

**The paradox of social sustainability in water allocation:
Multiple social values but no social objectives**

An institutional change analysis of a South Australian water
allocation plan

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DECLARATION

I declare that:

- this thesis presents work carried out by myself and does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university;
- to the best of my knowledge it does not contain any materials previously published or written by another person except where due reference is made in the text; and all substantive contributions by others to the work presented, including jointly authored publications, is clearly acknowledged.

A handwritten signature in black ink, consisting of a stylized 'V' and 'G' intertwined, with a horizontal line underneath.

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LIST OF PUBLICATIONS

1. **Gillet, V.** 2010. Framing of justice in local news reports of a regional water allocation planning process. Paper presented at the UniSA Division of Business Postgraduate Research Colloquium, Adelaide, 23 September 2010.
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ABSTRACT

Increasing water scarcity worldwide urges for sustainable management of the limited water resources. Sustainable development and its Australian translation in natural resources management, Environmental Sustainable Development, are widely recognised as having three interlinked dimensions: economic, environmental and social sustainability. However, in the context of Australian water management, where water markets and environmental flows have been introduced in the last decades, the social dimension has been less examined and considered than its economic and environmental counterparts.

This study intends to fill this gap in examining how well a water allocation plan—a local policy tool regulating the allocation of water resources among the uses and the users—addresses social sustainability from a community perspective. The study explores both the factors of change in water allocations and the social considerations involved in the water allocation planning process. It also combines several streams of theories in policy and institutional change analysis that are applied to the new or revised water institutions defined in the water allocation planning process. The Lower Limestone Coast water allocation plan, which was under revision during this study, served as a longitudinal case study and provided rich qualitative data. Mixed methods—qualitative and quantitative content analysis using NVivo software—were used for analysing the data collected, which comprised: i) 180 local newspaper articles on the planning process for the length of its revision, ii) 65 submission forms filled in by the community during a public consultation on the draft water plan and iii) 20 face-to-face interviews of stakeholders involved in the planning process.

The key findings suggest that despite social values associated with water are being multiple in the region, the water allocation planning process does not define any social objectives. In contrast, clearly set environmental goals place unbalanced emphasis on environmental sustainability. Nonetheless, through diverse, indirect and fragmentary approaches, the water allocation plan addresses social sustainability relatively well, although inconsistently, in protecting social values associated with consumptive uses.

At the same time, the study contributes to theories of social sustainability in proposing five synthesising principles to offer guidance in the examination of social sustainability of water allocation plans and overcome the ambiguities that the concept holds. In addition, the findings of this study also evidence that factors of water institutional change could be both drivers and barriers to change and have directions that are evolving over time and according to the stakeholders. Finally, they indicate that simultaneous institutional changes can exert influence on each other and therefore become factors of change themselves. These additional dimensions and characteristics of factors of change refine its current analytical framework.

Drawing on these findings and contributions, the study concludes by providing practical recommendations for policy design and implementation. A social approach mirrored to the environmental one, i.e. shifting from impact mitigation to adaptation and integration of social values, would benefit a more coherent and dedicated social approach in the water allocation planning process. Finally, preservation of non-consumptive uses would also greatly enhance the social dimension of water allocations.

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ACRONYMS

ACF	Advocacy Coalition Framework
CC	Comaum-Caroline Prescribed Wells Area
CESCR	United Nations Committee on Economic, Social and Cultural Rights
CPR	Common-Pool Resources
CoAG	Council of Australian Governments
CSIRO	Australian Commonwealth Scientific and Research Organisation
Cwlth	Australian Commonwealth
DAFF	Federal Department of Agriculture, Fisheries and Forestry
DEH	Department of Environment and Heritage
DENR	Department of Environment and Natural Resources
DFW	Department for Water
DWLBC	Department of Water, Land, Biodiversity and Conservation
DWR	Department of Water Resources
EPZ	Environmental Protection Zones
ESD	Environmentally Sustainable Development
FAO	Food and Agriculture Organization of the United Nations
GL	Gigalitre
ha	Hectare
haIE	Hectare irrigation equivalent (under the area-based system)
IAD	Institutional Analysis Development
IDC	Inter-Departmental Committee
IWRM	Integrated Water Resources Management
LK	Lacepede-Kongorong Prescribed Wells Area
LLC	Lower Limestone Coast
LLC PWA	Lower Limestone Coast Prescribed Wells Area
LLC WAP	Lower Limestone Coast Water Allocation Plan
MDB	Murray-Darling Basin
MDBA	Murray-Darling Basin Authority
MDBC	Murray-Darling Basin Commission
MIS	Management Investment Scheme
ML	Megalitre
NAFI	National Association of Forest Industries

NR	Naracoortes Prescribed Wells Area
NRM	Natural Resources Management
NSW	New South Wales
NWI	National Water Initiative
OCR	Optical Character Recognition
PAV	Permissible Annual Volume
PIRSA	Department of Primary Industry and Resources, South Australia
PWA	Prescribed Wells Area
SA	South Australia
SAFF	South Australian Farmers Federation
SC	Social Construction
SE	South East
SECWM board	South East Catchment Water Management board
SENRC	South East Natural Resource Consultative Committee
SENRM board	South East Natural Resources Management board
SKM	Sinclair Knight Merz Consulting
TAR	Total Available recharge
TARd	Total Available Recharge and Deep Drainage
TML	Target Management Levels
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UniSA	University of South Australia
USA	United States of America
USDA	United States Department of Agriculture
VIC	Victoria
VLA	Volume Licensed Allocation
WAP	Water Allocation Plan
WDE	Water Dependent Ecosystems
WMA	Water Management Areas
WRPC	Water Resource Planning Committee

INTRODUCTION

Water scarcity in Australia is institutional as much as physical. High inter- and intra-annual rainfall variability is exacerbated by both new realities of climate change and expectations of water users from former allocation policies that over-allocated the resource. Management of water demand, especially through water allocation, is therefore essential to address water scarcity. However, Australia's water consumption per inhabitant is the third highest among the OECD countries (OECD, 2005). In addition, over 75 per cent of its total water extraction is used to irrigate around 2.5 million hectares of agriculture, whereas in OECD countries, irrigation is responsible for only 44 per cent of the water withdrawals (OECD, 2008). One third of the irrigated crops are pastures, thus, contrasting with most other countries that mainly irrigate crops that are directly consumed by humans (Pigram, 2006). To make the situation worse, a portion of this agricultural water is virtually exported to other countries, as irrigation generates 25 per cent of Australia's agricultural exports' value (Shi & Meyer, 2009), thereby representing an additional pressure on Australia's water resources. These water allocations, paradoxical for the driest continent on earth, set a very challenging scene for an examination of a key tool introduced fairly recently in the Australian water governance: the water allocation plan.

1.1. RESEARCH BACKGROUND: SETTING THE SCENE

To face intensifying water scarcity and escalating pressures on water resources, water management is compelled to adapt, either through the development of alternative sources of water, the conservation of existing resources or the modification of current allocation methods (World Water Assessment Programme, 2009). While exploring all of these, and because of current water allocations, the Australian water governance is especially committed to the demand-side management of water through the last listed option in order to address over-allocation and to re-allocate water to the environment. However, such transitions in water management imply complex social changes and hence social issues.

1.1.1. Australian water governance

Since water is indispensable for sustaining economic growth, ecosystems and life, a balance between economic, environmental and social sustainability of water resources is one of the main objectives of Australian water management. The Environmental Sustainable Development (ESD) Strategy that launched this triple commitment (CoAG, 1992) indeed permeated the 1994 Council of Australian Governments (CoAG) Water Reform Framework (CoAG, 1994) and was pursued by the National Water Initiative (NWI), the 2004 Australian Federal government strategy to improve water management (CoAG, 2004a). As its core principle, the NWI recommended that an allocation plan reflecting ESD triple sustainability be developed for each system that is over-allocated, fully allocated or approaching full allocation.

