 1978. The Manipur Act empowers the state to notify and demarcate the flood plain area after proper survey, and prohibit or restrict the use of land therein. The Act also provides for the constitution of an authority, namely the Flood Plain Zoning Authority. The Authority is responsible for carrying out the surveys of land and rivers and classifing the land with reference to relative risk and permitted land use, and publishing the results for reference. But no cases of its enforcement have been reported so far. Other states, which include the major flood prone states of Assam, Bihar, West Bengal, Orissa and Uttar Pradesh, have, however, made no enactment on flood plain zoning so far, even though a plea to do so (along with a model bill) was made by the Union Government almost 30 years ago.

Another piece of legislation, namely the Andhra Pradesh Rivers Conservancy Act, 1884, deals in part with plain zoning. The main purpose of the Act is to provide for the conservancy of rivers, and for that purpose it aims to prevent the unauthorized action of private individuals in obstructing the flow of rivers. It is for the state to determine which river requires protection under this Act and to survey[77] the specified rivers and define the limits within which this Act can be applied. The charts, which are prepared after surveys, are exhibited for public information at the *kachahries* (local courts) of all districts.[78] Any person who wishes to raise objections to the boundaries or landmarks set forth in such charts is at liberty, during the specified period of ninety days, to submit the objections to the Collector. It is only after considering the objections raised and the response

of the Collector on the same that the state government finally decides and declares the limits and boundaries[79] of rivers within which the Act shall apply.[80] The charts of such rivers are open to public inspection at all reasonable times.[81] The Act prohibits certain works on land within the riverbed, without the permission of Conservator of Rivers, for instance:

- Fresh cultivation on the land which has not been cultivated for two years previous to the date on which this Act is applied to the river;[82]
- Making, removing or extending any grove, building or construction, plantation, grass or trees within such a riverbed. For the said purpose a licence from the Conservator of Rivers is to be obtained.

The Act also empowers the Conservator of Rivers to carry out any act that appears necessary to prevent erosion, breach of or flooding over embankments, encroachments by a stream or danger to life or property.[83]

Flood plain zoning inevitably entails restriction of land use; this power lies within the legislative competence of the state. The National Flood Commission has also pointed out in this regard that "since local conditions differ from area to area and, therefore, flood plain zoning is essentially a local problem, it needs to be dealt with by the state government and the Centre need not come in to the picture".

### 3.6 Regulating land use in flood prone areas: some legislative examples

Notwithstanding what has been stated above, restrictions of land use are typically mandated under the state legislation; one example of this in a municipal context is the Bihar Restriction of Uses of Land Act, 1948. The Act empowers the state government to declare any land to be a "controlled area" and prohibits any person to "erect or re-erect any building, or make or extend any excavation, or lay out any means of access to a road in a controlled area, except with the previous permission of the controlling authority in writing".[84] Likewise, the Calcutta Metropolitan Planning Area (Use and Development of Land) Control Act, 1965,[85] provides for controlling the use and development of land in the Calcutta Metropolitan Planning Area.[86] Under this Act, the state government may declare an area as a controlled area, if it thinks that the use and development[87] of the land requires to be controlled under this Act with a view to securing its orderly development.[88] The government is empowered to issue regulatory or prohibitory directions in relation to the controlled areas regarding matters such as use of land for agricultural, commercial, industrial, residential or other purposes, the erection of buildings, land allotment for roads, gardens, or other purposes.[89]

### 3.7 Encroachments on the flood plains and riverbeds

The issue of encroachments on the flood plains and on the riverbeds has been a major issue in most flood prone zones, but unfortunately it has been mired in politics with the law playing little part in managing the problem.[90]

Some of the specific state legislation addressing the issue of encroachment on floodplains and river beds may also be noted here. An ancient law, the Bengal Alluvion and Diluvion Regulation, 1825, was enacted to address the frequent changes which take place in the channels of the principal rivers and the phenomena where "large portions of land are carried away by an encroachment of the river on one side, whilst accession of lands at the same time are gained by dereliction of the water on the opposite side".[91] The regulation made clear that it should not be construed as justifying any encroachment by individuals on the bed or channels of navigable rivers, or to

prevent duly empowered officers of the government from removing obstacles which may appear to interfere with the safe and customary navigation of such rivers.[92]

The Andhra Pradesh (Andhra Area) Rivers Conservancy Act, 1884, also lays down that building or construction of any kind or the plantation of grasses or trees within the riverbeds without a licence from the Conservator of Rivers is prohibited. Furthermore, the Conservator of Rivers, with the prior sanction of the District Collector, is empowered to direct the removal of such unauthorized constructions and plantations. In this regard, whoever fails to comply with any order issued by the Conservator of Rivers could face a penalty of imprisonment for up to six months for every offence under the Act.[93] The Bengal Irrigation Act, 1876,[94] authorizes the Canal Officer to carry out all works which may be necessary to ensure the safety of a canal or flood embankment (see section 3.1). The Bengal Embankment Act gives the Collector certain powers,[95] such as the removal or alteration of any embankment or obstruction of any kind which is likely to cause loss of property by interfering with the general drainage or the flood drainage of any tract of land. Besides, the Northern India Canal and Drainage Act, 1873, and the Bengal Irrigation Act, 1876, also empower the states to prohibit the formation of, or to remove, any obstruction in any river, stream or drainage channel, whenever it appears that any damage to any lands or to the public heath or inconvenience to the public has arisen or may arise.

### 3.8 Town and country planning, building regulations and flood control measures

The National Housing and Habitat Policy, 1998, takes cognizance of the threat to the housing stock by major natural disasters like floods, earthquakes and cyclones. It advocates pre-disaster mitigation techniques by the construction/retrofitting of dwellings in disaster prone regions to prevent or minimize loss of life and shelter. This is intended to be carried out through the Vulnerability Atlas and Techno-Legal Regime.

The policy also notes that nearly one per cent (about 1 500 000 houses) of the housing stock in the country is destroyed every year through natural hazards. Disaster mitigation techniques for new constructions as well as the strengthening of existing houses are vital to prevent continuing loss of housing stock and human lives from major natural hazards like earthquakes, cyclones and floods.[96] The policy also records that the Vulnerability Atlas of the country has identified zones which are prone to earthquake, floods and cyclones. The code for disaster resistant construction and land-use planning would be observed and enforced without exception. Public awareness would be created.[97] It is important to note, however, that even while the policy dwells at length on the question of legal and regulatory reforms, it has no suggestions for reforms in law needed in building and housing projects from the viewpoint of natural disasters like floods, cyclones and earthquakes.

The state town and country planning acts deal specifically with planning the development and use of rural and urban areas.[98] Such laws provide for the development of towns and villages in a state and for that purpose development schemes and plans are prepared for different areas within the state. In this regard, the acts provide for the preparation of master plans, developmental plans or developmental schemes, outlining the various purposes for which the land can be used or allocated, such as land to be used for building purposes, drainage or open spaces, among other things. For instance, under the Assam Town and Country Planning Act, 1959, a master plan is prepared for the development of any area within the state. The master plan describes in detail the general land-use plan for various purposes such as residential, commercial, public or semi-public uses.[99] Such provisions can have a bearing on the overall land-use pattern in the areas which are prone to floods. The planning should be done in such a way that flood prone areas are allocated for seasonal agricultural and recreational purposes and not for residential, industrial and commercial

activities. The areas where there is a need to undertake flood control works can also be demarcated while carrying out land surveys and planning. Likewise, there is a provision for the preparation of development schemes[100] for specific areas in the state, wherein drainage works can be included in the provisions for buildings.[101] The Delhi Development Act provides for the preparation of a master plan for Delhi, wherein zones into which Delhi may be divided for development are provided, and the manner in which the land in each zone is to be used is indicated.[102] Zonal plans are subsequently prepared for specific zones. Similarly, under the Aligarh Development Authority (Master Plan and Zonal Plans) Regulations, 1983,[103] development and zonal plans are prepared taking into consideration details of, among other things, rivers flowing through the city. Here the Himachal Pradesh Town and Country Planning Act, 1977, deserves a special mention as this Act specifically provides for flood control works to be indicated in the development plan.[104]

The Town and Country Planning Organization, an organization of Central Government which deals with the subject of planning (regional, urban and rural) and developmental policies, formulated a Model Town and Country Planning Act in 1960. The states may adopt the model legislation with suitable modifications for this purpose. There have been some recent proposed amendments to the Model Town and Country Planning Act, whereby provisions regarding floods and cyclones and other natural disasters and hazards, areas prone to such disasters and their mitigation, etc. are sought to be incorporated. The proposed amendments aim at proper land-use planning and development in the areas prone to floods and other natural disasters. It is also proposed that the present land-use map should indicate clearly the areas prone to floods and natural disasters and that the development plans should be made bearing in mind the proneness of the area to natural hazards.

The laws relating to building operations assume importance, as they regulate or prohibit building operations in certain areas that may be susceptible to recurrent natural calamities. In this context the provisions of the Patna Municipal Corporation Act, 1951, can be considered. Under the Act, the Municipal Corporation has been empowered to direct the CEO to draw up[105] schemes providing for matters such as the permanent or temporary prohibition of building operations when, by reason of the situation of the land, the erection of buildings would be likely to involve danger or injury to health; or to prepare a standard plan for the division of land into buildings sites.[106] The Act also empowers the state government to make rules for various purposes including[107] the regulation or restriction of the use of land as sites for building, the regulation and restriction of building and alterations or additions to buildings, and the regulation of the construction of wells, ponds, tanks, etc. The rules may specifically provide that no insanitary or dangerous site should be used for building. The above-mentioned provisions may ensure that the areas prone to floods are not allocated for building purposes. The Asansol Municipal Corporation Act, 1990, empowers the Municipal Corporation to regulate all building operations and building uses. The draft development plan, which the Corporation is required under the law to prepare for Asansol in consultation with the District Planning Committee,[108] provides for the regulation and restriction of sites for construction of buildings, huts or structures for the purposes of safety.[109] Likewise, the Uttar Pradesh (Regulation of Building Operations) Act, 1958, provides for the regulation of building operations with a view to preventing haphazard development of urban and rural areas. The Act also provides for the preparation of a master plan showing the existing and proposed location and outline of the various land uses like buildings, residential sections, industrial areas, etc.[110] This becomes relevant in flood management when a master plan is prepared for the flood prone areas. For carrying out any material change in the site plan such as the erection or re-erection of buildings in the regulated areas declared under the Act, the person interested is required to make an application to the prescribed authority under the Act.

Another important piece of legislation enacted in the state of Uttar Pradesh is the *Uttar Pradesh Avas Evam Vikas Parishad Adhiniyam* (Uttar Pradesh Housing and Development Board Act), 1965,

which essentially provides for the establishment, incorporation and functioning of a Housing and Development Board in the state. The Board has been empowered to frame a housing or improvement scheme, either on its own iniative or at the instance of some local authority. The said scheme may comprise a "flood scheme", providing for housing facilities for areas affected by flooding of any river or rivulet or by water-logging. It may provide for:

(a) The construction of structures for the protection of houses and essential supply installations affected or likely to be affected by flood;
(b) The repair or reconstruction of houses damaged by flood;
(c) The construction of drains and other outlets for drainage of accumulated water;
(d) The raising of the level of any area;
(e) The re-laying of sites in any area;
(f) The acquisition of any land necessary for the scheme;
(g) The evacuation of the inhabitants of any locality affected or endangered by flood and the provision of alternative accommodation for them.

This legislation presents a good example of the measures that can be taken post-flood to rehabilitate and resettle affected people. Since the scope of the Act is limited to housing and improvement, the said "flood scheme" under the Act also focuses on these aspects only. The Act, however, seems to again follow the "may regime", as here, too, all or any of these acts may or may not be taken by the Board. The composition of the Board is top-heavy and bureaucratic, consisting of members who are appointed by the state and the secretaries of state departments such as Finance, Housing, Local Self Government, Housing Commissioner, etc. Although the Board also includes state appointed non-officials and representatives from the state legislature, there is little space for consultation or deliberations with the local community or their representatives.

Certain other pieces of legislation also provide for improvement schemes, such as the Howrah Improvement Act, 1956, and the Calcutta Improvement Act, 1911. The Howrah Improvement Act empowers the Board constituted under the Act to frame a sewage disposal scheme.[111] The types of improvement schemes that can be taken up are general improvement schemes and housing and re-housing schemes, among others. Unlike the Uttar Pradesh Housing and Development Board Act, the Act does not specifically provide for a "flood scheme". However, the general provisions of the Act may be utilized to meet the demands of an emergency like the provision of housing to flood affected people. The improvement schemes prepared under the Act may also provide for controlling the use of land developed by the Board by zoning or reserving areas exclusively for specific purposes.[112] Similar provisions can be seen in the Calcutta Improvement Act. Here, also, the improvement schemes may have provisions for the sewering and draining of streets,[113] controlling the use of land developed by the Board by zoning or reserving areas for specific purposes.[114]

An aspect which needs to be developed in law relates to strategies and procedures for restoration of flood affected lands. The existing legislation has fleeting and general references to such works. For instance, the Assam Town and Country Planning Act, 1959,[115] provides for the preparation of development schemes for a particular area in the state by the local or regional authorities.[116] Such schemes may inter alia provide for filling up or reclaiming swamp areas or levelling up land.[117] However, the impact of such provisions depends upon the implementation by the executing agencies, which has been tardy so far.

Here, the issue of land-use planning in Delhi's Yamuna Pushta is a useful case study, as it involves questions not only on the land-use pattern in flood plains but also on the authority competent to plan for the same (see box below).

### 3.9 Interstate rivers, River Boards and flood management

Issues pertaining to interstate rivers are of immense significance for India as it is these rivers which are the prime carriers of floodwaters in the country. As mentioned earlier, the subject falls under the Union List, provided the Union Parliament declares it so in the public interest.[118] The Centre has also been empowered to provide for the adjudication of any dispute or complaint with respect to the use and distribution of water in any interstate river.[119] In pursuance of the above provisions, the Centre had enacted the River Boards Act, 1956, and an overview of the Act especially for its implications for flood management and control is useful here. The Act provides for the establishment of River Boards for the regulation and development of interstate rivers and river valleys. The Central Government may, on its own initiative or at the request of the state government, establish a River Board. The Board is mainly constituted for advising the interested governments in relation to such matters concerning the regulation or development of an interstate river or river valley. The Board consists of a chairman and other members as the Central Government may think fit. They should have knowledge or experience of irrigation, flood control, soil erosion, electrical engineering, etc. The Board may also appoint one or more advisory committees for the purpose of enabling it to carry out its functions under the Act. The Boards are, however, empowered to

#### Land-use Planning in the Flood Plains of Delhi: Yamuna Pushta

The Delhi Administration's recent drive to clear Yamuna Pushta (the floodplains of the river Yamuna) and to convert the area into a national tourism-cum-cultural site raises several complex questions on the development of flood plains and the authority competent to carry it out. While the Delhi Government was carrying out evictions of various slum dwellings on the banks of the Yamuna earlier in 2004 for the cleaning up and development of Yamuna Plains, it is worth noting that the same flood plains are being used for the purposes of the Delhi Police Training Complex, Metro Depot, Akshardham Temple, Indira Gandhi Indoor Stadium, Express Highway, MCD pumping stations and office complexes. The Delhi Development Plan Perspective, 2001, itself envisages that on the banks of river Yamuna, large recreational areas are to be developed and to be integrated with other urban developments. The uses to which the land is being allocated in the flood plains should be closely monitored. While it is justifiable to prohibit residential use, at the same time other human activities and developmental activities should also be restricted in such areas, something which seems not to have been done in the case of Yamuna Pushta.

While the kind of activities going on or proposed to be taken up should definitely be reviewed, the competence of the Delhi Administration to plan for the development of the river Yamuna and its banks is itself questionable, in the view of a Delhi High Court Judgment in 1998 (1998 AIHC 42). In the said case certain notifications issued by the Delhi Government under the Delhi Development Act, 1957, regarding acquisition of land for planned development of Delhi were in question. The Court observed, "planning for inter-state rivers, their flood plains and their river valleys is not a matter of ordinary planning", and added further "Planning for a river is statutorily recognized as being distinct from planning for urban development/improvements." Therefore, the Delhi Development Authority or the Delhi Administration are not the proper authorities to plan for the development of interstate rivers. For that purpose special legislation exists, namely the River Boards Act, which provides for River Boards which have special and exclusive powers to plan for the development of interstate rivers, river beds and flood plains. The Court further clarified that, rather than development, "preservation" of rivers should be given priority and that any plan for the development of an interstate river like Yamuna should have provisions for irrigation and water supply as provided in the River Boards Act.

The Court in the said case also directed the state that the flood plains of the river Yamuna, as it flows through Delhi, should be clearly demarcated with the help of the revenue records to indicate which lands adjacent to the river Yamuna are flood prone. The Court also passed an injunction restraining the carrying out of any construction activity of any nature or description in the flood plains of the river Yamuna, or in the river bed, except in so far as such construction activity is necessary or incidental to the construction of bridges, weirs or barrages on the river Yamuna.

perform essentially advisory functions to the government. Some of the issues where they may be empowered to tender advice to the interested governments include promotion and operation of schemes for flood control, drainage, the promotion of afforestation and prevention of soil erosion. Where the Board has been empowered to perform any of these functions, it may prepare schemes for the purpose. After preparing the schemes, the Board shall consult the state governments interested and the Central Government in respect of the scheme, and after considering their suggestions the Board may reject, modify or confirm the scheme.[120] However, the scheme has to be executed by the states. The general powers of the Board may include the collection of topographical, meteorological, hydrological and subsoil water data as it deems necessary, publishing statistics or other information relating to the various aspects of the regulation and development of interstate rivers and river valleys, conduct and coordinate research on various aspects of the conservation, regulation or utilization of water resources, such as flood control, soil conservation, land use and connected structural and design features.[121]

The River Board presents a good example of a structure which can take a holistic and comprehensive view of the development of an interstate river by ensuring involvement of the interested states, especially with respect to flood management. Note here that it has been clarified that in the case of an interstate river, the respective state governments or the municipal bodies have no authority to plan for their development. It was observed by the Delhi High Court in a case in 1998 that since Yamuna is an interstate river, schemes for its development can be prepared and executed by the River Board alone and the Delhi Development Authority does not have the authority to do so[122] (see box above for details). More specifically, it was observed by the Delhi High Court that statutorily, the Delhi Development Authority cannot carry out any river planning for an interstate perennial river like Yamuna.[123] In the special case of an interstate river, it was also observed by the Court, "River-planning must be excluded from town planning". Since the Central Government enacted the River Boards Act in 1956 it has been possible for the schemes for development of interstate rivers to be prepared and executed only by the Boards constituted under the Act and not by any other person or authority. The Delhi Administration and the Development Authority are not River Boards constituted under the Act, and, therefore, they cannot be proper bodies which would plan for the development of interstate rivers and river valleys.[124] In this context it is worth emphasizing that the River Boards Act, enacted almost a half a century ago, continues to represent a potentially important legal space, but one which has not been utilized at all even while it remains in the law books.

Having said that, there has been specific legislation constituting boards or corporations in charge of development of specific rivers and river valleys. The Brahmaputra Board Act, 1980, was enacted for the establishment of the Brahmaputra Board for the planning and integrated implementation of measures for the control of floods and bank erosion in the Brahmaputra valley. The Board is to carry out surveys and investigations in the Brahmaputra Valley and prepare a master plan for flood control and bank erosion and the improvement of drainage in the Brahmaputra Valley.[125] The Board is also to prepare detailed reports and estimates in respect of the dams and other projects proposed in the master plan,[126] and to publish statistics and other information relating to various aspects of flood control, bank erosion and drainage in the valley. However, this provision has been made subject to possible future rules made by the state. As per the Act, the corporation is to be guided by the Central Government.

Another piece of legislation, the Damodar Valley Corporation Act, 1948, also deserves mention here.[127] The Act provides for the establishment and regulation of a Corporation for the development of Damodar Valley in the states of Jharkhand (formerly part of Bihar) and West Bengal. One of the functions of the Corporation is to promote and operate schemes for flood control, irrigation and drainage in the Damodar river and its tributaries, and afforestation to control soil erosion

in the Damodar river.[128] For that purpose it can take up the construction of dams and drainage canals, etc. The Corporation is mandated to prepare an annual report, in which the details of all activities taken up by the Corporation shall be given, including flood control, soil erosion control, and the use of lands.[129] This body has been active and has had much impact on the relevant area.

### 3.10 Evacuation of people from land and property during floods

Apart from speedy acquisition of land, an important aspect of flood management is the immediate evacuation of people from lands affected or threatened by floods. In the state of Uttar Pradesh a specific piece of legislation, the Uttar Pradesh Flood Emergency Powers Evacuation & Requisition Act, 1951, provides "for the protection of life and property from danger caused or threatened by floods".[130] It is important to note here that the Act can be used not only when some danger has been caused by floods, but also when the same is likely to be caused. The Act empowers the District Magistrate (DM) to take certain measures in cases of flood emergencies:

- To compulsorily evacuate people from land and property in areas threatened by floods. In exercising this power the DM may specify the route and time by which people are to be removed and the place to which they are to proceed;
- In order to accommodate the people so compulsorily evacuated, the DM may take possession of any premises other than those used for religious worship and private dwelling houses;
- The DM may also order requisition of boats;[131]
- The DM may also order the diversion of the flow of flooded water or the removal of any wall, embankment or object which is causing obstruction to the flow of such water in order to prevent imminent danger to life or serious damage to property, in the public interest.

Here, too, all the important measures that should be taken during or before a flood are left to the discretion of the DM, without there being any mandatory obligation for the DM to take such measures in flood emergencies.

### 3.11 Remission/suspension of land revenues on agricultural calamity from floods

There are a number of state laws which make it clear that those landowners who are seriously affected by flood are entitled to remission and suspension of land revenues. The Uttar Pradesh Zamindari Abolition and Land Reforms Act, 1950, lays down that landowners are entitled to remission or suspension of the land revenue on the occurrence of an "agricultural calamity".[132] Even though the Act does not define agricultural calamity, it is obvious that when it happens severe flood is one of the major causes of an agricultural calamity. It is also important to note here that a government order of the state of Uttar Pradesh has made clear that remission and suspension of revenue in cases of agricultural calamity would also extend to areas within the state not covered by the Uttar Pradesh Zamindari Abolition and Land Reforms Act.[133]

The Manipur Land Revenue and Land Reforms Act, 1960, also makes clear that the state government is to grant remission or suspension of land revenue "in years in which crops have failed in any area" and this formulation is broad enough to include crop failures by devastation caused by floods.[134] However, the rules under the Act made this aspect very clear, laying down that remission or suspension of land revenue may be granted in the event of failure of crops "due to local calamities such as hail and floods". The rules also make clear that in such a situation, relief shall ordinarily take the form of suspension of revenue, and remissions may be granted if later conditions justify such a course. Furthermore, in cases of widespread calamities, the degree of relief shall be the same in each village or homogeneous tract, and no attempt shall be made to differentiate according to the circumstances of the individual. The Manipur Land Revenue and

Land Reform Rules, 1961, also specifically lay down the extent of relief in cases of suspension of land revenue. Where 40 per cent or above of the crops has been devastated by floods the degree of relief would be full, for a crop failure of between 25 and 40 per cent the degree of relief would be half, and in the event of less then 25 per cent crop failure the degree would be nil.[135] Identical provisions for remission of land revenue during floods and for the extent of relief in this regard have been made for the state of Tripura through the Tripura Land Revenue and Land Reforms Act, 1960, and Tripura Land Revenue and Land Reform Rules, 1961.

The Himachal Pradesh Land Revenue (General) Assessment Rules, 1984, lay down that the Revenue Officer should classify the land in different categories for the purpose of assessment, and that one of the categories of the cultivated land should be "Sailab: Flood or kept permanently moist by water".[136] Among the principles for allowing exemption from assessment for improvement works, there is a specific mandate that this could be done in cases where there is practically no assessment possible on land because of river floods. In addition, where the land irrigated by a well is situated within reach of river floods, separate and specific sailab rates have been prescribed.[137] Importantly, the rules also mandate the Revenue Officer to prepare a forecast report showing whether, for fiscal reasons or otherwise, reassessment is desirable or not. In this regard, apart from specific factors like changes in cultivation, means of irrigation and rainfall, "any other factor affecting the general property of the tract" needs to be taken into account. The formulation "any other factor" is residuary in nature and can include the flooding of land as one of the factors. It is useful to note here that before such a forecast report is prepared "leading agriculturists and organizations of land owners of the area concerned shall, so far as practicable, be consulted".[138] The forecast report shall mention the nature of the consultation, indicating what opinions have been expressed by such land owners and agriculturists, including the reaction of the Revenue Officer to these opinions. This is a useful provision and the absence of these requirements in the preparation of forecast reports in the Northeastern States and in legislation like the Assam Land Revenue Reassessment Act, 1936, is especially notable.

