

REVISTA  
**DIREITO SEM  
FRONTEIRAS**

II. DOUTRINA INTERNACIONAL

**1**

**THE IMPORTANCE OF INTEGRATING FLOOD RISK MANAGEMENT  
INTO WATER GOVERNANCE: COMPARATIVE ANALYSIS OF THE  
LEGAL FRAMEWORK IN GERMANY AND BRAZIL**

**A IMPORTÂNCIA DE INTEGRAR A GESTÃO DO RISCO DE  
INUNDAÇÕES COM A GOVERNANÇA DA ÁGUA: ANÁLISE  
COMPARATIVA DO QUADRO JURÍDICO DA ALEMANHA E DO BRASIL**

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**Como citar este artigo:**

SIEBERT, Daniela H. **The importance of integrating flood risk management into water governance: Comparative analysis of the legal framework in Germany and Brazil** – Revista Direito Sem Fronteiras – Universidade Estadual do Oeste do Paraná. Foz do Iguaçu. Jul/Dez. 2017; v. 1 (2): 81-90.

## ABSTRACT

Extreme flood events have become recurrent in Brazil and Germany. The spring-summer of 2013 in Germany and the summer of 2013-2014 in Brazil are examples of great negative impacts. Many deaths and significant economic losses have led authorities to improve policies and review strategies to minimize adverse effects of floods. Despite having some similarities regarding political systems (federalism) and responsibilities among the different levels of government, the analysis reveals that authorities have chosen distinct approaches to tackle flood issues in both countries. This study seeks to assess the current legal frameworks by focusing on regulatory instruments of both countries and their capacity for coping with floods. The comparison aims to highlight points of convergence and divergence as well as recognize gaps and opportunities to improve Flood Risk Policy in Brazil and Germany. The investigation, using the deductive method, involves a literature review and explores the legal framework in federal level by considering the concept of Integrated Flood Management (IFM). Besides, the research alludes to Minas Gerais and Baden Württemberg legislation to exemplify flood policy in state level.

**Keywords:** Brazil. Flood regulatory instruments. Flood legal framework. Germany. integrated flood management.

## RESUMO

Eventos de inundações extremas têm se tornado recorrentes no Brasil e na Alemanha. A primavera-verão de 2013 na Alemanha e o verão de 2013-2014 no Brasil são exemplos de grandes impactos negativos. Um grande número de mortes e perdas econômicas significantes têm levado as autoridades a melhorar as políticas e rever estratégias para minimizar os efeitos adversos das inundações. Apesar de haver algumas similaridades a respeito dos sistemas políticos (federalismo) e das responsabilidades entre os diferentes níveis de governo, a análise revela que as autoridades têm escolhido abordagens distintas para lidar com os problemas de inundação em ambos os países. Este estudo visa avaliar os quadros jurídicos atuais, focando nos instrumentos regulatórios de ambos os países e suas capacidades de lidar com as inundações. A comparação visa ressaltar os pontos de convergência e de divergência, bem como identificar lacunas e oportunidades de melhorar as Políticas de Risco de Inundação no Brasil e na Alemanha. A investigação, usando o método dedutivo, envolve uma revisão literária e explora o quadro jurídico em nível federal, considerando o conceito de Gestão Integrada de Inundações (GII, em inglês IFM). Além disso, a pesquisa refere-se à legislação de Minas Gerais e Baden Württemberg para exemplificar as políticas de inundação em nível estadual.

**Palavras-chave:** Brasil. Instrumentos regulatórios de inundação. Quadro jurídico de inundação. Alemanha.

## INTRODUCTION

Germany and Brazil as other parts of the globe have suffered the effects of disruption of the hydrological systems. A combination of physical and societal processes have been intensifying flood events as happened during the spring-summer of 2013 in Germany and the summer of 2013-2014 in Brazil and therefore led authorities to improve flood policy in both countries. As federal republics, duties regarding flood risk management are divided by law among Federal, State and Local Government. Despite having similarities concerning competence related to civil defence, water resources management as well as environmental protection policies, approaches and strategies to tackle flood issues are diverse.

