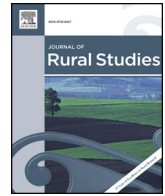


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Limits to adaptation: Reducing irrigation water in the Murray-Darling Basin dairy communities



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ABSTRACT

Increasing environmental disasters are creating significant uncertainty for farm families and their communities across the world. One site critically affected is the Murray-Darling Basin area of Australia, an area known as the food bowl of Australia. Following a lengthy drought at the turn of the century concerns were raised about water quality and river health. This led successive governments to introduce policies to systematically reduce water available for irrigated agriculture. The Murray-Darling Basin Plan was developed by the Commonwealth government and is designed to secure water savings from irrigators and to direct those water savings to the stressed natural environment. This paper focuses on the impact of these changes on irrigation dairy families and their communities in northern Victoria. Using a model designed to test the limits to adaptation, we draw out the constraints, limits and barriers to adaptation for dairy families and their communities coping with reduced water access. This model highlights the types of socially just and fair interventions necessary to assist adaptation and focuses attention on thresholds and traps that may prevent adaptation. The model is relevant to other areas where climate changes and environmental disasters are shaping inevitable change.

1. Introduction

Over the last two decades Australia has experienced a series of catastrophic climate-related weather events, including the lengthy Millennium drought (a period of significant dry weather from 1997 to 2009 (DELWP, 2016)), as well as major bushfires, cyclones and widespread flooding across several states. These events have had significant impacts on agriculture, on the rural communities that provide the essential infrastructure support to these industries and on farm families making decisions concerning food production during periods of uncertain and extremely volatile weather conditions. In Australia's Murray-Darling Basin area for example, an area known colloquially as the food bowl of Australia, the dry conditions have created concern about river health and ongoing water supplies leading successive Australian governments to introduce measures to restructure water use and increase water available to the environment. This has included reducing the amount of water to be made available for irrigated agriculture in the Basin.

Much has been written about the resultant draft Murray-Darling Basin Plan (MDBP), a plan designed to map out strategies for reducing irrigation water use across the Basin (MDBA, 2011b). This was released in 2011 and was followed by significant resistance and unrest in

irrigation communities impacted by the proposed Plan (see for example Alston et al., 2016; Evans and Pratchell, 2013; Gale et al., 2014). As a result, further amendments were made, chiefly relating to a reduced, but nonetheless still significant, amount of water to be recovered for the environment (known as the Sustainable Diversion Limits) and the final Plan was released in November 2012 (Commonwealth of Australia, 2012). In this paper we focus on adaptation strategies adopted by irrigation dairy families and communities in northern Victoria, who have absorbed significant reductions in water available for irrigation. While there is no doubt that attention to river health has been necessary and is accepted by all stakeholders, there are widespread perceptions amongst Basin communities that the water policy process was not only unjust, but that there were failures in consultation processes, in governance structures, in decision-making, in knowledge generation and in the provision of positive interventions to facilitate and enhance the adaptive capacity of those most critically affected (see for example Hussey, 2014; Bell and Quiggin, 2008).

Our research, and that of others (see for example Hussey, 2014) suggests that the heavy burden placed on Basin communities in general and irrigation dairy farm communities in particular would require significant social policy interventions so that families and communities would feel supported to adapt to new environmental realities through a

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time of immense change. Arguably, however, the Plan, remained focused on neoliberal constructs of economic and technological efficiency, and largely ignored, at least initially, the nuances of individual, industry and community vulnerability in the Basin. Thus it relied heavily on markets to shape adjustments and arguably failed to outline interventions that might build resilience and adaptive capacity amongst those most critically affected. As O'Brien and Selboe (2015, 311) quoted in Schlosberg et al., (2017, 2) note, such adaptive measures are unlikely to be successful if an environmental event is 'treated only as a technical problem' – a position backed by Pahl-Wostl (2015) who argues we ignore the human dimension of environmental disasters at our peril. Further, Schlosberg et al. (2017, 2) note that measures taken to address the uncertainty surrounding climate-related events must include socially just measures that address 'the drivers and risks of vulnerability' including social factors. However, the strategies outlined in the Basin Plan (Commonwealth of Australia, 2012) prioritized technological, economic and managerial solutions, and largely ignored the social contexts of the communities and the enormous expectations placed on farm families and communities to significantly change the way they operate.

In this paper, and drawing on a conceptual model developed in conjunction with the World Universities Network Limits to Adaptation group (Tschakert et al., unpublished), we explore adaptation limits for irrigation dairy families and their communities in northern Victoria and assess what institutional structures and supports are required to facilitate transformative adaptation. We argue that because these limiting factors were not addressed in the original Plan or in any subsequent policy initiatives, in many cases dairy families have struggled to adapt and have done so in ways that may not be sustainable into the future (Tschakert et al., unpublished).

