

# Improving adaptation of coastal communities through bottom-up approaches: a case study of the Conjola District, Shoalhaven, NSW

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## Abstract:

During the last 50 years there has been a significant development of the coastline leading to substantial population growth in coastal areas worldwide. This trend is also observed in Australia where about half of its population lives within 7 km of the coast. Coastal settlements located in low-lying coastal areas are considered to be vulnerable to climate-related impacts, including sea-level rise, storm surges and coastal and riverine flooding. While the severity of climate-related events affecting those areas may lead to widespread damage and disasters, they might generate opportunities for change to occur in their socio-ecological systems therefore improving their resilience and adaptation to natural hazards. For example, opportunities might be created to review how those areas are planned and managed as well as to gather lessons from past extreme events.

This paper investigates how those opportunities can be optimised by focusing on the Conjola District, Shoalhaven, NSW. The Conjola District and the southern NSW coast has a long history of bushfire threat and recurrent flooding associated with the intermittently closed and open lakes and lagoons, as evidenced by recent bushfires in January 2013 and large flood events in the 1970s involving the Conjola Lake. The paper focuses on a distinctive anticipatory response of the Conjola District to maximise opportunities to improve its socio-ecological system in light of future social and environmental change, including climate-related threats. In particular, the paper describes the collaborative process involved in developing a strategic planning initiative which culminated in the proposition of a long term vision as well as a set of priority actions to improve adaptation and resilience of the Conjola District to future social and environmental change. The paper also discusses how this bottom-up, community initiated and led, visioning and strategic planning initiative, may contribute to informing planning for climate change adaptation in coastal settlements.

**Key words:** climate change, community recovery, strategic planning, human settlements

## 1. Introduction

Urbanisation of coastal areas has increased significantly during the last century (Nicholls et al, 2007). As a result, coastal areas host significant populations and provide important socio-economic activities for regions worldwide (Birkmann et al, 2010). For example, it is estimated that coastal areas are now home for 10% of the world's population (McGranahan et al, 2007) and have an average population density 3 times higher than the global average (Small and Nicholls, 2003). The combination of increased population growth in coastal areas and forecasted climate change impacts is likely to exacerbate the vulnerability of many coastal communities (Nicholls et al, 2007). In the face of climate change, urbanised coastal areas are likely to be vulnerable to coastal and riverine flooding, sea level rise and storm surge (Brooks et al, 2006; Nicholls et al, 2007; Solomon et al, 2007; Hunt and Watkiss, 2011).

Following worldwide trends of coastal urbanisation, coastal areas in Australia host about half of the current country's population (Chen and McAneney, 2006). In particular, the east coast of Australia hosts major urban centres and many smaller townships such as the ones comprised by the NSW south coast. Coastal communities, because of the uncertainty related to global environmental change, increased population growth and trend in development are likely to have increased exposure to extreme weather events in the future (Nicholls et al, 2007).

Further, economic damages associated with extreme weather events have increased through time due to both social vulnerabilities and change to physical hazards (Adger et al, 2005). While natural hazards are an ongoing part of human history, a changing climate coupled with coastal development and population growth may exacerbate the exposure of coastal communities to their impacts (Nicholls et al, 2007) and continue to challenge their ability to respond appropriately as well as their economic recovery (Gunderson, 2010). Extreme weather events resulting in disasters also lead to a range of intangible social costs such as trauma which is likely to affect 95% of people in the early aftermath of a disaster and continue to affect 10-25% of people after the immediate recovery period (Gordon, 2007). Consequently, there is an urgent need to build resilience of coastal communities given their vulnerability to extreme weather events and future environmental and social change (Adger et al. 2005).

It is argued that planning plays an important role in safeguarding communities against future climate change impacts, particularly through adaptation (Bulkeley, 2006). Adapting to climate change thus is challenging and demands a rethink in the way in which our cities and towns are planned and built (Leitch et al, 2010). Such a rethink will need to take place in partnership with communities because they are at the forefront of impacts when extreme weather events occur. Coupled events such as sea level rise and East Coast Lows leading to severe storm surges and intense rainfall events will posit significant challenges to how coastal areas on the east coast of Australia are managed as well as testing the strength of the communities inhabiting those areas. Additionally, as climate change impacts are expected to be spatially non-uniform across the world (Füssel, 2007) cities and regions will need to adapt to climate change in different ways. Many communities worldwide have experience in dealing with extreme weather events such as floods and therefore provide important knowledge based and experience that can inform future climate adaptation. Consequently, it is important to capture the idiosyncrasies of different communities across the world in their efforts to adapt to extreme weather events as well as other environmental and social change.