Being a member of the European Union, Germany follows the European Directive on the Assessment and Management of Flood Risks (2007/60/EC) which prioritizes maintenance of natural balance. The idea to “work with nature, rather than against it” (EC, 2011) aims to avoid new physical modifications of water bodies and it is called Integrated Flood Approach (IFM). In contrast, the Brazilian programme established by the Brazilian National Policy of Protection and Civil Defence (Federal Law n. 12.608/2012) has a strong focus on Flood Defence System which enhances the risk protection.

In the following sections, this study briefly reviews the new tendency to replace fragmented approaches towards flood risk reduction with a more holistic view. The second part embraces an overview of German legal provisions and regulatory instruments. It highlights the adoption of the new approach and its particular characteristics as well as suggests opportunities to improve significant points. Subsequently a survey of Brazilian legislation reveals a different way which includes another understanding of the phenomenon of flooding. This comprehension plays a central role to determine the paradigm in which the policy is based on.

Intending to contribute to current debates concerning flood risk management this research underlines points of convergence and divergence between the policy programmes from Brazil and Germany. By analyzing the legislation and following the IFM concept as a guideline, the study seeks to enhance knowledge and capacity for coping with floods.

## METHODOLOGY

The research embraces a multi-disciplinary literature review and explores federal and state legal and policy documents, with the purpose of identifying connections among different policy agendas and their regulatory instruments. The analysis of legislation has been chosen considering the vital role of the law to implement policies in different levels of government. Authorities must follow the legal provisions to make decisions and plan each step of flood management. Furthermore, regulatory instruments are likewise crucial to establish legal limits and prohibitions which may cover interrelated policies.

The investigation, using deductive method, takes into account the IFM

concept. IFM is an initiative developed by the Global Water Partnership (GWP) and World Meteorological Organization (WMO). The IFM's view recognizes flooding as a natural phenomenon with beneficial impacts which can never be fully controlled. This programme requests for an interaction among various disciplines, government departments and also sectors of society (APFM, 2009).

The selection of Brazil and Germany is justified by their similarities in the distribution of competences among levels of government, particularly regarding policies correlated to flood management. The research focuses on inland floods, especially river floods from which both countries have been suffering in the past years. Legislations from Minas Gerais State in Brazil and Baden Württemberg in Germany were analyzed to complement the study and exemplify flood risk management in state level.

## **1. FLOOD RISK APPROACHES**

### **1.1 Flood risk: management or protection?**

Over the past two decades, a shift in the way to deal with flood risk has emerged. The recognition of floods as natural phenomenon has introduced the distinction between hydrological and damaging floods: "damaging floods result from a combination of physical and societal processes." (MERZ et al., 2010, p.509). The new interpretation has been completing or replacing the traditional flood protection approach.

The illusion of complete safety against flood has been substituted for the idea of promoting nature-based options along river catchments. Although technical flood defence is important to reduce extreme flooding, it is only effective up to certain return periods. The residual risk must be considered especially for communities living downstream (GARRELTS; LANGE, 2011, p. 200-209).

Recognized as a cost-effective way to deal with large uncertainty regarding flood events, the emerging IFM approach emphasizes non-structural measures. (EC, 2011) This new approach intends to protect people from flooding through effective planning and management of urban development. Different instruments are coordinated and may maximize the retention of water in soils, protect wetlands, and use temporary storage areas, for example (APFM, 2009).

### **1.2 German Flood Approach**

After recurrent tragic events over the years, the European Union has modified the flood risk policy by reforming the flood protection approach. A comprehensive plan based on conservation of hydrologic systems was introduced by the Directive 2007/60/EC in order to reduce adverse consequences of flooding for human health, environment, cultural heritage and economic activities. The objective of the Flood Directive is to combine a variety of actions, including planning of developments, land use management, flood warning, community involvement and new structures

to achieve the aims (EC, 2011). There are three policy implementation steps: preliminary flood risk assessment, flood hazard maps and flood risk maps. The Directive requires that Member States consider local and regional circumstances as well as follow standards and deadlines. (EU, 2007)