The Assam Land Revenue Reassessment Act mandates the state government to reassess the land revenue — the term for which is ordinarily not less than 30 years — in special circumstances. One of these includes the situation where "the soil of any estate has permanently been improved or deteriorated through causes beyond the control of the settlement holder".[139] Besides, the Settlement Officer is mandated to take into account the related advantages and disadvantages for any land for the purpose of assessment and one of the factors that must be considered is the liability and damage by natural causes.[140]

The Bengal Land Reforms Act, 1956, also contains a specific provision for alteration of land revenue in situations where, owing to exigencies, the land area gets "increased or decreased". This provision can be utilized for remission of revenue on the land that is damaged, or inundated by floodwaters, as that could lead to a decrease in the land area of the landowner whose land is so submerged.[141] The rules for remission and suspension of land revenue also exist for the Andhra Pradesh and Telangana area and such relief is granted in situations where "cultivation is impossible due to excess of water or slush".[142]

### 3.12 Rehabilitation of flood affected people and absence of specific provisions

The present legal regime deals inadequately with the rehabilitation of people affected by flood. The United Provinces Acquisition of Property (Flood Relief) Act, 1948, however, deserves mention, as it provides for the requisition of land and property for the village sites and houses for flood affected people. Having said that, even this Act is inadequate, as it deals with the provision of houses only, and overlooks other aspects like livelihood and development. It is also notable that

details with respect to relief works — such as the criteria to determine who is a flood affected person and how housing should be allocated to such a person — have not been elaborated. The Bihar and Orissa Natural Calamities Loans Act, 1934, follows a similar scheme. The Act enables the state government to grant loans to the owners of buildings which have been damaged or destroyed by natural disasters.[143] Under the Act the affected owner[144] is required to submit an application to the Collector.[145] The Collector, after proceeding in the prescribed manner,[146] may grant the loan applied for, once satisfied that the applicant is an affected owner.[147] Before granting the loan the Collector is also required to determine the need for the loan, the adequacy of the security paid, the total amount to be advanced and details of the repayment, among other things.[148]

Even the recent National Policy for Rehabilitation and Resettlement of Project Affected Families, 2004, addresses displacement caused by industrial or developmental projects and overlooks any kind of natural disaster like floods. The legal regime needs to be revisited in order to provide comprehensively for flood affected people. This assumes more importance in the absence of any specific legislation on flood insurance.[149]

### 3.13 Legally mandated famine relief funds

Certain state laws provide for the establishment and maintenance of relief funds to be utilized on occasions of serious famine and distress caused by floods or other natural disasters in the state: these include the Andhra Pradesh Famine Relief Fund Act, 1936, the Orissa Famine Relief Fund Regulation, 1937, and the Bombay State Famine Relief Fund Act, 1958. Under all these laws it is incumbent upon the state to establish a famine relief fund. Such funds are required to be utilized only for the relief of famine and distress caused by serious floods and other natural disasters. The Orissa Regulation specifically adds that the fund can also be used "for construction or repair of embankments after serious floods".[150] The 1936 Andhra Pradesh Act specifies that, if the fund exceeds 4 million rupees,[151] the government may utilize the excess to meet expenditure on protective irrigation works and other works for the prevention of famines. Under the Orissa Regulation this limit is as high as 10 million rupees.[152] Furthermore, the amount can be utilized inter alia for protective irrigation works, prevention of famines, granting of loans under the Agriculturists Loan Act, 1884, granting of loans to institutions, and undertaking to advance loans for building fire-proof houses.

The accounts of the fund are required to be produced at the end of each financial year. The Andhra Pradesh Act also provides that if these accounts show that the balance in the fund falls short of 6 million rupees, the deficiency shall be made up from the revenue of the state,[153] while the Orissa Regulation mandates that every year the state government shall place an amount of 87.5 million rupees to the credit of the fund and the said expenditure shall be a charge on the consolidated fund of the state.[154]

Another act which deserves mention here is the Bengal Famine Insurance Fund Act, 1938, which provides for the establishment and maintenance of the Bengal Famine Insurance Fund. The proceeds of the fund are required to be spent on the relief of famine and distress caused by serious floods and natural disasters, among other things.[155] The initial contribution to the fund is required to be made by the state. The Act also specifies the initial amount required to be contributed by the state as 1.2 million rupees.[156] Furthermore, if the accounts of the fund made up at the end of the year show that the balance to the credit of the fund falls short of 1.2 million rupees, the deficiency shall be made up by a contribution from the revenues of the state.[157]

Apart from the specific Famine Relief Fund Regulation, the Orissa Municipal Act, 1950, also contains provisions regarding relief measures, which may be taken up by the municipality in cases of famines and serious distress.[158] The Asansol Municipal Corporation Act, 1990, also lists giving relief and establishing and maintaining relief works for destitute persons in times of famine or scarcity.[159] However, the same is a discretionary power of the municipality.

### 3.14 Flood insurance and the lack of law

Flood insurance, despite being in vogue in countries like the United States of America, has not been deliberated upon so much in this country.[160] Even though flood risk has been included in the cover of continuing risk by general insurance companies in India, flood insurance has not been widely adopted in India because of difficulties in assessment of losses, generally not included in this cover. Besides, existing insurance policies are more concentrated in urban areas and they operate on an individual level. A government sponsored scheme for community insurance against floods does not seem immediately feasible in the Indian context, although a High Powered Committee on Disaster Management had advised mandatory insurance policies for devastation caused by disasters.

### 3.15 Emerging regulatory perspective on disaster management including floods

A draft National Disaster Management Policy exists that proposes to integrate disaster mitigation into developmental planning. The objectives of the policy include minimizing loss of lives, safeguarding social, private and community assets and protecting the interests of poor and vulnerable sections. Broad features of the draft National Policy on Disaster Management include (a) institutional structures to be built up for development of interstate arrangements for sharing of resources during emergencies; (b) culture of planning and preparedness for capacity-building; (c) construction designs conforming to the codes of the Bureau of Indian Standards; (d) all lifeline buildings e.g. hospitals, railway stations, airport control towers, etc. to be disaster resistant or retrofitted; and (e) revision of relief codes in the states to develop them into disaster manuals.

States have also been advised to clearly enunciate their disaster management policy. The states of Madhya Pradesh and Gujarat have already notified their policies in this regard. Gujarat and Bihar are also the first two states to have enacted their respective State Disaster Management Act. The Gujarat Disaster Management Act provides for effective management of disasters to mitigate their effects and for administrating, facilitating, coordinating and monitoring emergency relief during and after the occurrence of disasters. The Act defines disasters as including an "actual or imminent event whether natural or otherwise, occurring in any part of the State" and causing widespread loss or damage to property, human life and environment. The Act also seeks to provide for implementing and monitoring measures for rehabilitation and reconstruction in the aftermath of the disasters. For these purposes the Act establishes the Gujarat State Disaster Management Authority.[161] The said State Authority consists of the Chief Minister as an ex officio chairperson and includes two other ministers, the Chief Secretary and the State Relief Commissioner,[162] and the Director General of Police of the State and such other officers as may be appointed by the government.[163] The Authority acts as a central planning, coordinating and monitoring body for disaster management and post-disaster rehabilitation, reconstruction and assessment.[164] It is also required to collect, analyse and study the data on all aspects of disasters.[165] Every department of the state government under the supervision of the State Disaster Management Authority is required under the Act to prepare a disaster management plan, setting out the strategies and procedures in the event of a disaster and fixing the roles and responsibilities of the department in respect of emergency relief and post-disaster recovery and rehabilitation.[166] The Act describes in detail the powers and functions of local authorities,[167] State Relief Commissioner,[168]

Collector[169] and Chief Executive Officer[170] in the event of a disaster. It also fixes duties on the police force, fire services, *gram rakshak dals* (village defence groups), home guards, civil defence,[171] public and private sector enterprises,[172] and citizens.[173]

In the context of cyclones and the devastation they cause in coastal areas of the country, the provisions of a bill providing for the establishment of an adequate number of cyclone early warning centres and institutes is specially notable, even though it has not yet become law.[174] The bill also sought to provide training to people in cost-effective disaster resistant construction techniques for safer construction of houses and other buildings in the coastal areas of the country. The salient features of this bill include:

- Establishing such numbers of centres in the coastal areas as may be necessary to give advance information about the impending cyclone to the inhabitants for them to shift to safer places;
- Establishing such numbers of institutes as may be necessary for the purposes of the proposed act;
- Mandating the duty of the Central Government to provide adequate financial assistance to the affected people for reconstruction activities through district administrations, banks, financial institutions, cooperative societies and village *Panchayats*.

The bill also sought to create a mandatory obligation for the Central Government to make available requisite funds for implementation of the act.[175]

### 3.16 Community participation in flood management: a legal perspective

Community participation has come to be recognized as an important aspect of disaster management, as it is the local community which can provide immediate help when a flood disaster strikes suddenly. It is useful to revisit the laws dealing with flood management to see how they provide for the mobilization and involvement of the local community in the decision-making process at various levels.

Any structural measure taken up for flood control such as construction of dams or embankments should involve the beneficiaries to a reasonable extent in the planning and execution of schemes. Here the state irrigation laws[176] deserve mention, as most state laws provide for the publication of schemes and invitation of objections from interested persons.[177] It is incumbent upon the state government to publish a detailed description of the proposed works, including a report on the land where the work is proposed to be situated and the land likely to be benefited or adversely affected. But in emergencies some of these procedural safeguards can be dispensed with. For example, under the Bengal Embankment Act, 1882, the state can proceed with the work, pending the proceedings.[178] These acts also have provisions for the community to make applications and suggestions to the government if they wish a particular drainage and flood control work or irrigation work to be undertaken.

The Orissa Hydro-Electric Projects and Flood Control Works (Survey) Act, 1961, which specifically deals with the survey and investigation of the suitability of lands for the establishment of flood control works, also provides for the calling of objections and suggestions from the interested persons. The notice of such works is given at the offices of the *Panchayat Samiti* and *Gram Panchayat* as well as at the office of the Collector and in the official gazette. After the issuance of the Environment Impact Assessment Notifications in 1994,[179] a public hearing has become mandatory before any river valley project including hydel power, major irrigation and their combinations including flood control is taken up. The report of the public hearing is submitted along with

the environmental impact assessment report, both when a new project is undertaken and when an existing project is proposed to be modernized or expanded. Such a public hearing is required to be conducted by the state pollution control boards (SPCBs), after giving due notice of the same. Here not only the local community directly affected by the project, but also environmental groups, local authorities such as *Panchayats*, municipalities, and the person who owns or has control over the project for which the application has been made, can participate in the public hearing. The public hearing panel consists of representatives of the SPCB and the state department dealing with the environment, the District Collector, representatives of local bodies such as *Panchayats* and municipalities and senior members of the community, who are nominated by the District Collector.

While the laws dealing with structural measures have some albeit rather limited space for community participation in one way or another, the laws with respect to rescue and relief works for the victims of natural disasters grant complete powers to the state officials, who are not required to consult the community at large for any works that they may be proposing to undertake, such as under the United Provinces Acquisition of Property (Flood Relief) Act, 1948, and the Uttar Pradesh Emergency Powers (Evacuation and Requisition) Act, 1951. Likewise, under the *Uttar Pradesh Avas Evam Vikas Parishad Adhiniyam*, 1965, it is the *Avas Evam Vikas Parishad* that frames flood schemes for housing and improvement at both the pre-flood and post-flood stages. The said *Parishad* is a high powered body, with members of state legislatures, secretaries of the Housing Department, the Local Self Government Department, the Finance Department, housing commissioners and the *Nagar Pramukh*. However, notices for the proposed schemes are published in the newspapers and state gazette, and objections are invited from the persons interested within the specified time frame.

The town and country planning laws of states have provisions for inviting objections and suggestions from interested persons on the draft development or master plan for a specified area within a stipulated time frame. However, such provisions only facilitate reaction to a draft plan document at best, and do not necessarily involve people in each of the plan-making stages.

The River Boards[180] mandated to be constituted specifically for the regulation and development of interstate rivers and river valleys comprise members, appointed by the Central Government, having specialized knowledge of e.g. flood control, navigation, irrigation or soil conservation. Similarly, the Brahmaputra Board[181] consists of representatives of state governments of certain northeastern states,[182] representatives from the Central Ministries of Agriculture, Water Resources, Finance, Power and Transport, representatives from the Central Water Commission, the Indian Meteorological Department and the Geographical Survey of India.[183]

With regard to community participation, the Himachal Pradesh Land Revenue (General) Assessment Rules, 1984, contain some important provisions. Before assessing the revenue to be charged for an area, a forecast report is prepared taking into account the rainfall or any other factor affecting the general property of the tract that may include devastation by floods. The said report is prepared in consultation with the agriculturists and organizations of landowners of the area.

An example of community participation can be seen in the recently enacted Gujarat Disaster Management Act. The Act specifically provides for capacity-building of the groups of local community to cope with any disaster. The Act provides that community groups and youth organizations such as the National Cadet Corps, the Nehru Youth Center[184] and voluntary organizations[185] including non-governmental organizations may assist the state in disaster management activities

like capacity-building, relief works and training activities. Interestingly, the Act makes the citizens duty-bound to assist the Collector or the Commissioner in disaster management activities whenever their assistance is demanded.[186]

The powers and functions of *Panchayat Raj* institutions — elected local bodies in rural India — for rehabilitation and relief measures in times of flood, including provision for drainage, are also relevant here. *Bihar Panchayat Raj Adhiniyam*, 1993, empowers the village *Panchayat* to undertake relief measures in the event of a natural calamity,[187] while the *Panchayats* at the intermediate[188] and district levels,[189] have been empowered to constitute standing committees, including a general standing committee. An important function of the general standing committees is undertaking relief works during natural disasters.[190] But a field enquiry conducted by the Institute of Resource Management and Economic Development (IRMED), Delhi, in Assam, Bihar and West Bengal indicated that the rules framed by the respective state governments do not provide for a flood management committee which could perform functions other than mere relief. The rules need amending to give powers to the community in this respect, as clearly brought out in the Study on Community Approach to Flood Management by IRMED.[191] Similarly, the Uttar Pradesh Panchayat Raj Act, 1947, includes "relief against famine and other calamities" as one of the discretionary functions of the village *Panchayat*.[192] Similar provisions can be seen in the Orissa Grama Panchayat Act, 1965,[193] and the Assam Panchayat Act, 1986.[194]

Under the Uttar Pradesh Panchayat Raj Act, 1947, the *Goan Panchayat* is duty-bound to provide for the "maintenance, and repair of walls, bunds, raised platforms and other works for protection from floods".[195] However, this function of the *Panchayat* is subject to the funds that it may have at its disposal. Under the Assam Panchayat Act, 1965, the *Goan Panchayat*[196] and *Anchalik Panchayat*[197] are required to execute development schemes and programmes within the areas under their respective jurisdiction, providing for matters such as the construction, repair and maintenance of embankments, drains, etc.[198] The Orissa Gram Panchayat Act also requires the *Gram Panchayat* to construct, maintain and clean drains and drainage works.[199] The Act generally provides for carrying out any measure which is likely to promote public safety, health or general welfare.[200]

### 3.17 Riparian rights on flood waters[201]

No riparian owner is entitled to obstruct the flow of a public river with a dam. This restriction on the riparian owner has not only been laid down by the courts but is also provided under the Criminal Procedure Code of 1898.[202] In terms of floodwaters, riparian owners are permitted to obstruct the floodwater in emergency conditions to protect themselves, but here too no riparian owner is permitted to divert the floodwater into a neighbour's property.[203] But whether a riparian owner can claim riparian rights over the floodwater, especially when a state obstructs the flow of such floodwater in order to mitigate the damage caused by floodwater, is still not settled in India. When compared with other countries like the United States where the position on the riparian ownership over floodwater is well settled through various pieces of legislation, the Indian position on riparian rights vis-à-vis the state is ambiguous.[204]

### 3.18 Floods and efforts to produce dam safety legislation

The hydrologic safety of dams is an increasing concern in India. In view of this, the Government of India has constituted a National Committee on Dam Safety (NCDS) that has advisory and recommendatory powers. The NCDS enables an exchange of information on dam safety among experts, state governments, and bodies that own large dams or a significant number of dams. The NCDS

is chaired by the chair of the Central Water Commission (CWC). In June 1987, the Dam Safety Organization of the CWC issued the Guidelines for Safety Inspection of Dams, for adoption by the states of India.

Notwithstanding the existing guidelines and mechanisms, the need for a national dam safety law that obliges the state governments to act decisively and in a timely fashion is thought to be considerable. It may be noted in this connection that a draft Dam Safety Act has been in circulation with major dam-owning states for three years now, but no decision has been taken so far to turn it into a law. The draft Act seeks to provide for proper surveillance, inspection, operation and maintenance of all large dams in the country to ensure their safe functioning. The draft Act provides that all the states/dam-owning organizations having a significant number of dams shall constitute a body called "State Dam Safety Organization (SDSO)/Dam Safety Cell (DSC)" headed by an officer not below the rank of Superintending Engineer or equivalent. The draft Act also says that pre-monsoon and post-monsoon inspection of dams should be carried out by an engineer not below the rank of an Executive Engineer and a report of inspections is to be forwarded to the SDSO at the state level. The draft Act further provides that disaster management and emergency action plans should be prepared for all large dams. For projects that are going to be commissioned, such plans should be prepared before filling the reservoir. The fact that an emergency flood warning/inflow forecasting system should be established for all large dams is also taken into account in the draft Act. Finally, the draft Act stipulates that the Dam Safety Organization of the CWC will prepare a consolidated annual report and submit the same to the Ministry of Water Resources, Government of India.

### 3.19 The role of the Bureau of Indian Standards

In addition to the above-mentioned required dam safety mechanisms, India has the Bureau of Indian Standards (BIS) and a Code of Practice for all waterworks, including dams. These documents address safety considerations, and the role of the Bureau of Indian Standards in this regard has been important.

The Bureau of Indian Standards Act, 1986, provides for the establishment of a bureau for the harmonious development of the activities of standardization, marking and quality certification of goods and for matters connected with these. The Water Resources Division Council (WRDC) comes up with updated Indian standards on various aspects of water resources management and development. For example, a criterion for adopting inflow design flood for various hydraulic structures is recommended in the relevant Bureau of Information Standards Codes. Some of the notable published standards for the present purposes include:

- Guidelines for overall planning of river basins (IS 13028:1991);[205]
- Guidelines for estimation of flood damages (IS 13739:1993);
- Guidelines for planning and design of drainage in irrigation projects (IS 15087:2001);
- Guidelines for design of under-seepage control measures for earth and rockfill dams (IS 8414:1977);
- Code of practice for the protection of slopes for reservoir embankments (IS 8237:1985);
- Criteria for design of small embankment dams (IS 12169:1987);
- Guide for storm analysis (first revision) (IS 5542:2003);
- Methods for fixing the capacities of reservoirs: flood storage (IS 5477 (Part 4):1971).

All the structural measures associated with flood control works need to comply with these standards, which are to be reviewed periodically by the WRDC at the central level. The BIS Act provides for a penalty for improper use of its standard marks, treating it as a criminal offence.[206]

However, the courts can take cognizance of any offence punishable under the Act only on a complaint made by the Government or the Bureau of Indian Standards itself.

### 3.20 Forest laws not prohibiting flood works

The Indian Forest Act, 1927, is the most important piece of legislation governing forestry in India. The Act categorically provides that the state government may prohibit or regulate certain activities in any forest or waste land which is not the property of the government, when such regulation or prohibition appears necessary for protection against storms, winds and floods.[207] The Act also empowers the state to assume management of any such forest in flood emergencies.[208] Similar provisions may be seen in the Assam Forest Regulation, 1891, which is applicable to certain north-eastern states such as Assam, Arunachal Pradesh, etc.

Another important piece of forestry legislation is the Forest Conservation Act, 1980. Though the Act is stringent on the use of forest area for non-forest purposes, the establishment of dams, culverts and bridges is kept outside the term "non-forest purposes". The same are considered ancillary to management, development and conservation of forests and wildlife.[209] This further means that flood protection works can be taken up in forest areas without many restrictions. The above provisions also point to the fact that in cases of flood emergency nothing can possibly stop the government undertaking any required measure in forest areas, irrespective of its statutory classification.

### 3.21 Wetlands protection and rethinking the law

Unlike in some other countries, there are no special legal or policy regimes for conservation of wetlands in India. However, there is one important Calcutta High Court verdict on wetlands protection.[210] Here the Court held that "wetland being a bounty of nature does have a significant role to play in the proper development of society, be it from environmental perspective or economic perspective" and then directed the state government of West Bengal to take appropriate measures for protection of the wetlands. The fact that Sunderbans, the biggest wetland within the same Court's jurisdiction, continues to face major threats — most recently by a tourism project on the Sunderbans — points to the limitations of a general legal obligation together with the need for a strict and specific legal mechanism for the protection of wetlands. The West Bengal Town and Country Act, 1979, also provides for stoppage of all works in the wetlands in case these may damage the wetlands.[211]

There are good reasons to explore an independent legal regime for wetlands. First, water pollution acts and rules have traditionally been blind to wetlands and are too full of end-of-pipe effluent limitations to have a proactive approach to habitat protection. Likewise, wetlands are blind spots to the Forest and Protected Areas regime.[212] As the recent controversy created by a planned tourism project in the Sunderbans suggests, there is a critical question that policy and law makers would need to address: should the conservation of wetlands be only in a paradigm of "wise use" policy as the Ramsar International Convention on Wetlands requires, or should India opt for a "no use" policy, especially when it comes to construction and building projects in their habitats?

## 4. Inferences and conclusions

The constitutional issues relating to flood management in India veer round the legislative competence of the Centre and the states to enact laws concerning flood management. Even though forms of flood control viz., "Drainage and Embankment", are specifically mentioned in the State

List under the Seventh Schedule of the Constitution, flood control and management go beyond these, especially when one examines measures to deal with floods having inter-state dimensions — measures which the Union could be deemed to have the competence to take. It could also be said that it is the Union Parliament that has the exclusive power to make laws with respect to control and regulation of interstate rivers as well as any matter not enumerated in the Concurrent List or the State List, with flood control being one such subject. In addition, "Disaster Management" as a legislative subject could ideally be placed in the Concurrent List, thereby empowering both the Centre and the states to legislate on the subject.

A review of the legal regime seeking to address various aspects of flood management drives home the point that different states have different laws, dealing with a whole range of issues, from land-use planning, compulsory evacuation of land in flood situations, suitability of lands for construction of flood works, remission and suspension of land revenue in case of agricultural calamity caused by floods, to levying of betterment contributions for recovering the cost of flood control work. While different states have dealt with the subject with their own preferred emphasis on certain aspects of flood management, even then several similarities exist across the states. It was observed that in almost every state, in cases of flood emergency, the laws give full powers to the state government to undertake the required measures in any area. Moreover, while the states have isolated provisions in various laws that could be utilized to deal with flood management there is a need to integrate the disparate laws addressing the range of issues for a unifying legal perspective. In this context the need for a separate flood management law at the state level could also be explored.

The present review also shows that although there are direct laws in some cases and specific provisions in other laws regulating flood management, there have been, in general, few cases of their use and implementation. In the study, a review of all the High Court and Supreme Court cases since 1950 was also undertaken, but, despite problems evidenced almost annually with rehabilitation and flood relief works, litigation around the state laws in this area was found to be virtually non-existent.

Even though there are legal provisions at the state level regulating several aspects of flood management, one of the crucial findings of the study is that many of these lay down an essentially "may" regime, leaving ample scope for administrative discretion. A typical example is the Uttar Pradesh Flood Emergency Powers Evacuation & Requisition Act, 1951, where, while there is a listing of measures that should be taken during or before a flood, all these measures are left to the discretion of the District Magistrate, without there being any mandatory obligation for such measures to be taken in flood emergencies. A similar mandate couched in non-mandatory terms is reflected in the laws relating to speedy acquisition and requisition of land. In fact these laws, critical for effective and long-term rehabilitation and relief, give wide powers to the state officials during such emergencies. There are no specific qualifiers built into these statutes, and judicial review is also circumscribed to a great extent. However, it cannot be said that there are no checks on administrative discretion; the administrative agencies are required to act in a fair, just, and reasonable manner, and there is some case law referred to in the study which makes this aspect clear.

The study also revisited the laws dealing with flood management to see how they provide for the mobilization and involvement of the local community in the decision-making process at various levels. Under the present legal regime most of the important aspects of flood management like identification of areas suitable for flood works, initiating the schemes for such works, requisition and acquisition of lands, etc. have been vested in the state officials. While the laws dealing with structural measures have some space for involving people, especially by way of inviting comments

or objections and mandating service of notice to those affected, the laws with respect to rescue and relief for the victims of natural disasters give complete powers to the state officials for any works that they may be proposing to undertake, such as under the United Provinces Acquisition of Property (Flood Relief) Act, 1948, or the Uttar Pradesh Emergency Powers (Evacuation and Requisition) Act, 1951.

When it comes to the town and country planning laws, the states have provisions for inviting objections and suggestions from interested persons on the draft development or master plan for a specified area within a stipulated time frame. However, such provisions only facilitate reaction to a draft plan document at best, and do not necessarily involve people in each of the plan-making stages. More recent enactments like the Gujarat Disaster Management Act do provide — although again generally — for building the capacity of local community groups to cope with any disaster. The Act provides that community groups and youth organizations such as the National Cadet Corps, Nehru Youth Center, and voluntary organizations including non-governmental organizations may assist the state in disaster management activities like capacity-building, relief work and training activities.