A water plan is ‘a statutory plan for surface and/or groundwater systems, developed in consultation with all relevant stakeholders on the basis of best scientific and socio-economic assessment, to provide secure ecological outcomes and resource security for users’ (CoAG, 2004a, p. 30). The NWI implementation of a water plan differs in each State. In South Australia (SA), they are called Water Allocation Plans (WAP) and are developed only in prescribed areas—i.e. where water is already developed to such an extent that a licence system has been introduced—by the regional natural resources management (NRM) boards. NRM boards are also in charge of developing regional NRM plans, with which water plans should be consistent. Water plans specify how the resource is managed in relation to the allocation, transfer and permit

criteria of the resource (SENRM Board, 2007b) and, thus, are primarily responsible to ensure that over-allocation is addressed.

Addressing the over-allocation of water resources is currently one of the main priorities in Australian water management (CoAG, 2004b; Australian Minister for Climate Change and Water, 2008) and has a 15 year commitment. The National Water Commission, as the responsible body to implement the NWI, has ‘a firm expectation that the over-allocation will be addressed by 2014’ (SENRM Board, 2007a, p. 2) in order to achieve environmental objectives. Indeed, over-allocation bears responsibility for water scarcity and its subsequent water restrictions and environmental degradations—daily issues in the local and national media.

Institutions and institutional change theories provide useful insights for the analysis of changes in water allocations implied by environmental objectives and regulated in water plans, because, in setting local rules for water management, they can be seen as institutional arrangements. Accordingly, the development of water plans and their review represent an institutional change from previous rules (status quo) to new rules (Ostrom, 1990). Moreover, institutional change has been identified as one of the three processes that can lead to sustainable water management in agriculture and environmental sustainability (Molden et al., 2007).

Finally, the introduction of regional NRM boards and statutory community consultations in the water planning process has shifted the traditional water governance that was centrally managed by the State to a new water governance that involves collaboration among a wide range of stakeholders (Gunningham, 2009). Under these arrangements, resolution of conflicts over the allocation of water resources supposes a consensus at all levels, from local to Federal, and entails social approaches. Thus, the ESD strategy with its balance over the three dimension of sustainability and the regionalisation of the new Australian water governance—two recent paradigm shifts in the Australian NRM (Robins, 2007)—both prompt and stress the need to examine the social sustainability of water allocations as much as its economic and environment dimensions.

1.1.2. Social sustainability of water allocations

The social dimension of sustainability has a significant role in developing solutions to environmental problems, because most of these problems are induced and perpetuated by humans. Thus, the NRM is also concerned with people's activities (Davidson & Stratford, 2000) and is carried on by them either individually or in groups (Fenton & Rickert, 2008).

Furthermore, the social aspect of NRM is even more relevant for water, a vital and non-substitutable element of human life. The crucial feature of water for drinking and sanitation was finally recognised as a human right by a resolution of the United Nations General Assembly in July 2010 (United Nations General Assembly, 2010). In addition to these basic needs requirements, water is also heavily involved in culture in many ways, including mythology, rites, religion, arts, daily customs and rituals, sciences and techniques (Strang, 2004; UNESCO, 2006; Académie de l'eau, 2009). This cultural heritage of water, encompassing mostly intangible and immaterial values (UNESCO, 2003; Verschuuren, 2007), forged and is continuously re-shaping our lifestyles and livelihoods. These social and cultural immaterial values of water have been acknowledged in very few laws. The preamble of the European Water Framework Directive is one that acknowledges that:

Water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such (European Parliament, 2000, p. 1).

In Australia, the Aboriginals' spiritual connections with land have been acknowledged by the *Native Title Act 1993* and States' laws, such as the South Australian Natural Resources Management Act 2004, 'recognise and protect the intrinsic values of natural resources' (South Australian Government, 2004a, section 7). However, there has not yet been recognition of the specificities of water compared to those of other resources or commodities, except in the social pillar of sustainability in the NWI. But, socio-economic assessments, the only tool along with community consultations allowing for integration of the social dimension, are actually rarely included in the development of a water plan, as a recent review of eleven water plans has demonstrated (Hamstead et al., 2008). As a result, social aspects of water allocations occur, at best, only through mitigation of social impacts (Cruse, 2010). This is despite the re-allocation of water from agriculture to environment, which is currently occurring across Australia through water plans in

over-allocated water management areas (Kuehne & Bjornlund, 2006). This move is expected to affect not only the irrigators who are directly concerned but also the whole rural and urban community (Freeman, 2005; Meinzen-Dick & Ringler, 2006; Molden et al., 2007). Water management has indeed already been explicitly identified as a significant factor in historical social disruptions (Postel, 1999). In addition, allocation of water resources among multiple users and sectors induces considerable intra- and inter-generational issues of social justice and equity.

Thus, the above social aspects of water allocation further verify the essential need to consider the social dimension of sustainability, as emphasised by the new Australian water governance. However, initial observations suggest that it might not yet have been translated into the water allocation and planning processes.

1.2. RESEARCH SCOPE

This study is an analysis of the social conditions of a water institutional change aiming at environmentally sustainable development. It is supported by a case study examining, from a social sustainability perspective, a water allocation plan in a rural area of South Australia involved in two primary production fields—agriculture and forestry. The Lower Limestone Coast water allocation plan, concerned with the management of groundwater from two aquifers and intended for five years, was first introduced in 1997. Its revision, undertaken during this research study, will result in a second generation of that water plan (Mooney & Lewis, 2010). The attempt to account for forest plantations' impacts on water—interception of aquifer recharge and direct extraction of groundwater—delayed adoption of the revised plan.

This study is mostly based at a local level due to the social attention and scale of the water plan; however, the concerned area covers a large part of the corresponding NRM region: the South East. Moreover, consequences of the changes proposed in the revised water plan may reach beyond that region, either through inter-State agreements or by setting a precedent for other sectors and areas, thus further expanding the geographical scope of this study.

The assumption that expectations for environmental quality will rise overtime, as lifestyles have, expands the initial specific need for social consideration in areas with water over-allocation to future needs for re-allocations, even in under-allocated catchments. But more globally, efforts to achieve social sustainability are not only reserved for re-allocation, but are also required for consensus building and dispute resolutions over water allocations, as well as for better consideration of social and cultural values of water in water policies and associated regulations.

Finally, despite this study acknowledgement of the balance between the three dimensions of sustainability, it focuses on the social (directly) and environmental (indirectly) dimensions. Accordingly, the economic pillar will not be given similar attention, as it is beyond the scope of this study. Nonetheless, the study is based on the New Institutional Economics, an economic perspective focusing on the institutional dimension but currently expanding to the social domain (Williamson, 2000), that is thus well suited to this study for both the institutional and the social perspectives taken. In addition, economic aspects interfering with or refining the social dimension will also be explored.

1.3. RESEARCH RATIONALE

In the Australian context, in spite of the need to consider the social dimension of sustainability expressed in both the ESD strategy and regionalisation, current research focuses mainly on the economic and environmental sustainability of water plans. Significantly less research has been undertaken regarding the social aspects of water plans (Hatfield-Dodds et al., 2006/07; Alston & Mason, 2008; Baldwin, 2008; Shepherd & Martin, 2008; Syme & Nancarrow, 2008) or has been restricted to some aspects of social sustainability, such as social justice (Syme et al., 1999; Nancarrow & Syme, 2001; Syme & Nancarrow, 2001; Potter et al., 2007) or social capital (Keremane & McKay, 2008). Previous research also attempted to:

Quantify the economic dimensions of the social flow. However none have provided a comprehensive overview of the qualitative value of social uses and cultural significance of water to communities (Alston & Mason, 2008, p. 138).

The present study therefore fills this gap by focusing on all aspects of the social dimension of sustainability of water allocation from a community perspective and by using a qualitative approach.

The revised Lower Limestone Coast water allocation plan supporting this case study was expected in 2006, but has not yet been adopted at the time of writing. The extended planning process suggests the presence of disputes and rivalries among stakeholders regarding resource allocation and indicates difficulties in developing locally agreed allocation policies. Such a lack of consensus is considered a wicked water problems (Freeman, 2000) and solving a wicked problem is essentially a social process (Jeffrey, 2003). This further corroborates the need, at the local level, for examination of the development of this water plan from a social perspective.

