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Climate Change Adaptation and Disaster Risk reduction integration: Strategies, Policies, and Plans in three Australian Local Governments

Giuseppe Forino[a,*], Jason von Meding[a], Graham Brewer[a], Dewald van Niekerk[b]

[a] School of Architecture and Built Environment, University of Newcastle, University Dr, Callaghan, NSW 2308, Australia
[b] African Centre for Disaster Studies, North-West University, Potchefstroom, South Africa

A B S T R A C T

Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR) integration is a pressing concern for Australia. Normative instruments such as Strategies, Policies, and Plans are among the principal ways that Local Governments (LGs) use to promote CCA & DRR integration. To understand how CCA & DRR integration is promoted into Strategies, Policies, and Plans by Australian LGs, the paper performs a content analysis of documents in Singleton, Newcastle, and Lake Macquarie - three LGs located in the Hunter region, New South Wales (NSW). Findings indicate that: (i) the three selected LGs recognize that climate change exacerbates frequency and intensity for hazards; (ii) some documents include common goals for promoting CCA, showing synergies among different topics; (iii) documents recommend CCA measures for several aspects of the built environment, including land-use, building standards, and infrastructure and asset materials; and, (iv) public participation mechanisms were proposed to enact CCA measures. While these measures are important, understanding how CCA will be implemented is still necessary. Fragmentation exists between CCA goals in these LGs and future programs by the NSW government for the built environment in the Hunter region. Additionally, efforts are required to understand how public participation mechanisms can contribute to addressing vulnerabilities to climate change-related hazards. Finally, the initial evidence shows that the Lake Macquarie LG shows greater commitment in CCA & DRR integration than Newcastle and Singleton LGs. The paper demonstrates that a focus on how LGs promote CCA & DRR integration into Strategies, Policies, and Plans can extend our understanding of climate change response by LGs.

1. Introduction

The contribution of climate change and associated processes in increasing frequency and intensity for some of the hazards occurring worldwide requires a better understanding of the relations between climate change and disasters [1]. Scientific communities and international organizations are therefore paying increased attention to the need for a coherent integration of Climate Change Adaptation (CCA) into Disaster Risk Reduction (DRR) (hereafter, CCA & DRR integration) [2–16]. The special report by the Intergovernmental Panel on Climate Change (IPCC), *Managing the risks of extreme events and disasters to advance climate change adaptation*, defines CCA in social systems as "the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities" [15, p. 556]. Meanwhile, it defines DRR as "a policy goal or objective, and the strategic and instrumental measures employed for anticipating future disaster risk, reducing existing exposure, hazard, or vulnerability, and improving resilience" [15, p. 558]. This report [15] represents a milestone for CCA & DRR integration and focuses on the relationships between climate change and extreme weather and climate hazards, the impacts of such hazards, and the ways to manage the associated risks [8,13,14]. The report acknowledges that CCA and DRR both aim to reduce the impacts of climate change-related hazards through e.g. vulnerability reduction, resilience increase, and risk transfer and share, and to promote pro-active, holistic, and long-term approaches for disaster risk management [4–6,15]. It recognizes, however, that CCA and DRR do often refer to different organisations usually operating through different approaches and technical languages [6,8,10,14,15]. Institutional, political, and financial barriers also inhibit collaboration and coordination within and across organizations [9,15]. Therefore, a coherent integration of CCA into DRR is commonly considered necessary for ending separation within and among organizations and scientific communities, and for promoting a target on simultaneous and common goals for climate change response [2,3,17].

In 2015, the ratification of three important international agreements provided potentially useful benchmarks for the CCA & DRR integration

* Corresponding author.
E-mail address: g.forino@gmail.com (G. Forino).

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agenda [8,18]. The Sendai Framework for Disaster Risk Reduction 2015–2030 [19] recommended addressing climate change as a driver of disaster risk. The new Sustainable Development Goals suggested strengthening resilience and adaptive capacity to climate-related hazards [20]. The Paris Agreement by the United Nations Framework Convention on Climate Change (UNFCCC) articulated a global consensus about greenhouse gas emissions, representing a further opportunity to strengthen the linkage between CCA and DRR [21]. Critiques about the shortcomings of these frameworks and lack of synergies have been expressed [8,14,18], but these agreements constitute the current background against which scholars, policy-makers, and practitioners will discuss the DRR agenda for several years to come.

To increase effectiveness in CCA & DRR integration, multi-level governments use different kinds of institutional, legal, and technical instruments, including normative instruments such as Strategies, Policies, and Plans [8]. Literature has successfully investigated convergences and divergences among normative instruments at the national level in countries including several Least Developed Countries [6], Indonesia [4], the Philippines [13], Nicaragua [2], South Africa [22], Zambia [16], Mexico [12], and Fiji and Samoa [7]. However, both the IPCC [15] and the United Nations Office for Disaster Risk Reduction (UNISDR) [23] underline the necessity for including important actors at the local level such as Local Governments (LGs) within CCA & DRR integration. In fact, LGs are helpful in managing local risks by connecting national programs with local instances and by including adaptive responses into the local DRR agenda [23]. Literature explored CCA & DRR integration from a LG perspective, but an in-depth focus is still required for understanding how LGs promote CCA & DRR integration in their Strategies, Policies, and Plans.

