Geography Papers
2017, 63
DOI: http://dx.doi.org/10.6018/geografia/2017/294901 ISSN: 1989-4627

INTEGRATED FLOOD RISK MANAGEMENT AND LOCAL COMMUNITIES IN PORTUGAL AND BRAZIL: THEORETICAL CONTRIBUTIONS

Francisco da Silva Costa[1] *& Márcia Aparecida Silva Pimentel*[2]
University of Minho and Federal of do Pará

1. INTRODUCTION

Absolute flood protection is a myth. There will always be some residual risks. It is in this context that the concept of "Acceptable Risk" arises as the level of loss that a society or community considers acceptable according to the existing social conditions, economic, political, cultural, technical and environmental conditions. Acceptable risk implies the need for integrated flood risk management rather than a fragmented, difficult-to-reach approach where municipal management suffers from a lack of technical capacity, funding or resources (COSTA *et al.*, 2014). Integrated flood risk management is holistic in approach, strategic in content and collaborative in nature (SHRESTHA, CHAPAGAIN, THAPA, 2011) and is now widely accepted as the best way to ensure that water management is managed in a sustainable manner. Integrated flood risk management requires a pro-active paradigm shift to ensure the effective integration of risk reduction concerns into sustainable development policies Successful management of flood risk areas depends on the selection Of appropriate measures based on the physical and morphological characteristics of the affected areas, economic and social conditions, political and environmental conditioning, and the planning of this same risk (SHRESTHA, 2008). In fact, risk reduction is one of the main targets in flood risk management and can be addressed through prevention strategies that some authors frame under the "culture of prevention" or even the "flood prevention law" (ARAGÃO, 2009; CEDOUA, 2007).

Based on international reference documents and the legislation of Portugal and Brazil, we tested a theoretical framework on flood risk management and local communities in these two countries. It should be noted that in the conceptual approach developed by national norms and regulations of the two countries, some terms related to the scale and classification of the occurrence (LOURENÇO, 2015), such as risk, accident, catastrophe and disaster, are omitted and imprecise.

2. THE MANAGEMENT OF THE FLOOD RISK AND CIVIL PROTECTION IN PORTUGAL AND BRAZIL - DISCUSSION AND CONCLUSIONS

Portugal, in signing the Hyogo Declaration, has committed itself to developing a risk prevention culture (EIRD/ONU, 2007) based on innovative approaches that include: the development of local and community strategies (GPDRR / UN, 2009). The Hyogo Framework for Action sets out guiding principles and practices that can enhance the resilience of communities vulnerable to disasters in the context of sustainable development, including through the identification, assessment and monitoring of risks through scientific development and technical capacity building. Observing, predicting, modeling and mapping natural hazards, and increasing the responsiveness of early warning systems, from a strong institutional basis of implementation, from national to local scales (TAVARES, 2010). This risk management training should use innovative approaches (GPDRR / UN, 2009) that include, in particular: (i) new urban space references; (ii) the cost / benefit analysis of the implemented solutions; (iii) the development of local, community-based strategies; (iv) the development of early warning or the implementation of structural safety benchmarks, particularly in schools and hospitals; (v) the

[1] Departamento de Geografia, Centro de Estudos em Geografia e Ordenamento do Território, Universidade do Minho Campus de Azurém\ Guimarães\Portugal. costafs@geografia.uminho.pt.
[2] Universidade Federal do Pará, Grupo de Pesquisa Paisagem e Planejamento Ambiental (GEPPAM). Faculdade de Geografia, Rua Augusto Corrêa, 01, Belém/Pará/Brasil. mapimentel@ufpa.br.