There are other areas where the legal regime impacting on flood management needs to mature. These include aspects of river basin planning, dam safety, wetlands protection, flood insurance, restoration of flood affected lands and disaster management. For instance, the River Boards Act, enacted almost a half a century ago, has not been utilized at all even while it remains in the law books. This is notwithstanding judicial orders like the one by the Delhi High Court clarifying in no uncertain terms that "since the Central Government has enacted the Rivers Boards Act, 1956, the schemes for development of interstate rivers can only be prepared and executed by the Boards constituted under the Act and not by any other person or authority". Besides, the existing legislation has general references only to procedures for restoration of flood affected lands. When it comes to dam safety aspects, there is a draft Dam Safety Act that has been in circulation with major dam owning states for over three years now, but it has not made much headway. Besides, there are also good reasons to explore an independent legal regime for wetlands. The existing water pollution acts and rules have traditionally been blind to wetlands and are too full of end-of-pipe effluent limitations to have a proactive approach to habitat protection. There is a need to revisit the legal regime in all the above areas with a view to providing legal recognition and backing wherever possible and to make the existing laws operative wherever they are dysfunctional.

## ANNEX. LIST OF LAWS RELATING TO FLOOD MANAGEMENT IN INDIA

### The Constitution of India

### Water, irrigation and drainage laws

1. Assam Embankment and Drainage Act, 1954
2. Bihar Irrigation Act, 1997
3. Bihar Public Irrigation & Drainage Act, 1947
4. Northern India Canal & Drainage Act, 1873
5. Orissa Irrigation Act, 1959
6. Orissa Public Embankment Construction and Improvement Act, 1951
7. Bengal Embankment Act, 1882
8. Bengal Irrigation Act, 1876
9. Bengal Drainage Act, 1880
10. Madhya Pradesh Irrigation Act, 1931
11. Bombay Irrigation Act, 1879
12. Mysore Irrigation Act, 1965
13. Andhra Pradesh Rivers Conservancy Act, 1884
14. Bihar Irrigation & Flood Protection (Betterment Contribution) Act, 1959
15. Andhra Pradesh Irrigation (Levy of Betterment Contribution) Act, 1955
16. The Bengal Alluvion and Diluvion Regulation, 1825
17. Bengal Agricultural and Sanitary Improvement Act, 1920

### Disaster management

1. The Gujarat Disaster Management Act, 2003
2. Draft National Disaster Management Policy

### Town and country planning and development

1. National Housing and Habitat Policy, 1998
2. Delhi Development Act, 1957
3. Aligarh Development Authority (Master Plan and Zonal Plans) Regulations, 1983
4. Assam Town and Country Planning Act, 1959
5. Uttar Pradesh Avas Evam Vikas Parishad Adhiniyam, 1965
6. Uttar Pradesh Area Development Act, 1976
7. Delhi Municipal Corporation Act, 1957
8. Uttar Pradesh (Regulation of Building Operations) Act, 1958
9. Orissa Municipal Act, 1950
10. Himachal Pradesh Town and Country Planning Act, 1977
11. Model Town and Country Planning Act, 1960
12. Bombay Building (Control on Erections, Re-erections and conversion) Act, 1948
13. Howrah Improvement Act, 1956
14. Calcutta Improvement Act, 1911
15. Patna Municipal Act, 1951
16. Asansol Municipal Corporation Act, 1990
17. Calcutta Metropolitan Planning Areas (Use and Development of Land) Control Act, 1965
18. The West Bengal Town and Country Act, 1979

### Land use

1. Manipur Flood Plain Zoning Act, 1978
2. Land Acquisition Act, 1894

3. Himachal Pradesh Land Revenue (General) Assessment Rules, 1984
4. Uttar Pradesh Bhoomi Evam Jal Sanrakshan Adhiniyam, 1963
5. The Assam Land (Requisition and Acquisition) Act 1964
6. Nagaland Land (Requisition and Acquisition) Act, 1965
7. The Uttar Pradesh Zamindari Abolition and Land Reforms Act, 1950
8. Manipur Land Revenue and Land Reforms Act, 1960
9. Tripura Land Revenue and Land Reform Rules, 1961
10. Assam Land Revenue Reassessment Act, 1936
11. Bengal Land Reforms Act, 1956

**Flood relief**

1. United Provinces Acquisition of Property (Flood Relief) Act, 1948
2. Uttar Pradesh Flood Emergency Powers Evacuation & Requisition Act, 1951
3. Andhra Pradesh Famine Relief Fund Act, 1936
4. Orissa Famine Relief Fund Regulation, 1937
5. Bombay State Famine Relief Fund Act, 1958
6. Maharashtra Project Affected Persons Rehabilitation Act, 1986
7. Madhya Pradesh Pariyojna Ke Karan Vishthapit Vyakti (Punasthapan) Adhiniyam, 1985
8. Karnataka Rehabilitation Act, 1987
9. Bihar and Orissa Natural Calamities Loans Act, 1934
10. Bengal Famine Insurance Fund Act, 1938

**Forest laws**

1. Indian Forest Act, 1927
2. Assam Forest Regulation, 1882
3. Forest Conservation Act, 1980

**Rivers including inter-state rivers**

1. River Boards Act, 1956
2. Brahmaputra Board Act, 1980
3. Damodar Valley Corporation Act, 1948
4. Inter-State River Water Disputes Act, 1956
5. Andhra Pradesh Rivers Conservancy Act, 1884

**Flood control works**

1. Orissa Hydro-Electric Projects & Flood Control Works (Survey) Act, 1961
2. Environment Protection Act, 1986
3. Environment Impact Assessment Notifications, 1994

**Panchayat laws**

1. The Bihar Panchayat Raj Adhiniyam, 1993
2. UP Panchayat Raj Act, 1947
3. Orissa Grama Panchayat Act, 1965
4. Orissa Panchayat Samiti Act, 1959
5. Assam Panchayat Act, 1986

**Others**

1. The Bureau of Indian Standards Act, 1986
2. Criminal Procedure Code of 1898

**International**

1. Convention on Wetlands of International Importance especially as Waterfowl Habitat, 1971 (Ramsar Convention)
2. The Hague Ministerial Declaration, 2000
3. International Conference on Water and Sustainable Development, 1998
4. Kyoto Ministerial Declaration, 2003
5. International Conference on Freshwater, 2001

## ENDNOTES

1 The Kyoto Ministerial Declaration 2003. Other examples include The Hague Ministerial Declaration, 2000, the International Conference on Water and Sustainable Development, the Plan of Implementation of the 2002 World Summit on Sustainable Development.

2 Flood forecasting as a non-structural measure was brought into operation in 1969 by the Central Water Commission (CWC) of the Government of India and has now assumed considerable importance for flood management.

3 *Integrated Flood Management: Concept Paper*, APFM Technical Document No. 1. The Associated Programme on Flood Management, WMO, Geneva, 2003.

4 Ibid.

5 Ibid.

6 Notably the most flood prone basins in India are those of the Ganga and Brahmaputra in Bihar, Uttar Pradesh, West Bengal and Assam followed by Baitarini, Brahmani and Suvarnarekha basins in Orissa.

7 Entry 17 of List II (State List) of the Indian Constitution.

8 Report of the Rashtriya Barh Ayog, 1980, Ministry of Irrigation, Government of India.

9 See article 248 of the Constitution read with entry 97 in the Union List under the Seventh Schedule of the Constitution.

10 Entry 56 List I (Union List) of the Indian Constitution.

11 Article 262 of the Constitution of India. By virtue of the said power, the Parliament enacted the Inter-State River Water Disputes Act, 1956. The Act is discussed in detail later in the report.

12 Entry 42, List III under Schedule 7 of the Constitution of India.

13 Entry 18, List II under Schedule 7 of the Constitution of India.

14 The Act has been repealed in Bihar and Orissa.

15 Here flood embankments have been defined as any embankment constructed or maintained by the Government in connection with any system of irrigation works for the protection of lands from inundation, or which may be declared by the state government to be maintained in connection with any such system and includes all groynes, spurs, dams and other protective works connected with such embankments. Section 3 (4).

16 Section 33.

17 Section 35 of the Act. As per Section 36 of the same Act, before the Canal Officer proposes to enter any building or enclosed court or garden attached to a dwelling-house not supplied with water flowing from any canal, and not being adjacent to a flood embankment, the occupier shall be given reasonable notice as per the urgency of the case.

18 If the tender is not accepted by the occupier then the Canal Officer may refer the matter to the Collector. See sections 37–38 of the Act.

19 Section 40.

20 In Bihar the Act has been repealed by the Bihar Irrigation Act, 1997.

21 The Act was initially not extended to Sunderbans. Later, by virtue of the Sunderbans Act, 1915, the Act was applied to Sunderbans.

22 Section 7.

23 The collector is also required to prepare plans, specifications and survey maps depicting the boundaries of the lands likely to be affected by the above schemes.

24 All the plans, specifications and maps prepared are deposited at the office of Collector and are open to inspection by any person interested. Thirty days after the publication of such public notice, the Collector shall hear the objections of the persons interested.

25 The Commissioner may refuse the proposal made in the report of the Collector or may forward the report to the state government complete with remarks.

26 Sections 8–14.

27 However, the general notice as mentioned above, with all the details, is to be given and thereupon the proceedings and inquiries shall be had. See section 25.

28 Section 18.

29 Sections 21–14.

30 The Act extends to Uttar Pradesh, Punjab, Haryana and Delhi.

31 Section 3 (3).

32 Section 57.

33 AIR 1968 S.C. 394.

34 It is to be noted that the term "drain" includes any channel, canal, a sluice, a syphon or any device excluding or regulating floodwaters, among others. See section 2 (v) of the Act.

35 By virtue of this Act, the Bengal Irrigation Act, 1876, the Bengal Embankment Act, 1882, the Bengal Drainage Act, 1880, and the Bihar Public Irrigation and Drainage Act, 1947, were repealed in the state of Bihar.

36 Section 2(K). Likewise, the term "irrigation works" includes drainage works.

37 Sections 16–17.

38 The Act also provides for applications to the Executive Engineer for the construction of any public embankment by any person.

39 Section 4 (6).

40 Sections 7–9.

41 Section 30 read with section 4 (16).

42 Sections 39, 40 (3).

43 The Act, however, provides for the recovery of cost incurred in construction or improvement of any public embankment in part or full from beneficiaries, which can be recovered as arrears of land.

44 Section 87 (1) (b).

45 Section 258 (e).

46 Section 305 of the Act.

47 Section 306 of the Act.

48 Section 310 of the Act.

49 Preamble to the Act.

50 See the statement of objects and reasons preceding the Act.

51 The Bengal Drainage Act, 1880, and the Bengal Sanitary Drainage Act, 1895, were repealed by virtue of the present Act.

52 This clearly means that any drainage improvement scheme including dams and embankments proposed under this Act will be overridden by the provisions of the specific legislation that applies to such measures and structures. See section 28 of the Act.

53 Section 17 (1) of the Land Acquisition Act, 1894. For example, the Railway Administration can acquire immediate possession of any land, in case of sudden change in the channel of any navigable river, for maintenance of traffic or for the purposes of constructing a riverside or ghat station. Similarly, the Collector can acquire possession of any land when the government feels it is necessary for maintenance of any drainage work.

54 Collector of Monghyr and Others etc. v. Keshav Prasad and Others AIR 1962 SC 1694.

55 See Section 3 of Assam and the Nagaland Acts mentioned above.

56 See Section 9 of the Act.

57 Section 9 of the Assam Land (Requisition and Acquisition) Act 1964.

58 Section 2 (f) of the United Provinces Acquisition of Property (Flood Relief) Act, 1948.

59 The land requisitioned can either be released or acquired as per the Act.

60 Rule 3 (1).

61 Section 7.

62 Section 12.

63 Section 13.

64 As mentioned earlier, land acquisition is a Concurrent List subject. The states can adopt the Land Acquisition Act, 1894, with some modifications and amendments.

65 Section 17 (2) of the Land Acquisition Act, 1894 (Bihar Amendment). The said provision was incorporated by virtue of the Bihar Amendment Act, 1961.

66 Ram Krishan Singh and Others v. State of Bihar AIR 1995 Patna 73.

67 Durganath Sarma v. Deputy Commissioner and/ or Collector Kamrup and Others AIR 1963 Assam 141.

68 Section 2 (c) of Orissa Hydro Electric Projects & Flood Control Works (Survey) Act, 1961.

69 Section 3.

70 Issued on 27 January 1994.

71 Twenty-nine industries listed in Sch I to the Regulations.

72 Entry 2, Sch I, of the EIA Notification dated 27 January 1994.

73 It could not be immediately ascertained as to whether the state has increased this cost limit, though the figures presented here seem to be low in the present context.

74 See Regulation 111 of the Assam Land and Revenue Regulation, 1886.

75 See Section 51-H of the 1960 Act.

76 Generally speaking, the flood plain should not be used for residential purposes or building construction, or for public and social institutions, like schools, hospitals, etc. However, agriculture, especially cultivation of seasonal crops can be permitted.

77 After the survey, detailed charts and registers are prepared on which all existing cultivation, buildings, constructions and plantations within the surveyed limits of the said rivers are marked.

78 Here we mean only those districts from where any part of the surveyed river is situated.

79 The limits so defined and approved by the state shall be the riverbed.

80 Section 7.

81 Section 9.

82 "Cultivation" here refers to the growing of plants which require the ground to be ploughed once a year or at short intervals and which are ordinarily removed at the end of the season. See section 11 of the Act.

83 For that purpose the Conservator of Rivers may also interfere with the private rights of property, enter or take up necessary works like digging of earth, construction, etc. on any private or public land within or outside the riverbed.

84 See section 2 to section 6 of the Bihar Restriction of Uses of Land Act, 1948.

85 The Act extends to the whole of West Bengal.

86 Preamble to the Act.

87 The Act defines development to mean the carrying out of building, engineering, mining or other operations in, on, over or under land, or the making of any material change in any building or land (section 2.e).

88 Section 3.

89 Section 4 of the Act.

90 When politicians dole out government lands it is usually the low-lying lands, which are part of a natural drainage system, that become the first easy option.

91 See the preamble to the Bengal Regulation No. XI of 1825 as adapted and modified by the Adaption Of Laws Order, 1950.

92 Regulation 5 of the Bengal Regulation No. XI of 1825.

93 Sections 13 and 14 of the 1884 Act.

94 The Act has been repealed in Bihar and Orissa.

95 Section 7.

96 Clause 4 (ix) of the National Housing and Habitat Policy, 1998.

97 Clause 5.4 of the National Housing and Habitat Policy, 1998.

98 See Tripura Town and Country Planning Act, 1975, Assam Town and Country Planning Act, 1959, Nagaland Town and Country Planning Act, 1966, Himachal Pradesh Town and Country Planning Act, 1977.

99 Section 11 of the Assam Town and Country Planning Act, 1959.

100 Sections 15–21 of the Assam Town and Country Planning Act, 1959.

101 Section 2 (4) of the Assam Town and Country Planning Act, 1959.

102 Section 7 of the Delhi Development Act, 1957.

103 Applicable to Aligarh Development Area in Uttar Pradesh.

104 See sections 17 (j) and 18 (j) of the Himachal Pradesh Town and Country Planning Act, 1977.

105 The Municipal Corporation may draw up such a scheme if under the provisions of the Bihar Town Planning and Improvement Trust Act, 1951, a portion of the master plan for Patna or a scheme within the framework of the master plan has been allotted to the Corporation for execution or an improved scheme prepared by the Corporation has been duly approved by the state and if the state government requires the Corporation to prepare such a scheme, the Corporation shall, within six months of such requisition, direct the CEO to draw up the scheme(s).

106 Section 228 (f) and (h) of the Act.

107 Section 253 (1) (a–c).

108 Section 258 of the Act.

109 Section 258 (f) of the Act.

110 Section 10-A of Uttar Pradesh (Regulation of Building Operations) Act, 1958.

111 Section 33 of the Act.

112 Section 35 (vi) of the Act.

113 Section 35 C (f) of the Act.

114 Section 35 C (j) of the Act.

115 The Act is applicable to the entire state except for autonomous districts of the state.

116 Constitutes under the Act.

117 Section 18 (2) (b) of the Assam Town and Country Planning Act, 1959.

118 Entry 56 List I.

119 Article 262 of the Constitution of India.

120 Section 15 of the River Boards Act, 1956.

121 Section 16 (d), (e) and (f).

122 1998 AIHC 42 (DB) (Delhi).

123 1998 AIHC 42.

124 1998 AIHC 42.

125 Section 12.

126 Section 13 (a).

127 The "Objects and Reasons" behind the Act mention that "the river Damodar was causing havoc in the rainy seasons, it was therefore necessary to harness the water of this river".

128 Section 12 of the DVC Act.

129 Section 45.

130 See the preamble to the Act.

131 The Act also provides for payment of compensation to the person whose premises or boats have been requisitioned under the Act.

132 Section 268 of the 1950 Act.

133 GO No. 4400/22-X-B-(6)39 as printed in the UP Revenue Manual Chapter 26.

134 Section 21 of the 1960 Act.

135 For a full description of the scale of relief in two different situations of widespread calamities and local calamities respectively, see rules 28 to 30 of the Manipur Land Revenue and Reforms Rules, 1961.

136 See rule 4 of the 1984 Rules.

137 See rule 23 of the 1984 Rules.

138 See rule 13 of the 1984 Rules.

139 Section 13 of the 1936 Act.

140 Section 9 (2) (iii) of the 1936 Act.

141 Section 25 of the Bengal Land Reforms Act, 1956.

142 Rules for Remission and Suspension of Land Revenue in the Telangana Area, GO Ms No. 231, Revenue, 12.2.1964.

143 See preamble to the Act.

144 The affected owner has been defined as the owner of a building which has been damaged or destroyed by an earthquake or other natural calamity (section 2.a).

145 Section 3 of the Act.

146 As per the Bihar and Orissa Natural Calamities Loans Rules, 1934, when the Collector considers that the grant of a loan to any applicant is prima facie desirable, he shall make an enquiry or cause an enquiry to be made by a government servant or by an non-official agent for the purpose of verifying the particulars required.

147 Section 4 of the Act (rule 2).

148 Rule 4 under the Bihar and Orissa Natural Calamities Loans Rules, 1934.

149 It is pertinent to mention here that in the United States of America there are laws on flood insurance, namely the National Flood Insurance Act, 1960.

150 Section 5 (iii) of the Orissa Famine Relief Fund Regulation, 1937.

151 Section 5.

152 Proviso to section 5 of the Orissa Famine Relief Fund Regulation, 1937.

153 Provided that, if the deficiency exceeds five lakhs (1 lakh = 100 000) of rupees, it may be made up in annual installments, the amounts of each installment, except the last, being not less than five lakhs of rupees (section 7).

154 Section 7 (2).

155 Provided that, if at any time, the total amount of fund exceeds 12 lakhs of rupees, the state government may utilize such excess to meet expenditure on protective irrigation works for the prevention of famine and floods (section 5 of the Act).

156 Section 4.

157 Section 7 of the Act.

158 Section 411 of the Orissa Municipal Act, 1950.

159 Section 88 (1) (a).

160 In countries like the United States there are specific laws dealing with flood insurance including the National Flood Insurance Act, 1960.

161 Section 6 of the Gujarat Disaster Management Act, 2003.

162 The state government may appoint a State Relief Commissioner under the Act (section 11). The Act sets out in detail the Commissioner's powers and functions (sections 21–22).

163 Section 7, Gujarat Disaster Management Act, 2003.

164 Section 12 (2).

165 Section 13.

166 Section 5 (2) of the Gujarat Disaster Management Act, 2003.

167 Sections 25–26.

168 Sections 20–21.

169 Sections 23–24.

170 Section 20.

171 Section 27.

172 Section 29.

173 Section 31.

174 See Bill No. LXI of 2001, which sought to introduce a Coastal Areas Vulnerable to Cyclones (Establishment of Early Warning Centres and Introduction of Disaster Resistant Construction Techniques) Act.

175 It is also worth noting here that Rumandla Ramachandraiah in Rajya Sabha (Parliament of India) introduced the National Commission for Natural Disaster Management Bill 2001 on 7.12.2001. This information is available from the official Rajya Sabha website http://rajyasabha.nic.in/.

176 Those which have been repealed as well as the present laws.

177 For example, Bihar Public Irrigation and Drainage Act, 1947, Northern India Canal and Drainage Act, 1873, Assam Embankment and Drainage Act.

178 Here it is notable that a law that now stands repealed, the Bengal Drainage Act, 1880, had provisions which are most participatory and inclusive. The state government was empowered to appoint Drainage Commissioners to execute any scheme for drainage works. The number of such Commissioners should not be fewer than seven, and the majority should be the holders of lands to be affected by drainage works. The notification of such schemes was required to be published by beat of drum in every village affected, the details of the work are also deposited at the office of the sub-divisional officer, court of munsif and thana. No work is required to be taken up until at least half of the land holders whose lands are affected assent to the work. All decisions relating to the landholders' entitlement to vote, lands affected, and ascertaining how many landholders have assented to the project are taken by the Commissioners. The Act presents a good example of how an affected community can be involved directly in the execution of schemes.

179 Issued under the EPA.

180 Constituted under the Rivers Boards Act, 1956.

181 Constituted under the Brahmaputra Board Act, 1980.

182 Assam, Meghalaya, Tripura, Manipur and Nagaland.

183 To be appointed by the Central Government.

184 Section 28.

185 Section 30.

186 Section 31.

187 Section 22.i (3) of the Act.

188 Section 48.

189 Section 75.

190 Section 49 provides for the General Standing Committee of the *Panchayat Samiti* and section 76 provides for the General Standing Committee of the *Zilla Parishad*.

191 See Report on Community Approach to Flood Management in India by the Institute for Resource Management and Economic Development, Delhi, submitted to WMO, Geneva, 2004.

192 Section 16 (g).

193 Section 45 (g). Wherein the *Grama Panchyat* can take relief measures against famines and calamities.

194 Under this Act the *Panchayat* at the intermediate level (called *Anchalik Panchayat*) has been empowered to undertake measures for relief of distress caused by floods and other calamities (section 37.5.a).

195 Section 15 (v).

196 *Panchayat* at the village level.

197 *Panchayat* at the intermediate level.

198 Section 36.2.g (*Gaon Panchayat*) 37.2.b (*Anchalik Panchayat*).

199 Section 44 (d).

200 Section 45 (y).

201 According to Black's Law Dictionary, riparian right is the right "of the owners of lands on the banks of water courses, relating to the water, its use, ownership of soil under the stream, accretions, etc". The term is generally defined as including the right which every person through whose land a natural watercourse runs has to the benefit of such a stream as it passes through his land for all useful purposes to which it may be applied.

202 See section 133 of Cr. P. C 1898.

203 Lankanpara Tea Co. v. Gopalpur Tea Co. Ltd. 40 CWN 916.

204 A possible reason for this ambiguity can be that the riparian rights under the Indian legal regime have been largely discussed in the context of private individual rights enforceable against private individuals or as an issue between lower riparian and upper riparian. The liability of the state acting as a riparian has been discussed in only a few cases.

205 The IS represents the BIS code number and this is followed by the year when these were published.

206 Section 33 of the Act.

207 Section 35 (1) of IFA.

208 Section 36 of IFA.

209 Explanation to section 2 of FCA.

210 People United for Better Living in Calcutta and another v. State of Bengal AIR 1993 Calcutta 215.

211 Section 46 (1) of the Act.

212 The fact that when these laws were being put in place wetlands might have been seen with an untrained eye as undesirable swamps could possible explain this legal blindness.