In Germany, the Flood Control Act entered into force in 2005 and introduced flood protection plans as new policy instrument. Furthermore, this act designated a new zoning category for areas likely to be flooded and for the first time in Germany introduced a prohibition of planning new buildings in flood plain areas. (GARRELTS; LANGE, 2011, p. 200-209)

Still, only in March, 2010, with the transposition of the Directive 2007/60/EC into national law a “management approach” was brought in legislation. (HEINTZ et al, 2012, p. 135-156). Germany has been adopting a range of measures and concepts from the EU Directive. However, the main focus of flood policy is management of riverine and coastal flooding as settled by the Act to Improve Preventive Flood Control.

With regards to competences to implement the new approach of flood risk management, it is important to clarify that federal government legislates on water rights in general (Basic law, art. 74) and both Federation and Federal States (Länder) have legislative powers regarding water resources. Federal States are also responsible for rules related to the regulation of flood management. Flood risk assessment, planning and management are examples of regulation provided by the State Government. However, there are basic management rules which were established by the Federal Water Act. At a regional and municipal level, communities are in charge of authorizing specific projects in their areas which have influence in flood policy.

The new basis of the German flood risk management inserted in 2009 promoted revisions in German legislation. In terms of regulatory instruments, there is a great number of restrictions to use floodplain, for example. The HQ100 standard defined the floodplain areas which are protected. It means that Germany’s flood managers intend to provide a particular level of protection by banning land use in HQ100 areas (areas which frequent events that occur once every 100 years). According to the Federal Water Act (Wasserhaushaltsgesetz - WHG, 2009) it is forbidden in flood plain areas:

construction of new buildings or modification of old ones as well as construction of walls or other structural measures to control flood. Planting trees and garden is not allowed if the process does not adhere to either the flood management plans, objectives or flood prevention measures.

Another limitation of land use embraces riparian forest and wetland which are considered as protected areas and cannot be used. Moreover, the German Land Use Planning Act (Raumordnungsgesetz – ROG, 2008) requires that development plans must include retention areas (“polders”). The provision target is to control the extension of river floods mainly by protecting or recovering wetlands, retention areas and relief areas. Federal Building Code and Federal Soil Protection act has

restrictions regarding maintenance and restoration of natural process as infiltration and functional capacity of soils.

The regulatory instruments pursued by Federal States are similar. Baden Württemberg, for instance, has indicated precisely in its State Water Act (Wassergesetz für Baden-Württemberg - WG, 2013) which areas must be protected as floodplain. The building code has also restrictions concerning storage of toxics/chemicals substances and disposal of rainwater, for example. Moreover, it establishes that building design projects are only approved if they incorporate flood adaptation measures. At state level the Soil Protection Law (Landes-Bodenschutz- und Altlastengesetz – LbodSchAG, 2004) also presents guidelines to promote sealed areas reduction as well.

### **1.3 Brazilian Flood Approach**

The tragic effects of floods have not been avoided by preventive measures despite the Federal Government investment between 2007 and 2012 of R\$ 27,6 billion (around US\$ 11,8 billion) in disaster prevention. (Brazilian Ministry of Planning, 2012) The National Policy of Protection and Civil Defence, introduced in 2012 by the Federal Law n. 12.608, determines the adoption of a systemic approach of prevention, mitigation, preparedness, response and recovery as guidelines. However, the analysis of responsibilities of federal government, states and municipalities as well as other provisions shows that the policy is based on the former traditional defence approach (“fighting against flood”) (MERZ et al, 2010, p. 509-527) and prioritizes an implementation of emergency planning (proactive pre-incident activities) and the recovery is based on structural measures.

In Brazil there is no specific policy to deal with floods and there are few flood measures either focused on degradation of water resources or based on environmental options. For instance, the Brazilian National Water Resources Law (Law n. 9.433/97) alludes the term “defence” against hydrological events and determines that water governance embraces management and protection of only surface and groundwater resources only (following the Federal Constitution art.26,I and art.20, III). This idea does not follow the systematic approach in which the policy is inspired. Consequently, the notion of IFM approach is not yet envisaged by Brazilian authorities even though the National Policy of Protection and Civil Defence has as guideline the integration of policy agendas.