Theoretically, the definition, scope and methods of analysis of social sustainability are still blurred and largely lag behind its economic and environmental counterparts (Littig & Griebler, 2005; Dillard et al., 2008; Larsen, 2008; Magis & Shinn, 2008). This is specifically true in environmental policies (Sharma & Ruud, 2003; Lehtonen, 2004; Strang, 2004; Verschuuren, 2007; Throop, 2010), which have tended to focus on the economic valuation of ecosystems services and the determination of ecological thresholds to protect them. Similarly analytical frameworks for investigation of institutional change are still incomplete (Ostrom, 2008) and few studies have applied them to environmental policies or water governance (Kuks,

2004; Livingston, 2005; Caldera Ortega, 2009); in particular, in the Australian context (Connor & Dovers, 2004). But even less research combines both perspectives with an analysis of social conditions of institution change in environmental policies, despite both perspectives being identified as significant for the Australian NRM (Davidson & Stratford, 2000). Such a combined approach will bring new insights to contribute to the resolution of water governance crises (World Water Assessment Programme, 2006; Keremane, 2007).

1.4. RESEARCH QUESTIONS AND OBJECTIVES

The purpose of this study is to explore how well a water allocation planning process addresses social sustainability from a rural community's perspective. It is subdivided into the following two research questions:

- **What are the main factors of change driving the water allocation planning process from a community perspective?**
- **What considerations of social sustainability does the water allocation planning process encompass?**

By answering these research questions, the study aims at:

- Examining the institutional arrangements governing the South Australian water planning process
- Establishing factors that influence the water planning process
- Proposing principles of social sustainability against which the planning process will be assessed
- Assessing whether the influential factors affect the social sustainability of the water allocation
- Identifying the social and cultural values of water in the case study
- Determining whether each of the suggested social sustainability principles has been integrated in the water allocation plan.

1.5. RESEARCH CONTRIBUTIONS

The case study involved in this research will assist in deepening institutional change theories, as the use of case study is considered a methodology that is well adapted for investigating such change (Alston, 1996), and thus gain insights on the outcomes of the process at field level. Indeed, the longitudinal analysis proposed for this study will allow for a dynamic analysis of institutional change, a need that is recognised by numerous authors in the field of institutional change (Ingram et al., 1984; Schmid, 2004; Fischer et al., 2007; Ostrom, 2008). Therefore, this research will contribute to the definition of a dynamic institutional change theory for the specific sector of water governance, and therefore to the wider field of New Institutional Economics.

Moreover, the second research question intends to participate in the Australian, and more global, debate of sustainable development within the agricultural water management sector. The findings of this study will assist the social dimension of sustainability to keep pace with its more studied and developed economic and environmental counterparts. Likewise, the research design devised to investigate this social perspective should enrich the field's often-decried methods of exploration (Sabatini, 2005; Colantonio, 2007; Alston & Mason, 2008). The policy contributions of this study will contribute to addressing the water governance crisis, especially by providing insights needed to develop strategies and guidelines for an improved consideration of the social sustainability in water planning process. Furthermore, outcomes of this study should provide valuable information to uncover social values that are associated with water. The latter should both protect the identified cultural uses of the resources and help design practical and socially sustainable solutions to address over-allocation through re-allocation. Eventually, the results of this research study will participate in the resolution of water allocation conflicts and, therefore, in achieving a socially cohesive policy on water.

1.6. THESIS OUTLINE

This thesis is organised into eight chapters. This first chapter has introduced the context, scope and rationale for this study, which the research questions in section 1.4 encapsulate.

Chapter Two is a review of the literature that provides the theoretical foundations for the research that are based on the fields of social sustainability and water governance. It proposes a set of five guiding principles for the exploration of social sustainability in water governance, as well as a number of policy analysis theories that are relevant from a social perspective and to be combined into a framework for analysis of water institutional change. Finally, it identifies gaps and convergences between the social sustainability and institutional change fields that shape the research questions.

Chapter Three describes the research design, as well as the methods for the collection and analysis of the data that fuel the case study. It also explains the rationale and criteria for selection of both the data and the methods. In addition, implementation of the methods, as well as the methodological and analytical limitations, are detailed.

Chapter Four presents a review of the path to the current nested Australian and South Australian legal and policy arrangements for natural resources management, in particular for water resources management. The water plan, a water policy tool under examination in this study, is especially described, as well as its recent evolution towards allocation of the resource and the social sustainability principles. Finally, the chapter introduces the Limestone Coast in the southeast of South Australia, the case study area and the particularities of the area's water allocation plans.

Chapters Five to Seven report and discuss the results of the data analysis. Chapter Five focuses on the results of the analysis of the first set of data collected: articles from the local newspaper published during the revision of the water plan. It presents a longitudinal overview of the water allocation planning process and discusses the changes to be introduced in the revised water allocation plan. It attempts to identify the key factors influencing the planning process and describes both the consideration of social sustainability and its five principles during the water planning.

Chapter Six discusses the results of the analysis of the submission forms, the second set of data collected. It first describes the community consultation on the draft water

plan, for which the submissions were sent, by revising both the proposed draft water plan and its practical details. This chapter follows the same structure as that in Chapter 5 and reflects the two research questions: it refines both the factors exerting influence on the planning process and the reflections of social sustainability in both the draft plan and the planning process.

Chapter Seven sharpens and triangulates results of the two previous chapters using an analysis of a third and last set of data collected from interviews with twenty stakeholders involved in the development of the water plan. A review of the interviews' context and participants begins the chapter. It then brings refinements and new perspectives fuelling, and again organised according to, the two research questions.

Ultimately, Chapter Eight provides an answer to the research questions drawn from the case study analysis. Next, it returns to the study area to discuss the implications on social sustainability of likely outcomes of the water planning process. Based on the conclusions, it describes the contribution of the research to theories, methodology and practices, before debating the limitations of the study and suggesting directions for further research.

SOCIAL SUSTAINABILITY & TRANSITIONS IN WATER GOVERNANCE

The purpose of this chapter is to understand the underlying theoretical foundations of, and relationships between, the main concepts under study in this research, as well as to position this work within the existing base of knowledge. This research is concerned with the analysis of a water policy instrument—a water allocation plan—from the social sustainability perspective. The first section reviews therefore the literature regarding social sustainability. The concept holds many ambiguities and lacks appropriate social indicators and measurements. These are overcome by the proposal of five synthesising principles to offer guidance in the study of social sustainability of water allocations plans. The second section then turns to water governance, the specific field of this research, in particular its transition phases, as explored from a social perspective. It first examines the social nature of water governance in replacing social water allocations in water doctrines and water allocations theories. Next, policy analysis theories, another literature stream, are critically explored to analyse the implementation of water plans. Those theories are then merged with the field of institutional change in order to propose elements for the study of transitions in governance. Finally the main findings of the two literature reviews are merged to shape the two research questions of this study and establish their significance.

2.1. SOCIAL SUSTAINABILITY

Social sustainability is often considered as the social dimension of sustainable development. The latter was articulated by the so-called Bruntland report in 1987 as a development that ‘meets the needs of the present without compromising the ability of future generations to meet their own needs’ (World Commission on Environment and Development, 1987, p. 8). It, however, builds on earlier statements (Merrett, 1997) including those in the United Nations Conference on Human Environment held in Stockholm in 1972. Sustainable development reoriented international development based on a growth-oriented model, criticising it as damaging to the environment. As a result, environmental sustainability was given expanded attention from both ecological and economic traditions. The triple dimensions of sustainable development, namely the economic, environmental and social pillars, have crystallised its most agreed upon definition since the Rio conference in 1992 (Lehtonen, 2004). These international trends do not relate only to developing countries, but also translate into national strategies of developed countries. The Australian government developed a National Strategy for Ecologically Sustainable Development in 1992 (CoAG, 1992) and pursued the triple objective of economic, social and environmental sustainability in its National Water Initiative (CoAG, 2004a). The Federal government of the Australian Commonwealth has led that of State governments and has used coercive means to insist on the use of triple objective-related wording in State legislation (see Chapter 4).