While the severity of extreme weather events affecting coastal areas may lead to widespread damage and disasters, they might also generate opportunities for change to occur in their socioeconomic, political and organisational systems (Pelling and Manuel-Navarrete, 2011). This paper explores how those opportunities can be optimised by focusing on the Conjola District, NSW, Australia which is in the process of developing a long term strategy for its future, independent of official planning processes of state and local governments.

To this end, the paper is structured in three parts following this brief introduction. In the first part, we present the research approach and describe the case study area. In the second part, we describe the collaborative process involved in developing this strategic planning initiative which culminated in the proposition of a long term vision and a set of priority actions for the Conjola District. Last, we discuss how this bottom-up, community initiated and led, visioning and strategic planning initiative may contribute to inform the planning process for dealing with environmental and social change in urbanised coastal areas, including climate change adaptation.

## **2. Research Approach**

This study adopted elements of intervention research methodology (Hatchuel, 2001). This type of research methodology, also called participatory intervention research (Daniel et al, 2011), has gained momentum over the last decades amongst sciences which deal with collective action processes (Hatchuel, 2001). It is an approach that builds on elements of action research (Hatchuel, 2001) first developed by Kurt Lewin in the 1940s (Halkup et al, 2004). Widely used in the fields of human health where it is referred to as community-based participatory research (Halkup et al, 2004; Wallerstein and Duran, 2011) and management research (Hatchuel, 2009), it comprises a type of research which allows collaboration / interaction between actors and researchers to generate the means for collective action (Daniel et al, 2011). Midgley (2008) defines intervention in the context of research methodology as a “purposeful action by an agent to create change” (pp. 56).

Advantages of adopting this type of research methodology include its contribution to aiding decision-making processes, and the fact that researchers play a dual role of investigators and stakeholders in the process which can increase its path to impact (Daniel et al, 2011). Furthermore, intervention-research is conducive to bring about positive change (Midgley, 2008).

In adopting research-intervention as our methodology we created a broader scope for the collaborative component of the study. Advantages of establishing collaborative approaches in the planning context are well discussed in the literature and extensively represented by the work of Patsy Healey (2006, 2008). Specifically, collaborative planning provides opportunities for the argumentation and debate of critical issues in policy-making practices (Healey, 2008, pp. 285). In such collaborative approaches, negotiations between stakeholders assist in determining which focal issues are to be included or discarded in the planning process, and responsibilities and accountabilities associated with the plan-implementation process (Daniel et al, 2011).

In our context, the research comprised a partnership between Conjola District stakeholders and the research team established to conceptualise and develop a long term strategy for the community’s future. The research followed a two-pronged approach related to data collection, including:

- a) Literature review and background research; and
- b) Workshops with community stakeholders following a scenario planning approach to prepare a community-based strategic action plan.

The literature review and background research involved assembling and analysing background planning data, secondary documents and climate change data; confirming key existing and potential planning initiatives for ongoing engagement by the Conjola District community (including planning process opportunities and initiatives); and identifying potential natural and socio-economic triggers for the area. Workshops with community stakeholders enabled the preliminary investigation of community networks and essential steps of community bottom-up approaches that may lead to improved community resilience and adaptation to future environmental and social change, including natural hazards and climate change.

### **2.1 The Conjola District**

Located in the NSW south coast, Australia, the Conjola District has a population of approximately 1,154 (Australian Bureau of Statistics, 2011). Conjola is located approximately 200km South of Sydney and 50km South of Nowra (BMT WBM Pty Ltd 2007) (see Figure 1). The District comprises three main townships: Lake Conjola, Conjola



Figure 1. Location map for Conjola District, Australia (source: Google Earth)

Park and Fisherman's Paradise. The surrounding natural beauty makes the area a popular destination for tourists and the local population can increase significantly during the peak tourism season. Consequentially the region has a range of services, facilities and activities to support the tourism industry.