The WUN model provides a useful framework from which to analyse not only how people have coped and adapted, but also to examine the potential interventions and institutional arrangements that could assist to build resilience amongst those who have been required to make rapid and extensive livelihood changes. In applying and discussing our model we comment on the social context shaping adaptive capacity and focus on the social justice issues. Drawing on Lukasiewicz et al. (2013) we define these as the equitable allocation of benefits as well as the distributive and procedural fairness of the strategies inherent in the process of reform. We also note that there are adaptive thresholds where more positive change may still be possible if astute interventions are made, and we comment on the traps that have emerged where people are unable to move forward without assistance. Our model exposes the flaws in the original Plan and provides critical commentary on the types of interventions required to assist Basin communities to adapt in ways that are more transformative and sustainable. Before discussing critical concepts, we provide a brief overview of the Basin, the Basin Plan and the Basin dairy industry.

2. The Murray Darling Basin, the Murray Darling Basin plan and the dairy industry

Australia's Murray-Darling Basin is the catchment for the Murray and Darling rivers and their tributaries. It extends from Queensland through New South Wales, the Australian Capital Territory, Victoria and into South Australia and includes three-quarters of New South Wales and half of Victoria. In total there are 23 river valleys in the Basin, covering over 1 million square kilometres, or 14% of Australia (MDBA, 2010). The Murray-Darling Basin contains 40% of Australia's farms, 39% of Australia's agricultural production and 65% of Australia's irrigated land area (MDBA, 2010). Just over two million people live within the Murray-Darling Basin and additional populations, communities and towns outside the Basin boundaries rely on water from the Basin for domestic, agricultural and industrial use.

The lengthy drought at the turn of the century, the historical over-allocation of water licenses and concerns about river health led to

Commonwealth government intervention into water policy – an area that has previously been the responsibility of the states – in the early 2000s. As a consequence, the Water Act 2007 and its 2008 amendment were introduced and required the Murray-Darling Basin Authority (MDBA) to prepare a Basin Plan to reduce the quantities of surface water and groundwater that could be extracted from the Basin water resources. The Plan was finally enacted in 2012 but only after numerous protests, demonstrations, arguments, conflicts, and differences of opinion and priorities (Wroe and Arup, 2012). Under the Plan, initially the buyback of water licenses from irrigators willing to sell their entitlement to the government was the water recovery strategy of choice. More recently, following the election of a conservative government, there has been a move to gain water efficiencies through the upgrading of infrastructure off-farms as well as an efficiency grants scheme for similar strategies on-farm – the Connections program. These schemes are designed to make water savings by improving the efficiency of infrastructure. Those farm families who have been successful in receiving grants are required to return half of the water savings to the government and ultimately to the environment. The implementation of these schemes has appeared haphazard and has created controversy both because of the flow of public money into private hands and because of the divisions emerging within communities over who has been successful in receiving grants and who has not.

Within the Basin, dairying is one of the main irrigated industries and the Murray-Goulburn dairy region in the Basin is the site for our research. There are approximately 1500 dairy farms in this region, a vast majority of them run as family farms and heavily reliant on irrigation. The Basin Plan signals an irrigation future that is clouded by uncertainty. Before discussing our limits to adaptation model, we examine critical relevant concepts.

3. Vulnerability, adaptation and resilience

When a disaster occurs, or a major policy initiative such as the MDBP is enacted to protect depleted environmental resources, the need for individuals, families and communities to adapt is obvious. However, in the wake of an environmental crisis such as the reduction of water and the need for critical livelihood adjustments, everyone affected is vulnerable and there is an urgent need for interventions by governments, industry and other organisations to introduce fair and just measures to assist positive and transformative adaptation (Schlosberg et al., 2017; Matthies, 2017; Pelling, 2011). However, in the case of the MDBP and subsequent institutional responses, interventions were framed in technological/scientific and economic terms with scientific expert knowledge prioritized and little attempt made to address the complexities inherent in local situations and circumstances, or to draw on local knowledge (Tschakert et al., unpublished). Yet, as Folke et al. (2002) remind us, we cannot treat ecological systems in isolation from social systems as they are interlinked and constantly evolving in concert with each other. Thus if ecological and social vulnerabilities are to be addressed and the resilience of those affected strengthened, the multiple ecological and social stressors, and the opportunities and threats they represent must be assessed in parallel (Murphy, 2015; Folke, 2006). Thus the need for major, ongoing, just and fair institutional interventions to support social as well as ecological sustainability (Cocklin and Alston, 2003) in affected communities going through enormous challenges must not be overlooked.

Moser and Ekstrom's (2010:22026) definition of adaptation to climate/environmental events captures social and environmental factors. They define adaptation as *involv[ing] changes in social-ecological systems in response to actual and expected impacts of climate change in the context of interacting non-climatic changes*. This definition exposes the complex interactions between environmental factors (in this case the reduction of water for irrigation) and social factors (in this case the critical reliance on farm family based irrigated agriculture for ongoing livelihood and social sustainability amongst families and communities in the

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