Japan

# LEGISLATIVE ARRANGEMENTS OF FLOOD MANAGEMENT IN JAPAN

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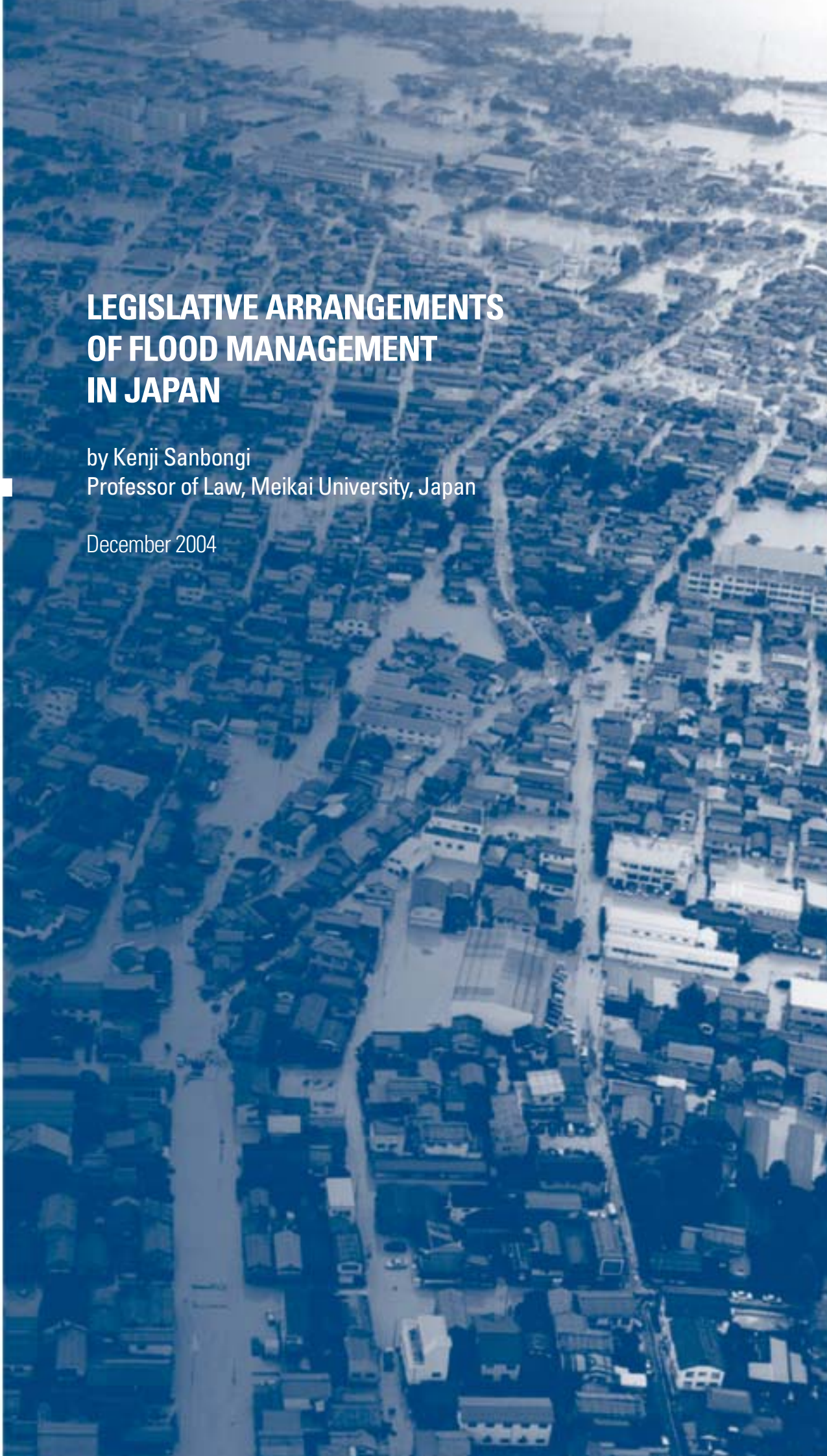

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# LEGISLATIVE ARRANGEMENTS OF FLOOD MANAGEMENT IN JAPAN

*by Kenji Sanbongi*

## Foreword

Legislation on flood management has a long history. However, in relation to the history of disasters themselves, it has been in existence only a short time. Nevertheless, it should be admitted that the social changes of modern days, such as land use, habitation, urban development, etc. on the one hand, and devastation, climate change and other environmental impacts on the other, have necessitated new policies for countermeasures, and even various pieces of legislation. First of all, the need for legislation, for instance for the frequent flood disasters, should be highlighted.

Need should be assured by maturity of legislation, that is, the opportunity to endorse the new policy through national consensus, for instance after a major disaster. As for disaster prevention, this situation, among others, may be recognized clearly in the legislative process.

However, the statute law should be equipped with effectiveness; this may be supported by the technological progress in particular. Moreover, cooperation and participation by several jurisdictions, related parties, even by residents, may be indispensable. These elements make the laws effective in practice.

In this paper, pieces of legislation concerning flood management, from over a century ago up to the present day, are overviewed. They range from basic ones to practical ones, from prior to post-flood policies, extending as far as those legal frameworks which are rather difficult to apply, included here for reference in legislative discussions elsewhere. Lastly, an appendix of flood disaster chronology is added for better understanding of the background.

## 1. Comprehensive and basic legislation

### 1.1 River Law (1896, totally revised in 1964, last amended in 1997)

The River Law was first enacted towards the end of nineteenth century, against a background of flood disaster across the country, to be the model statute for public domain management. In the course of the economic growth of the 1960s, the Law was totally revised to strengthen the water-use system as well as flood control, introducing the river administrator jurisdiction, so as to be the core institution of "substantial water law" for river basin management with various water-related pieces of legislation around it. The Law was last amended in 1997 to establish environmental policies concerning rivers and to introduce the public opinion system and other modern methods into river administration.

The purpose of this Law is to contribute to land conservation and the development of the country, and thereby to maintain public security and promote public welfare, by administering rivers comprehensively to prevent damage due to floods, high tides, etc., to utilize rivers properly, to maintain the normal function of the river water and to maintain and conserve the fluvial environment.

The class A rivers are designated by the Minister of Land, Infrastructure and Transport within large water systems that are especially important from the point of view of land conservation and the national economy, and class B rivers are designated by Prefectural Governors within other water

systems. Administration of part of a class A river may be entrusted to the Prefectural Governor concerned. These organizations are called "river administrators". The river administrator determines the design flood discharge and other matters, which provide the basis for the basic river management policy of river works and river maintenance for the improvement of the river, and establishes the river improvement plan according to the basic river management policy.

The river improvement plan is designed to enable the integrated administration of rivers, with special consideration given to taking the measures necessary to prevent and mitigate damage for those areas where disasters frequently occur owing to precipitation, topography, geology and other conditions.

### 1.2 Meteorological Service Law (1952)

Legislation of the Meteorological Service Law was based on a number of different rationales, particularly from the perspective of flood damage. First of all, meteorological science and techniques had evolved side by side with the network arrangement of observation stations. Second, there was an urgent need for an institutionally organized weather forecast and warning system, especially considering the experiences of serious typhoon damage in the past. Third, international cooperation was indispensable to ensure adequate information and knowledge.

The purpose of this Law is to ensure sound development of the national meteorological service through establishing a fundamental system of the service, and thereby to contribute to the enhancement of public welfare, by promoting the prevention of disasters, maintenance of safety of transportation, growth and development of industries, etc., and at the same time to promote international cooperation in the meteorological services.

To achieve the purpose mentioned above, the Japan Meteorological Agency bears responsibilities such as:

- To establish and maintain the meteorological and seismological observation networks;
- To establish and maintain the centralized systems for forecasting and warning of meteorological phenomena, tsunami and storm surge;
- To establish and maintain the systems of quick exchange of information relating to observations, forecasts and warnings of meteorological phenomena;
- To establish and maintain the systems of quick exchange of seismological and volcanological observations;
- To standardize the methods for meteorological observations and the announcement of their results;
- To promote the application of the meteorological observations, forecasts and warnings of meteorological phenomena, and the results of meteorological research and study, to industry, transportation and other public activities.

### 1.3 Basic Law for Disaster Countermeasures (1961)

The Basic Law for Disaster Countermeasures was legislated after the Ise Bay Typhoon of 1959, an unprecedented disaster with over 5,000 victims. The Law comprehends major natural disasters as well as urban disasters such as fire, and is equipped with as many administrative tools as possible. Around this basic and comprehensive Law a great deal of particular pieces of legislation and ordinances are enacted to make an extensive system of disaster countermeasures, restoration and relief of victims.

For the purpose of protecting the land, the lives of citizens and their property, this law aims to establish the necessary systems through the State, local governments and public corporations, making clear their responsibilities, and to provide for disaster prevention planning, preventive, emergency and restorative measures, financial and banking support and other basic matters necessary for disaster countermeasures, and thereby to arrange and promote a comprehensive and well-organized disaster prevention administration with a view to the preservation of the social order and the security of public welfare.

The State and local governments are particularly responsible for matters such as:

- Scientific research on disasters and their prevention as well as its actualization;
- Forest conservation, flood prevention and other matters relating to land preservation;
- Fire-proofing of buildings and other improvements of urban structures for disaster prevention;
- Disaster prevention measures corresponding to the concentration of urban functions, such as traffic, information facilities, etc.;
- Arrangement of facilities and organizations necessary for disaster countermeasures relating to meteorological, terrestrial and hydrological services, such as observation, forecasting, information, communication, etc.;
- Improvement of disaster forecasting and warning;
- Improvement of notification methods of earthquake predictive information;
- International cooperation in promoting meteorological observation;
- International cooperation in artificial control of typhoons and other study, observation and information exchange necessary for disaster prevention;
- Measures for wide-spread disaster caused by volcanic phenomena, etc.;
- Arrangement of facilities and organizations for flood fighting, fire fighting, rescue and other emergency measures;
- Conclusion of mutual aid agreements among local governments;
- Encouragement of people's voluntary activities for disaster countermeasures such as fostering of autonomous disaster prevention groups and circumstantial arrangements for disaster prevention activities by volunteers;
- Measures necessary for disaster prevention for those who need special care, such as the elderly, the handicapped, babies and young children;
- Acceptance of disaster prevention assistance from abroad;
- Offering of adequate information to disaster victims;
- Education and training necessary for disaster prevention;
- Spreading of ideas about the importance of disaster prevention.

## 2. Legislation on particular disasters

### 2.1 Sabo (Erosion Control) Law (1897)

The Sabo Law was enacted in 1897, the same time as the Forest Law and just one year after the River Law; these are often called the "Three Laws for Flood Control", extending from the mountain source to the upper reach and the lower reach of the river. Unlike the Forest Law, which covers the forestry project and service, the Sabo Law is solely concerned with riverine erosion control contributing to flood mitigation or eliminating flood causes. Debris flood control is one of the highlighted sabo projects of recent years.

The main provisions of the Sabo Law deal with the construction of sabo facilities (dykes, canals, etc.) and the restriction of harmful acts within the designated sabo area.

### 2.2 Landslide Prevention Law (1958)

Large-scale landslide is often caused by the effects of groundwater, with sites often in areas around former rivers or desert streamlets. The Landslide Prevention Law was enacted to execute landslide prevention works (drainage, conduits, etc.) and to manage the designated landslide-threatened area through the restriction of harmful acts.

Landslide prevention works, as well as sabo works mentioned above (2.1), are executed by the Minister of Land, Infrastructure and Transport when the works are extensive or require high technology.

### 2.3 Law for Prevention of Disaster due to Collapse of Steep Slopes (1969)

Collapse of steep slopes (over 30 degrees by the legislative definition) is often caused by heavy rainfall, and accounts for the largest number of victims in the annual statistics of recent years. Then, disaster prevention measures, such as typhoon information, warning and evacuation, are usually dealt with side by side with flood countermeasures.

The Law for Prevention of Disaster due to Collapse of Steep Slopes was enacted to execute slope failure prevention works (slope protection, retaining walls, etc.) and to manage the designated danger area of steep slope failure through the restriction of harmful acts, almost parallel to the landslide prevention measures mentioned above (2.2).

These pieces of legislation (2.1 to 2.3) are called the "Three Sabo Laws", because they are related to the sand and soil movement or geological erosion mainly concerned with the effects of water. These policies essentially target the "disaster source". However, the newest legislation was enacted for the management of the "disaster vulnerable area" by way of soft measures such as information and building regulation (see 3.1 below) as an extension of the three laws.

### 2.4 Sea-coast Law (1956)

The purpose of this Law is to protect the sea-coast from tsunami, storm surges, high waves and other means of damage due to sea-water or ground movement, as well as to promote the improvement and conservation of the coastal environment and the proper utilization of the sea-coast by the people, and thereby to preserve the land.

This Law was first aimed only to protect the sea-coast against natural hazards, focusing on the construction of coastal protection facilities and the protection of the designated sea-coast conservation area relating to the facilities by restricting harmful acts. However, the amendment was made in 1999 so as to include the sea-coast in general, without it being restricted to protection works, and to introduce provisions concerning environmental and common use management, and thus public domain jurisdiction of the sea-coast was established. (Traditionally, the sea-coast belongs to the State in Japan as opposed to the "riparian" or "enclosure" tradition.) As the sea-coast in general is vulnerable to disasters by typhoon and other natural phenomena, sea-coast disaster may be managed together with other fields in any situation.

### 2.5 Sewerage Law (1958)

The purpose of the Sewerage Law was originally the advancement of public health; more recently the focus has been on the qualitative preservation of public waters. On the other hand, sewerage facilities usually deal with both domestic sewage-water and rainwater in urban areas, and the latter function is substantially concerned with the prevention of urban inundation. Even though flood damage has been greatly diminished in the course of river improvement progress, local heavy rain causes disastrous damage, sometimes in the underground constructions, especially in densely inhabited areas. Rainwater management used to be borne by public finance, as against sewage-water treatment by users' payment.

The recent legislation has actualized a new cooperative inundation countermeasure between the river administrator and the sewerage administrator (see 3.2 below). Moreover, joint works among all of the water-related jurisdictions are expected, as is comprehensive river basin management at the local level.

### 2.6 Special Measures Law for Typhoon Prone Zones (1958)

This Law stipulates special measures concerning civil engineering structures for disaster prevention in the typhoon prone zones, which may be designated by barometric pressure of under 987 hPa and by annual average rainfall from May to October of over 1 200 mm.

## 3. Legislation for prior regulation and information

### 3.1 Law relating to Promotion of Measures for Sediment-related Disaster Prevention in a Restricted Area (2000)

The purpose of this Law is to promote the prevention of sediment-related disaster through such measures as the clearing of land areas susceptible to sediment-related disaster, the arrangement of warning and evacuation systems and the regulation of specific development acts, as well as the structural regulation of buildings, etc.

The term "sediment-related disaster" means such damage to the lives and bodies of people as caused by steep slope failure (natural phenomenon of slope failure with an angle of slope of over 30 degrees), by debris flow (natural phenomenon of a flow mixture of water and debris produced by hillside collapse or transported by mountain streams) or by landslide (natural phenomenon of landslide due to groundwater or movement of land accompanied by landslide).

The Prefectural Governor may designate the alert area of sediment-related disaster where a warning and evacuation system should particularly be prepared, mentioning the sort of natural phenomenon stipulated above, and further may designate the special alert area where restriction of specific development acts and structural regulation of habitable buildings should be enforced, determining the estimated impact on them should there be a sediment-related disaster.

The Prefectural Governor may recommend the owners, keepers or occupants of buildings in the special alert area to relocate the said buildings or to take other measures for the prevention or mitigation of sediment-related disaster. The State and prefecture should secure or offer financial assistance for those measures. This Law has introduced the first legal system of direct buildings regulation with physical standards in the context of natural disaster prevention.

### 3.2 Urban River Inundation Countermeasures Law (2003)

The purpose of this Law is to promote countermeasures for major inundation disaster in urban river basins where river works are difficult as a result of urbanization, through such measures as the designation of specific urban rivers and urban river basins, basin flooding countermeasure planning, the arrangement of rainwater retarding and infiltration facilities by the river administrator, and other measures referred to below.

Sewerage administrators are responsible for specific sewerage systems as well as the operative coordination of drainage pump stations, and may, by the local ordinance, oblige individuals to introduce retarding and infiltration functions into drainage equipment.

Regulations, such as a permit system for harmful acts against rainwater infiltration, a recommendation system for the preservation of retarding ponds, etc, are enforced by the Prefectural Governor. When the estimated areas of urban flooding (water coming into cities from rivers) or urban inundation (excess surface water in cities) have been designated, the municipal disaster prevention council should establish the method of releasing inundation information, especially to people in the underground malls. The council must also decide where the evacuation sites are to be, and inform the public accordingly.

This Law has presented a new cooperative scheme among various jurisdictions responsible for the River Law, the Flood Defence Law, the Sewerage Law, the City Planning Law, etc. in such complicated situations of disaster as caused by natural forces and human activities.

## 4. Legislation on urgent and on-site measures

### 4.1 Flood Prevention Association Law (1908)

This Law is based on the old tradition of self-defence against flood disasters. An association for flood prevention might, in former days, be established for flood defence to protect dykes, water gates, etc., under special circumstances where local government could not take responsibility within an area susceptible to flood disasters. Under this legal control, the association has to obtain permission to act and is subject to various kinds of supervision by the Prefectural Governor. Nowadays, the function of the association has mostly been replaced by that of the new flood defence management by municipality under the Flood Defence Law (see 4.3 below); only 12 of the former remain as opposed to over 3,000 of the latter.

### 4.2 Disaster Relief Law (1947)

This Law aims to give urgent relief by the State with the cooperation of local government, the Japanese Red Cross Society and other organizations, as well as of the nation, and thereby to protect the sufferers and to maintain the social order. Actual aid mainly consists of supplies, such as food and water, and the cost is borne by the prefecture as a rule. However, when it exceeds 1 million yen, the State subsidizes 50–90 per cent of the sum, according to the amount.

### 4.3 Flood Defence Law (1949)

The purpose of this Law is to give warning and to defend and mitigate flood disaster at the time of flooding or surging, and thereby to secure the public safety. Fundamental elements of this Law

are setting up of a flood defence management body in each area, establishing flood defence plans and issuing flood defence warnings.

The flood defence management bodies are divided into three categories: the independent municipality responsible for flood defence, the association of municipalities who manage the flood defence service jointly and the flood defence association that remains (see 4.1 above).

The flood defence plan is a plan concerning supervision, warning, information, communication, transportation and operation of any dam or water gate necessary for flood defence, the activities of the flood defence body and fire-fighting organization and their cooperation and support, and the preparation and use of instruments, materials and apparatus necessary for flood defence.

The flood defence warning is a warning notice, indicating the water level and flow amount, to the effect that flood defence is necessary to avert disaster by flooding or surging.

The Amendment Law of 2001 stipulates that, first, the Prefectural Governor, besides the Minister of Land, Infrastructure and Transport, may designate the river for which a flood warning is necessary, second, the estimated inundation areas should be made public concerning the said rivers, and third, the giving of flood warnings should be designated so as to produce smooth and speedy evacuation activities, especially from underground malls and other underground structures.

## 5. Legislation on restoration, recovery and relief from disaster

### 5.1 Disaster Sufferers' Tax Relief Law (1947)

This Law provides the exemption, reduction and moratorium of taxes for the sufferers of house and household effects damage by natural disaster, according to the amount of annual income.

Similar relief is prescribed in the Income Tax Law (national tax), in a formula that takes into account the substantial loss and the annual income or particular expenditure relating to the disaster.

Taxpayers may choose the most advantageous way among these institutions.

### 5.2 Public Infrastructure Restoration Law (1951)

This Law stipulates special measures of State responsibility on restoration following major disaster concerning public infrastructure, such as rivers, sea-coast, sabo facilities, road, harbour, sewerage and parks, according to the financial capacity of local public bodies. Disaster restoration works are usually to recover the original state of those public facilities, etc.; however, in cases where recovery of the original is considerably difficult or unsuitable, alternative facilities may be admitted.

Similar measures are stipulated for agriculture, forestry and fishery facilities and for public school facilities by other laws.

### 5.3 Law for Loan Rendering to Agriculture, Forestry and Fishery Workers affected by Natural Disasters (1955)

This Law aims to stabilize agriculture, forestry and fishery management by rendering loans to those who have suffered damage through natural disasters and to the bodies composed of such people.

Similar loan rendering institutions are enacted for industry and commerce enterprises, small enterprises, housing in general, etc., by other laws.

### 5.4 Law concerning Special Financial Support in Large-scale Disasters (1962)

This Law stipulates special financial support by the State both for local public bodies and for individual sufferers in large national-scale disasters by way of listing the approved objects and conditions of support prior to actual disasters. When a disaster occurs, the actual support is given by Cabinet Order designation according to these legal standards as a whole, instead of separate legislation for the budgetary authorization, so as to practise prompt execution of State expenditure.

Other than national-scale designation mentioned above, local-scale designation may be available by municipality unit, according to the extent of the damage.

### 5.5 Disaster Condolence Money Payment Law (1973)

This Law stipulates payment of condolence money to the families of victims and to those seriously injured in mind or body by major natural disaster, and the giving of supporting loans to families who have suffered from natural disaster in general.

### 5.6 Sufferers' Livelihood Recovery Support Law (1998)

This Law stipulates subsidies for the livelihood recovery of those whose houses are destroyed by natural disasters, according to the age and income of the representative of family. Prefectures raise a fund for that purpose, and in the event of actual support, the State should bear half the amount of expenditure. This institution was one of the results of the great Hanshin earthquake of 1995.

## 6. Other institutions of insurance, compensation and house removal (practical difficulties notwithstanding legislation)

### 6.1 Insurance Service Law (1939, totally revised in 1995)

Application of insurance against storm and flood damages is sometimes debated, aside from life insurance in general. A licence had already been issued as early as 1938, when a huge mudflow disaster affected the Hanshin area, and two decades later the Insurance Authority recommended activating the licence after immense damage by the Ise Bay typhoon in 1959. However, insurance companies would not spread the flood insurance; the reasons were topographic concentration of insurance demands, possibility of reverse choice and the huge sums of money payable in cases of actual disaster. Accordingly, coverage for flood damage has been included in the general fire and other insurance or as an attached security within the comprehensive house insurance, although the sum paid is small.

### 6.2 State Liability Law (1947)

This Law stipulates two sorts of State liabilities. One is liability of government officers' torts and negligence, and the other is liability of defective arrangement and management of the public domain (not "responsibility" in the sense of policy-making). As for flood damage, the latter, particularly in the management of rivers, has often been questioned. The Supreme Court issued a decision in 1984 as an established precedent, concerning a lawsuit on flood damage, stating:

- The river naturally embraces danger of disaster brought about by floods, and is accessible for public use in its natural state;
- Safety usually may be accomplished by flood countermeasure works; river works are gradually executed within the limits of budgets and other elements; measures to avert danger cannot be taken as easily and urgently as can roadwork;
- The safety of the river would be transitory owing to these limits;
- River management should be viewed from general standards and due common sense;
- Where reasonable planning or no reason to take special measures is recognizable, there is no defect in the river management.

### 6.3 Law concerning State Finance for Group Removal Projects in Disaster Countermeasures (1972)

This Law stipulates the State finance for group removal projects by the local government, in areas unsuitable for habitation within an area where major natural disaster has occurred or in a disaster-threatened area (mainly sediment-related disaster) designated by the Building Standards Law (1950). However, the practice has been rather limited, presumably because other measures, as stated in section 5 above, have been effective and it is difficult to get residents' agreement in group removal projects. A similar measure mentioned in 3.1 was the second challenge in legislation, though it is not a group handling but separate one, as the last resort of damage mitigation policy.