The District experiences a seasonal subtropical, but mostly temperate, climate characterised by warmer summers and cooler winters. The region has an average yearly rainfall of 1058mm. The majority of rain falls from February to June. In addition, East Coast Lows that form over the ocean during winter cause intense rainfall that raises the water levels of Lake Conjola, sometimes flooding low-lying areas (Bureau of Meteorology 2013). Many parts of the Conjola District have been developed on low-lying lands adjacent to the coast and in river valleys (BMT WBM Pty Ltd, 2012). In times of non-flood, these areas offer lifestyle opportunities highly sought after by permanent and temporary residents alike. However, significant flood risk with the potential for frequent and severe inundation from a number of flooding sources is very high. The main causes of flooding in the District are: significant catchment rainfall, oceanic inundation and low-level persistent flooding from elevated lake water levels, particularly when the lake entrance is closed (BMT WBM Pty Ltd, 2012).

Recent flood experiences across Australia have demonstrated the devastating impacts of flooding with many 'never seen before' or 'worst flood on record' events (BMT WBM Pty Ltd, 2012). These events highlight the susceptibility of development on flood prone lands. Unfortunately for the residents of the Conjola District, the nature of flooding in the area is such that severe flooding problems can occur with very little warning (BMT WBM Pty Ltd, 2012).



The Conjola District is also exposed to coastal hazards. As above-mentioned, the District contains homes and services located in low-lying areas adjacent to Conjola Lake (see Figure 2). Conjola Lake is referred to as an Intermittently Closed and Opened Lake/Lagoon (ICOLL), which features a sand barrier that creates a constricted entrance allowing the intermittent exchange of water between the central basin and the ocean. The Lake entrance shoals constantly change due to floods, tidal flows, storm-waves littoral sand supply and wind-blown sand from Conjola Beach. The entrance can remain closed for years in the absence of rainfall events and/or mechanical intervention, but has mostly been classified as open over the past 20 years (Shoalhaven City Council, 2012). Lake Conjola's coastal landscape is continually changing due to natural forces of wind, waves, rainfall and tides as well as human interventions (Umwelt, 2012; SMEC, 2008). Coastal hazards and influences in Lake Conjola include: storm surge, coastal inundation, creek entrance migration and lake entrance condition, and climate change and sea level rise.



Figure 2. Lake Conjola (source: NSW Estuary Management Program 2000)

Additionally, the Shoalhaven area has been affected by a number of serious fires through the years (see Figure 3). In particular, the area has been affected by two significant fire events that occurred during the 1990s (NSW Rural Fire Service 2013).

### 3. The Collaborative Process

The collaborative process of developing a long-term strategy for the Conjola District was initiated in May 2013. A partnership was established between the Conjola District Lake Care Association, the official Community Consultative Body (CCB) for the District identified by Shoalhaven City Council, and the research team.



**Figure 3. Bushfire damage along the Illawarra ranges in 2013**

To date, the collaborative process has involved four engagement activities with community stakeholders, including one forum and three workshops (see Figure 4 for an outline of each engagement activity). As a result of these activities, the Conjola District in partnership with the research team has developed and confirmed a vision for the future of their community (see Figure 5); identified a series of future options for the community; and composed a draft action plan which contains a series of prioritised actions that will have to be implemented over the life of the action plan in order to achieve its vision and strategic intents.

The remaining step in the process is to disseminate the action plan to the wider community as well as authorities from both local and state governments. Ultimately, it is expected that the proposed future options put forward by the Conjola District will be integrated and incorporated as part of the review of official plans and strategies that have direct implications for the District.

The compilation of future options for the community involved an iterative process in which community members were given the opportunity to submit a selection of options to be assessed at the third stakeholder workshop. Options were assessed against two plausible future scenarios for the District: 'Paradise Lost' – a scenario where the Conjola District is characterised by a low level of both environmental and social quality and a low level of community engagement in the District's affairs; and 'Congenial District' where the Conjola District is characterised by a high level of both environmental and social quality and a high level of community engagement in the District's affairs. The assessment was guided by five 'what if' questions:

- The extent to which the option would enable the Conjola District to deal with future major natural hazards;
- The extent to which the option would enable the Conjola District to deal with future shocks and surprises (e.g. economic downturn, collapse of the international and national tourism industry, dramatic changes to oil availability);
- The extent to which the option would represent the best use of public money;
- The extent to which the option would have a negative impact on the Conjola District; and
- The extent to which the option would assist the Conjola District to fulfil its Vision.