The social dimension of sustainability originates from the human-centred development and basic needs movements that have legitimately attempted to redirect development towards its primary aim, i.e. human development. In parallel, the community well-being tradition has developed and added a collective perspective to the social dimension (Magis & Shinn, 2008). Despite being incorporated from inception in sustainable development by international and development organisations, social sustainability has not received as much attention as its economic and environmental counterparts. Indeed, despite a limited initial literature from practitioners in developing countries, the social dimension only stands out in academic literature since 2000 and that mostly from developed countries such as Australia, United Kingdom, USA and Canada (Appendix 2.1). The social sustainability concept is however immediately applied in a great number of fields (urban planning, housing, natural resources management, business, development,

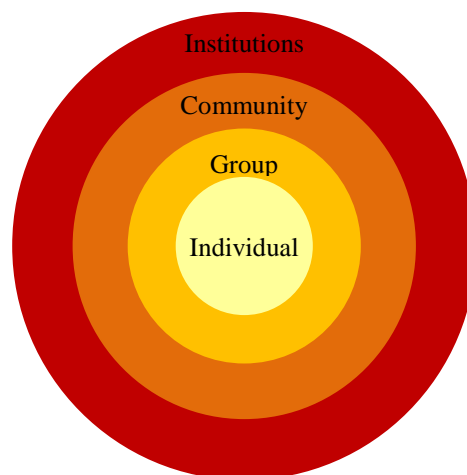
sociology and politics). In parallel, a variety of terms have developed by focusing on social concerns reflecting the interests of each field and indicate disagreement over the definition of social sustainability: for example social well-being, social justice, socially sustainable development or social responsibility, respectively, from the social work, psychology, international development or corporate sector.

2.1.1. Disagreement over the social sustainability definition as a reflection of ambiguities and controversies

The co-existence of numerous definitions of the ‘social sustainability’ proposed in the literature and dependant on the field of study (Appendix 2.1) suggests that conflicting views on the social sustainability concept prevent academics from comprehensively defining the term and studying it and prevent policy makers from integrating the concept. Each element of the expression indeed contains ambiguities and controversies that further complicate its aggregate notion.

2.1.1.1. Ambiguity of the ‘social’ term

The term ‘social’ bears various semantic ambiguities as it relates to individuals, specific groups, the society as a whole (Ballet et al., 2003) and institutions (Littig & Grießler, 2005) (Figure 2.1). Not only is the level under study confused but these levels can conflict with each other, as some individual progress may not result in global improvement for a society. However, in front of these integrative approaches, social sustainability is sometimes considered as contradictory to self-interest (Cox, 2004), initiating rivalry between the private and public domains.



Sources: (Graphic interpretation of Ballet et al., 2003; Littig & Grießler, 2005)

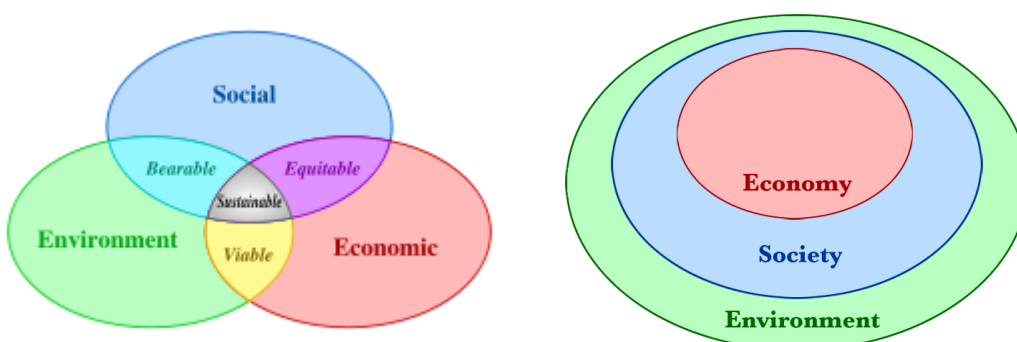
Figure 2.1. Social spheres

Additionally, the cultural, aesthetic, spiritual, religious, ethical and political elements, all implicitly encompassed in the social dimension of sustainability create another semantic ambiguity within the social element. The economy itself is a social phenomenon and therefore could be included in the social dimension of sustainability (Littig & Grießler, 2005). Its separate dimension reflects a societal-level emphasis on economics (Dillard et al., 2008).

The semantic ambiguities of the term ‘social’ suggest conflicting interpretations on the analytical level of the social sustainability framework, as well as on the social elements that it encompasses.

2.1.1.2. *Ambiguity of the ‘sustainability’ term*

Similarly ambiguities exist around ‘sustainability’ or sustainable development as both are used indifferently in most cases (Cheney et al., 2004). It is a highly contestable concept (Neumayer, 2003); rival renditions present it either as an ‘ethical concept or overarching societal value, akin to concepts such as justice or democracy’ (Mooney, 2005, p. 103), as a consensus (Ratner, 2004) or as an oxymoron from a more negative standpoint—development understood as economic growth that challenges sustainability and, more specifically, environmental sustainability (Redclift, 2005). Two models of sustainability (Figure 2.2) dominate the debate. The concentric model puts a focus on the environment (because it encompasses the two others), while the interlinked model suggests that only the juxtaposition of the three pillars allows for sustainability. The latter model emphasises the need for balance and integration of each element.



Source: (McKenzie, 2004)

Figure 2.2. The interlinked (left) and concentric (right) models of sustainability

These models are sometimes associated with different perspectives: the biocentric (or ecocentric) versus the anthropocentric models, also labelled as strong or weak sustainability suggesting that sustainability's quality can vary, as argued by Smailes (1995). The former calls for the non-deterioration of the natural capital stock and therefore only to be used to maximum sustainable yield, whereas the latter assumes that there can be substitutability of natural capital by any other type of capital (economic, human or technological capitals); therefore, it accept the deterioration of the environment under certain conditions (Daly & Cobb, 1994; Neumayer, 2003).

Behind these disputes over the term, lies one of the two great issues regarding sustainability, and more specifically social sustainability: whether it relates to a state or a process. Conflicting literature argues that sustainability is the way to achieve a desirable state—sustainability refers to the ability to maintain an effort for a long period according to The Australian Concise Oxford Dictionary (2004)—or the final state (Sutton, 2000) or both (McKenzie, 2004). This nuance expresses exactly the difference between sustainability and sustainable development according to Partridge (2005a). But Larsen (2008, p. 50) explains these conflicting positions from 'sustainability and sustainable development' (being) concerned with both material world [...] and social world', involving therefore contradictory theoretical foundations. Regarding social sustainability, the permanent evolution of social conditions does not allow the identification of a final state and, therefore, tends to reject the final state perspective. Discussion over this controversy is pursued in the following sections.

2.1.1.3. Ambiguity of the 'social sustainability' expression

Social sustainability, as the union of two ambiguous terms, is clearly a confounding concept, but this confusion is also magnified by its own specific complexities. From a theoretical position, the ambiguity also arises from the lack of 'clear differentiation between the analytical, normative and political aspects' of social sustainability (Littig & Grießler, 2005, p. 69) due the lack of corresponding theory (Littig & Grießler, 2005; Larsen, 2008). This has implications on the practical level, but also comes from that level. Indeed, the social sustainability concept is both 'immaterial' and 'reflexive' (Lehtonen, 2004, p. 202). This is due primarily to its subjective characteristics that are associated to individuals' perceptions and interpretations of the relatively intangible social conditions, despite their practical consequences on people's lives. Two significant consequences ensue from this reflexive nature.

