The Social Implications of the Degradation of the Coorong and Lower Lakes

Melanie Gale
University of South Australia

Abstract

The severe drought that Australia that has endured over the past few years has impacted adversely on the environment and is the major cause of the reduction of water levels in the Coorong and Lower Lakes (Brodie, Gow, Haese & Wallace 2008). The over-allocation and over-use of water in the Murray-Darling Basin (MDB) has caused the system to endure the longest period ever of reduced freshwater inflows and levels. The Coorong and Lower Lakes environmental state is an issue that requires immediate action by governments and the surrounding community. This article will explore current data regarding the social and planning implications of the degradation of the Coorong and Lower Lakes. It primarily focuses on the social impacts that will occur if the Coorong and Lower Lakes area is significantly environmentally degraded. Drawing on Beck's (2007) risk theory, this paper analyses the adaptive capacity of settlements in the Coorong and Lower Lakes area and how they respond to the stresses and risks caused by environmental degradation. Economic and environmental implications will also be explored to provide an understanding of the interdependencies. This article provides a foundation and theoretical structure for further investigative research to be undertaken.

Keywords: Degradation, Social Implications, Interdependencies, Drought, Over-allocation, Over-use, Community

Introduction

The Coorong and Lower Lakes are located 50 kilometres to the south east of Adelaide and are acknowledged internationally as one of Australia's most significant wetlands (Murray Futures 2009).

In South Australia the Coorong and the Lower Lakes (Lake Alexandrina and Lake Albert) are major interconnected coastal water bodies between the Murray River and the sea (Brodie, Gow, Haese & Wallace 2008).

Goolwa, Clayton, Milang, Langhorne Creek, Wellington, Meningie, Narrung, Raukkan and Salt Creek are the key regional centres located in the Coorong, Lower Lakes and Murray Mouth region. These towns are currently experiencing the adverse effects of the over-allocation of water upstream (Murray Futures 2009).

The Coorong is a large body of water stretching for more than 140 kilometres southeast from the mouth of the River Murray. The width of the Coorong reaches five kilometres in some areas and is no deeper than two to three metres. Coastal sand dune systems, wetlands and unique coastal vegetation form the Coorong and Lower Lakes landscape. The Coorong and Lower Lakes are a major migratory and waterfowl habitat and include important Aboriginal heritage (Government of South Australia 2007).

The region has significant habitation for a variety of water birds, some of which come from the Northern hemisphere each summer to recuperate, forage and feed before flying back home to breed (Santen 2006). The environmental significance of the Coorong and Lower lakes region has been recognised and large expanses of the area have been designated as National Park and a wetland of international significance under the Ramsar convention. The Coorong National Park protects and conserves more than 50,000 ha of the Coorong and Lower Lakes. The Ramsar Convention is the most important international strategy for the conservation of wetlands (Nicolson 1993). The Coorong and Lower Lakes provide habitat for migratory birds which are protected under the China-Australia Migratory Bird Agreement and the Japan-Australia

Migratory Bird Agreement (Murray-Darling Basin Commission 2008). Therefore the Australian government is responsible for preserving the Coorong and Lower Lakes at a high quality level.

Traditional Owners of the Land

The Ngarrindjeri people are the traditional owners of the land surrounding the Coorong and Lower Lakes and many continue to inhabit this area. Ngarrindjeri Aboriginal land encompasses the Murray River and Lakes, Coorong and Encounter Bay region.

> Ngarrindjeri is a term that collectively describes the many peoples and their environments along the Murray River, Lakes, Coorong and Encounter Bay in South Australia (Department of Education Training and Employment 2001).

The Ngarrindjeri people include several tribes, with each tribe owning delineated sections of land. They are well known for their profound history and culture (Sim & Muller 2004). Originally, the Ngarrindjeri were not nomadic people as their environment had ample food supplies, rich with animal, plant and aquatic resources (Kartinyeri 2006). Prior to European settlement the Ngarrindjeri lands were very productive and supported one of the largest aboriginal communities in South Australia (Sim & Muller 2004).

The environmental crisis of the Coorong and Lower Lakes has had catastrophic consequences for the Ngarrindjeri.