## APPENDIX. MAJOR FLOOD DAMAGE IN JAPAN SINCE 1945

| *Disaster* | *Date* | *Deaths*[a] | *Damaged houses* | *New outcome around the time, etc.* |
|---|---|---|---|---|
| Typhoon | Sept. 1945 | 3 756 | 361 321 | |
| Typhoon | Sept. 1947 | 1 930 | 394 041 | River Works Plan Reviewed |
| Typhoon | Sept. 1948 | 838 | 138 052 | Conference on Flood Warning |
| Typhoon | Aug. 1949 | 160 | 161 263 | (Merit for Flood Warning) |
| Typhoon | Sept. 1950 | 508 | 222 736 | (Land Subsidence Problems) |
| Typhoon | Oct. 1951 | 943 | 359 391 | |
| Heavy rain | June 1953 | 1 013 | 489 298 | Basic Guideline for Flood Control |
| Heavy rain | July 1953 | 1 124 | 97 368 | Telemeter at Major Rivers |
| Typhoon | Sept. 1953 | 478 | 582 273 | Seacoast Protection |
| Typhoon | Sept. 1954 | 1 761 | 311 075 | (1 175 dead by shipwreck) |
| Heavy rain | July 1957 | 992 | 79 376 | |
| Typhoon | Sept. 1958 | 1 269 | 538 458 | Urban Flood Countermeasures |
| Typhoon | Sept. 1959 | 5 098 | 1 197 576 | Long-term Flood Control Plan |
| Heavy rain | June 1961 | 357 | 422 826 | Regulation of Urban Development |
| Typhoon | Sept. 1961 | 202 | 883 564 | (Merit for Life Damage Decrease) |
| Typhoon | Sept. 1966 | 318 | 126 767 | Slope Disaster Countermeasures |
| Heavy rain | July 1967 | 371 | 305 201 | |
| Heavy rain | July 1972 | 442 | 199 030 | (Frequent lawsuits on Flood Damages) |
| Typhoon | Sept. 1976 | 169 | 453 510 | Comprehensive Flood Countermeasures |
| Heavy rain | July 1982 | 345 | 53 016 | Subdivision of warning |
| Heavy rain | Aug. 1993 | 79 | 22 811 | (Tokyo subway inundated) |
| Heavy rain | July 1995 | 5 | 17 928 | |
| Heavy rain | Aug. 1998 | 25 | 14 413 | (Public Utilities Damaged) |
| Heavy rain | June 1999 | 39 | 10 675 | Regulation of land use and building |
| Heavy rain | Sept. 2000 | 10 | 71 603 | Hazard Map of Urban Flood |

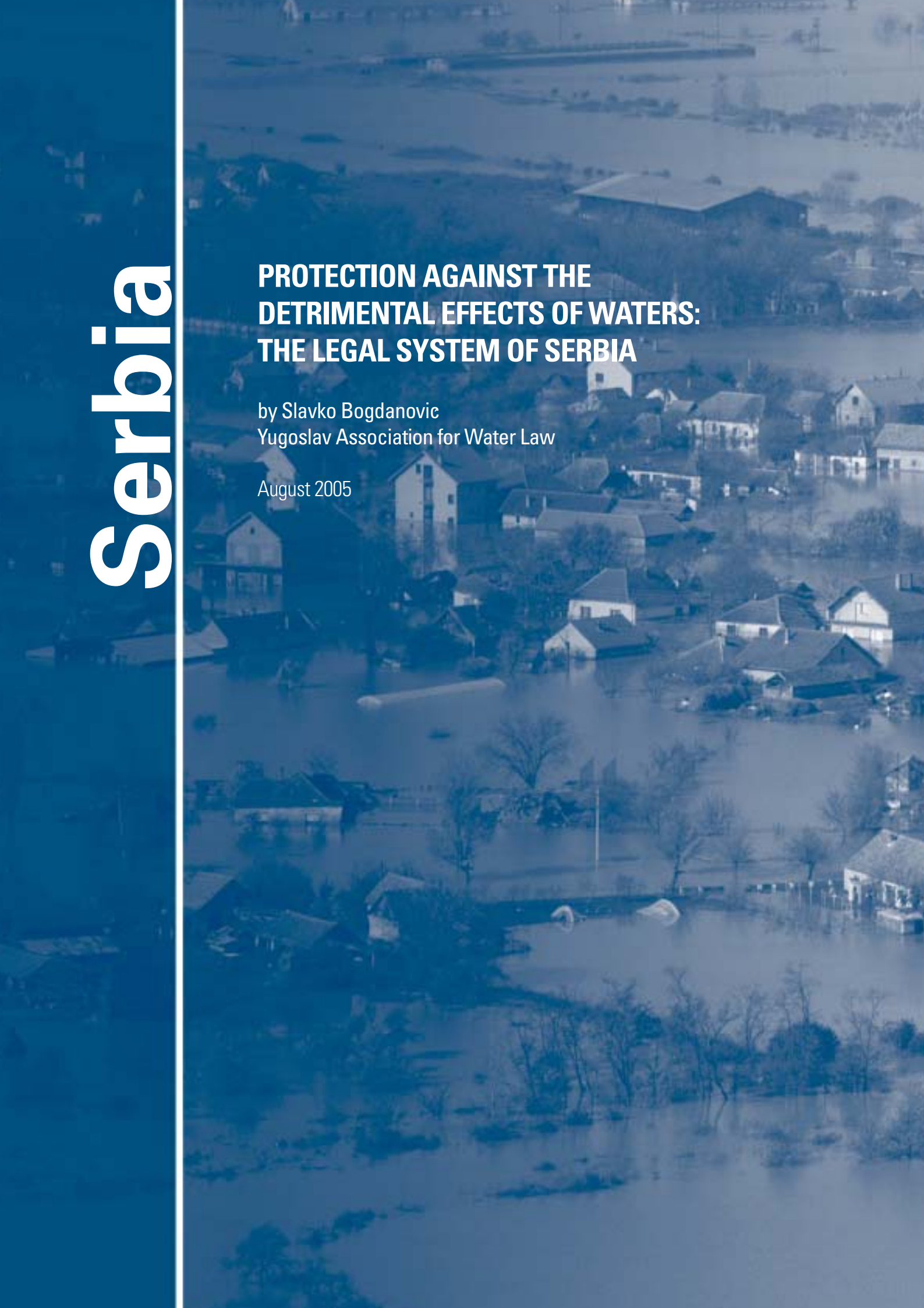
[a] Deaths include the missing.

Serbia

# PROTECTION AGAINST THE DETRIMENTAL EFFECTS OF WATERS: THE LEGAL SYSTEM OF SERBIA

by Slavko Bogdanovic
Yugoslav Association for Water Law

August 2005



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# PROTECTION AGAINST THE DETRIMENTAL EFFECTS OF WATERS: THE LEGAL SYSTEM OF SERBIA

*by Slavko Bogdanović*

## 1. Introduction

It is estimated that an area of some 1.6 million hectares in Serbia is under threat from the detrimental effects of waters. The threat originates mostly from the transitional (incoming) waters of international rivers (Danube, Sava, Tisa, Tamis) flowing through Serbia. Particularly under threat is the northern province of Vojvodina, which comprises the southern part of the Panonia Plain and has significant parts lying below the high waters of transitional watercourses. More than 60 per cent of its territory (approximately 1.3 million hectares out of total of 2.0 million hectares) is endangered by high waters.

To resolve the problem of the detrimental effects of waters, authorities in Serbia have been undertaking different kinds of active, passive and non-investment measures.[1] Such protective measures have been implemented over a very long period.[2] The history of floods in the territory of Serbia is rich and contains numerous accounts of floods leaving behind often huge direct and indirect damage, worsening the living conditions of the population and sometimes taking a price in human lives. The situation now is that there are numerous hydraulic structures across the whole territory of Serbia, constructed to effect protection against floods from incoming or inland (local) waters (groundwater or excessive precipitation), from ice and flood caused by ice accumulation and torrents and erosion.

This heritage needs to be managed in a sustainable way which reflects contemporary views of water management science and the needs of society in the post-socialist era. Serbia's flood management system is ready for modification and modernization, although, as a whole, it has great potential for coping with floodwaters, based on the vast experience of institutions and professionals in the water management sector.[3] Such local knowledge is worthy of broader attention if efforts are to be invested in the development of certain model systems.

The integrative dimensions of the existing system of legislation on floods in Serbia can be identified as those encompassing the whole territory of the country, all kinds of flood phenomena, logically connected pre-, during- and post-flood measures, and comprehensive transboundary arrangements. Besides that, clearly defined legislative points of connection with the broader national system of protection from natural and other major disasters contribute to this integrative quality.

Environmental protection aspects, the opportunity to modify existing legislative frameworks for protection against the detrimental effects of waters and the ongoing process of developing a draft Protocol on Flood Protection in the context of the Framework Agreement on the Sava River Basin (FASRB)[4] are the main reasons for the preparation of this case study, and the active participation in the realization of the World Meteorological Organization project on Integrated Flood Management. Exchange of information and experience during the project realization is expected to make the accomplishment of these tasks easier.

The main pieces of existing legislation on protection against the detrimental effects of waters in Serbia are:

- The Law on Waters:[5]
  - General Flood Defence Plan for the period 2003–2008;[6]
  - Operative Flood Defence Plan for 2004;[7]
- The Law on Water Regimes involving Two or More Republics, Autonomous Provinces and Interstate Waters;[8]
- The Law on Protection Against Natural and Other Major Disasters;[9]
- The Law on Use of Funds for Rehabilitation and Protection against Natural Disasters;[10]
- Water authorization issued to the hydroelectric power station "Iron Gate" (1970);
- Convention Between the Federal Executive Council of the Socialist Federal Republic of Yugoslavia and the Government of the Socialist Republic of Romania on the Exploitation and Maintenance of Hydroelectric Power Production and Navigation Systems "Iron Gate I" and "Iron Gate II" (1970); and
- Joint Regulations on Flood Defence signed with Romania, Hungary, Bulgaria and Albania.[11]

Different aspects of protection are additionally regulated by other legislation but, for the purpose of this study, it was not necessary to research into all such details.

After the introduction and presentation of the most important concepts regarding the subject matter, a detailed review of all pieces of legislation that are important for understanding the system (i.e. laws and secondary legislation, as well as examples of joint legislation adopted in the framework of cooperation with Hungary) follows.

The author's additional remarks are given in square brackets.

## 2. Important concepts

A number of concepts that are important for protection against the detrimental effects of waters have been defined by the Law on Waters. These are:

- Bank is the strip of land immediately alongside the high water bed of a watercourse or lake or accumulation. The bank in a flood protected area is a strip of land measuring 50 metres from the inner base of the levee to the protected area;[12]
- High water bed (major bed) is the area over which the high water of a watercourse flows, or which is covered by the water of a lake when the water level is at its highest, which would probably occur once every 50 years;[13]
- Low water bed (minor bed) is the area through which the water of a watercourse flows during low and mean water levels, or which is regularly covered by the waters of a lake;[14]
- Inundation area is a strip of land between the low water bed and the outer base of a levee, or between the low water bed and the limit of the flood in areas with no defensive hydraulic structures;[15]
- Melioration area [drainage district or/and irrigation district] comprises one or more catchment areas of inland waters for which a unified system has been developed for the drainage of excess water or the withdrawal of water for irrigation;
- Protective belt with wood and protective green (protective woods) is a strip of water land measuring 50 metres from the outer base of the levee to the watercourse [in inundation], which is an integral part of the levee;[16]

- Water area is an area comprising one or more catchment areas or their parts which make a hydrographical wholeness;[17]
- Water land comprises the bed and banks of a watercourse, lake or accumulation;[18]
- Water management structures for protection against the detrimental effects of waters (or hydraulic objects; protective structures/objects) with water management facilities and equipment are:
  - levees;
  - river training structures;
  - retentions;
  - dams;
  - accumulations;
  - canals for diverting excess water;
  - drainage wells;
  - sluices;
  - pump stations;
  - structures for protection against erosion and torrents.[19]

Visual presentation of these concepts is shown in the figure in the appendix.

The concept of protection against the detrimental effects of waters has been developed so as to comprise works and measures for protection against floods and ice, and erosion and torrents, and for the elimination of their consequences.[20]

## 3. The Law on Waters

### 3.1 Flood defence plans

Flood defence measures and works in certain areas are designed and defined in various plans.

#### *3.1.1 Areas protected by existing water management structures*

For the areas protected by hydraulic structures built to defend against the detrimental effects of the waters of certain watercourses, the following plans must be adopted:[21]

- The General Flood Defence Plan, for a period of five years. The Government of Serbia is responsible for the adoption of this Plan.[22] The General Flood Defence Plan contains:
  - Preventive measures that must be undertaken;
  - Measures that must be undertaken during the period of approaching high waters (incoming or inland);
  - Duties, responsibilities and the power to take decisions to carry out certain acts, methods of monitoring and evidencing hydrological and other data, forecasting, information and other data;[23]
- The Operative Flood Defence Plan, for a period of one year. The Plan is within the jurisdiction of the ministry responsible for water economy; it must be adopted by 30 November for the following year.[24] The Operative Flood Defence Plan contains:
  - Names of sectors and sections [sub-sectors];
  - Names of companies and other organizations with flood defences;
  - Responsibilities;
  - Names [and other data] of responsible persons;
  - The means needed;
  - Criteria for the announcement (proclamation) of regular and extraordinary flood defence.[25]

The General and Operative Flood Defence Plans and the plans for Protection Against Natural Disasters[26] must be harmonized with each other.[27] These plans are discussed in greater detail in separate chapters.

#### *3.1.2 Areas not protected by water management structures*

For areas which are not included in the General and Operative Flood Defence Plans but are vulnerable to floods, responsibility for the adoption of protective measures and works has been given to the Municipal Assembly.[28]

#### *3.1.3 Other cases*

Companies and other legal persons whose assets or land are endangered by floods are also obliged to adopt the flood defence plans.[29]

### 3.2 Ice hazard prevention measures

If, owing to an accumulation of ice, an ice jam is formed that could cause floods, or if, owing to ice in rivers beginning to move, damage to the defensive water management structures and other objects appears possible, measures are to be undertaken to break up and remove the ice, in accordance with General and Operative Flood Defence Plans.[30] These measures for protecting bridges, hydraulic structures, vessels and other objects from damage should be undertaken by the companies which construct, maintain or exploit such objects, in accordance with General and Operative Flood Defence Plans and orders issued by the Flood Defence Manager.[31]

### 3.3 Measures against erosion and torrents

The Municipal Assembly is responsible for determining which areas are subject to erosion and for adopting the measures against erosion, acting on the advice of the responsible water management authority[32] [in that area].

With the aim of preventing erosion and torrents, owners and users of land have a duty:

- To construct and maintain protective objects (e.g. sluices, retentions); and
- To implement protective measures (ban on or limitation of cutting trees, ban on or limitation of extraction of sand and gravel, methods of agricultural land use, etc.).[33]

If, in areas subject to erosion, damage due to the exploitation of forests or stone, or due to works, reconstruction or new construction of buildings, or other investments, appears at the surface of the land, leading to greater exposure to erosion, the appearance of furrows or ravines, or damage to wells, pathways, roads and hydraulic structures, the undertaker (or user) has a duty to protect the land with vegetation or in other suitable ways, and rehabilitate the land and objects in the shortest time possible.[34]

### 3.4 Some specific measures

Besides a number of various measures that can be undertaken during the period of flood defence, which are listed in great detail in the General and Operative Flood Defence Plans, several specific measures are regulated by the Law on Waters, as shown below.

#### *3.4.1 Ban on road, rail and river traffic*

When there is danger of flood, the minister responsible for water management may, upon agreement with the minister responsible for traffic, place a ban on road, rail and river traffic in the area under risk.[35]

### *3.4.2 Decision to cut through a levee*

The Main Flood Defence Manager is responsible for taking the decision to cut through the levee in order to intentionally flood certain areas in cases as set out in the General and Operative Flood Defence Plans. In cases not foreseen in the General and Operative Flood Defence Plans, the responsibility for taking such a decision is given to the responsible body of the civil protection system or to a suitable operative body determined by the Operative Flood Defence Plan.[36]

### *3.4.3 Use and maintenance of accumulations and retentions*

Users of accumulations and retention ponds have a duty to maintain and use these objects in such a way that would enable them to receive flooding waves, to the extent appropriate to the size and other technical features of these objects.[37]

The ministry responsible for water economy has been accorded the responsibility of determining the size, volume and height of free space to be maintained for the acceptance of flooding waves in certain periods, as well as determining the technical conditions for the release of water from accumulations.[38]

Users of accumulations and retention ponds are obliged to regularly provide data on the condition and level of water in accumulations and retentions to:

- The ministry responsible for water economy;
- The Hydrometeorological Institute of the Republic (HMI);[39] and
- The Main Flood Defence Manager.[40]

### *3.4.4 Use of water land*

The land between the flood defence levee and the river bed (inundation area) and the 50-metre-wide strip, measured from the inner base of the levee to the protected area, may be used only in a way that would not endanger the implementation of flood defence measures, in accordance with the Flood Defence Plan.[41] No planting of trees is allowed in this strip.[42]

The responsible water management authority has a duty to manage the protective woods in accordance with a separate plan that must be harmonized with the Flood Defence Plan.[43]

Water land may be used without previously obtained water authorization only as pasture or meadow or as arable land.[44]

In flooded areas it is permitted to build structures in accordance with physical and urban plans, which contain details of the land designated as subject to floods and of the conditions for building on such land.[45]

### *3.4.5 State of emergency*

In the case of a proclamation of a state of emergency, in addition to the measures set out in the General Flood Defence Plan the following measures are to be undertaken with the aim of rescuing persons and property:[46]

- Evacuation of the population;
- Mobilization of citizens and their property;
- Mobilization of employees.

### 3.5 Limitation of owners' rights

The owner or user of the land is required to:

- Allow officials and inspectors as well as persons working on the building, reconstruction or maintenance of flood protection structures to enter his or her property for the purpose of measuring, designing and marking the land and waters;[47]
- Allow a major river bed and river bank, up to a width of three metres, to be used by the official making the inspection and maintenance of the river bed;[48]
- Allow the free runoff of water flowing from upstream land, without changing its direction and velocity;[49]
- Manage woods in an inundation area in a way that does not obstruct the natural flow of water and ice or hinder navigation in navigable waterways;
- Maintain flood defence structures and implement flood defence measures.[50]

Owners and users of land have a right to compensation for damage caused by admission to their property and works.[51]

When a new structure causes permanent rising of the water level of a natural watercourse and such rising of the water level increases the costs for protection from the detrimental effects of waters, the owner or user of such a structure is obliged to offset such increased costs to the water management authority responsible for undertaking the measures against damage from water.[52]

Owners and users of land at the river [watercourse] bank are obliged to undertake certain (smaller) interventions at the request of the responsible water management authority, in order to prevent erosion or bank collapse, or to remove obstacles to the flow of water, etc. For a similar purpose, the Water Inspector may order (at the request of the water management authority) the owner to plant trees and shrubs.[53]

Owners or users of land are obliged to remove wood from the bed of a torrential watercourse, at the request of the responsible water management authority. If they do not, the responsible water management authority may do it itself without having to pay compensation for the removed wood.[54]

### 3.6 Special measures

With the aim of protecting waters and watercourses and preventing damage to defensive water management structures and installations, it is forbidden:

- To perform acts that could damage beds and banks of watercourses or objects that give protection from the detrimental effects of water; [55]
- To deposit stones, soil, barren soil, cut wood and other material in natural and artificial watercourses, lakes and retentions;[56]
- To perform works or extract material from a watercourse which could endanger the water regime, the stability of a dam or its intended use, or the stability of protective levees, river training and other structures; or could change the natural conditions surrounding accumulations and retention ponds, which could cause landslides, erosion and torrents;[57]
- To build structures or plant trees in an area that could be flooded in a way that could obstruct the flow of water and ice or is contrary to the regulations on building in such areas;[58]

- To plant trees on a protective levee or alongside the levee on land within 10 metres of the watercourse, measuring from the outer boundary of the levee, or within 50 metres of the protected area, measuring from the inner boundary of the levee;[59]
- To dig wells, trenches and parallel canals alongside a levee on land within 50 metres of the watercourse and 100 metres of the protected area, unless it can be proved by the technical documentation that the stability of levee would not be endangered.[60]

Exemptions from the above bans are allowed by the responsible water management authority.[61]

### 3.7 Obligations of landowners

Owners or users of land have a duty to allow the transport and temporary deposit of material extracted from the bed of a watercourse or lake with the aim of implementing water works. Owners or users are entitled to compensation for damage done in such cases.[62]

### 3.8 Finance

The financing of all activities and measures for protection from the detrimental effects of waters has been in principle regulated by the Law on Waters, but there are other laws regulating financial aspects of certain protective activities or measures. Without making an exhaustive review of these (financial) issues here, it can be said that main sources for financing are:

- Parafiscal charges (e.g. for drainage waters — excess groundwater and surface water originating from precipitation),[63] collected from owners and users of land and various kinds of structures in a designated area;
- The State budget;
- The municipalities' budget;
- The State company for the production of electrical energy;
- Insurance companies (if the damaged property was insured).

### 3.9 Fines

The Law on Water sets out a number of fines for acts and omissions constituting the breaking of the Law.[64]

## 4. General Flood Defence Plan

### 4.1 General provisions

Defence against flood caused by high waters and accumulation of ice, according to this Plan, is to be organized and implemented in the water areas of Serbia through implementation of all the above listed national and bilateral legislation.[65]

Flood defence in the water areas Sava, Danube and Morava is the responsibility of public water management companies, with the engagement of HMI, and companies charged with the maintenance of the hydraulic structures for flood protection as well as the operative performance of flood defence tasks and measures.[66]

Flood defence is the duty of Flood Managers, as follows:

- Flood defence at the level of Serbia is the duty of the Main Flood Defence Manager;
- Flood defence in a water area is the duty of the Water Area Flood Defence Manager;
- Flood defence in a flood defence sector is the duty of the Flood Defence Sector Manager;
- Flood defence in a flood defence section [sub-sector] is the duty of the Flood Defence Section Manager;

All of them have deputies and the Water Area Flood Defence Manager also has assistants.[67]

Defence against flood and ice is to be organized and executed depending on the level of danger, and can have the following phases:

1. Preparation for defence;
2. Regular defence;
3. Extraordinary defence.[68]

Certain phases of flood defence are to be declared when:

- The water level at the reference water gauge station shows the levels set in the Operative Flood Defence Plan; and
- A further rise in the water level is expected; or
- The flood defence line [i.e. structures] has been endangered by a continued high water level.[69]

The phases of ice defence are to be defined by the Operative Flood Defence Plan, depending on the characteristics of the ice, the percentage of ice cover on the water surface, conditions relating to the ice beginning to move and its accumulation.[70]

## 4.2 Works and measures before and after a flood defence period — preventive measures

Precisely defined preventive measures could be undertaken before and after flood defence by persons or organizations responsible for flood defence.

### *4.2.1 Responsible public water management companies*

The public water management companies[71] have been accorded the following duties, in accordance with the Law on Waters:

- Providing development and reconstruction of flood defence lines [i.e. structures], in accordance with the Government's annual waterworks programme;
- Providing necessary investigations, studies, designs and plans for undertaking measures and works for improving the level of flood defence safety;
- Providing regular maintenance of flood defence lines;
- By 1 October, for the following year, preparing the elements for:
  - adoption of the Operative Flood Defence Plan;
  - the proposal of an organization for defence against floods and ice (with all necessary schemes and lists of personnel, machinery, tools and materials for each sector and section);
  - communication system maintenance for all the flood defence phases;
- Completion and updating of technical documentation for flood defence, containing:
  - an overall detailed scheme;

  - a scheme with marked areas that could be flooded, showing various high waters scenarios and positions of the flood defence structures;
  - longitudinal profiles of the watercourses with marked lines for high waters;
  - longitudinal profiles and cross-sections of levees, with marked points for cutting through the levees to release the water from flooded areas or divert high waters into the retention areas, built objects in the body of levees, accumulations and retentions, lateral and relief canals, secondary flood defence lines and seasonal (temporary) defence lines;
  - data on ice breakers;
  - roads and traffic lines relevant to flood and ice defence;
  - monitoring systems;
  - communication systems;
  - watchmen points;
  - stores;
  - data on weak points;
  - technical guidance for work during the flood defence period;
- Ensuring functionality of the communication systems.[72]

#### *4.2.2 Reports on past flood defence*

All responsible persons are obliged to report following a period of flood defence, as follows:

- The Flood Defence Section Manager is to submit the report to the Sector Manager within 5 days of the termination of flood defence;
- The Flood Defence Sector Manager is to submit the report to the Water Area Flood Defence Manager within 15 days of the termination of flood defence;
- The Water Area Flood Defence Manager is to submit his report to the Main Flood Defence Manager within 30 days of the termination of flood defence;
- The Main Flood Defence Manager is to submit his comprehensive report on the past flood defence to the ministry responsible for water economy within 45 days of the termination of flood defence.[73]

#### *4.2.3 The Hydrometeorological Institute and other organizations*

The HMI has been accorded the duty of submitting the report to the Main Flood Defence Manager and responsible Water Area Flood Defence Manager within 20 days of the termination of flood defence. The report must contain the analyses of hydrological and meteorological conditions that caused the recorded regimes of the watercourses.[74] The HMI is required to continually improve its prognostic techniques relating to high water occurrences.[75]

Not only the HMI, but also other organizations carrying out monitoring of ice, are required to submit a report on the conditions of forming ice and ice phenomena during the previous winter to the Main Flood Defence Manager and responsible Water Area Flood Defence Manager by 1 May.[76]

#### *4.2.4 Flood Defence Managers*

The Flood Defence Sector Manager is required to inspect his sector with responsible Flood Defence Section Managers twice a year outside the periods of flood defence, and to submit his written reports to the Water Area Flood Defence manager by 15 August at the latest.[77]

The Flood Defence Sector Manager's assistants must inspect flood defence structures and check the condition of flood defence lines and the preparedness of personnel, as well as the

preparedness of machinery and flood defence equipment, once a year at least. Their joint report on facts found and their proposals for undertaking rehabilitation measures must be submitted to the Water Area Flood Defence Manager by 10 September at the latest.[78] The Water Area Flood Defence Manager, after inspecting the weakest parts of the flood defence line, is to submit his written proposal for rehabilitation measures to the Main Flood Defence Manager by 1 October at the latest.[79]

The Water Area Flood Defence Manager is to submit his proposal for rehabilitation works on the flood defence structures to the ministry responsible for water economy by 10 December.[80]

#### *4.2.5 Manager of Telecommunication and Information Service*

The Manager of Telecommunication and Information Systems has to check the whole system of flood defence communication and submit a report to the Main Flood Defence Manager and Water Areas Flood Defence Managers.[81]

#### *4.2.6 Manager of Service for Civil Engineering Works and Transport*

The Manager of Service for Civil Engineering Works and Transport is required to check preparedness of service and functionality of equipment and submit a report to the Main Flood Defence Manager and Water Areas Flood Defence Managers.[82]

### 4.3 Declaration of flood defence and its termination

Flood defence in its different phases is to be declared by the order of the Water Area Flood Defence Manager, acting on a proposal by the Flood Defence Sector Manager. A proposal for the declaration of flood defence must be based on the conditions and criteria set by the Operative Flood Defence Plan. The Main Flood Defence Manager is to be informed of the order declaring the flood defence.[83] Exceptionally, flood defence on the torrential watercourses may be declared by an order issued by the Flood Defence Sector Manager, in accordance with conditions and criteria set out in the Operative Flood Defence Plan. The Flood Defence Sector Manager is to inform the Water Area Flood Defence Manager and Main Flood Defence Manager of his order declaring flood defence.[84]

The Flood Defence Sector Manager and the responsible HMI Manager are required to report to the Water Area Flood Defence Manager on the conditions of hydraulic structures and hydrometeorological conditions that could require the declaration of flood defence, prior to the criteria set in the Operative Flood Defence Plan being reached.[85] If the conditions at certain locations on flood defence levees and objects on levees, or the hydrometeorological conditions require it (e.g. the levees becoming saturated or leaching, devastating force of flood wave, ice conditions and other harmful phenomena) the Water Area Flood Defence Manager may, if it is proposed by the Flood Defence Sector Manager, declare flood defence on that/those location(s) before the criteria for the declaration of flood defence have been reached.[86]

The Water Area Flood Defence Manager, on the basis of a proposal by his assistant or the Flood Defence Sector Manager, may terminate certain flood defence phases before the criteria set by the Operative Flood Defence Plan have been met, if he considers the condition of flood protection structures and hydrometeorological conditions allow such a decision.[87]

The Flood Defence Sector Manager on Torrential Watercourses has the same rights and duties with regard to the declaration and termination of flood defence as the Water Area Flood Defence Manager.[88]

Orders on the declaration and termination of flood defence shall be submitted to:

- The ministry responsible for water economy;
- The HMI;
- Affected municipalities;
- Field offices of the Ministry of Interior in affected municipalities;
- Serbia's Centre for Emergencies (i.e. information and alert);
- Montenegro and neighbouring countries, as necessary. [89]

## 4.4 Duties, responsibilities and powers of persons responsible for flood defence

Persons responsible for flood defence are allocated different duties and rights during the period of flood defence, which are carefully divided/harmonized between them.