application of measures conditioning the use and occupation of the soil. The aim is to implement actions not only to reduce the potential for disasters, but also to maintain the momentum of the Millennium Development Goals, which include poverty reduction, adaptation to climate change and the improvement of health indicators. In Portugal, a set of strategic benchmarks emphasize the need to promote a policy of managing natural and technological risks, involving populations exposed to risks, with a view to mitigating their effects (TAVARES, 2010). This commitment assumed a formal character with the creation of the National Platform for Disaster Reduction in 2010, under the aegis of the National Civil Protection Authority (ANPC), which is responsible for the coordination of relief and emergency situations in case of serious natural accidents (TELES, 2011). Portugal, through Civil Protection, carries out its activities in an integrated and hierarchical way from the municipal level to the national level, also guaranteeing fundamental strategic international articulations, through the Civil Protection System whose main social actor is the National Civil Protection Authority (ANPC), in the fundamental role of planning, coordination and execution of the Protection Policy.

In the European context, the Directive 2007/60/EC of the European Parliament and the Council of 23 October 2007, with the objective of developing a framework for the assessment and management of flood risks to Damage related to floods and that are harmful to human health, the environment, cultural heritage and economic activities. The European Union, through DAGRI, recognizes some of the factors involved in this process: - the need for river basin planning as a flood protection measure; - the existence of differences in the perception of the risk of flooding between the different Member States of the European Union; - the need for a flood defense strategy to take into account various structural and non-structural measures; - the interconnection of hydrological and meteorological models to improve flood forecasting; - and the need to implement measures to raise awareness among the population of the risk and effects of flooding, emphasizing community co-responsibility and participation in the flood risk management process (DIRETIVA 2007/60/CE, 2007). The adoption of this directive has ensured an autonomous legal treatment of this type of risk. The European Union itself, through the European Parliament resolution on floods of 3 July 2013, recommended the implementation of flood prevention programs through comprehensive measures such as closer involvement of regions, cities and local communities. In the light of the foregoing, we can affirm that there is now a State duty to prevent risks arising from European law and that this obligation is expressly provided for the prevention and management of a specific risk, the floods (ARAGÃO, 2011).

Since in recent years there has been a global context marked by intense changes and great uncertainties, Brazil has adopted strategies to reduce the risk of flooding, which implies an adaptive risk management to the current scenario of climate change. Incorporating the issue of disaster-related threats into the political-institutional framework is essential for integrated management and in line with the contemporary risk scenario, based on strategies for coping with the extraordinary climate variability that are capable of strengthening Brazil to the flood phenomenon (ALMEIDA E PASCOALINO, 2009). In this sense, Brazil has strengthened the development of policy instruments that integrate disaster risk reduction in its contents through the implementation of national plans over the last decade and that are part of the norms of its policies. The National Policy on Protection and Civil Defense (PNPDEC, 2007) and the National Plan for Risk Management and Response to Natural Disasters (PNGRRDN, 2012) are examples of public management mechanisms in the country that stimulate the formulation of risk reduction actions Flooding in various areas of activity (POZZER, COHEN E COSTA, 2014).

In Brazil, the formulation of policies that integrate disaster risk reduction is currently configured by Law 12,608 / 12, which establishes the National Policy for Protection and Civil Defense, which provides for the National System of Protection and Civil Defense And the National Council for Civil Protection and Defense and authorizes the creation of a system of information and monitoring of disasters, among others. In August 2012, Brazil launched the National Plan for Risk Management and Response to Natural Disasters which presents disaster risk reduction actions geared to four main axes: prevention, mapping, monitoring and disaster response and response. This plan has the objective of protecting people's lives, ensuring the

safety of communities, minimizing damage from disasters and preserving the environment through actions in each of the axes (PLANALTO, 2012). With regard to floods, the Prevention Axis covers, among other things, structural actions for the construction of slope restraint works, urban drainage and flood control; conductors;cConstruction of water supply systems etc. The Mapping Axis includes the mapping of high-risk flood and landslide areas in 821 priority municipalities, where intervention plans will be drawn up, which identify the vulnerabilities of the housing infrastructures; And elaboration of geotechnical charts of urban aptitude, that will allow the development of urban guidelines to new projects of land subdivisions (PLANALTO, 2012). The Monitoring and Alerting Axis comprises actions to strengthen the Monitoring and Alert System, such as the expansion of the observation and structuring network of the National Center for Natural Disaster Monitoring and Alert, which develops, tests and implements a forecasting system of the occurrence of disasters in risk areas throughout Brazil, and identifies vulnerabilities in land use and occupation, especially in urban planning and in the installation of infrastructures. The fourth axis, Disaster Response Axis, presents actions focused on the elevation of the capacity to respond to disasters, such as the creation of the National Strength of the Unified Health System, established by Decree no. 7.616/2011 to support States and Municipalities that declare Emergency Public Health Situation of National Importance.