Firstly, social sustainability is strongly context-dependent. While this feature is sometimes considered to be negative, since it does not allow any generalisation at theoretical level, it is also believed to be the most useful property of the concept as context leaves space for various forms of sustainability (Baldwin et al., 2008). Contextualisation also allows a better understanding of social sustainability (Koning, 2001). Secondly, and more importantly, people are the core of social sustainability (Cox, 2004; Larsen, 2008). From that significant finding springs the second major issue and criticism of existing social sustainability literature. The vast majority indeed subdues social sustainability to economic and environmental sustainability. People are considered either as a menace to the environment from an ecological perspective or as a means to achieve growth from an economic perspective (Dillard et al., 2008). This research, on the contrary, argues that social sustainability should be operationalised independently from, although interrelated with, the two other dimensions. A social sustainability theory should therefore focus on, and place people at, its centre. The very attractive nature of an integration of the three components of sustainability (Partridge, 2005a) should not provide rationale for neglecting of the social dimension (McKenzie, 2004).

On the basis of these ambiguities reflected in the two identified critical issues on social sustainability, practical measures appear necessary to be able to consolidate the basis of a suitable theory.

2.1.2. Indicators and measurements of social sustainability

In the absence of a social sustainability theory, most practical explorations of the concept have been pursued through a search for relevant social indicators, in an effort to monitor and evaluate progress towards achieving social sustainability. However, despite manifold attempts to select suitable social indicators in the natural resources management field (Pepperdine, 2000; Lockie et al., 2002; Baldwin et al., 2008; Herreira et al., 2008), there is still a lack of a commonly agreed upon and comprehensive set of social indicators. This is partly due to the necessary contextualisation of indicators, but is also because the literature has not proposed an easy and quick way to measure social impact (Sabatini, 2005). The ‘triple bottom line’ concept widely promoted in Australia (Elkington, 1994 in Mitchell et al., 2007), enables organisations to respond to sustainability issues, but it is only a reporting tool and was not specifically designed for measurement of the social dimension of sustainability. The ‘social analysis’ and ‘social assessment’ methods are built,

respectively, on social capital—which is only one component of social sustainability—and sustainability theories, and are employed for the evaluation of a project, in particular, one related to natural resources management (Dale et al., 2001; Schirmer & Casey, 2005). One of the major flaws of these measurement techniques is grounded in the limited assessment of the economic or quantifiable side of water's social values (Alston & Mason, 2008); thus, there is a need for additional attitudinal data for local application (Herreira et al., 2008). Notwithstanding a recent trend to mix quantitative and qualitative indicators to overcome this issue, there is still an unresolved dispute between proponents of integrative evaluations that do not offer practical tools and supporters of methods that separate the economic, environmental and social dimensions without any solution to aggregate the diverse metrics (Norman & MacDonald, 2004; Colantonio, 2007). As a result, methods to assess the social dimension of sustainability are still being tested (Baldwin, 2008; McKay et al., 2010).

Facing both these theoretical ambiguities and practical complications, there is clearly a need for more synthesising of the social sustainability concept in order to overcome both content and methodological challenges. The following section develops such a synthesis in the form of social sustainability principles applied to the water management field.

2.1.3. Synthesising principles of social sustainability as applied to water allocation policies

As no definition of social sustainability seems able to stand by itself, most authors propose elements to be considered in any social sustainability study. Table 2.1 presents some of those elements that have been selected for their recurrence and for their suitability in the field of water management. They can easily be organised into four principles: fairness, quality of life, community engagement and future focus. These social sustainability principles can easily be tracked back to the various political movements—human-centred, basic needs and community well-being—that have given birth to the social sustainability concept. A fifth element, social value, is added for this research as it relates to water, a resource that embraces a wide range of social values (Figure 2.3).

Table 2.1. Concepts included in each of the five synthesising principles of social sustainability

Fairness	Quality of life	Community engagement	Future focus	Social values of water
<ul style="list-style-type: none"> • Procedural justice • Distributive justice • Inter-generational equity • Intra-generational equity • Social justice 	<ul style="list-style-type: none"> • Basic needs • Capacity development • Livelihood • Employment • Services • Lifestyle • Freedoms 	<ul style="list-style-type: none"> • Democracy • Social capital • Social cohesion • Rural community vibrancy • Social fabric • Trust • Transparency • Social capacity • Public interest 	<ul style="list-style-type: none"> • Adaptive management • Resilience 	<ul style="list-style-type: none"> • Common good • Local identity • Cultural and traditional uses • Recreational uses • Aesthetic uses • Inherent value

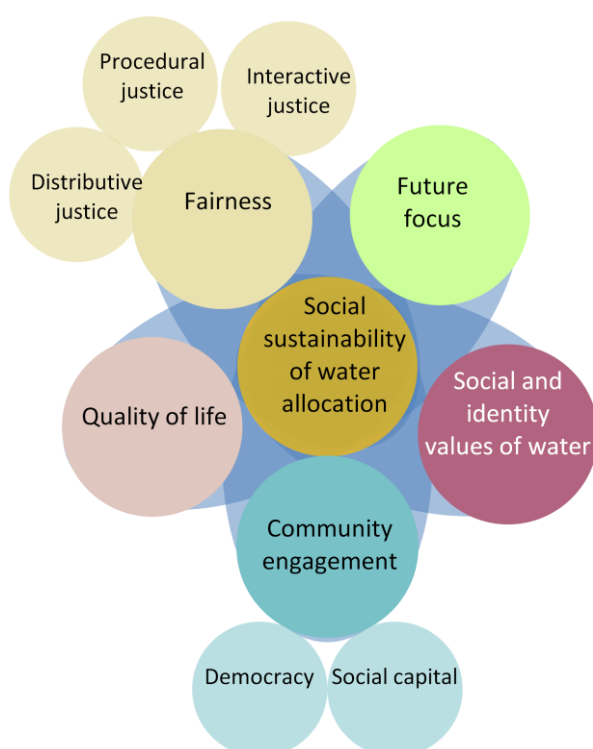


Figure 2.3. Synthesising principles of social sustainability as applied to water allocation

2.1.3.1. *Fairness*

Fairness is a highly ranked principle in any social sustainability discussion and comprises various elements. To Syme and Nancarrow (1996; Syme et al., 1999), fairness in allocating water encompasses procedural, distributive and interactive justice. The first relates to the decision-making process and the static versus dynamic debate on sustainability, validating that at least for the social dimension, the process is as significant as the final state. The second focuses primarily on equitable access and outcomes for every stakeholder, with specific attention to gender-based distribution, as well as inter- and intra-generational equity. Lastly, interactive justice is concerned with providing comparative attention among people. In integrated water resources management (IWRM), allocation of water is directly linked to distributive justice (Dinar et al., 1997; Agarwal et al., 2000) and therefore links the water allocation planning process with its procedural counterpart. The interactive justice depends on the comparative benefits and advantages for each stakeholder from the process and in the resulting water allocations. Additionally, a strong component of equity in relation with environmental sustainability, and thus also significant in natural resources management, is inter-generational equity. But, akin to sustainable development, fairness is an ethical concept and therefore some conflicting theoretical foundations are in play over what is considered fair, depending on what fundamental principles fairness is being assessed against. For example, equality and proportionality values result in different equitable outcomes (Rasinski, 1987). With regard to water, Tisdell (2003) confronts the main water doctrines—riparian, prior appropriation and non-priority permit doctrines—to three schools of thought on justice. These are alternately considered fair or not fair depending on utilitarian, equality of opportunity or legitimacy notions of fairness from Bentham, Rawls and Nozick, respectively. In this research, the South Australian legislation that constitutes the water doctrine in place in the case study (Chapter 4) becomes therefore the higher principle against which the fairness principle of social sustainability will be assessed in relation to water allocation.