### *4.4.1 Main Flood Defence Manager*

During a declared period of flood defence, the duties of the Main Flood Defence Manager are to be as follows:

- Coordinating the work of the Water Area Flood Defence Managers;
- Collaborating with the flood defence authorities of Montenegro and neighbouring states, as necessary;
- Studying the forecasts with regard to water level and ice;
- Analysing the conditions of flood defence protection structures;
- Studying official bulletins issued by Water Area Flood Defence Managers;
- Organizing, in case of need, mutual assistance between water areas;
- Taking decisions on cutting a levee with the aim of directed flooding;
- Informing the ministry responsible for water economy of declarations of flood defence and implementation of flood defence measures;
- Ordering measures and activities with the aim of synchronizing ice and flood defence in water areas;
- Ordering the precautionary release of water from accumulations in the area under flood defence with the aim of acceptance and mitigation of flood waves or protection from ice, if, on the basis of the HMI forecast on weather conditions and water levels of rivers and other watercourses, such a measure is considered justifiable;
- If the protective structures in the zone of water retention show weak points, the Main Flood Defence Manager may order the companies managing the hydraulic structures to change the operation regime of the accumulation and adjust it to the condition of the protective structures with the aim of avoiding destruction of the levee.[90]

### *4.4.2 Water Area Flood Defence Manager*

The tasks of the Water Area Flood Defence Manager are defined as follows:

- Coordinating the work of his or her assistants, Flood Defence Sector Managers and companies participating in flood defence;

- Studying the hydrological and meteorological forecasts, analysing water levels and ice phenomena and informing the Main Flood Defence Manager;
- Ordering measures and activities to be carried out with aim of successful flood defence and defence against ice, and controlling their implementation;
- Organizing the keeping of records in a flood defence diary;
- Issuing the flood defence bulletin by noon at the latest, covering the flood defence activities for the previous 24 hours. The bulletin is to be given to the Main Flood Defence Manager, HMI, Serbia's Centre for Emergences and Information, and to Montenegro and neighbouring States, as the case may be;
- Proposing cutting a levee, changing the operational regime or releasing water from accumulations.[91]

#### *4.4.3 Assistant to the Water Area Flood Defence Manager*

The tasks of the Assistant to the Water Area Flood Defence Manager are chiefly as follows:

- Studying forecasts and analysing changes in water level and ice occurrences and informing Water Area Flood Defence Managers and Flood Defence Sector Managers;
- Organizing the keeping of evidence on water levels, ice, etc.;
- Analysing daily reports by Flood Defence Sector Managers on the safety conditions of protective structures, informing the Water Area Flood Defence Manager, proposing measures and activities and taking part in their execution, on the order of the Water Area Flood Defence Manager;
- Reporting on a daily basis, by 11 a.m., to the Water Area Flood Defence Manager and to the responsible authorities, on flood defence activities and the condition of protective structures in the past 24 hours, as well as on his or her observations on the execution of flood defence measures;
- Keeping the records in the flood defence diary and submitting reports on past flood defence;
- Carry out orders received from the Water Area Flood Defence Manager.[92]

#### *4.4.4 Flood Defence Sector Manager*

The Flood Defence Sector Manager is responsible for carrying out the following duties:

- Monitoring the appearances of flood protective structures, analysing them and assessing the safety of structures;
- Following the forecasts of water levels and ice and proposing declarations of certain flood defence phases in accordance with the General Flood Defence Plan;
- Undertaking appropriate measures to rehabilitate weak points on the protective structures. In more serious cases, proposing to the Water Area Flood Defence Manager that specialized companies be engaged;
- Tasking the specialized companies with carrying out works on rehabilitation of weak points;
- Tasking organizations (owners or users) of structures on the levee or in the water land with undertaking protective measures and activities with regard to their structures;
- Executing orders of the Water Area Flood Defence Manager;
- Coordinating the work of services in the sector;
- Keeping records in the flood defence diary;
- Informing, by 8 a.m., the Water Area Flood Defence Manager of the condition of protective structures and the measures and activities undertaken and their effects over the previous 24 hours;

- Carrying out obligations set out in the Joint Flood Defence Regulation for the transboundary watercourse[93] and informing on that to the Water Area Flood Defence Manager.[94]

#### *4.4.5 Flood Defence Section [sub-sector] Manager*

The duties of the Flood Defence Section Manager are set out as follows:

- Safeguarding, observing and controlling the protective structures in the flood defence technical section with the aim of recording, in time, any deficiencies and harmful appearances;
- Controlling the recorded phenomena, registering them and undertaking the necessary measures of rehabilitation with available personnel;
- Proposing to the Flood Defence Sector Manager the engagement of an operative group or, in more serious situations, a specialized organization, if the levee is considered to be in a dangerous condition;
- Controlling and coordinating Levee Watchmen and Assistant Watchmen;
- Keeping records in the flood defence diary;
- Informing, by 7 a.m., the Flood Defence Sector Manager of the flood defence measures and activities undertaken and the condition of protective structures over the previous 24 hours.[95]

#### *4.4.6 Levee Watchman*

The Levee Watchman's duties are set out as follows:

- Inspecting the section under his responsibility and observing changes appearing on the protective structures;
- Recording the water level at the local water gauge station at certain times and immediately informing the Flood Defence Section Manager;
- Marking the weak points in the section (wells, leaching, saturated sites, etc.) and informing the Flood Defence Section Manager;
- Giving instructions to Assistant Watchmen and controlling their work;
- Participating in the execution of rehabilitation measures needed for coping with harmful phenomena on protective structures;
- Ensuring functionality of the telephone line;
- Keeping records in a work diary of all phenomena and measures undertaken;
- Informing the Flood Defence Section Manager of all changes and measures undertaken in the section and their effects, and of the execution of orders received from Flood Defence Managers.[96]

#### *4.4.7 Manager of Telecommunication and Information Service*

The duties of the Manager of Telecommunication and Information Service are set out as follows:

- Following up the implementation of flood defence;
- Collecting all the reports of water management companies and getting the HMI familiar with them;
- In accordance with the agreement made with the Water Area Flood Defence Manager:
  - providing information to the public media at regular conferences;
  - keeping in communication with centres for information and public media;
  - providing permanent communication functionality between Flood Defence Managers and responsible managers of specialized services;
  - controlling and providing functionality of communications in the flood defence sectors.[97]

#### *4.4.8 Responsible Manager of the Hydrology Service of HMI*

The tasks of the Manager of the HMI Hydrology Service are as follows:

- Coordinating hydrological and meteorological services with regard to flood defence;
- Organizing extraordinary monitoring and measuring of water levels, and the transport of solids and ice at cross sections of the hydrological stations of the HMI and delivering extraordinary hydrological information;
- Submitting reports on hydrological and meteorological conditions during flood defence as well as giving forecasts in accordance with the Operative Flood Defence Plan to the Main Flood Defence Manager and the Water Area Flood Defence Manager.[98]

#### *4.4.9 Manager of the Service for Civil Engineering Works and Transport*

The duties of the Manager of the Service for Civil Engineering Works and Transport comprise coordinating specialized groups and task forces, carrying out special tasks during flood defence aimed at the rehabilitation of weak points on the protective structures, and organizing all operative tasks connected with the use of ice breakers and ice mining. These tasks must be carried out in accordance with the orders of the Water Area Flood Defence Manager.[99]

#### *4.4.10 Poor and unprofessional performance of duty*

Flood Defence Managers are entitled to remove from duty, in the shortest time possible, any person performing in a poor or unprofessional manner or whose presence is harmful to flood defence in another way. The Flood Defence Manager who uses this power must immediately appoint another person as a replacement during flood defence and to inform the ministry responsible for water economy of the replacement.[100]

### 4.5 Duties and responsibilities of companies which organize and execute the flood defence

The duties and responsibilities of companies included in flood defence activities and the HMI are regulated in great detail.

#### *4.5.1 Responsible public water economy company*

The duties of the water management companies and other companies engaged in flood defence are, in accordance with the Flood Defence Operative Plan, as follows:

- Providing professional personnel daily, depending on the phase of flood defence;
- Monitoring the water levels on the local water gauge stations;
- Providing observations and informing responsible Flood Defence Managers in good time of water level changes and ice movement, of the condition of protective structures and of changes on water land; recording in the flood defence diary all noted situations (levees getting too wet or leaching, wells, etc.) significant for flood defence;
- Undertaking measures and works in cases of changes in the stability of protective structures and other objects in the zone of the flood defence line (washing out material from levees and terrain in the levee zone, the impact [damage] of waves on levees, etc.);
- Participating in the execution of flood defence activities and measures in another water area in accordance with need, if they are not engaged in such flood defence in their own water area.[101]

#### 4.5.2 Companies engaged in ice defence

In accordance with the Flood Defence Plan, companies assigned tasks relating to protection from ice have a duty to prepare vessels and other machinery by 15 December and to give a written report on their preparedness to the Main Flood Defence Manager and Water Area Flood Defence Manager, who will decide on their further deployment, depending on the hydrometeorological situation.[102] This section contains further details on the deployment of ice breakers in different Danube sectors (on the basis of national legislation or bilateral arrangements with Hungary and Romania).

#### 4.5.3 Companies managing accumulations

In cases of ice building up in accumulations, companies managing the installations are required to lower the water level to the minimum level prescribed (close to the natural regime) and to undertake other measures in order to prevent ice barriers forming.[103]

#### 4.5.4 Owners and users of objects or structures on a levee or in the zone of a levee

Companies and citizens possessing objects or structures on a levee or in the zone of a levee are obliged to participate in flood defence, to undertake measures and activities and to pump water from affected areas by their own means and at their own expense.[104]

#### 4.5.5 Development sites in the zone of flood protection objects

In development sites which could have an impact on the safety of the execution of flood defence measures, investors are required to implement all measures ordered by flood defence managers, during and out of the period of flood defence.[105]

#### 4.5.6 Bridges, dams, etc.

If high waters or ice threaten to damage bridges, dams and other objects, the users of such objects are required to undertake measures to remove such threats. Previously, they were obliged to inform the company responsible for flood defence on undertaking such measures.[106]

#### 4.5.7 Companies managing the objects for slowing down the water flow

These companies are required to manage objects in a way that harmonizes with the requirements of flood defence and, during flood defence, to register water levels and water flow in the zone of accumulation each day, and to collect data on ice conditions (percentage of cover, ice accumulations, ice barriers, etc.). They must report on their observations to the Water Area Flood Defence Manager by 9 a.m.[107]

#### 4.5.8 HMI

During flood and ice defence, the HMI is required to hand over daily complete hydrological and meteorological reports to Serbia's Centre for Emergencies and to inform the ministry responsible for water economy, the Main Flood Defence Manager and the Water Area Flood Defence Manager[108]. The HMI must hand over its forecasts on water levels at the reference water gauge stations by 1 p.m. to those Water Managers.[109]

The HMI is obliged to make accessible to the Main Flood Defence Manager and the Water Area Flood Defence Manager all the relevant data for water levels forecasts and water flow, acquired through the international exchange of information.[110]

During flood and ice defence, the HMI must provide the Main Flood Defence Manager and the Water Area Flood Defence Manager with meteorological forecasts on daily air temperatures and precipitation in the water area under flood and ice defence, as well as seven-day ice forecasts for the main rivers (Danube, Sava, Tisa, Morava and Tami) every day, and, in accordance with need, approximate monthly forecasts.[111]

#### *4.5.9 State of emergency*

When measures and works set out in the Operative Flood Defence Plan are not sufficient to remove the threat of flood, the Main Flood Defence Manager is required to inform the ministry responsible for water economy accordingly with the aim of an urgent declaration of a state of emergency, in accordance with the law.[112]

### 4.6 Flood defence against inland waters

#### *4.6.1 Legal frameworks*

Flood defence against inland waters is based on the provisions of the Law on Waters, the Law on Protection Against Natural Disasters, regulations on maintenance and operation of drainage water systems, joint regulations on flood defence agreed with neighbouring countries and General and Operative Flood Defence Plans.[113]

#### *4.6.2 Types of measures*

Flood defence against inland waters consists of:

- Carrying out the preventive works;
- Execution of direct operative measures intended to prevent harm to the melioration area caused by high groundwater and excess surface waters.

Flood defence against inland waters is to be carried out when regular drainage of water cannot prevent flooding of the area.[114]

Preventive protective measures comprise:

- Preparation of data and documentation for the elimination of excess waters from the area;
- Construction of drainage water systems that are also enabled to receive atmospheric waters from urban areas;
- Maintenance of drainage systems in operative conditions, so as to receive excess water from snow melting and intensive rain;
- Implementation of agro-technical measures intended to accelerate elimination of waters from affected areas, especially from heavy types of soil.[115]

Operative measures comprise:

- Identification of flooded areas and the extent of the flood;
- Removal of possible obstacles from drainage canals;

- Cutting through the earth deposits alongside drainage canals to enable runoff from flooded surfaces and digging trenches to enable removal of water from depressions;
- Local protection of urban areas and assets;
- Deployment of moving pump stations.[116]

Public water management companies are responsible for the implementation of preventive and operative measures in collaboration with owners and users of agriculture land and with municipalities (when reception of waters eliminated from urban areas is concerned).[117]

#### *4.6.3 Flood defence service*

The Municipal Inland Waters Flood Defence Plan regulates the organization of services for flood defence, drainage water systems and flood defence objects, the names of responsible persons, hydrological and meteorological observations and communication systems during flood defence.[118]

Funds for defence against floods from inland waters is to be provided in accordance with the Law on Waters in the municipal annual budget.[119]

#### *4.6.4 Technical documentation (regular and extraordinary flood defence)*

Public water management companies are obliged to:

- Produce and regularly update technical documentation that contains:
  - the general review scheme;
  - longitudinal and cross-section profiles of drainage canals;
- Adopt the operative guidelines for the drainage system, regulating its maintenance and operation and regular inland water flood defence in accordance with the capacity of the system and the defined drainage regime.[120]

Extraordinary inland water flood defence occurs when it is not possible to eliminate all inland water from the melioration area by means of the existing drainage system within the limits of the established regime and when, because of this, overflowing of water from canals occurs, causing flooding.[121]

#### *4.6.5 HMI*

The HMI is required to hand over all hydrological and meteorological data to public water management companies, in accordance with the Operative Flood Defence Plan, in order to enable effective protection against inland waters.[122]

#### *4.6.6 State of emergency*

When a public water management company is not able, with the deployment of available personnel, means and measures set out in the Operative Flood Defence Plan, to remove the threat of flood caused by inland waters and reduce the flood impact to the minimum, it shall propose to responsible authorities a declaration of a state of emergency in the water area or in the part of that area affected by flood, in accordance with the Law on Natural and Other Major Disasters.[123]

### 4.7 Funds for implementation of the Plan

Funds for implementation of this Plan shall be provided by the Law on Waters in the State budget, municipality budgets and in the budget of the hydroelectric industry State company.

## 5. Operative Flood Defence Plan

The Operative Flood Defence Plan in force[124] establishes the organization of flood defence and the names of flood defence sectors and sections, and contains the names of organizations responsible for flood defence and the names of responsible persons, the means needed and criteria for the declaration of regular and extraordinary flood defence.[125] All the data contained in the Operative Flood Defence Plan are presented in the pattern shown in box 1.

**Box 1. Contents of the Operative Flood Defence Plan**

1. Sector
   Sector code;
   Name and description of the sector (length in km); municipality;
   Sector Flood Defence Manager (telephone; mobile);
   Sector Flood Defence Deputy Managers (telephone; mobile);
   Organization responsible for sector's flood defence (address; telephone; mobile).
2. Section
   Section Code;
   Name and description of the section (length in km); municipality;
   Section Flood Defence Manager (telephone; mobile);
   Section Flood Defence Deputy Manager (telephone; mobile).
3. Characteristic water levels
   Reference water gauge station;
   Maximum registered water level (date of appearance);
   Criterion for declaration of regular flood defence;
   Criterion for declaration of extraordinary flood defence;
   Arithmetic mean water level (for __% reference flow);
   Water level when overflowing the defence line occurs.
4. Protected area
   Name;
   Character (closed cassette; conditionally closed cassette — possible penetration of water from neighbouring state; open cassette; regulated area — for regulated watercourses; knot — for a group of objects);
   Total length of objects subject to flood defence in km.
5. Defence structures
   Code of object (if needed); more detailed description of object; length of the parts of the object in km; total length; etc).

The Operative Flood Defence Plan contains details of the HMI duties for distribution of the reports on the hydrological situation, warnings and forecasts and distribution of the declaration and termination of flood defence, in accordance with the General Flood Defence Plan. A review of reporting hydrological stations in the responsibility of HMI is attached to the Plan. The review contains the list of stations with regular and extraordinary measurements of water levels. These lists are structured as shown in table 1.

| Table 1. Contents of the lists of hydrological stations with ordinary and extraordinary measurements of water levels | |
|---|---|
| • ordinary numeral<br>• water area<br>• watercourse<br>• hydrological station | • flood defence area<br>– section and municipality(ies)<br>– conditional water level[126]<br>– forecast obligatory |

The Operative Flood Defence Plan contains the review of Reporting meteorological stations (which measure precipitation for the needs of the hydrometeorological service) and the review of [relevant] hydrological stations abroad.

With regard to defence against ice jams, the Operative Flood Defence Plan contains the list of locations for monitoring ice phenomena and the criteria for the declaration of defence against ice, as shown in table 2.

This Plan contains detailed rules for the deployment of ice breakers and engagement of personnel for regular and extraordinary defence against ice jams, as well as technical documentation with reviews of available tools, material, equipment and machinery for flood defence, shown in sectors or responsible water management organizations. Additional regulations and contracts regulate the engagement of personnel and deployment of machinery, as well as expenses occurring during flood defence.

| Table 2. Criteria for the declaration of defence against ice | | | |
|---|---|---|---|
| ***Regular defence against ice*** | | ***Extraordinary defence against ice*** | |
| Danube, Sava, Great Morava | Tisa, Tamis, Old and Navigable Bega, Kolubara, Brzava, Moravica, Timok, Drina and Western Morova | Danube, Sava, Great Morava | Tisa, Tamis, Old and Navigable Bega, Kolubara, Brzava, Moravica, Timok, Drina and Western Morova and other watercourses |
| When 40% of river surface is covered with ice with a trend of increasing | When 40% of river surface is covered with ice more than 5 cm thick | When more than 60% of river surface is covered with ice | When, after a standing phase, ice starts moving and accumulating |
| Other watercourse: when ice cover is 100% and ice is more than 5 cm thick in the period when ice movement can be expected | | | |

## 6. State of emergency (natural and other major disasters)[127]

The notion of natural and other major disasters comprises earthquakes, droughts, snow deposits, atmospheric storms, explosions, uncontrolled release of dangerous substances, etc., as well as floods, torrents, accumulation of ice in watercourses and breaking of dams on watercourses.[128] Protection against natural disasters comprises:

- Preventive measures (aimed at preventing natural disasters and mitigating impact);
- Protection measures in cases of imminent danger from a natural disaster (aimed at direct preparation for participation in protection);

- Participation measures during a natural disaster (which provide for the participation of military forces and the means for protection);
- Mitigation and rehabilitation measures (aimed at the mitigation and elimination of the consequences of a natural disaster).[129]

Protection against natural disasters is based on the broad scale of rights and duties of all members of society, and cooperation, solidarity and mutuality of all citizens and organizations.[130] Priority during protection from natural disasters has been given to human health and life.[131] All levels of authority, public utility services and other public services are obliged to develop and adopt plans for emergency situations and provide training for, and implement, different protective measures.[132]

During a natural disaster and in the case of such an imminent threat, the mobilization of citizens and various civil services, as well as the participation of military forces, could be ordered.[133] A very broad list of measures that could be undertaken (i.e. requested to be undertaken by all affected citizens and organizations, or undertaken by responsible local, regional or central authorities) includes the evacuation of the population and assets, and the provision of accommodation during an emergency.[134] This Law contains very detailed provisions on emergency state management, personal rights and duties of participants in implementation of ordered measures, as well as comprehensive provisions on assessment of damage, aid for rehabilitation and compensation for participation in undertaken activities.

This Law was enacted almost 30 years ago and has been amended a couple of times since. This segment of the integrated system of protection against the detrimental effects of water could benefit from some modification to reflect recent institutional and social changes, with a view to its developing into a system which would be a part of the European and subregional transboundary cooperation systems established for the same purpose.

Financial aspects of rehabilitation and protection against natural disasters have been regulated by the Law on the Use of Funds for Rehabilitation and Protection against Natural Disasters.[135] This Law contains, among others, provisions that funds for rehabilitation and protection from floods, torrents, accumulations of ice in the watercourses and breaking of dams shall be reserved in the State budget. All the funds for this purpose held in the accounts of Vojvodina and Kosovo provinces at the moment of the entry into force of this Law (1992) were transferred to the central budget. Use of these funds has been accorded to the Central Government. Assessment of the damage from natural disasters should be made using the methodology adopted in 1987. The spending of funds is intended to be done mostly through the municipalities, following their application for the funds within a certain time limit. The municipalities, having very serious duties in cases of natural disaster, do not have funds designated by the Law for financing activities and measures, but receive money from the Government. This Law could be adjusted to the new circumstances once a new Constitution is adopted.

## 7. Transboundary arrangements for flood defence

### 7.1 Introductory remarks

As mentioned above,[136] for the purpose of this case study a comprehensive review of the Joint Regulation is made here. The Joint Regulation consists of 33 articles and 3 annexes, as shown in box 2.

**Box 2. Contents of the Regulation on Defence Against Flood from Incoming and Inland Waters and Blocking the Water Passage by Ice on the Bordering Watercourses and Watercourses Transsected by the Yugoslav–Hungarian Border and Hydraulic Systems of Joint Interest**
**Joint Regulation]**

I.. General provisions.

II. Preparatory measures.

III. Carrying out defence

1. Flood defence
2. Defence against ice
3. Defence against inland waters.

IV. Miscellaneous.

V. Closing provisions.

Annex 1. List of sectors of mutual interest

- ordinal number
- name
- km [from—to]
- territory [of the Party]
- state border
- length of the territory of each state
- remarks.

Annex 2. Water authorities responsible for cooperation

- ordinal number
- sector/catchment area
- water management authority
- name
- seat
- tel./fax
- remarks.

Annex 3. Joint defence plans

3.1 Map (1 : 100.000).
3.2 Longitudinal and cross-section profiles of levees, watercourses and canals.
3.3 Review of reference water gauge stations on watercourses, for different phases of flood defence.
3.4 Review of hydraulic objects on main defence line and their features.
3.5 Review of catchment areas and canals of joint interest.
3.6 Review of reference water gauge stations on watercourses and canals of joint interest.
3.7 Code of ice conditions.
3.8 Joint principles for defence against ice.
3.9 Joint operative regulations [for hydraulic structures and installations].

## 7.2 General provisions

The Joint Regulation relates to all works and measures implemented in coordination between authorities and organizations of Serbia and Montenegro* and Hungary (henceforth: Parties) with the aim of successful defence against floods from incoming and inland waters and obstruction of water flow by ice.[137] These measures comprise:

* On 3 June 2006, Montenegro seceded from Serbia and Montenegro, thus creating two States, officially known as the Republic of Montenegro and the republic of Serbia.