Through the National Plan for Risk Management and Response to Natural Disasters, the federal government of Brazil acts in inter-sectorial, interdisciplinary and inter-institutional networks with different government ministries. The National Center for Risk and Disaster Management promotes the development, analysis, synthesis, updating and periodic dissemination of information on flood risks and knowledge of vulnerabilities at the national and regional levels, issuing previous warnings on the basis of information received from Various federal government agencies (MIN, 2012). Flood risk management is a networked articulation that involves recursive actions based on multiple knowledges that are integrated to deal with vulnerable communities, involving different areas of knowledge and different fields of action, since flooding implies an organization Interdisciplinary and interinstitutional political that articulates different practices and knowledge, acting together in the space of sharing of innumerable theoretical and technical concepts. It is observed that there are still difficulties in the operationalization of this intersectoral network of protection and civil defense and that need to be overcome for the success of this strategy of action in flood situations in Brazil.

We now accept that flood management can benefit greatly from the involvement of those involved. In order to do this, the action of reducing the risk of flooding must be elaborated through a participatory process, so a fundamental requirement is to identify the information, experiences and methods that different actors can provide, and then to design concrete measures, using such experience and knowledge (APFM, 2006). Community involvement is essential in all stages of flood risk management, including risk identification, prioritization, plan formulation, implementation, monitoring and evaluation (SHRESTHA, CHAPAGAIN E THAPA, 2011).

In preparation for flooding, most institutions tend to favor specialized scientific knowledge that often can not be assimilated into local contexts and realities, where "local knowledge" predominates on the basis of the experience and experiences of people dealing with different risk situations (JHA, BLOCH and LEMON, 2009). Knowledge and local practices in specific place evolve and are complex adaptive responses that contribute to change. In dealing with flood preparation and management activities, most institutions tend to favor scientific and specialized knowledge, which often can not be assimilated into local contexts and realities (SHRESTHA, CHAPAGAIN AND THAPA, 2011). On the contrary, local knowledge can provide information related to the context, environmental variability, local specificities and perceptions of flood risk as well as to identify conflicts in the community in relation to it and in the context of multiple tensions; Identifying vulnerable groups and individuals. "Local knowledge" can also be used to inform: early warning systems, surveys and other inventories to verify information, as well as contribute to the adaptation of communication strategies to local understanding and perceptions, and to integrate local values into processes Of decision-making. "Local knowledge" involves experience, coexistence, experience, practices, lifestyles, risk culture, adaptive responses and their incorporation into flood risk preparation and management

activities can be done in a cost effective, efficient and sustainable way . It is a fundamental requirement to identify the information, experiences, and methods that different actors, including professionals and residents, can provide - and design measures using that experience and knowledge. Greater involvement of all stakeholders in the development of flood management policies is considered vital as it allows the inhabitants of flood-prone regions to choose the level of risks that they are ready to take. Community mobilization, sensitization and preparedness can increase community resilience and enable them to adjust and overcome flood events. It is about promoting good governance in the community by actively preparing them for economic development, social change, and environmental change.