The National Policy of Protection and Civil Defence has among its objectives the idea of developing sustainable urbanization. However, policy instruments are not clearly defined to achieve such objectives. Regarding urban planning, for instance, only the municipalities which are registered as municipalities susceptible (areas where events are frequent) to landslides, flash floods, geological or hydrological processes must plan measures for preventive intervention and relocation of the residents from risk areas. Draining areas to prevent and mitigate the impacts of natural disasters is also required from these municipalities. In addition, only municipalities interested in enlargement of their urban areas must delimitate

risk areas in order to promote a special control of natural disasters. Another rule involves contents of the master plan which must be created by municipalities as well and it must consider points and priorities from water resources plans.

Besides, according to the Law n.12.608/12, municipalities are responsible for controlling and monitoring of risk areas and in conjunction with the State Government must identify areas and prepare risk maps. The same law has promoted some changes in the National Land Use Law (Law n.6766/1979). The most important regulation is that municipalities cannot approve allotment projects or new buildings in risk areas (which are defined as non-buildable in the master plan). It is noticeable that the most of the standards and deadlines for implementation measures must be established by ordinances and other laws which are different in Germany. Building regulation in Brazil is defined by municipalities and must follow the general terms of the Law n 10.257/01 which determines rules regarding urban policy. That Law recommends that municipalities stimulates the adoption of eco-friendly technologies with a especial purpose of impact reduction on natural resources as well as a particular instrument to reduce sealed areas. The National Law of Forest Protection (Lei n. 12.651/12) includes as regulatory instrument the requirement of identification of risk areas in the process of environmental licence of settlements in urban areas.

Minas Gerais, as Baden Württemberg, has policies which adhere to national police guidelines as civil defence, water governance and environmental protection policies. Regarding natural events and their effects, since 2005 there has been a specific policy to prevent and combat disasters resulting from heavy rains and other measures. Still, the legislator has not established particular instruments to face the problem. Environmental impacts have been mentioned but the approach is based on “protection against floods” as the federal law concerning civil defence.

## CONCLUSIONS

The implementation of Integrated Flood Management (IFM) represents one essential step to build a culture of disaster prevention and resilience. Designed to be a long term policy based on nature protection IFM involves a multidisciplinary approach with coordination among various levels of administration. In order to demonstrate how Germany has introduced this approach and the importance of the adaptation of the current approach in Brazil, the study embraces an investigation of legal framework and regulatory instruments. These rules must cover not only planning measures as floodplain zoning but also disaster response duties as defined institutions responsible for weather forecasting and warning services. The investigation has identified gaps regarding political commitment and balance of responsibilities. The study intends to contribute to the improvement of policy programmes from Brazil and Germany as well as inspire other countries which seek to enhance knowledge and capacity to cope with floods.

By introducing a specific and long term policy to manage floods based on IFM, Germany has been achieving satisfactory results concerning flood management

in conjunction with safety and nature conservation. It is possible to infer that Federal States are notably responsible for the implementation of flood policy. The analysis has revealed that regulation of flood management puts Federal States in an important position to determine the success of policy implementation. The choice and arrangement of measures and instruments together with communication strategies are crucial to reach the goals. Moreover, the acceptance of the EU Directive is quite high in Germany. Despite the policy approach is straightforward and regulatory instruments well established. States have found different ways to manage floods. The review has indicated that coordination between states, communication and stakeholders' participation are the main challenges for Germany. (HEINTZ et al, 2012, p. 135-156)

In relation to Brazil, the investigation has demonstrated that Brazilian authorities are not so familiar with new technologies and instruments concerning flood management. Compared to Germany, Brazilian regulatory instruments do not embrace the most obvious problems. One important challenge for Brazilian authorities is to fill the gap related to the role of water authority in flood management. In order to fill this gap, it is also necessary to redefine the concept of floods by understanding hydrologic systems and natural phenomena. Another crucial factor involves the balance of competences among administrative borders municipalities in Brazil have different characteristics and dimensions and a great part of them cannot implement by themselves the range of measures and instruments which are established in the current legislation. In order to overcome issues related to funds and skilled professionals, cooperation across administrative borders are essential.