- Timely information sharing;
- Harmonization of flood defence activities;
- Harmonization of the operation of hydraulic structures and installations.[138]

For implementation of the Joint Regulation, responsibility has been assigned to the authorities in each Party's territory in the sectors of joint interest, on watercourses and hydraulic systems.[139] Sectors of joint interest are listed in great detail in annex 1 to the Joint Regulation. The lists contain details of watercourses, levees, canals and hydraulic systems.[140] Water management authorities of the Parties responsible for cooperation are listed in annex 2 to the Joint Regulation.[141]

### 7.3. Preparatory measures

Responsible authorities of the Parties carry out all preparations for defence against floods from incoming and inland waters and obstruction of water flow by ice on watercourses and hydraulic systems in the sectors of joint interest, in accordance with the Joint Regulation and their national legislation.[142] In order to carry out successful defence, the Parties accepted the obligation to exchange (through local water economy authorities) parts of the plans pertaining to sectors of joint interest, listed in annex 3, in accordance with the territorial division as in the framework below:

I. The Tisa River Catchment Area;

II. The Danube River and Left Bank Danube Catchment Area.[143]

The Parties accepted the duty to exchange information immediately on every change of their national legislation; on plans for defence against floods from incoming and inland waters and ice jams; and on changes in the completeness of protective systems.[144]

The Parties accepted the duty to maintain [watercourse] beds, flood defence structures, hydraulic systems and communication means in their sectors, in accordance with the available funds.[145]

The Parties agreed that experts and members of the Flood Defence Sub-Commission, every year and after every large-scale flood defence in accordance with need, would make joint inspection of the flood defence structures in the sectors of joint interest and the required amount of flood defence equipment and material; and assess defence preparedness and the flood defence carried out.[146]

During inspection, representatives of the central and local water management authorities of the Parties must check the content of all annexes to the Joint Regulation and if any changes are noted, they will exchange the changed parts of the annexes (in two copies).[147] Should defence be declared, changed annexes are to be exchanged through local Officers for Communication.[148]

The Parties agreed to appoint, for the forthcoming period, their central and local Officers for Communication and to provide their communication data at the session of the Interstate Commission.[149] During the period of flood defence, local Officers for Communication are required to:

- Establish mutual communication and exchange available information;
- Inspect the sites under flood threat in person;
- Undertake all measures in order to remove the danger as quickly as possible;
- React to a call from the other side within six hours.[150]

Central Officers for Communication meet each other on their own initiative or on the proposal of local water management authorities and check sites under threat from flood, decide on disputed issues and harmonize the measures.[151]

In order to carry out successful flood defence, Parties agreed to inform each other on meteorological conditions in catchment areas of the watercourses of joint interest and on available hydrometeorological data.[152] Hungary took on the obligation to inform the other Party, through the Central Officer for Communication if, according to its forecast, it could be expected that the water level would rise above 700 cm on the Danube River at the town of Baja or that the water level would rise above 650 cm on the Tisa River at the town of Seged.[153]

## 7.4 Carrying out defence

### *7.4.1 Flood defence*

Local water management authorities are required to exchange data on high waters as well as on ice conditions, in accordance with respective parts of the annexes to the Regulation.[154]

Responsible authorities of the Parties are required to carry out measures for defence against flood from incoming and inland waters and obstruction of water flow by ice on watercourses and hydraulic systems in the sectors of joint interest, in accordance with the Joint Regulation and their national legislation.[155]

Defence against floods from incoming and inland waters is designed to be carried out through the phases shown in table 3.

**Table 3. Flood defence phases and measures**

| *Territory* | *Phase* | *Hours* |
|---|---|---|
| Serbia and Montenegro | Regular defence | Intensified daily monitoring and active defence |
| | Extraordinary defence | Intensified monitoring day and night and strengthened defence |
| | State of emergency | — |
| Hungary | I degree | Daily watchmen service and active defence |
| | II degree | Watchmen service day and night and active defence |
| | III degree | Watchmen service day and night and active defence |
| | Extraordinary preparedness[156] | — |

Declaration of certain phases of defence depends on the water levels at the reference water gauge stations, listed in annex 3 to the Joint Regulation. In cases of exceptions to reference water levels, i.e. when an earlier declaration has been made or certain phases of flood defence have been terminated, responsible water management authorities are to inform each other immediately.[157]

During defence, local water management authorities are required to exchange by telephone and by fax observed water levels at the reference water gauge stations listed in annex 3 to the Joint Regulation[158] at the times shown in tables 4 and 5.

| Table 4. Hours for recording water levels during flood defence from incoming waters | | |
|---|---|---|
| ***Territory*** | ***Phase*** | ***Hours*** |
| Serbia and Montenegro | Regular defence<br>Extraordinary defence<br>State of emergency | 6 a.m. and 6 p.m.<br>6 a.m., noon, 6 p.m., midnight<br>All even hours |
| Hungary | I degree<br>II degree<br>III degree and extraordinary preparedness | 6 a.m. and 6 p.m.<br>6 a.m., noon, 6 p.m., midnight<br>All even hours[159] |

| Table 5. Hours for recording water levels during flood defence from inland waters | | |
|---|---|---|
| ***Territory*** | ***Phase*** | ***Hours*** |
| Serbia and Montenegro | Regular defence<br>Extraordinary defence | 7 a.m.<br>7 a.m., 7 p.m. |
| Hungary | I and II degree<br>III degree | 7 a.m.<br>7 a.m., 7 p.m.[160] |

The Party in whose territory a levee has broken is required, immediately after the occurrence, to inform by telephone and by fax the central and local officers for communication of the other Party on:

- When the levee broke;
- The location and size of the break;
- The water level at the reference water gauge station;
- The estimated flow of water through the break;
- The probable direction of the water flow and speed of spreading;
- Measures undertaken for localization of the flood.[161]

The Party in whose territory a levee has broken is required to undertake measures to allow the officers for communication of the other Party to visit the site of the broken levee as a matter of urgency with the aim of inspection and the undertaking of further harmonized measures for closing the break.[162]

When a levee has been broken, the Party in whose territory the levee lies is obliged, with the agreement of other Party, to undertake the following measures as a matter of urgency:

- To localize floods in its territory;
- To immediately undertake a provisional closing of the break;
- To undertake the most efficient measures for eliminating floodwaters from the bordering zone.[163]

Cutting through the levee in order to release the floodwaters may be carried out at the location designated for such a purpose, if the level of floodwaters is higher than the water level of the recipient watercourse and allows such a release of water.[164]

### *7.4.2 Defence against ice*

Phases of defence against ice are set out as shown in table 6.

| Table 6. Phases of defence against ice | | |
|---|---|---|
| ***Territory*** | ***Phase*** | ***Criteria for declaration/measure*** |
| Serbia and Montenegro | Regular defence | Ice formation, moving and standing |
| | Extraordinary defence | Ice accumulation and obstruction of the water flow |
| | Emergency state | — |
| Hungary | I degree | Ice beakers in a state of preparedness in their ports |
| | II degree | The ice breakers are sent to their destinations and kept in a state of preparedness |
| | III degree | Execution of tasks on breaking the ice |
| | Extraordinary preparedness[165] | — |

The Parties monitor ice and coordinate defence against ice as follows:

- During the period of defence and outside it the monitoring and information services shall be organized and technical conditions for their functioning shall be provided for;
- When moving ice covers 20–30 per cent of the water surface, local water management authorities are to inform each other by 11 a.m. on:
  – The location of observation;
  – The time of observation;
  – The water level at the reference water gauge station;
  – The size of ice coverage and movement of ice, in accordance with annex 3 to the Joint Regulation.

Daily information shall contain the following data:

- Thickness, quality and size of the ice pieces;
- Condition, size, time and location of a possible accumulation and obstruction of the water flow;
- Time ice stops and begins to move;
- Meteorological data;
- Undertaken and planned measures.[166]

During degrees I and II of defence against ice in the territory of Hungary and regular defence in the territory of Serbia and Montenegro, information on water levels is to be exchanged at 9 a.m. and 6 p.m. During degree III of defence in the territory of Hungary and extraordinary defence in the territory of Serbia and Montenegro, such information will be exchanged every even hour or, in accordance with need, every hour.[167]

The joint plan of the water management authorities for cooperation is the basis for setting ice in motion. Breaking the ice and setting it in motion could be done by means of ice breakers, mining and bombardment or other means.[168]

Breaking the ice and setting it in motion should be performed by moving upstream, leaving enough room on the water surface for the broken ice to flow.[169]

Before setting ice in motion by means of mining or bombardment, the Parties agreed to undertake necessary safety measures in their territories.[170]

Using and retaining icebreakers for defence against ice in the territory of another Party shall be in accordance with the international conventions in force and national legislation on navigation. [171]

Every year, before 15 December, Central and local Officers for Communication, at the preparatory meetings, shall designate icebreakers and set out details, such as:

- The time when vessels are to be put into a state of preparedness and their location;
- Accommodation and subsistence of the crews;
- Fuel supply;
- Fixing possible damages;
- Expenses issues.[172]

The Parties agreed to inform each other on significant changes in the watercourse beds at the preparatory meeting.[173]

Designated icebreakers shall be put into a state of prior preparedness in the period designated by the Central Officers for Communication. Hungarian icebreakers crossing into the Danube sector of Serbia and Montenegro is to be based on a (telephone or fax) request by the Central Officer for Communication of Serbia and Montenegro, following a proposal by local Officers for Communication.[174]

Serbia and Montenegro shall provide radio communication between Hungarian ice breakers working in the Danube sector of joint interest in Serbia and Montenegro and the team managing defence against flood and ice. This is to be done by means of installing radio stations on the Hungarian ice breakers. Permanent telephone and fax communication is to be established between local water management authorities of the Parties. During the whole period of defence against ice, Serbia and Montenegro shall provide direct communication between their ice breakers and those from Hungary. The expenses are to be borne by Serbia and Montenegro.[175] Local Officers for Communication are to agree on harmonized measures for the use of ice-breakers to carry out defence tasks.[176]

#### *7.4.3 Defence against inland waters*

Each Party is obliged to carry out defence in its territory against (local) inland waters, on the border or where the border intersects hydraulic systems of joint interest. They should use local terrain conditions and sluices and base their activities on joint operative regulations.[177] Basic technical characteristics of hydraulic structures designated for defence are given in a separate part of annex 3.[178] In the catchment areas where drainage of water has not yet been regulated, the state of things will stay unchanged, but the Parties agreed as soon as possible to resolve the issue of catchment area regulation and in that way facilitate controlling the flow of the waters from the territory of one Party to the territory of another.[179]

#### *7.4.4 Miscellaneous*

In cases of danger from flooding of incoming or inland waters or from ice in the joint sector, when there is need for joint work on defence or for providing help, the Parties agreed to respond urgently on the request of the other Party by deploying its personnel, material and equipment, on the basis of previous arrangement and in accordance with their ability.[180] In such cases, the Parties agreed

to facilitate personnel, material and equipment crossing the border without delay.[181] Expenses made during the provision of such help shall be settled through the Joint Inter-State Commission.[182]

In cases of danger from flooding of incoming or inland waters or from ice in bordering sectors of joint interest, the Parties agreed to allow, upon a joint proposal by Central and local Officers for Communication, air reconnaissance of the territory of another Party for the purpose of defence against flood and ice, under the condition that authorization for such activity has been previously obtained from both Parties.[183] This authorization shall contain data on:

- Aircraft;
- Air space;
- Sector or hydraulic system that is to be inspected;
- Size (width and length) of the strip of territory which is to be inspected;
- Date and time;
- Altitude of flight.[184]

During air reconnaissance, only aeroplanes and helicopters of one Party may be found in the same air space. Following air reconnaissance, the Party which carried it out is to inform the other Party within a very short time of the noted appearances.[185]

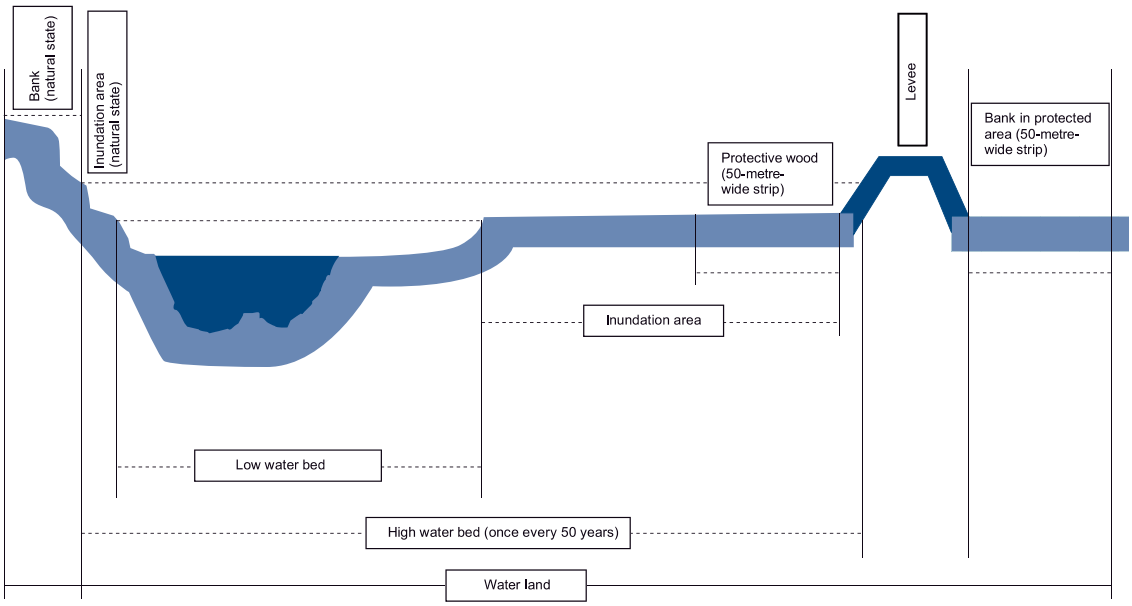
The Parties agreed to inform each other on the beginning and termination of defence phases by telephone and fax.[186]

Following the defence, the water economy authorities of both Parties are to make a joint report and submit it to the Inter-State Commission for adoption.[187]

Following a period of defence preparedness, the Parties are to repair, without delay, damaged protective structures and replenish defence material and equipment.[188]

The Joint Regulation is to enter into force following ratification by the Governments of the Parties.[189]

# APPENDIX. GRAPHICAL PRESENTATION OF CERTAIN TERMS USED IN THE LAW ON WATERS OF SERBIA (1991)



## ENDNOTES

1 Active measures comprise such interventions enabling the control of water flow, e.g. building dams for accumulations, retentions etc. A huge specific hydraulic structure of this kind in Vojvodina is the Canal DTD, connecting Danube and Tisa and Danube again. Passive measures are those constructed directly to protect certain area from floodwaters, e.g. building levees. Non-investment measures comprise various legislative, institutional and planning policies, etc.

2 In Vojvodina, implementation of such planned measures could be traced back more then 250 years.

3 It should be noted that such experience can be seen as well in other countries of the region, i.e. in Croatia, Bosnia and Herzegovina, Hungary, etc.

4 The Parties to the FASRB are Bosnia and Herzegovina, Croatia, Serbia and Montenegro and Slovenia. The FASRB entered into force on 29 December 2004. The International Sava River Basin Commission should begin with work in the forthcoming six months.

5 "Službeni glasnik RS" [henceforth: "Official Gazette"], No. 46/91, 53/93 and 54/96.

6 "Official Gazette", No. 34/2003.

7 "Official Gazette", No. 6/2004.

8 "Official Gazette", No. 2/74, 24/76, 31/76.

9 "Official Gazette", No. 20/77, 24/85, 27/85, 6/89 & 52/89 and "Official Gazette", No. 53/92, 67/93, 48/94.

10 "Official Gazette", No. 50/92.

11 For the purpose of this research, reference shall be made only to the Regulation on Defence Against Flood from Incoming and Inland Waters and Blocking the Water Passage by Ice on the Bordering Watercourses and Watercourses Transsected by the Yugoslav–Hungarian Border and Hydraulic Systems of Joint Interest (henceforth: Joint Regulation), adopted by the Yugoslav–Hungarian Commission for Water Economy, at its XXXVI Session, held 9–12 June 1998 at Sv. Stefan, Montenegro. The legal ground for adoption of Joint Regulation has been found in article 4, paragraph 2 of the Agreement Between the Government of the Federal People's Republic of Yugoslavia and the Government of the People's Republic of Hungary on Water Economy Issues, signed on 8 August 1955 at Belgrade. The provision of article 4, paragraph 2 reads: "The Commission shall adopt a joint regulation on defence against floods and ice and other regulations as the need may be. Such adopted regulations shall be subject, prior to their entry into force, to ratification by the Governments of the Contracting Parties."

12 Article 5. (11).

13 Article 5. (10).

14 Article 5. (9).

15 Article 5. (12).

16 Article 37, paragraph 2.

17 Article 5. (1). Originally, it was designated as three water areas in the territory of Serbia, Danube, Sava and Morava (Article 6. paragraph 1). The territory of Serbia was declared as the unified water economy area (Article 6. paragraph 3) for which the long-term management plan is to be adopted ("vodoprivredna osnova") as well as the similar plans for one or more, or only part of, the water areas (Article 9. paragraph 1). All water areas were designated as parts of the Danube Basin.

18 Article 5. (13).

19 Article 4. (1).

20 Article 26.

21 Law on Waters, Article 30. paragraph 1.

22 At the time of writing, the General Plan adopted in 2003 was in force (see ref. 2. supra). The General Flood Defence Plan for the period 2003–2008 is an integral part of the Government of Serbia's "Decree on establishment of General Flood Defence Plan for the period 2003–2008" ["Uredba o utvrđivanju opšteg plana za odbranu od poplava za period od 2003. do 2008. godine"], adopted on 27 March 2003, and published in the "Official Gazette of the Republic of Serbia" No. 34, 2 April 2003.

23 Law on Waters, Article 28. paragraphs 1–2.

24 At the time of writing this publication, the Operative Plan adopted in January 2004 was in force (see ref. 3. supra). The Operative Flood Defence Plan for 2004 is an integral part of the Ministery of Agriculture and Water Economy of Serbia "Order on Establishment of Operative Flood Defence Plan for 2004" ["Naredba o utvrđivanju Operativnog plana za odbranu od poplava za 2004. godinu"], adopted on 5 January 2004, and published in the "Official Gazette of the Republic of Serbia" No. 6, 21 January 2004.

25 Law on Waters, Article 29. paragraphs 1–3.

26 See infra note 132.

27 Op. cit., Article 27, paragraph 2.

28 Op. cit., Article 30, paragraph 2.

29 Op. cit., Article 30, paragraph 3.
30 Op. cit., Article 34, paragraph 1.
31 Op. cit., Article 34, paragraph 2.
32 Op. cit., Article 38, paragraphs 1–2.
33 Op. cit., Article 37.
34 Op. cit., Article 39.
35 Op. cit., Article 30.
36 Op. cit., Article 32
37 Op. cit., Article 33, paragraph 1.
38 Op. cit., Article 33, paragraph 2.
39 Henceforth: HMI.
40 Op. cit., Article 33, paragraph 3.
41 Op. cit., Article 36, paragraph 1.
42 Op. cit., Article 69, paragraph 1. (5).
43 Op. cit., Article 36, paragraphs 3–4.
44 Op. cit., Article 36, paragraph 5.
45 Op. cit., Article 36, paragraph 6.
46 Op. cit., Article 35.
47 Op. cit., Article 64, paragraph 1. (1).
48 Op. cit., Article 64, paragraph 1. (2).
49 Op. cit., Article 64, paragraph 1. (3).
50 Op. cit., Article 64. paragraph 1. (4).
51 I.e. in cases of Article 64, paragraph 1. (1) and 2. — Law on Waters, Article 64, paragraph 2.
52 Op. cit., Article 66.
53 Op. cit., Article 67.
54 Op. cit., Article 68, paragraph 1–2.
55 Op. cit., Article 69, paragraph 1. (1).
56 Op. cit., Article 69, paragraph 1. (2).
57 Op. cit., Article 69, paragraph 1. (3).
58 Op. cit., Article 69, paragraph 1. (4).
59 Op. cit., Article 69, paragraph 1. (5).
60 Op. cit., Article 69, paragraph 1. (7).
61 Op. cit., Article 70.
62 Op. cit., Article 71, paragraphs 1–2.
63 Op. cit., Article 100–101.
64 Articles 114–118.
65 See supra, ref. 1–6. General provisions, Section 1.
66 Op. cit., Section 2.
67 Op. cit., Section 3, paragraphs 1–4.
68 Op. cit., Section 4, paragraph 1.
69 Op. cit., Section 4, paragraph 2.
70 Op. cit., Section 4, paragraph 3.
71 At the time of writing there are two of them — one, "Waters of Vojvodina" ("Vode Vojvodine") responsible for the water economy in the territory of Autonomous Province of Vojvodina and the other, "Waters of Serbia" ("Srbijavode"), responsible for the water economy in the central part of Serbia. The responsibility for water management in the territory of Kosovo (i.e. Autnomous Province of Kosovo) has been given to UNMIK.
72 Preventive Measures, Section 1.
73 Op. cit., Section 2.
74 Op. cit., Section 3, paragraph 1.
75 Op. cit., Section 3, paragraph 3.
76 Op. cit., Section 3, paragraph 2.
77 Op. cit., Section 4.

78 Op. cit., Section 5, paragraph 1.
79 Op. cit., Section 5, paragraph 2.
80 Op. cit., Section 5, paragraph 3.
81 Op. cit., Section 6.
82 Op. cit., Section 7.
83 Declaration of Flood Defence and its Termination, Section 1.
84 Op. cit., Section 2.
85 Op. cit., Section 3.
86 Op. cit., Section 4.
87 Op. cit., Section 5.
88 Op. cit., Section 6.
89 Op. cit., Section 7.
90 […]Period of Flood Defence, Section 1.
91 Op. cit., Section 2.
92 Op. cit., Section 3.
93 See e.g. infra, title Transboundary Arrangements for Flood Defence.
94 […]Period of Flood Defence, Section 4.
95 Op. cit., Section 5.
96 Op. cit., Section 6.
97 Op. cit., Section 7.
98 Op. cit., Section 8.
99 Op. cit., Section 9.
100 Op. cit., Section 10.
101 Duties and Responsibilities of Companies […], Section 1.
102 Op. cit., Section 2.
103 Op. cit., Section 3.
104 Op. cit., Section 4.
105 Op. cit., Section 5.
106 Op. cit., Section 6.
107 Op. cit., Section 7.
108 Op. cit., Section 8, paragraph 1.
109 Op. cit., Section 8, paragraph 2.
110 Op. cit., Section 8, paragraph 3.
111 Op. cit., Section 8, paragraph 4.
112 I.e. with the Law on Protection of Natural and Other Major Disasters — see supra, note 9.
113 See supra, ref. 1–6. — Flood Defence Against Inland Waters, Section 1.
114 Flood Defence Against Inland Waters, Section 2, paragraph 1.
115 Op. cit., Section 2, paragraph 2.
116 Op. cit., Section 2, paragraph 3.
117 Op. cit., Section 2, paragraph 4.
118 Op, cit., Section 3.
119 Op. cit., Section 4.
120 Op. cit., Section 5, paragraph 1.
121 Op. cit., Section 5, paragraph 2.
122 Op. cit., Section 6.
123 Op. cit., Section 7.
124 Order on Establishment of Operative Flood Defence Plan for 2004 — see supra, note 24.
125 Op. cit., Article 1.
126 Conditional water level is the water level reached when HMI begins the extraordinary registering of water levels and issuing warnings and water level forecasts. For the main rivers (Danube, Tisa and Sava), the HMI is required to began issuing warnings and forecasts two days before the appearance of the conditional water level.
127 Henceforth: natural disasters.

128 Law on Protection Against Natural and Other Major Disasters (see supra, note 9), Article 2.
129 Op. cit., Article 3.
130 Op. cit., Article 4.
131 Op. cit., Article 5.
132 Op. cit., Articles 27–65.
133 Op. cit., Article 9.
134 Op. cit., Article 17.
135 See supra, ref. No.10.
136 See supra, note 11.
137 Joint Regulation, Article 1, paragraph 1.
138 Op. cit., Article 1, paragraph 2.
139 Op. cit., Article 2.
140 Op. cit., Article 3.
141 Op. cit., Article 4.
142 Op. cit., Article 5.
143 Op. cit., Article 6.
144 Op. cit., Article 7.
145 Op. cit., Article 8.
146 Op. cit., Article 9, paragraph 1.
147 Op. cit., Article 9, paragraph 2.
148 Joint Regulation, Article 9, paragraph 3.
149 Joint Regulation, Article 10, paragraph 1.
150 Joint Regulation, Article 10, paragraph 2.
151 Joint Regulation, Article 10, paragraph 3.
152 Joint Regulation, Article 11, paragraph 1.
153 Joint Regulation, Article 11, paragraph 2.
154 Joint Regulation, Article 12.
155 Joint Regulation, Article 13.
156 Op. cit., Article 14, paragraph 1.
157 Op. cit., Article 14, paragraph 2.
158 Op. cit., Article 15, paragraph 1.
159 Op. cit., Article 15, paragraph 2.
160 Op. cit., Article 15, paragraph 3.
161 Op. cit., Article 16.
162 Op. cit., Article 17.
163 Op. cit., Article 18.
164 Op. cit., Article 19.
165 Op. cit., Article 20.
166 Op. cit., Article 21, paragraph 1.
167 Op. cit., Article 21, paragraph 2.
168 Op. cit., Article 22, paragraphs 1 and 2.
169 Op. cit., Article 22, paragraph 3.
170 Op. cit., Article 23.
171 Op. cit., Article 24, paragraph 1.
172 Op. cit., Article 24, paragraph 2.
173 Op. cit., Article 24, paragraph 3.
174 Op. cit., Article 24, paragraph 4.
175 Op. cit., Article 24, paragraph 5.
176 Op. cit., Article 24, paragraph 6.
177 Annex 3, Part 3.9 — Joint Regulation, Article 25, paragraph 1.
178 I.e. Part 3.5.