2.1.3.2. *Quality of life*

The quality of life principle includes elements from the basic needs movement, also sometimes stated to be basic rights: food, shelter, health, education, water and sanitation, sometimes extended to freedoms—‘five critical freedoms [...]’: economic facilities, protective security, political and civil rights, transparency guarantees and

social opportunities' (Sen, 1999 in Magis & Shinn, 2008, p. 24). Water is concerned with almost all of the above basic rights as it is involved in food security, flood protection, water-borne diseases, water conservation and, of course, access to water and appropriate disposal of wastewater. Water is defined as a common-pool resource (Ostrom & Ostrom, 1977) but debate arises whether it is a common good and, by extension, whether it should be freely accessible. People's quality of life also relates to their livelihood. As a case in point, Littig and Grießler propose the notion of work as a basis for social sustainability (2005). The individual level of social sustainability or human well-being (Magis & Shinn, 2008) is prevalent in this principle, whereas community engagement, the next principle, has a collective meaning.

2.1.3.3. *Community engagement*

Community engagement includes both the process (democracy) and the results (social capital) and comes from the community well-being movement (Magis & Shinn, 2008). Even so, social sustainability is sometimes reduced to the preservation and further development of social capital (Koning, 2001; Goodland, 2002; Keremane & McKay, 2007), similarly to the restrictions of economic and environmental sustainabilities on economic and environmental capitals, respectively. Three elements constitute the social capital theory: 'i) groups and networks, ii) trust and solidarity, and iii) cooperation' (Keremane & McKay, 2008). Social capital should not be confused with human capital, as the former refers to the community level while the latter corresponds to the individual level (Goodland, 2002). Social capital can be bonding—referring to social cohesion (Mollard, 2008), social inclusion or interaction (Cooper, 2006) or interconnectedness (McKenzie, 2004)—, bridging—in particular integrating the community's diversity (McKenzie, 2004)—and linking to areas outside the community through institutions (Lehtonen, 2004). Communities with strong social capital are believed vibrant, with robust social fabrics and able to work together to solve water and other allocation problems.

The process of community engagement includes much more than public participation; it also encompasses engagement with science, through social learning (Collins & Ison, 2006), and with democracy, through its institutions. An actual citizen engagement—not only tokenistic (Arnstein, 1969)—bridges democracy and social capital, the two components of community engagement, but also has a dual impact on social sustainability. On the one hand, it promotes dialogue and understanding between the various stakeholders (Kauffman & Shorett, 1977) and

thus enhances the social capital of the concerned community. But on the other hand, it also enables the community to influence their local water governance (Razzaque, 2009) (detailed in section 2.2.2), which may threaten the equity principle of social sustainability. Engagement with science builds the social capabilities or capacities of individual or collective entities (Sen, 1999; Ballet et al., 2003; Cooper, 2006). Finally, engagement with democracy includes both democratic governance and democratic government (Magis & Shinn, 2008). The shift from government to governance acknowledges the interaction of a multitude of stakeholders in the development of policy (Kuks, 2004; Gunningham, 2009; Huitema & Meijerink, 2009). The former refers to institutions that are open, transparent and accountable (Whelan & Oliver, 2005), while the latter is concerned with the government as the ‘holder of the public trust’ (Magis & Shinn, 2008, p. 35) and as a protector of the public interest. Both are significant in water management.

2.1.3.4. *Future focus*

The future focus refers to the Bruntland report’s definition of sustainable development assuming that development will be sustained over a long period and will lead to inter-generational equity (see introduction of section 2.1). It also confirms, within the critical state versus process debate on sustainability that the process needs to be included in order to consider the future. However, due to the evolving nature of social values and perceptions and the vagueness of its definition, the notion of sustainability itself can change over time; thus, calling for the additional consideration of adaptability or adaptive management. The management of a water system can only be sufficiently flexible to adapt to future changes if both its institutions and its relying community are resilient (Folke et al., 2002)—i.e. both having the capacity to absorb disturbance and reorganise while undergoing change and retaining the same essential identity, structure, functions and feedback, according to Glavovic (2005). Social resilience also stresses ‘human beings as an active component of social change’ (Herreira et al., 2008, p. 8), adding to the familiar idea that people, being both agent and beneficiary, are central to sustainable development (Larsen, 2008).

The fifth and last principle of social sustainability of water allocation, touching on the social and identity values associated with water, will be detailed in the section on water governance (section 2.2.1.4), which will place these values in the corresponding contexts of water doctrines and allocation theories.

2.1.3.5. Relationships between the five analytical principles

The five guiding principles of social sustainability have strong relationships that coherently bind them together. Table 2.2 displays the concepts that link each of the guiding principles with the other four principles.

Table 2.2. Relationships between the five social sustainability principles

	Fairness	Quality of life	Community engagement	Future focus	Values
Fairness					
Quality of life	Perception of justice				
Community engagement	Equivalent political voices Democratic governance	Involvement in community			
Future focus	Inter-generational equity Social capacity	Capacity building	Alternative scenarios for adaptive management Community resilience		
Values	Water as a common good	Aesthetic values Regional identity values	Values influence social capital	Values influence desired future	

Quality of life is greatly affected by involvement and by perceived fairness in community life. Capacity building not only improves the immediate quality of life but also contributes to better adapt to future change and become resilient.

Community engagement and participatory processes permit greater fairness through inputs from all individuals and groups in the community, as well as similar access to political voices and powers (Partridge, 2005a), which in turn supports democratic governance.

Empowered communities, through community engagement, are better able to deal with future change. In particular, a strong social capital positively influences community resilience (Rydin & Pennington, 2000; Schwarz & McRae Williams, 2009). Additionally, formulation of alternative options by interested parties

(Beekman, 2002) fosters symbiosis between community consultation and adaptive management.

Inter-generational equity blends the fairness and future focus principles. Likewise, social capacities embodying the social learning component necessary for social resilience is also a means to promote transfer of capabilities to the next generation (Ballet et al., 2003), for equity not only in current resources, but also in capacities.

Finally, the social and identity values have strong influences over the other four principles. The aesthetic and regional identity values (attachment to an area), in particular, enhance the quality of life locally. The common good value of water calls for an even greater fairness principle. In exchanging values, stakeholders of the water planning process build social and institutional capital (Whelan & Oliver, 2005). More generally, values associated with water affect both the social capital and the desired future of a community.

These relationships among the five principles identified on social sustainability establish that they are strongly tied together, defining a robust framework to assess the social sustainability of water allocations against. These relationships also make it difficult to treat the principles separately, and support the use, in this study, of diverse data and multi-methods of analysis to look at these principles (see Chapter 3).

2.1.4. Water management as an interface between social and environmental sustainability

Water, as a natural resource, clearly contributes through its sustainable management to the potential environmental sustainability. However, the social uses and benefits of water (detailed in section 2.2.1.4) entrust it with important contributions towards social sustainability, in particular of a rural community, blending therefore the environmental and social pillars of sustainability. Furthermore, ‘what constitutes environmental sustainability is ultimately a social and political question as much as a scientific one’ (McKenzie, 2004, p. 10); thus, placing water at the nexus between environmental and social sustainability.

At that interface, the causal relations are still unclear. Evidence has demonstrated clearly that communities can perpetrate extreme environmental damages. But there are rival interpretations as to whether environmental degradations can threaten the

sustainability of rural communities relying on natural resources (Diamond, 2005a) or on the contrary whether environmental governance mechanisms can facilitate social cohesion, even to the detriment of the environment (Mollard, 2008; Lopez-Gunn, 2009a). A social sustainability framework constructed around the above-mentioned five significant principles for the allocation of water, will contribute to clarify these relations.

Finally, the strong relationship shared by the three dimensions of sustainability could be crystallised in its social dimension. Indeed, whereas the economic and environmental dimensions are sometimes seen as conflicting, the social dimension could bridge them; that is, a community cannot be sustainable if both the environment and the economy are not sustainable.

This review of social sustainability-related literature points to the need for research contributing to the construction of a consolidated theory that would clarify causal relations located at the interface of social and environmental sustainability. Moreover, such consolidation calls for the integration of two identified key issues: first, placing people at the centre of the research in order to obtain a genuine social perspective—rather than a means for economic or environmental sustainability—, and second, giving equal attention to the process and to the end state.

To understand how the previous findings could be adapted for the collective management of water resources, the next section focuses on water governance.