**Forum** – starting negotiations with stakeholders to establish the process to develop a strategic Action Plan for the Conjola District, including definition of the community of interest relevant to the Conjola District strategic Action Plan, scoping of a planning and engagement process for the community, and identification of issues of relevance for the Action Plan.

**Workshop 1** – confirmation of the community of interest, completion of a SWOT analysis to identify the strengths, weaknesses, opportunities and threats for the District, and drafting of a long term Vision for the Conjola District.

**Workshop 2** – first of two scenario planning workshops – identification of key drivers of change likely to influence the Conjola District over the next 25 years; definition and selection of two future plausible scenarios for the District; and confirmation of vision statement.

**Workshop 3** – second of two scenario planning workshops – confirmation of compiled list of future options; assessment of options against two plausible future scenarios; and preliminary allocation of priorities to each future option.

**Figure 3. Outline of workshops**

### Vision Statement

Lake Conjola District will continue to be acclaimed by its natural beauty. It will become an inspirational model of a community living and working together to adapt and respond to natural hazards and reach common and sustainable solutions which protect and conserve the lake and its catchment for future generations.

The District's congenial character is retained within the footprint of the existing settlements to serve the needs of residents and visitors within the area's sustainable limits.

**Figure 4. Community vision**



Thus far, a total of 29 preliminary future options have been proposed to be included in the action plan. Future options can be grouped under four major themes derived from the Vision Statement: Social and Community Well Being, Preserving Natural Beauty and Environment, Resilience/ Emergency/ Disaster and Risk Management, and Economic Development and Sustainable Solutions. Examples of proposed future options under each theme include: Ownership and management of community affairs, Promote the Lake Foreshore as the District's Primary Community Asset, Conjola District Community Disaster Management Plan, and Water Conservation.

#### **4. A Way Forward**

Understanding how coastal communities value their place and wish to plan for their future is of critical importance considering the planning challenges posed by current and future social and environmental change, especially to government agencies from all levels as they seek to support and meet the needs of these communities. The use of intervention-research is perceived to be a useful approach to generate such understanding. For example, drawing on workshop outputs, two characteristics were identified in the Conjola District community that are understood in the literature to be important elements that assist communities to deal with shocks such as disasters caused by natural hazards (Airriess et al, 2008; and Samper, 2008). These include place attachment and well-established social networks. These two characteristics became evident during workshop 1, when participants undertook a SWOT analysis to identify the community's strengths, weakness, opportunities and threats. In doing so, participants were able to identify key characteristics of their District and community that contribute to defining a strong sense of belonging. This was exemplified by the high valorisation of their lifestyle which is enabled by the attributes of their area, including its natural environment, its lack of urban development, its peacefulness, and its close-knit community with caring and helpful neighbours.

This paper also confirms the usefulness of intervention-research in supporting collaborative planning as it generates important information related to the community's values and interests that should be discussed and potentially incorporated in future plans for their area. Such values and interests were identified through the iterative process of developing and assessing future options for their community which ultimately have the potential of enabling the Conjola District community to deal with future environmental and social change. The extent to which the future options will be incorporated in future official plans is yet to be determined and their effectiveness will continue to be tested in the years to come as the action plan is widely disseminated to both the broader community and government agencies.

Additionally, collaborative planning processes enabled through intervention-research, such as the one outlined in this paper, have the potential to address complex and highly contested issues of interest to local and state governments, including climate change adaptation (Head & Ryan, 2003; Innes & Booher, 2004; Horlick-Jones et al, 2006). Nevertheless, these collaborative planning processes need to be continuously evaluated to ensure their legitimacy, effectiveness and robustness particularly associated with the plan-implementation phase. Such evaluation would involve a number of key criteria as proposed Holkup et al (2004), including: credibility, transferability, fairness, level of participant involvement, community voice, acceptable problem solution and feasibility of project sustainability. Hence, more longitudinal studies would be required to confirm the role of collaborative planning in improving community outcomes, effectively addressing future environmental and social change as well as providing important lessons that can inform other collaborative planning initiatives.



## Acknowledgments

This research was kindly supported by the Griffith University Industry Collaboration Scheme. We would like to thank the Conjola District community for their time, efforts and enthusiasm to participate in this research. The content of this paper are the solely responsibility of the authors.

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