> For the Ngarrindjeri people, the land is not just soil, rocks or minerals but a dynamic environment that sustains and is, in turn, sustained by people and their culture. Moreover, the Ngarrindjeri people view the land as central to their spirituality, intertwined by traditions and belief and this spirit of 'country' is focus to the issues of land management and are important to Indigenous people (Haines 2009).

The Ngarrindjeri also believe that the Australian community as a whole is accountable for the wellbeing of the Country (Kartinyeri 2006)

The Ngarrindjeri Nation Yarluwar-Ruwe Plan (2006) has been established to assist government departments, natural resource managers, researchers, industry and communities acquire a better knowledge of the responsibilities to protect the Yarluwar-*Ruwe* (Sea Country). This area includes the Coorong and Lower Lakes (Ngarrindjeri Nation Yarluwar-Ruwe Plan 2006).

The Ngarrindjeri Nation Yarluwar-Ruwe Plan (2006) also outlines future goals and strategies that need to be implemented to improve the environmental condition of the Sea Country. The goals include:

- For our people, children and descendants to be healthy and to enjoy our healthy lands and waters.
- To see our lands and waters healthy and spiritually alive.
- For all our people to benefit from our equity in our lands and waters.
- To see our closest friends - our Ngartjis (special animals) - healthy and spiritually alive.
- For our people to continue to occupy and benefit from our lands and waters.
- To see all people respecting our laws and living in harmony with our lands and waters.

  (Ngarrindjeri Nation Yarluwar-Ruwe Plan 2006)

The Murray-Darling Basin

The Murray-Darling Basin (MDB) encompasses more than one million square kilometres and is located on the eastern side of Australia. Its population is just under two million people.

The MDB contains around 30,000 wetlands; eleven are listed under the Ramsar Convention of Wetlands of International Importance. The river system is divided between the southern and eastern Australian states of New South Wales, Victoria, South Australia and Queensland and the Australian Capital Territory.

The basin is a major water supplier for South Australia and generates water supplies for approximately 40 percent of Australia's agriculture and pastoral production. About 96 percent of

this water is used for irrigated agriculture. This comprises about two thirds of Australia's rural and urban water consumption (Connell 2007).

The MDB is experiencing its worst drought since 1891. Years of over-allocation of water to irrigators in the basin, and the severity of the current drought have led to the system enduring significant environmental degradation and declining resource security. Water management in the MDB has become a major political issue (Connell 2007). The environmental costs associated with altered flows are significant and the MDB ecological condition is considerably impaired and no longer robust (Grafton & Hussy 2007).

River Murray

The Murray River forms a significant part of the MDB and stretches over 2000 km from the Snowy Mountains in NSW to the Southern Ocean in South Australia (Howard 2008).

The health of the Murray relies on the functionality of its ecosystems to maintain water flows and discharge, the physicality of the channel and riparian area, water quality and management, level of exposure, and rare species (Ogden & Reid 2006). The Murray differs from other major rivers around the world because of its highly variable flows and climatic environment. The natural ecosystems connected to the Murray are reliant on the complex dynamics of the river system to maintain its preservation. Unfortunately the construction of dams, levee banks and weirs has severely altered the Murray's flow regimes, thus affecting in-stream flows especially to the Murray Mouth (Howard 2008).

Comprehensive systems of diversions, locks, dams and weirs were constructed to support intensive agriculture, irrigation and regional rural development. The Murray is predominately influenced by the activities associated with irrigation which comprises more than 95% of the water extracted from the river (Howard 2008).

The alteration of flow regimes has significantly reduced natural flows and as a result has detrimentally affected the Murray River. It is crucial for current practices to change if the river is to maintain its functionality.

A program called the Living Murray Project was implemented in 2004 by the Australian government. However, due to the severe drought, there has been minimal progress on this project (Connell 2007).

The restorations of biophysical and ecological systems are the key focuses of the rehabilitation process. This will be achieved through restoring the dynamics of the natural flow of the Murray including quantity, frequency, timing and duration of flow events. The Coorong and Lower Lakes councils and communities are also involved in implementing the program (Connell 2007).