2.2. SOCIAL PERSPECTIVE ON TRANSITIONS IN WATER GOVERNANCE

Water governance, as opposed to government policy on water, acknowledges the human dimension of water management (Kuks, 2004; Jeffrey, 2006; Lopez-Gunn, 2009a) and the multitude of stakeholders affected by and influencing its design (Lopez-Gunn, 2009a, b; Meijerink & Huitema, 2009). Water governance assumes integrated water management that is addressing water problems. Water governance is multi-levelled (Kuks, 2004) where water doctrines, defined and shaped by water laws, set the highest reference that is then implemented through water policies and institutions. Owing to the precise directions that water doctrines offer for the allocation of water, this section will replace, from a social perspective, the water allocation plan under study within the wider context of water governance and each of its constituent levels.

2.2.1. Social water allocations

2.2.1.1. *Water doctrines and social sustainability*

Water laws, as the fundamental approaches of the legal system in relation to water, impose strong directions upon water governance, enabling or not social water allocations. In particular, water laws, in shaping the doctrine in place, regulate the relationship between the public and private domains through the concept of property rights (Hodgson, 2006; Fisher, 2009; Lopez-Gunn, 2009a). A private water right is a secure form of ownership enforceable by the State, unless it challenges the public interest (Kuks, 2004). Water as a common-pool resource can be controlled and/or owned by different entities: the State, the community, an individual or by no one (Kuks, 2004; Fisher, 2009), complicating the water rights system and enforcing the public interest. In this study, the term social water allocation includes the allocation of water for the public interest, encompassing, but not exclusively, the preservation of the environment. The social sustainability of water allocation exactly lies at the boundary between these public and private realms.

However, this public-private delimitation is evolving over time and, depending on the context, can result in competing water doctrines. Under the classic land based approach to water rights, the English Common Law developed the riparian doctrine and the prior appropriation doctrine (Hodgson, 2006)—also called appropriation, priority appropriation, statutory or Colorado doctrine. The former considers water as

an integral part of the land, but gives only a usufruct right up to ‘reasonable use’ of the resource to all riparians of that resource (McKay, 2006). The latter was achieved through occupancy of the land and beneficial use of the water, giving priority to those who first appropriated the water (Howe, 1996; Kuks, 2004; Hodgson, 2006; Fisher, 2009). It also translated into the beneficial use doctrine for groundwater (Hodgson, 2006). The common and more recent separation of water from the land generated the non-permit or allocation doctrine, based on water allocation granted by the State. Other doctrines derived from the Civil Law are not relevant to the Australian context. Within these doctrines, the public domain rose until the late 20th century (Kuks, 2004), but then:

The use of water for social aims has disappeared in preference to modern economic rationalism and tendency from government to refrain from intervening in society generally (Syme & Hatfield-Dodds, 2007, p. 18).

Subsequently, the current tendency to use market-based instruments to allocate water resources, moving therefore the demarcation towards private water rights, prompts the need to explore their implications on the public domain and on social water allocations.

Additionally, these various water doctrines are especially important from a social sustainability perspective. Since water problems are ‘wicked’ (Freeman, 2000, p. 483) and relate to social choices, there is no unique solution to solve them (Larsen, 2008). In particular, as previously mentioned, the fairness principle of social sustainability is deeply related to the standpoint: ‘equity is in the eye of the beholder’ (Syme & Hatfield-Dodds, 2007, p. 19). Water doctrines thus play a framework role against which the fairness of water allocation can be evaluated. Furthermore, as water governance is the cooperation of all stakeholders in order to favour sustainability (Kuks, 2004), water doctrines will be useful references for the social sustainability of water allocations, as well as for the location of the private-public domains boundary.

Water doctrines and laws establish the water rights and thus define the water allocation mechanisms.

2.2.1.2. Water allocation theories and mechanisms

The literature on water allocations is abundant and displays a great variety of models and mechanisms enabling the allocation of water resources to the various water affecting activities. Allocation theories and related models can be classified according to their main purpose, namely economic efficiency or social objectives.

The optimum allocation of water for economic efficiency is based on economic theories and assigns high economic efficiency to each drop of water, and thus favours high value uses such as orchard irrigation, to the detriment of low value uses like irrigation of cereal crops. The objective is to reach a Pareto-efficiency, i.e. no user can possibly gain from a change of allocation without entailing a loss from another user. This approach is strongly supported in the context of scarce resources (Freebairn, 2003). To achieve this optimum allocation, a mechanism recommended by economists is water pricing within a water market (Young & McColl, 2007), which requires well-defined water rights for the Coase theorem to apply, i.e. for economic efficiency of economy-based allocations in the presence of externalities (Coase, 1960). Water rights no longer should be tied with land rights, departing therefore from the traditional water doctrines. However, the water market can have high transaction costs, requires governmental institutions to compensate for the non-perfect conditions of the market (Freebairn, 2003) and can have unintended negative impacts on third parties (Etchells et al., 2006). Furthermore, the use of the terms ‘socially optimal allocations’ (Dinar et al., 1997) or ‘social efficient allocations’ (Freebairn, 2003) as synonyms of ‘optimum allocations’, may mislead one to think that social criteria are considered, whereas only economic criteria actually are.

Under the current context of expanding private water rights and a declining public domain, these economic theories of water allocation largely prevail. However, water allocation mechanisms can also be used by some communities as a way to pursue public interest and to achieve social objectives, considered in such cases as preceding economic efficiency. Two cases can engender allocations that consider social criteria as important. The Public Trust doctrine gives sovereignty to the State over certain water resources and enables administrative allocations. While equity may be increased greatly, this type of allocation mechanism is criticised as wasteful and expensive. Community water rights also generate social water allocations on the basis of user-based (Dinar et al., 1997) or collective negotiation mechanisms (Meinzen-Dick & Ringler, 2006). However, there is no specific theory for collective

allocation of water and these mechanisms are therefore based on institutional economic theories for collective action applied to natural resources management, in particular Ostrom's Institutional Analysis Development (IAD) Framework (Ostrom, 2008) that acknowledges such social benefits (detailed in section 2.2.3).

The lack of specific allocation theories with a social perspective is evidenced by the identification of equity as an economic principle for allocation of scarce water resources (Dinar et al., 1997; Thoyer, 2006). Two important features for social allocation of water also come out of this statement. First, social sustainability is not commonly considered when water is allocated, otherwise there would have no need to single out the equity principle. Secondly, the mention of equity among the three main principles for allocation suggests the significance of the social sustainability perspective in water allocations.

Finally, an allocation mechanism can be based on any mix of market-based, user-based and administrative-based allocations. Water reallocation mechanisms are also based on these (Meinzen-Dick & Ringler, 2006), but with the significant difference that water is already allocated and is required for another use, often environmental water flow, introducing the need for expropriation and compensation (Kuks, 2004). Practical existing reallocation mechanisms vary widely: public takings, voluntary agreements, compulsory acquisitions, constrained negotiations, participatory decision-making, auctions or public buybacks (Thoyer, 2006; Crase et al., 2009a).

2.2.1.3. Example of the Australian water allocation

In Australia, water is owned by the State and was allocated to water users in the form of licences under the Common Law up to 1994. However, the emergence of a water market widely promoted since the 1994 CoAG Water Reform—in particular through the separation of water and land entitlements (CoAG, 2004a)—modified the allocation mechanism (McKay & Marsden, 2009). A water allocation is defined as 'the specific volume of water allocated to water access entitlements in a given season, defined according to rules established in the relevant water plan' (CoAG, 2004a, p. 30; Australian Bureau of Statistics, 2006, p. 86). Water plans are expected to define the local conditions of water markets in order to achieve simultaneously economic, social and environmental sustainability (CoAG, 2004a), while State water laws set the rules for water planning. Therefore in Australia, the interplay of water plans and water markets for water allocations reflect an approach that blends both

administrative and economic traditions. Water reallocation in Australia mostly resulted from buy-back schemes in the Murray Darling Basin, but the planning approach also allows for reduction in allocation of consumptive uses without compensation (Cruse et al., 2009a).