## REFERENCES

Associated Programme on Flood Management - APFM (2006). **Legal and Institutional Aspects of Integrated Flood Management**. World Meteorological Organization-No. 997, Geneva, Switzerland.

Associated Programme on Flood Management - APFM (2009). **Integrated Flood Management Concept Paper**. World Meteorological Organization-No. 1047, Geneva, Switzerland.

Baden-Württemberg (2013). Wassergesetz für Baden-Württemberg – WG. **State Law Gazette** (GBl), p.389, dated 03 December 2013.

Baden-Württemberg (2004). Landes-Bodenschutz- und Altlastengesetz - LBodSchAG. **State Law Gazette** (GBl), p.908, dated 14 December 2004.

Brasil (1988). **Federal Constitution**. Senado Federal. *Federal Law Gazette*. Section 1, p.1, dated 05 October 2013.

Brasil (1997). Lei n. 9.433. **Federal Law Gazette**. Section 1, p.470, dated 09 January 1997.

Brasil (2012). Lei n. 12.608/2012. **Federal Law Gazette**. Section 1, p.1, dated 11 April 2012.

Brasil (1979). Lei n. 6766 / 1979. **Coleção de Leis do Brasil**, vol. 7, p. 172.

Brasil (2012). Lei n. 12.651/2012. **Federal Law Gazette**. Section 1, p.1, dated 28 May 2012.

Brazilian Ministry of Planning (Ministério de Planejamento) (2012). **Lançado Plano Nacional para prevenção de desastres naturais**. In: <http://www.pac.gov.br/noticia/c1619715>.

Bundesrepublik Deutschland (1949). Grundgesetz. **Federal Law Gazette**, dated 23 May 1949.

Bundesrepublik Deutschland (2009). Wasserhaushaltsgesetz – WHG. **Federal Law Gazette** (BGBl.), I p. 2585, dated 31. Juli 2009.

Bundesrepublik Deutschland (2008). Raumordnungsgesetz – ROG. **Federal Law Gazette** (BGBl.), I p. 2986, dated 22 Dezember 2008.

Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit - BMUB (2005). New Flood Control Act enters into force. Preventive flood protection is improved significantly, **Press statement** n. 111, May 9th 2005.

Fliervoet, J.M.; Van den Born, R.J.G.; Smits, A.J.M.; Knippenberg, L. (2013). Combining safety and nature: A multi-stakeholder perspective on integrated floodplain management. **Journal of Environmental Management**, 128, 1033-042.

Garrelts, H.; Lange, H. (2011). Path Dependencies and Path Change in Complex Fields of Action: Climate Adaptation Policies in Germany in the Realm of Flood Risk Management. **Ambio**, 40, 200–209.

Heintz, M.C.; Hagemeyer-Klose, M.; Wagner, K. (2012). Towards a Risk Governance Culture in Flood Policy – Findings from the Implementation of the “Flood Directive” in Germany. **Water**, 4, 135-156.

Merz, B.; Hall, J.; Disse, M.; Schumann, A. (2010). Fluvial flood risk management in a changing world. **Natural Hazards and Earth System Sciences**, 10, 509-527.

Minas Gerais (2005). Lei n. 15660. **State Law Gazette**. Section 1, p.1, dated 7 July 2005.

The European Commission (2011). **Towards better environmental options in flood risk management**. Directorate-General Environment D.1, 236452, Brussels.

The European Parliament and the Council of the European Union (2007). Directive

2007/60/EC of the European Parliament and the Council of 23 October 2007 on the assessment and management of flood risks. **Off. J. Eur. Union**, L288/27-L288/34. Umwelt Bundes Amt – UBA (2010). **Water Resource Management in Germany (Part 1 – Fundamentals)**, UBA, Dessau-Roßlau.

Artigo recebido em: 26/04/2017

Artigo aceito em: 16/06/2017