Current issues

The severe drought that Australia has endured over recent years has obviously impacted adversely on the environment and is the major cause of the reduction of water levels in the Coorong and Lower Lakes (Brodie, Gow, Haese & Wallace 2008).

Regional communities and the traditional owners associated with the area are being adversely affected by the degradation of the study site. Declining conditions of the system include the degradation of swamps, receding riverbanks and irrigation banks, disruption of irrigation usage and the irregularity of ferry services. This environmental crisis has the potential to disrupt the provision of potable water to Adelaide and regional towns that are currently relying on this water source (Murray Futures 2009).

All industries in the region will experience change in the future. Some changes that have already occurred are the reduction of livestock on dairy farms and a decrease in wine manufacture. Other industries adversely affected include fishing, tourism, and boating industries (Murray Futures 2009).

The over-allocation and over-use of water in the MDB has caused the system to endure the longest period ever of reduced freshwater inflows and levels.

Increased evaporation and low levels of rainfall and have also exacerbated this problem (Murray Futures 2009). This situation has occurred due to erroneous decisions made in the past by state

and territory governments, and the lack of collaboration between these governments continues (Department of the Environment, Water, Heritage and the Arts 2009).

In South Australia, the Murray River and the Southern Ocean are connected by the coastal waters of the Coorong and Lower Lakes. The five barrages that exist between Lake Alexandrina and the Lower Lakes have restricted the freshwater inflow from the Murray River to the Coorong since their establishment. The recent decline of freshwater flowing through the Murray River has caused an increase in salinity levels in the Coorong and Lower Lakes. These high salinity levels have created an environment that is not tolerated by most native fish species and plants major food sources for water birds (Haese, Gow, Wallace & Brodie 2008).

There has also been an increase in major algal blooms and the salinisation of surrounding land. The toxic algal blooms will impact on the tourism industry and recreational users of the region and is adversely affecting the fishing trade (Murray-Darling Basin Commission 2000).

Connell and Grafton (2008, p. 6) acknowledge the importance of water security and argue there is a lack of recognition of its importance by the government and other institutional parties. They define water security as:

> An outcome of the processes and actions of water managers to 'secure' an agreed flow of sustainable public and private benefits that explicitly account for climate variability and encompasses all uses and non-uses (including the environment).

Water security takes into consideration the inflows, evaporation and quality of biodiversity systems through determining the appropriate uses and non-uses of water. It also promotes the need for bio-physical and socio-economic systems to be resilient to natural environmental disasters such as droughts and floods. The lack of investment from the government will detrimentally effect the improvement of water security along the Murray River, Coorong and Lower Lakes (Connell & Grafton 2008).

Economic, Social and Environmental Factors/Indicators

Nicolson (1993) argues that there are many economic values the Coorong and Lower Lakes provide for the region. Some of these values include:

- The provision of minerals and organic products.
- Potential source of energy.
- Algal species that produce high protein content and can be used in the production of paints, cosmetics, drugs and specific foods.
- The diversity of salt tolerant plants creates opportunities for genetic engineering to develop salt tolerant agricultural and agricultural species.
- The variety of vertebrates and invertebrates potentially serve as a food source for humans and other animals that live in salt lakes.

A recent study by Econsearch (2005) suggests the fishing industry in the Coorong and Lower Lakes is volatile and has experienced significant changes over the years. Licence holders indicated that due to the 'boom and bust' nature of the fishery, little money is spent on boats and gear in difficult years, as fishers try to keep costs to a minimum. The reduced flows of the river have disrupted the natural cycle of migratory fish thus exacerbating the volatility of the industry. The licence holders sell fish products to several markets, including local, Adelaide, Sydney, Melbourne, Brisbane and Perth (Econsearch 2005).