Brazil and Portugal have adopted the international strategy for disaster risk reduction and its five macro-actions of the Hyogo Framework applied to the process of flood risk management in the two countries. Brazil and Portugal have internalized the strategies of the Hyogo Framework, with common points in the main flood risk reduction measures used. Flood risk management should be characterized as participatory, shared, continuous and strongly supportive, for its application in the community, with the aim of improving the environment and the well-being of the human being - something that some authors refer to as "hydrosolidarity "(BLENKNER, 2001; FALKENMARK, 2002; RIBEIRO, 2007). For the future, it will be vital to link flood risk management with more specific issues of participatory planning, local communities and urban management. Throughout this article we verified the characteristics and the assumptions of an intersectorial network action and it was possible to denote how complex its configuration and development, as well as its observed obstacles and challenges that are part of the political-institutional organization Of flood risk management in Portugal and Brazil.

3. BIBLIOGRAPHY

ALMEIDA, L. Q., PASCOALINO, A. (2009): “Gestão de risco, Desenvolvimento e (meio) Ambiente no Brasil - um estudo de caso sobre os desastres naturais de Santa Catarina”, Simpósio Brasileiro de Geografia Física Aplicada, 13., 2009, Viçosa, Anais eletrônicos, Viçosa: UFV, 20 pp.

APFM (2006): Legal and Institutional Aspects of Integrated Flood Management. Flood management policy series, WMO-No. 997, Associated Programme on Flood Management, Genebra, 103 p.

ARAGÃO, A. (2011): “Prevenção de riscos na União Europeia: o dever de tomar em consideração a vulnerabilidade social para uma protecção civil eficaz e justa”. Revista Crítica de Ciências Sociais, 93, Junho 2011, p.71-93.

ARAGÃO, A. (2009): A prevenção de riscos em Estados de direito ambiental na União Europeia. Observatório do Risco, Centro de Estudos Sociais, Universidade de Coimbra. Coimbra, 39 p.

BLENKNER, S. (2001): Turning the page for Hydrosolidarity in Spain: Inherited paradigms favor Well-off framees. Stockholm International Water Institute. Report Series. Report 13, Stockholm.

CEDOUA (2007): “O risco de inundação em Portugal”. Dossier. Revista do Centro de Estudos de Direito do Ordenamento, do Urbanismo e do Ambiente, 2.2007, Coimbra, p. 167-179.

COSTA, F. S., LOURENÇO, L., FERREIRA, C., GOUVEIA, M. (2014): “Medidas preventivas na gestão integrada do risco de inundação em Portugal: o planeamento participativo e o papel das comunidades locais”: In Luciano Lourenço (Coord. Editoria): “Multidimensão e Territórios de Risco”, Riscos - Associação Portuguesa de Riscos, Prevenção e Segurança, Simões & Linhares, Lda., Coimbra, p. 287-290.

DECRETO-LEI Nº 115 de 22 de Outubro de 2010 (2010): Quadro legal para a avaliação e gestão dos riscos de inundações. Protocolo disponível: http://dre.pt/pdf1sdip/2010/10/20600/0475704764.pdf [07 ABR. 2016].

DIRETIVA 2007/60/CE do Parlamento Europeu e do Conselho de 23 de Outubro de 2007 (2007): Elaboração de Quadro para Avaliação e Gestão dos Riscos de Inundação. Protocolo disponível: http://eur-

lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:288:0027:0034:PT:PDF [07 ABR. 2016].

ESTRATÉGIA INTERNACIONAL PARA REDUÇÃO DE DESASTRES/EIRD/ONU (2007): Marco de Ação de Hyogo 2005-2015: Aumento da resiliência das nações e das comunidades frente aos desastres. Estratégia Internacional para Redução de Desastres/Organizações das Nações Unidas. Protocolo disponível: http://www.integracao.gov.br/cidadesresilientes/pdf/mah_ptb_brochura.pdf [12 MAI. 2016].

FALKENMARK, M. (2002): Socio-hydroecologic catchement Management – Towards Hydrosolidarity. Stockholm International Water Institute, Stockholm.

