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Integrating climate change adaptation, disaster risk reduction and urban planning: A review of Nicaraguan policies and regulations

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ABSTRACT

The integration of risk reduction and climate change adaptation has become an urgent task in addressing increasing urban risk more effectively and efficiently. This paper analyses the extent to which climate change adaptation is integrated into the policies and regulatory frameworks that guide urban risk reduction in Nicaragua, and discusses related progress. The results reveal significant progress in integrating climate change adaptation into the policy and regulatory frameworks of the three relatively new fields of (a) disaster risk reduction, (b) environmental management and (c) urban planning. They show that differences in the degree of integration relate to the development and updates to policy instruments in each field, and the extent to which they are related to the implementation of international climate change agreements. Although initially climate change adaptation integration was focused on the protection of natural resources in general, and food production in particular, since 2008 authorities have shown increasing interest in a more comprehensive and integrated approach. Nevertheless, the integration of climate change adaptation into disaster risk reduction and urban planning still lags behind the advances made in the environmental management field. It is concluded that in order to achieve greater and more coherent integration of CCA and, ultimately, improve the way climate-related risks is dealt with, urban authorities need to systematically review current policies and regulations to assess the synergies and gaps. This requires inter-sectoral and participative work with the actors concerned at national and local level, as well as the establishment of related monitoring and learning mechanisms.

1. Introduction

Climate change (CC) contributes to more frequent and more severe disasters [1]. During the last three decades, two-thirds of the world's disasters have been caused by climate-related phenomena [2–4]. So-called developing countries are most affected by climate-related events, with Nicaragua being classified as one of the most affected countries in the last two decades [5].

Given that climate change adaptation (CCA) and disaster risk reduction (DRR) both aim to reduce the impacts of climate-related disasters and associated risks [6,7], the need to integrate them in a coherent way is receiving increasing attention from international communities and academics in both fields (e.g. [7–14]).

Abbreviations: DRR, disaster risk reduction; CCA, climate change adaptation; CC, climate change; UP, urban planning

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In the field of DRR, the World Conference on Disaster Reduction (WCDR) held in 2005 in Kobe, Japan [9] sparked discussions about the importance of integration. As a result, CC considerations were incorporated into the risk reduction strategies of the Hyogo Framework for Action 2005–2015 [15]. In the field of CC, related discussions slowly emerged in 2009 in the context of the United Nations Framework Convention on Climate Change in Copenhagen. It is only recently that the Intergovernmental Panel on Climate Change (IPCC) published a report, which tries to address and link both fields: the special report "Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (IPCC-SREX)" [7]. It is now one of the most relevant documents for both disaster risk reduction and climate change adaptation [13].

The increased attention given to the integration of CCA and DRR also relates to the urgency of addressing growing urban risk. There is widespread consensus that urban disasters are increasing exponentially, resulting in escalating human and economic losses [6,16]. In urban settings, hazard impacts are intensified by high levels of vulnerability [17]. There is substantial population growth in risky areas, particularly through unplanned urban development. With an influx of poor and marginalized groups in cities, the proportion of the at-risk population increases [18]. This situation, where cities expand without adequate attention being given to the links between urban planning (UP) and risk increases the potential for disaster [19]. Hence, UP processes, both planned and unplanned, can intensify existing vulnerabilities if DRR and CCA are not fully integrated [20].

The importance of the integration of the three fields of CCA, DRR and UP at policy level was outlined in the latest review of the implementation of the Hyogo Framework for Action 2005–2015 [21]. For instance, the first core indicator of Priority Four that measures progress and challenges in "reducing the underlying risk factors" states:

> Disaster risk reduction is an integral objective of environment-related policies and plans, including for land use planning, resource management and adaptation to climate change [21] (p. 29).

This indicator calls for a better integration of DRR, CCA and UP policies and regulatory frameworks, in order to achieve the goals established by the Hyogo Framework for Action 2005–2015.

Against this background, this paper analyses whether, and if so, to what extent CCA is integrated into current policy and regulatory frameworks for DRR and UP. The research question is: *"How is climate change adaptation integrated into current policies and the regulatory framework that promote urban risk reduction planning in Nicaragua?"* Nicaragua was selected as the focus for the case study as, since 1885, the country has experienced frequent damage and serious losses due to hazards such as earthquakes and floods [22]. Nicaragua is also an interesting case because of recent significant advances in adaptive capacity at institutional level. Following Central America's most recent large-scale disaster, namely Hurricane Mitch in 1998, the government has actively encouraged DRR efforts, which have been supported by a range of international aid organizations [23,24]. As a result, the national framework for DRR has made significant progress and is considered to be one of the best in the region [25]. It therefore provides a good basis for a study of the integration of CCA, DRR and UP, which can provide valuable insights for other countries.

The remainder of this article is divided into four parts: methodology (Section 2); the results of the analyses of policies and regulatory frameworks (Section 3); a discussion of advances in climate change integration into urban risk reduction at policy level (Section 4); and finally the conclusions (Section 5).

2. Methodology

Our work is based on a case study of Nicaraguan policies and regulatory frameworks and a content analysis. Case studies are a useful way to explore new processes and their outcomes [26]. They provide reliable information, which can be used to generalize a phenomenon [27]. Our data was mainly drawn from existing policies and regulatory frameworks concerning DRR, UP and environmental management, and our aim was to explore the extent to which CCA is integrated into them, and, if so, how. Content analysis was selected as the method for the analysis as it leads to valid inferences and makes it possible to highlight aspects related to CCA integration in the documents examined [28]. It enabled a systematic exploration of policies and regulatory frameworks by identifying sections of text that were related to aspects of CCA.

This examination of Nicaraguan policies and regulatory frameworks is based on the following definitions: Climate change adaptation (CCA) is understood as the process and related actions that aim to reduce the vulnerability of systems (e.g. cities) to the adverse impacts of anticipated climate change [29]. Climate change (CC) refers here to any change in climate over time, whether due to natural variability or as a result of human activity [1]. The concept of disaster risk reduction (DRR) is broader. It can be seen as a conceptual and operational approach that aims to reduce risk through systematic efforts to analyse and manage the causal factors of both climate and non-climate related disasters. This includes measures to reduce hazard exposure and vulnerability as well as to improve response and recovery preparedness [30]. Regarding the term urban planning (UP), it is seen both as a discipline and a practical way to shape and modify urban settlements and space [31]. Furthermore, integration is understood here as part of a mainstreaming process, where mainstreaming involves modifications to specific, core operations in order to incorporate and indirectly act upon new aspects or topics [6,32]. In the context of this study, UP and DRR are the core operations, and CCA is the new aspect to be incorporated.

The documentation reviewed in this study consists of those policies and regulations that provide guidance to practitioners in the field. Polices are understood as rules or principles that a group or organization uses to guide its decisions and actions [33]. Regulations are rules or directives drawn up and maintained by an authority [34]. Documents were selected using various Internet search engines.