179 Joint Regulation, Article 26.
180 Op. cit., Article 27, paragraph 1.
181 Op. cit., Article 27, paragraph 2.
182 Op. cit., Article 27, paragraph 3.
183 Op. cit., Article 28, paragraphs 1–2.
184 Ibid.
185 Op. cit., Article 28, paragraph 3.
186 Op. cit., Article 29, paragraph 1.
187 Op. cit., Article 29, paragraph 2.
188 Op. cit., Article 30.
189 Op. cit., Article 32.

Switzerland

# FROM FLOOD DEFENCE TO FLOOD MANAGEMENT: LEGAL AND INSTITUTIONAL ASPECTS OF SWISS FLOOD MANAGEMENT

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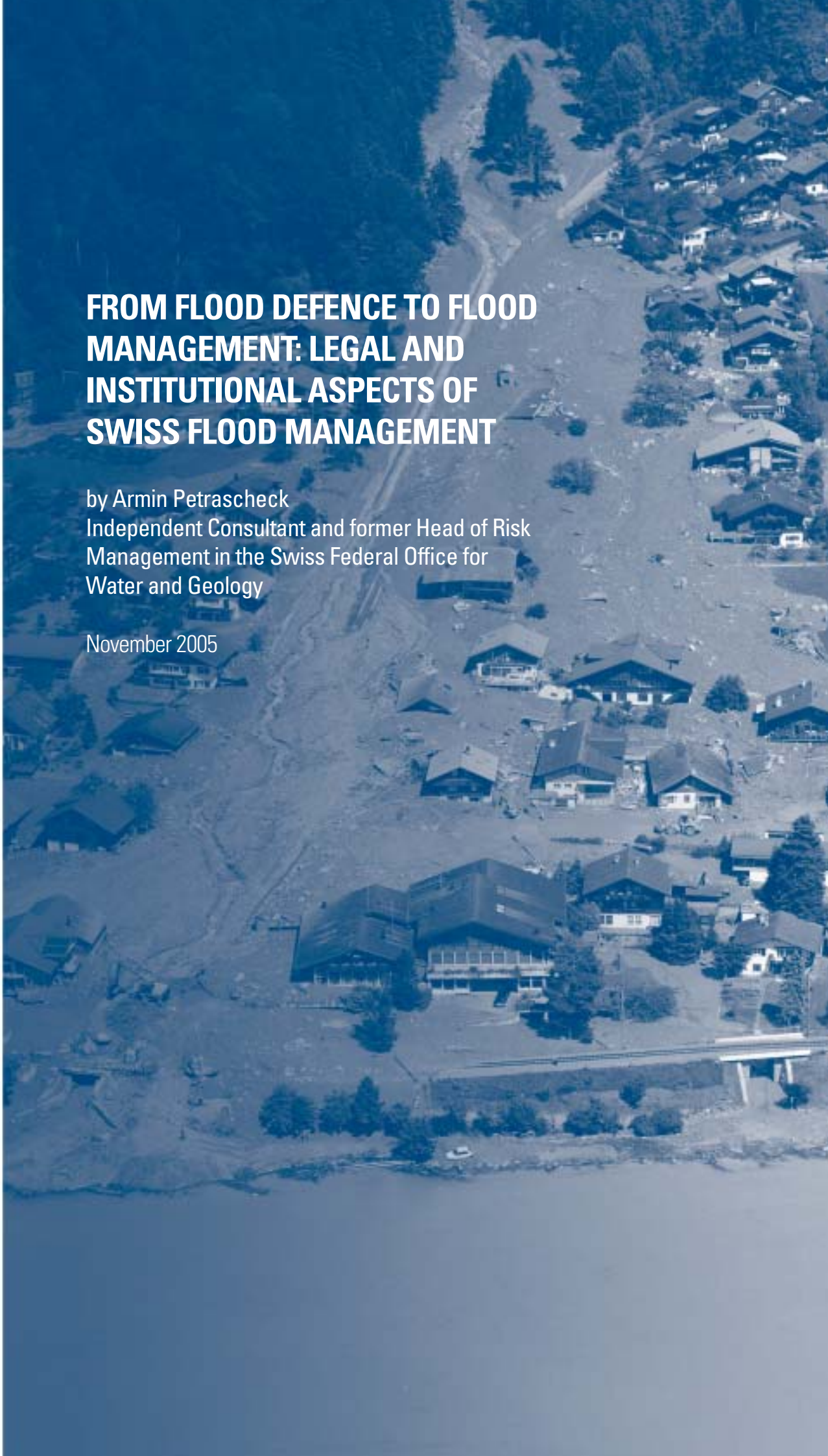
November 2005



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# FROM FLOOD DEFENCE TO FLOOD MANAGEMENT: LEGAL AND INSTITUTIONAL ASPECTS OF SWISS FLOOD MANAGEMENT

*by Armin Petrascheck*

## 1. Introduction

Safety is one of the basic goals of any society; this implies avoiding any loss of life, health risks and serious damage to property. However, existing risks can be blamed only partly on natural hazards, being mainly a result of economic and social development. The belief that natural hazards can be managed through structural means alone led in the past to an ill-considered land-use planning policy. To avoid this in future, any flood protection policy should not restrict itself to protecting what already exists, but must steer development in a direction that minimizes new risks. This means that flood protection must be embedded in the planning of economic development. Sustainable development, a major goal of the Swiss Federal Government, takes into account not only safety and other social aspects but also environmental concerns and economic factors in a balanced way.

This progression of a single objective policy (flood protection) to a multi-objective policy (sustainable development) is reflected in the motto "from flood defence to risk culture". It requires comprehensive measures, in particular spatial planning, flood defence structures, warning and emergency planning, insurance and, last but not least, the responsibility of the owners and their architects to ensure that constructions in hazardous areas are flood-proof.

The legal basis for this policy is in the Federal Law on Flood Protection, which states in article 3:

1. The cantons shall ensure flood protection first and foremost by maintaining the watercourses and through land-use planning measures.
2. If this is not enough, they shall take other necessary measures such as protective structures, containments, corrections, sediment and flood retention structures and all further preventive measures to prevent bed movements.
3. These measures must be assessed integrally, in terms of their interaction with measures in other areas.

It is clearly stated that watercourses and the existing protection works must be maintained to keep or exceed the present level of safety and that land-use planning has priority over the construction of new defence structures. Although the policy and legal background discussed here concern floods only, the same policy and an analogous legal background apply to other natural hazards.

Watercourses are a key element in nature, and any activity in or near the watercourse will have ecological impacts. Therefore, article 4 of the Federal Law defines the ecological constraints which have to be observed when executing flood protection measures:

- In the event of interference in watercourses, their natural course must be retained or restored whenever possible. Watercourses and banks must be structured such that:
  - They can provide a habitat for diverse flora and fauna;
  - The interdependencies between overground and underground watercourses are largely maintained;
  - Riparian vegetation adapted to the location can thrive;
- In built-up areas, the authorities may approve exceptions from the above.

The wording is exactly the same as in the Federal Law on Water Quality. This shows that a complex matter, like embedding flood protection into sustainable development, cannot be regulated by a single law, and interaction with several other laws must be observed.

## 2. Background

### 2.1 The landscape and the hazards

With a total surface area of 41 285 km$^2$ and a population of 7 165 000, Switzerland is commonly designated as a small State. Although the hilly and mountainous country of Switzerland is situated amid the Alps, it is characterized by more than just these mountains and their foothills, which account for 60 per cent of the total surface area.

The Jura, a hilly subalpine range, is situated in the north of the country and covers 10 per cent of the total surface area, and the Central Plateau, accounting for 30 per cent, stretches between the Jura and the Alps. In spite of its small area, Switzerland has an astonishingly varied climate, brought about by its situation at the point of intersection of the main climatic regions of Europe: the oceanic, the northern European, the Mediterranean and the continental. The annual average rainfall is 1500 mm and daily maxima can reach 250 mm.

Owing to the high percentage of mountain areas the settlements in the valleys are endangered not only by floods, but also by avalanches, landslides, rock fall and debris flows. Floods are predominantly of the dynamic type with high velocities developing strong destructive forces. Times of concentration are short and consequently so are warning times, but the structure of the landscape offers short escape routes since the flood plains are small in relation to the international level.

### 2.2 Economic aspects

The economic importance of this small country is apparent in, among other things, the Gross Domestic Product (GDP), which in 2000 amounted to US$ 34 428 per capita. The dense population and the economic strength create high damage potential, but also great capacity to cope. The average expected damage from natural disasters is about CHF 1 800 million a year, with damage to property amounting to CHF 1 000 million. The rest is attributed to loss of life as well as economic and ecological damage. At CHF 270 million a year, floods cause the greatest damage to property, but the number of casualties remains small (on average two flood victims a year).

The strong economy enables substantial investment in defence against natural hazards. The annual investment for prevention of flood damage is CHF 380 million; from this amount, one third comprises subsidies from the Federal Government and the rest is distributed to the cantons, the municipalities and private persons or companies. In total about 0.6 per cent of GDP is invested annually in protection from all natural hazards.

### 2.3 Political and legal aspects

In its political structure, Switzerland has evolved as a federal State composed of 26 states, known as cantons and half-cantons, which have retained a high degree of autonomy.

According to the Swiss Constitution the Federal Government is responsible only for tasks that are explicitly mentioned in the Constitution. Usually, federal laws set a framework. The 26 cantons

are responsible for its execution and have their own legislation within this framework. In relation to international standards the power and responsibility is assigned at a very low level, since the number of inhabitants of the cantons varies between 15 000 (Appenzell Innerrhoden) and 1 250 000 (Zürich). There is even greater variation in the size of the 2 800 municipalities, which may range from fewer than 100 up to 340 000 or more inhabitants (as in Zürich). The municipalities also enjoy considerable rights to self-government, which extend as far as fixing their own taxation at the community level. According to the decision levels (federal, cantonal, municipal), many issues must pass a plebiscite.

The great variety in landscape, size and cultural background — the canton Graubünden has around 186 000 inhabitants and three official languages — led to the system of direct democracy, which requires that those concerned have the power to influence decisions. This means that the decision is delegated to the corresponding level, which in many cases is the municipal. In between the administrative levels the subsidiary principle applies, which states that first the persons concerned, then the municipality, then the canton and finally the Federal Government have the responsibility to act. The federal laws set out the objectives and some constraints, while the corresponding cantonal laws define the implementation more precisely.

## 3. The role of the Federal Government

The Federal Law on Flood Protection is based on article 76 of the Constitution where it is stated: "Within the limits of its powers the Confederation shall ensure the moderate use and the protection of water resources, and fight against harmful effects of water." The Federal Law assigns the responsibility for flood control to the cantons, which in turn can assign this task to the municipalities or even to the riparian landowners. This means that the role of the Federal Government is to provide financial support and, as required, technical and scientific support. Financial support can be provided only if projects fulfil the objectives as given in chapter 1 of the Law. The subsidies cover on average 30 per cent of total costs and are dependent on the financial power of the canton and the municipality. The maximum is 45 per cent, which may exceptionally be raised to 65 per cent for restitution after flood disasters. The remaining costs are distributed between the canton (frequently 30 per cent) and the municipalities. No financial support is given in cases of constructions in known hazard areas.

Financial support of up to 70 per cent of the total costs is given for basic studies, particularly in hazard maps. By means of this high percentage the Federal Government intends to encourage the preparation of these important basic documents. If financial support is requested by the canton, projects must be approved by the Federal Office for Water and Geology (FOWG) before work on them is started. No financial support is given for maintenance works, although they have the highest priority. The basic idea is that federal support is necessary only for larger works which exceed the financial capacities of the municipalities concerned.

The Federal Government is obliged to give the financial subsidies if the planning is in accordance with the federal and cantonal laws; however, it has to adapt the payment to the financial resources available. Any decision on federal subsidies must be published and can be opposed by persons concerned or the acknowledged non-governmental organizations. The latter may be the case if environmental constraints are not sufficiently respected. Owing to the long participatory planning process objections are rare.

## 4. The role of the cantons and municipalities

A great variety of cantonal laws exists. However, the rules may be generalized in the following way:

The cantons are the executing agencies. Even if the municipalities are responsible, the technical knowledge will be supplied by the canton. The initiative for protection projects must come from the municipalities. A contribution, not always only in financial terms, is always requested from the society concerned. The municipalities are responsible for the maintenance. The canton will decide on priorities according to its financial means. The hazard maps, which are now established systematically, provide objective criteria for the need for the measures. The cantons apply for federal subsidies.

Technical planning is done by private consulting companies, mandated by the municipalities, and is revised by the cantonal and federal authorities. Larger projects must be approved by popular voting, depending on the financial competences of the cantonal or municipal authorities. The local population's identifying with the project is an important factor for its long-term success.

The role of the municipalities is important since they have the authority to carry out municipal spatial planning. Flood protection measures are closely related to spatial planning and environmental concerns.

Most of the cantons have established commissions for natural hazards, which coordinate the activities of the different actors and approve hazard maps and building codes established by the municipalities.

## 5. The elements of flood management policy

The various elements of the Swiss flood management policy have different legal backgrounds. The following indicates the importance of the various elements in the process of risk management.

### 5.1 Hazard maps (knowledge of the hazard)

No meaningful risk management is possible without knowledge of the hazards. This knowledge is visualized in the form of hazard maps. The legal background is on the one hand in the Federal Law on Land-Use Planning (RPG), which requires that the cantons outline the areas endangered by natural hazards, and on the other by the Federal Law on Flood Control (WBG) and the corresponding Ordinance on Flood Control (WBV), which defines the conditions for subsidizing the creation of hazard maps and other elements (register of events, maps of phenomena, hydrologic and hydraulic studies) necessary to assess the hazards correctly. According to how important it is to have an accurate assessment these basic documents are subsidized by up to 70 per cent. The federal offices have established recommendations on the content and on the layout of hazard maps. The maps are drawn up by the cantons (overview maps) or the municipalities (detailed maps).

### 5.2 Land-use planning and construction rules (avoid hazards and minimize risk)

Areas endangered by natural hazards must be respected. No construction zones should be established in areas endangered by substantial hazards. In cases of medium or low risk appropriate

construction (waterproofing) should be selected. The RPG establishes the general objectives. The most important instrument is the cantonal land-use plan where the objectives are quantified and the municipalities are obliged to respect these objectives in their municipal land-use plans. The landowners are obliged to respect the municipal plans. Rules for appropriate construction are laid down in municipal building regulations. There is no absolute interdiction of construction in hazard zones since hazards and type of construction may vary and may be adapted; however, it is strongly recommended that such areas be avoided. Permission is given only exceptionally, if the building is safe. It is the task of spatial planning to coordinate the space requirements of all sectors by weighing their interests.

Another task of the cantonal and municipal land-use plans is to reserve the space requirements of the watercourses, the necessary retention areas and the space needed for construction of protection measures.

### 5.3 Environmental constraints (respect nature)

Rivers have many functions besides drainage. These functions, in particular the interference with groundwater and the ecological role as a habitat for many species, must be preserved, as must the quality of water. The regulations are laid down in the Federal Laws on Environmental Protection, on Water Quality and on Fisheries. Compared with other laws, the federal legislation for environmental issues leaves less space for cantonal particularities. On agricultural land it is forbidden to lay watercourses into culverts and even in towns there is a tendency to open up brooks rather than lay in pipes. Subsidies may be given for restoring natural conditions and there is an obligation to improve as far as possible the ecological status in cases of river training measures for flood control.

The Federal Office for Water and Geology has established criteria for the minimum space needed for watercourses in order to maintain the different ecological and economic functions.

Rivers are the backbone of the landscape. Their appearance, and in particular that of the riparian vegetation, must be maintained or restored after construction works. The Federal Law for the Protection of Nature and Landscape has an inventory where the objects of national importance in alluvial plains are listed. In those areas even flood control measures are possible only to a very limited degree.

### 5.4 Protection works

If settlements are already situated in hazard areas, protection by technical means is often necessary. In the first place, retention measures are emphasized and protection by forests is important with regard to all natural hazards. To minimize impacts, possible failure points must be investigated. The level of protection is adapted to the value of material assets in the flood plain, meaning that a higher protection level is demanded for densely populated areas than for agricultural or other areas. To assure the long-term effect, maintenance must be guaranteed and spatial planning regulations should preserve the space for the river and impede new flood plain encroachment which jeopardizes the effects of the flood control measures. The corresponding legal background is laid down in the federal and cantonal laws for flood protection, and for other natural hazards in the Law on Forests. The Law on Forests also regulates the conditions of clearing if this is necessary for flood control measures. The subsidies must be given in compliance with the regulations of the Federal Law for Financial Aid and Compensation.

The Federal Office for Water and Geology has established guidelines for the execution of protection works. However, the cantons are free to apply their own methods, as long as the objectives are achieved.

### 5.5 Emergency planning

Since any measure can fail, emergency planning for floods higher than the designated level must be prepared. Emergency planning involves police, fire brigade, health care services and technical units. The Confederation has established the legislative framework for the protection of national and regional cultural property by the Federal Law on the Civil Protection System and Protection and Support Service. The cantons implement the necessary measures according to federal provisions in cooperation with cantonal and municipal institutions and the private sector. In recent years flood protection planning has included the coordination of emergency operations with all services concerned.

### 5.6 Insurance

Risk acceptance includes the acceptance of damage. When a disaster occurs the damage may exceed the savings of private persons, households or property owners, in particular when the house is destroyed. Therefore, in most of the cantons insurance of buildings is mandatory. In 19 of the 26 cantons the insurance must be arranged through an insurance company owned by the canton. This system has existed for about 100 years and has proved efficient, since the monopoly insurance companies cover prevention too and fees are lower than those charged by the non-monopoly insurers. All natural hazards, except earthquake, are insured.

In fact the legal obligation to be insured has minor effect. When giving loans on houses, banks demand insurance, and since almost every house purchase involves a loan the effect is that all houses are insured. In general, Swiss people favour insurance. Contents are also insured in more than 80 per cent of households, although no obligation whatsoever exists.

## 6. Regional and international cooperation

The Federal Government has a supervisory function, which involves coordinating the protection works of the independent cantons. It can prohibit or even remove works which have negative effects on downstream cantons. So far it has not been necessary to apply these regulations, since coordination and early joint planning are customary. Since federal subsidies are demanded in most cases, the federal authorities will be involved at an early stage. The large-scale common protection works like the Linth Correction, the correction of the lakes in the Jura and the regulation of the larger lakes date back to the nineteenth century in most cases. Their financing and operation was regulated by agreements between the cantons and the Federal Government. Several of these works must be renewed in the coming decades. In the planning phase, new agreements are negotiated, since distribution of costs and benefits changed during the century following the first construction.

On the international level the federal authorities act on behalf of the cantons. Common issues are negotiated in the respective river commissions, such as the International Commission for the Protection of the Rhine (ICPR), the International Commission for the Protection of Lake Constance and the Commission for Lake Maggiore. Cooperation for water management and flood control is based on mutual agreement. In most cases the cantons concerned are members of the respective commissions. Smaller correction works along the borderlines are negotiated directly between

the cantons and their regional partners. Formal international treaties regulate the construction and operation of specific works, mostly for hydropower plants.

A special case is the River Rhine along the border between Austria and Switzerland; there an international treaty has existed since 1892. Since the border between the States was the centre line of the river, the protection works, which also included a correction of the river course, have been executed jointly. To this day the Commission decides in annual meetings on maintenance works, improvements and cost sharing.

## 7. Summary

The Swiss system aims to cover all aspects of risk management. This starts by avoiding hazards and continues with protection and rescue, including insurance to supply the financial resources for a new start after a disaster. This complete system involves many different laws on federal and cantonal levels. It is further complicated by the obligation to observe environmental constraints. Despite the complex legal situation, the system is working well, since the responsibilities are delegated to the lowest applicable political level. This ensures a participation of the population concerned from the beginning of the planning process and in the different phases of the decision-making process.

**Federal Law on Flood Control** (Wasserbaugesetz, WBG; SR 721.100) and supplemental **Ordinance on Flood Control** (Wasserbauverordnung, WBV; SR 721.100.1)
These occupy centre stage among federal legal tasks concerning flood control. The federal legal outlook can be summarized as follows: Legislative attention focuses primarily on land use which recognizes existing natural hazards and maintains (or creates) the necessary buffer areas. Thus, recognized hazards should not be summarily removed but imbedded in a global concept for the entire area.

**Federal Law on the Forests** (Waldgesetz WaG; SR 921.0)
The law enacted a ban on clearing in principle. Waivers are granted only under strict conditions, especially if the envisioned structure or facility is confined to the location, and adequate compensation areas must be established. It emphasises the protective function of forests and according to article 19, the Federal Government grants subsidies for the protection against avalanches, landslides, rock fall and torrential floods. The same principles as in the Federal Law on Flood Control are applied.

**Federal Law on Land-Use Planning** (Raumplanungsgesetz RPG SR 700)
According to article 6c, land which is endangered by substantial hazards must be earmarked and must be considered as not suitable, or less suitable, as a building area. Therefore, planning of flood control is a step in establishing a land-use plan. It has to be coordinated with space requirements of other sectors by weighing interests. Among other things, planners must consider the river's or stream's space requirements for flood control and to guarantee ecological functioning. A waiver permit must be obtained for buildings outside construction zones. Engineers must prove that the measure is bound to the location, and a preponderance of interests must not oppose it.

**Federal Law on Water Quality** (Gewässerschutzgesetz GSchG SR 814.20)
Hydraulic engineering projects must not cause water pollution. The implementation of such projects is only conditionally possible in water protection areas and groundwater protection zones. Hydraulic flood control measures need a legal permit for water quality control protection, in particular endangered water protection areas. The law basically forbids rivers or streams being laid into culverts. Extraction of sand, gravel and other material requires a federal law permit (it cannot be granted if the sediment regime in rivers or streams is adversely affected). The water quality law (like the hydraulic engineering law) requires maintenance or restoration of natural rivers.

**Federal Law on Fisheries** (Bundesgesetz zur Fischerei BGF SR 923)
Interventions in rivers, their discharge regime, or their course as well as in bank and bed areas require a legal fishery permit (to the extent that no permit is required in connection with the water quality law).

**Federal Law on Protection of Nature and Landscape** (Natur- und Heimatschutzgesetz NHG SR 451)
Objects listed as being of national importance in the federal inventory of alluvial zones are of special importance. They are to be maintained undiminished (thus flood-control measures are only permitted in a restricted manner). In all other protection areas, according to the NHG, unavoidable interventions require compensation or restoration measures. Ecological compensation is also allowed for in intensively used areas (e.g., by restoring riparian vegetation) and by identifying ecological buffer zones to protect biotopes.

**Law for the Protection of the Population** (Bundesgesetz über den Bevölkerungsschutz und den Zivilschutz BZG SR 520.1)
This law regulates the cooperation between the federal, regional and local authorities to protect the population in cases of catastrophes, emergency situations and armed conflicts.

**Federal Law for the Supervision of Private Insurers** (Bundesgesetz betreffend die Aufsicht über die privaten Versicherungseinrichtungen VAG SR 961.01)
In article 38 it is stated that insurance contracts must cover both the risk of fire and natural hazards. This contributes to the fact that over 95 per cent of the buildings are insured against flooding and other natural hazards.

**Federal Law on Financial Aid and Compensation** (Bundesgesetz über Finanzhilfen und Abgeltungen SUG SR 616.1)
This law regulates the procedures for obtaining subsidies and other financial aid from federal authorities.

### Other interfaces

There are also interfaces with other concerns of federal law. Those especially worth mentioning are:

- The Decree on Security Precautions: for pipeline facilities (in connection with safe distances);
- The Decree on Security of Dam Facilities (Stauanlagenverordnung StaV): It regulates the standards and the supervision of all dams.

A systematic collection of the Swiss laws are available in German as "Systematische Rechtssammlung (SR)" at http://www.admin.ch/ch/index.de.html or in French as "recueile systématique" at http://www.admin.ch/ch/index.fr.html.

On the cantonal level in most cases corresponding cantonal laws exist. Since the federal law provides only a framework, the cantonal laws are more detailed. As an example, the laws of the Aargau canton can be found in the "Systematische Sammlung des Aargauischen Rechts (SAR)" at http://www.ag.ch/sar/index.htm?/sar/sar.htm (German language only).