The Coorong and Lower Lakes fishery contributes to the social, environmental and heritage values of the local community through:

- Assisting local sporting clubs (e.g. coaching, fundraising, social events);
- Removal of introduced pest species of fish (i.e. carp, redfin);
- Removal of rubbish from water, lake banks etc.;
- Donating fish to community groups for fundraising, school camps etc.;
- Caring for the elderly (e.g. cooking, donating fish, Meals on Wheels);
- Reporting illegal fishing activities to PIRSA, police and National Parks and Wildlife Service;

- Assisting local schools (i.e. taking on work experience students, assisting with reading programs, donating fish for camps, supervising school camps, taking students on tours of the Coorong), etc.;
- Identifying aboriginal sites;
- Office bearer/member of local associations (i.e. Town Hall, sporting clubs, Local Council, Parents and Friends Committee); and
- Passing on valuable knowledge and information regarding the Lakes and Coorong environment and the fishing industry to local residents from outside the fishing community, tourists and recreational fishers (Econsearch 2005, p. 36).

The fishery is a significant industry in the region because it not only generates income but also provides a supportive network for the community (Econsearch 2005).
According to Sobels (2007) the drought impacts on communities of the Lower Murray by affecting people's health, welfare, voluntarism, retirement and relationships. An increase in workloads and diminishing access to services adds to the problems. The interdependency of these facets of our social lives needs to be recognised by government agencies.

Importance of Local Communities

The towns and communities surrounding the study site have a pristine environment and unique history. Over the years the population has grown and there has been an increase in the range of services and facilities available. This has provided great economic benefits to local industries. The environmental problems these towns have endured over the years have caused great hardship. The future of local industries, employment and local economy are of a major concern to many residents. The once thriving and vibrant economy has slowly deteriorated due to the lack of freshwater, increasing acid sulfate soils, rising salinity levels and loss of animal and plant species (Murray Futures 2009).

Conceptual Framework

Beck's (2007) and Giddens' (1999) concepts of risk and reflexivity provide a conceptual framework for analysing and understanding how the communities respond and adapt to risks relating to the degradation of the Coorong and Lower Lakes.

Beck (2007) and Giddens (1999) provide an analytical rubric for understanding how people make decisions in today's society. Communities in the Coorong and Lower Lakes are faced with many risks associated with the adverse affects of climate change and environmental degradation, thus have to make decisions based on risk to their well-being.

Beck (2007, 1992) and Giddens (1999a, 1999b) argue that whilst humans have always been subjected to a level of risk in the form of natural disasters, pandemics and the like, these have usually been understood as the product of nature. In the current era, however, industrial societies are exposed to risks such as pollution, new illnesses like AIDS and rising crime that can be considered to be the product of modernisation. Giddens (1999a, 1999b) refers to these types of risks as falling into two categories, 1) external risks and 2) manufactured risks. The latter category, manufactured risks, are marked by a significant level of human agency in making the risks but also in the mitigation of risks.

In forwarding a claim that manufactured risks are the product of human agency, Giddens and Beck argue that societies have the capacity to assess the level of risk that is being produced, and the level of risk that will be produced in the future. A reflexive response such as this can alter planned activities. They argue that disasters such as Chernobyl and the destruction of the Aral Sea have caused public faith in the modern project to decline and generating rising public distrust of industry, government and experts (Giddens 1990). Rising public distrust of modern industrial practices is claimed to have resulted in a state of reflexive modernisation, that can be illustrated by concepts such as sustainability and the precautionary principle that focus on preventative measures to decrease levels of risk.

Beck contends that widespread risks contain a 'boomerang effect'. That is, individuals producing risks will also find themselves to be exposed to the risks that they create (Beck 2007, 1992). For example, wealthy corporate investors who place capital in companies producing industrial toxins will face consequences when the toxins seep into the water supply. Or investors who sink capital into water hungry cotton farms on the Murray might suffer through higher taxes to mitigate the cost of remediating the environmental problems caused downstream by the over allocation of resources. Wealthy people of course have the capacity to mitigate risk more easily by, for

example, avoiding tax by smart accounting schemes and it is likely that the highest burden will fall on those least able to afford to address risk. However Beck argues that this sort of risk management is the result of knowledge, rather than wealth, which suggests that if there is public awareness of the risks then there will be social pressure for mitigation.

Figure 1.1 has been derived from Jarvis (2007) to formulate a table using Beck and Giddens' risk theory to categorise the risks associated with the Coorong and Lower lakes into three epochs. This framework provides an understanding of how Beck's risk theory can be applied to determine the communities' decisional patterns.