This paper aims at partially filling this gap by exploring how Australian LGs promote CCA & DRR integration into Strategies, Policies, and Plans. In fact, Australian LGs frequently experience the occurrence of hazards associated with weather and climate variability and change. Therefore, several Australian LGs are promoting CCA & DRR integration by using part of their Strategies, Policies, and Plans to plan and implement CCA measures to contribute to DRR [7,8]. The paper performs a content analysis of publicly available documents by three LGs in the Hunter region (hereafter, Hunter), in the State of New South Wales (NSW). The remainder of the paper is as it follows: Section 2 provides an overview of CCA & DRR integration in Australia and a focus on the role of LGs. Section 3 presents and describes the methodology by introducing the three selected LGs and the sequential steps of data collection, selection, and analysis. Section 4 presents the main research findings based on four themes emerging from data analysis; and, Section 5 discusses these findings in terms of challenges and opportunities for CCA & DRR integration in the three selected LGs. Section 6 draw conclusions and asserts the necessity to continue exploring this topic.

2. Governing CCA & DRR integration in Australia

The size of Australia and its varied climates imply that the country is affected by a range of weather-related natural hazards, including storms, associated extreme wind and hail, coastal and inland floods, heatwaves, bushfires, and drought [24]. Further changes in climate, atmosphere and water composition are projected to have substantial impacts on water resources, coastal ecosystems, infrastructure, health, agriculture, and biodiversity [25]. A recent analysis of disaster declarations in Australia found that the most frequent and costly type of declared disasters are those associated with weather and climate-related hazards [24], which collectively account for over 90% of Australian insured losses [26]. Due to these issues, CCA & DRR integration in Australia can become part of a larger set of operations to respond to climate change. These operations provide strategic sectors, regions, and stakeholders at different levels with potential benefits [27] including those related to living in safer environments, stabilizing property values, and increasing access to a range of climate change expertise and funds to be embedded into the DRR agenda [10].

The federal and subsidiary structure of the Australian government system does not yet ensure an integrated and cross-scale response to climate change [9]. Responsibilities for the management of public affairs (including those related to climate change and disaster risk issues) are allocated to the national (federal) and State/Territory governments [28], while LGs' mandates and schemes are delegated for legislation and related approvals by State/Territory governments [29,30]. Therefore, responsibilities for managing issues related to climate change and disaster risk are siloed, dispersed, or duplicated into discrete areas of intervention; meanwhile, jurisdictional disputes and lack of trust exist within and among government levels [9,11,31]. Interdisciplinary and cross-scale efforts towards CCA & DRR integration are required to allow an effective use of existing public institutions. For this reason, in the past decade the Australian government has promoted "whole-of-government" and "all-hazards" approaches to DRR [9,10,32–36]. The "whole-of-government" approach aimed at providing common guidelines among and between government levels in order to strengthen the decision-making process for planning and implementation of CCA. Likewise, an "all-hazards" approach aimed at proactively supporting the full inclusion of climate change issues into DRR agenda [9,10,32].

To strengthen these two approaches, the Council of Australian Governments (COAG) was pivotal in promoting CCA initiatives to be aligned to the national DRR agenda, by encouraging cooperation between different government levels [9,35–37]. For example, the COAG designed the *National Climate Change Adaptation Framework* [38] to assist the three government levels in improving their communication and collaboration. Meanwhile, in the *National Disaster Resilience Strategy* [39] the COAG recognized climate change and its impacts as a national security challenge; in this way, a disaster resilience approach promoted adaptation to new and emerging hazards, to reduce our exposure to risks, and to recover from disasters effectively. The *National Climate Resilience and Adaptation Strategy* [40] provided a further linkage between CCA and DRR, by promoting a sustainable and coordinated national approach to undertake CCA.

Nevertheless, improvements are still necessary in the public sector towards a more effective CCA & DRR integration within and among government levels and sectors. In this way, Howes et al. [9] proposed reforms in the public sector, including: (i) to develop a policy vision which is shared among multi-level government organizations and sectors responsible for CCA and DRR; (ii) to adopt a multi-level and integrated planning for CCA and DRR for implementing a shared vision; (iii) to provide a consistent legislation which also underpins Strategies, Policies, and Plans, and provides them clear objectives and appropriate directions; (iv) to build a culture of networks and collaboration among organizations and sectors; (v) and, to establish cooperative funding mechanisms for CCA and DRR goals which encourage collaboration and partnerships among public sector and stakeholders from market and local communities [9]. In addition, the public sector should focus on reducing local vulnerability and enhancing participation by stakeholders in order to respond to climate change [32]. The public sector should also explore informal communities' practices as a way of considering perspectives about climate change and disaster risk not experienced yet, of generating complex visions about key climate change-related issues, and of identifying potential governance options [36,41].

2.1. Local Governments

In Australia, the local level is considered the most commensurate to potentially experience climate change-related issues [30]. Impacts by climate change can affect public functions (e.g. land-use, assets and infrastructure, public health, and community services) which are provided by Australian LGs [42]. Therefore, LGs are being encouraged to provide their own response to climate change-related risks [30,31,43]. The COAG [44] places substantial responsibilities on LGs for climate