GLOBAL PLATFORM FOR DISASTER REDUCTION/UNITED NATIONS/ GPDRR/UN (2009): Proceedings Creating Linkages for a Safer Tomorrow, Global Platform for Disaster Risk Reduction, 2nd session, UNISDR, Geneve, p. 44;

JHA, K. A., BLOCH, R., LEMON, J. (2012): Cities and Flooding. A Guide to Integrated Urban Flood Risk Management for the 21st Century. Global Facility for Desaster Reduction and Recovery, International Bank for Reconstruction and Development, Washington DC, 638 p.

LOURENÇO, Luciano (2015): Risco, perigo e crise: Pragmatismo e contextualização. In Riscos de desastres relacionados à água: aplicabilidade das bases conceituais das Ciências Humanas e Sociais para a análise de casos concretos, ed. Siqueira, Antenora; Valencio, Norma; Siena, Mari; Malagodi, Marco Antonio, 3 - 43. São Carlos: São Carlos: RiMa Editora.

MINISTÉRIO DA INTEGRAÇÃO NACIONAL/MIN (2012): Centro Nacional de Gerenciamento de Riscos e Desastres (CENAD). Protocolo disponível: http://www.integracao.gov.br/defesa-civil/cenad/apresentacao [24 Set. 2012].

PLANALTO (2012): Imprensa: Release sobre Plano Nacional de Gestão de Riscos e Resposta a Desastres Naturais. Protocolo disponível: http://www2.planalto.gov.br/imprensa/releases/presidenta-dilma-lanca-o-plano-nacional-de-gestao-de-riscos-e-resposta-a-desastres-naturais-e-inaugura-novas-instalacoes-do-centro-nacional-de-gerenciamento-de-risco-e-desastres-cenad [08 Ago. 2012].

PLANO NACIONAL DE GESTÃO DE RISCOS E RESPOSTA A DESASTRES NATURAIS 2012-2014. Protocolo disponível: http://www.pac.gov.br/pub/up/relatorio/d0d2a5b6f24df2fea75e7f5401c70e0d.pdf Brasília: Ministério da Integração Nacional/Secretaria Nacional de Defesa Civil. [30 Ago. 2012].

POLÍTICA NACIONAL DE DEFESA CIVIL/PNDC (2007): Protocolo disponível: http://www.defesacivil.gov.br/publicacoes/publicacoes/pndc.asp [05 ABR. 2016];

POZZER, C. P., COHEN, S. C., COSTA, F. S. (2014): "O marco de ação de Hyogo aplicado à gestão de risco de inundação no Brasil e em Portugal". Territorium 21, Riscos - Associação Portuguesa de Riscos, Prevenção e Segurança, Lousã, p. 49-70.

RIBEIRO, C. A. G. R. (2007): Hidrossolidariedade como princípio de gestão participativa de risco de inundações por associação de bacia. Dissertação apresentada à Universidade de São Paulo-Escola de Engenharia de São Carlos-Centro de Recursos Hídricos e Ecologia Aplicada, Programa de pós-graduação das ciências da engenharia ambiental, São Paulo, 212 p.

SHRESTHA, A. B. (2008): Resource Manual on Flash Flood Risk Management. Module 2: Non-structural Measures. International Centre for Integrated Mountain Development, Kathmandu, 103 p.

SHRESTHA, A. B., CHAPAGAIN, P. S, E THAPA, R. (2011): Flash Flood Risk Management. A Training of Trainers Manual. International Centre for Integrated Mountain Development, Kathmandu, 160 p.

TAVARES, A. O. (2010): "Riscos Naturais e Ordenamento do Território – Modelos, Práticas e Políticas Públicas a partir de uma Reflexão para a Região Centro de Portuga"l, Prospectiva e Planeamento, Vol. 17, Lisboa, p. 33-55.

TELES, V. M. B. A. (2011): (In)consciência dos riscos naturais em meio urbano - estudo de caso: o risco de inundação no concelho de Braga, Tese de doutoramento em Geografia (área de especialização em Geografia Física e Estudos Ambientais), Universidade do Minho, Braga, 312 pp.