Categorising Risks associated with the Coorong and Lower Lakes across Three Epochs			
	Pre- Modernity	**Industrial Society (Modernity)**	**Risk Society (Reflexive Modernity)**
Types of Risk	***a*Decisional**	**Risk Calculus**	**Radicalised Risk**
Risk Originators	Natural hazards, dangers, and catastrophes (floods, droughts, famines, crop failures, pestilence, disease, self-injury, extreme weather conditions)	Natural hazards associated with pre-modernity and risks at the workplace, industrial accidents, risks from the utilisation/ operation of machinery and equipment	Artificial catastrophes, incalculable risks, self imposed risks, risks are generated by the nature of social, political, economic organisation
Risk/ Hazard as a function of individual decision	**NO** Hazards that occur due to natural events/disasters	**YES** Risk as a result of industrialisation and the utilisation of industrial processes and equipment (driving, flying, workplace injuries, machine	**NO** (Collectively taken decisions concerning the adoption/ development/ application of technologies mostly imposed on individuals/ society).

		accidents, sickness from different forms of food. Utilising or not utilising these products can be a decision made by individual choice.	Individuals must deal with the risk of radicalised modernity with lack of knowledge/education and with science and 'experts' unable to control the risks created.
Scale of Destruction	Communities, cities, regions, traditions, the Indigenous	Limited by freedom, time, social boundaries, or political assumptions; controlled by insurance cover	Limitless accidents; reproductive risks that are difficult to predict, consequences on multiple generations
Calculation of Damage	Ambiguous, seen as resulting naturally, religious understanding	Quantifiable uncertainty, level of ambivalences, harm and known; insurable, compensation probability; legal determination of liability possible	Diminutive; probability of level of destruction immeasurable; calculation not possible; outcomes not known; legal determination of responsibility not possible; no legal determination of liability available; not insurable; compensation not accessible
Responsibility	Inevitable, acts of human nature	Rules of obligation through political/ market/ institutions/ legal apparatus	Yes and No: inability of political institutions being able to respond to reflexive modernity's risks

Figure 1.1 **Source: Jarvis (2008)**

Figure 1.1 describes the three epochs of risk typology; *a*Decisional, Risk Calculus and Radicalised Risk. The table shows the different types of *a*Decisional hazards faced by communities in the Coorong and Lower Lakes. For example, communities are faced with the inevitability of drought and need to make decisions about the viability of their future. Conversely, Risk Calculus is associated with industrial modernity and involves risk being '*measured, assessed, monitored, controlled, and managed'* (Jarvis 2007). The utilisation of machinery and products is made by individual choice. For example, farmers need to consider whether the operation of machinery and technological products will cause injury or whether pesticides will be harmful to their health. Whereas, Radicalised risks are incalculable, evolving through social, political and economic based organisations. Communities are forced to make decisions without essential information and unreliable sources. '*Science now fails us, with conflicting reports, contradictory assessments and wide variance in risk calculations'* (Jarvis 2007). Acid sulfate soils have recently emerged in the Coorong and Lower Lakes due to lack of water. Conflicting science reports about the severity of the sulfate soils is confusing the community. They are not able to determine whether the sulfate soils are going to cause long-term health problems, thus making it difficult to assess the scope of risk.

Conclusion

Currently there is a lack of qualitative and quantitative data on the Coorong and Lower Lakes. The environmental state of this area is an issue that requires immediate action by governments and the surrounding community.

The role of government departments needs to be clear. There is ambiguity regarding which agency is responsible for the Coorong and Lower Lakes region thus contributing to the mismanagement of the area. At present the government seems to be focused on the economy rather than the well-being of local communities and the environment.

Communities are struggling to cope with the risks associated with the environmental disaster and feel the government has fundamentally excluded them from decision-making processes.
The conceptual framework discussed above provides a theoretical structure and foundation for further investigative research to be undertaken into the implications of the degradation of the

Coorong and Lower Lakes. By evaluating community responses an opportunity exists to identify and respond to any shortfalls of the current procedures implemented by the government, such as community consultation.

If the government does not act now and implement appropriate planning policies to deal with this problem there is little hope for the recovery of the river system.

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