The local level of regional planning, as selected in Australia for water resources at a catchment scale, is not only considered best adapted to integrate the three pillars of sustainability (Lehtonen, 2004), but also as a ‘condition for consideration of its social dimension’ (Theys, 2002, p. 1). But reciprocally, social considerations are also indispensable for effective planning (Pepperdine, 2000). Finally, water planning represents an arena in which competing doctrines are proposed and combined and ‘include discourses about sustainability from the perspective of governance’ (Larsen, 2008, p. 59), bridging therefore the social dimension of sustainability and the water governance fields of this research.

Water planning, as an implementation tool for allocation, occurs mostly at a practical level (Morrison, 2006) and, will therefore be discussed later in the Australian context (Chapter 4).

2.2.1.4. Social water uses and benefits

‘There has been a long understanding that water can be a direct determinant of many social benefits’ (Syme & Hatfield-Dodds, 2007, p. 18). Social research has evidenced that water is a natural element involved in life and that holds very strong social and identity values (Strang, 2004). However, only recently were these social benefits formally recognised. The social cohesion of an old Spanish community organised around an ancient irrigation system was the basis for a legal challenge in the 1990s in New Mexico, USA, to rule against a water transfer (Howe, 1996). Likewise in an attempt to build a comprehensive valuation framework for water, the Global Water Partnership recently conceded that water is both an economic and a social good (Rogers et al., 1998).

In order to better comprehend the significance of the nature of water benefits as Syme and Nancarrow requested (2008), a distinction can be made in the social value of water between two use-based aspects (Howe, 1996; Rogers et al., 1998):

- (consumptive) use value that can be direct or indirect. The indirect use-values can also be understood as societal objectives that Rogers et al. (1998) arguably believed to be estimated under some circumstances.
- (non-consumptive) non-use value, also called the intrinsic value of water.

Table 2.3. Social uses and benefits of water reported in the literature

Social use value of water	Social non-use value of water
<u>DIRECT:</u>	
<ul style="list-style-type: none"> • Recreational • Stock and domestic supply • Fire-fighting 	<ul style="list-style-type: none"> • Transport • Traditional access to water • Aesthetic value of water ecosystems • Bequest value • Regional identity • Life supporting • Religious • Social cohesion • Risk sharing • Healing • Cultural heritage of water (qanats, water mills, etc.)
<u>INDIRECT:</u>	
<ul style="list-style-type: none"> • Poverty alleviation • Food security • Employment • Social (income) redistribution: direct subsidies to specific disadvantaged groups • Settlement of remote regions • Promote agrarian reform • Social acceptability 	

Sources: (Delli Priscoli, 1989; Dinar et al., 1997; Rogers et al., 1998; Agarwal et al., 2000; Faysse, 2001; Freebairn, 2003; Kuks, 2004; Strang, 2004; Iyer, 2008)

Some of the indirect use values of water or societal objectives, such as poverty alleviation or food security are likely to be in developing countries. However others, like risk sharing, social redistribution, employment or social cohesion, concern both developing and developed countries. For instance, in Australia the Soldier Settlement Schemes implemented after each of the World Wars distributed land supplied by water for irrigated food production with the overall goals to give returned soldiers employment, as well as to promote settlement in remote rural regions, social redistribution, and food security (Broughton, 1999; Bjornlund & McKay, 2000). Nowadays employment is often the only social objective clearly articulated in irrigated areas. Nevertheless, risk sharing, which is not openly acknowledged, is obviously behind the compensation conditions of water allocation changes in Australia—where farmers bear the risk associated with climate change, i.e. they cannot be compensated for reduced allocations and the government would only compensate in case of reductions that are introduced by a change in policy (CoAG, 2004a). Furthermore, social licence to irrigate as ‘a voluntary unwritten consent that a community attaches to resource use’ remains accordingly only informal (Shepherd

& Martin, 2008, p. 32). Community engagement assists in clarifying these societal objectives for the allocation of water (Agarwal et al., 2000).

This research, focusing on the social sustainability of water allocation plans, acknowledges both the social use and non-use values that are associated with the water allocation process, and will thus give particular attention to these values. Water allocation plans can be understood as both policies—from the almost regulatory status given to them in Australia—and institutions—a set of regulations to allocate water. Therefore this section continues with a review of policy analysis and institutional change theories.

2.2.2. Social frameworks of water policy analysis

Given the volume of literature from the policy sciences, only theories that are relevant from a social perspective, i.e. reflecting social phenomena, were included in this literature review. Indeed, social values and issues are critical for effective policy development (Pepperdine, 2000; Colantonio, 2007).

The once influential stages heuristic framework for policy analysis developed by Lasswell (1956 in Sabatier, 2007) declined in the 1980s due to strong and valid criticisms. Indeed, it does not identify the factors driving policy processes, represents a more top-down approach and simplifies the process into one single process (Sabatier, 2007). Various theories explaining policy development have emerged since the mid-1980s (Meijerink & Huitema, 2009).

2.2.2.1. Advocacy Coalition Framework

Since the 1980s, Sabatier (2007) worked on the Advocacy Coalition Framework (ACF), refining it progressively in the face of critics. Its theory posits that changes in a policy subsystem can be explained by groups formed by interest in similar objectives, called ‘advocacy coalitions’. These groups share the same ‘policy core beliefs’—the middle level of a three-tier structure of beliefs also constituted with ‘deep core beliefs’ and ‘secondary aspects’—and coordinate their efforts to change the policy. Every policy subsystem comprises at least one dominant and one minority advocacy coalition. Four paths of change are proposed in the ACF: an external shock, a policy learning, an internal shock crystallising focusing events and a negotiated agreement—the two last one being new additions in its last version of the ACF (Sabatier & Weible, 2007). One of the main criticisms of the ACF is its

evolving form, considered as a way to evade criticism. But a more meaningful point is its lack of consideration of the ‘free-rider problem’ in collective action. Sabatier proposed three rationales to overcome that problem: i) the transaction costs of coalitions are relatively low for a collective action; ii) anticipated advantages from coalitions are overdone; and iii) cooperation intensity and thus corresponding costs varies greatly among coalitions. However, these have not been empirically confirmed and he is asking the research community to pursue its investigations.

2.2.2.2. Social Constructions

Ingram suggests that power resources and coalition considerations are not enough to predict policy change and proposes the Social Construction (SC) concept (Ingram et al., 2007). SC reflects the way policy’s target groups are seen by policymakers and public opinion and thus are given benefits or on the contrary burdens depending on their social construction, which can be either positive or negative. She creates a matrix crossing positive and negative social construction with the political power of each target group, resulting in four potential groups: advantaged, contenders, dependents and deviants. The SC theory provides an understanding of why some policies are not effective or why others are not fully implemented or enforced. Negative SC target groups are caught in a vicious circle in which negative SC attracts fewer resources that in turn impede policy participation and reduce motivation to remain active. Thus positive policies favouring positive SC target group are more likely to dominate the policy system and create a path dependant history favouring these same groups.

However, these two theories—ACF and SC—appear compatible and complementary as an advocacy coalition can be formed by groups having a specific social construction. Groups with different social constructions can even reunite into a coalition in order to achieve a conjoint goal. ACF seems to have a broader view of the policy system, including the external world, whereas SC theory is more limited to the subsystem itself.

2.2.2.3. Policy Entrepreneurs

The Policy Entrepreneurs concept builds on the realisation of these complementary aspects in existing policy analysis theories and argues that any change in policy can be mostly attributed to a few stakeholders, either as individuals or as a group, called Policy Entrepreneurs (Huitema & Meijerink, 2009). The initial concept proposed by

Kingdon (1984) considered ‘people who seek to initiate dynamic policy change’ (Mintrom, 1997). The strategies used by these entrepreneurs to achieve the desired change in policy include advocacy coalitions—based on ACF—, the exploitation of windows of opportunity—based on the Multiple-Streams Framework that sees opportunity to change a policy emerging from the temporary junction of the problem, policy and politics streams usually operating independently (Zahariadis, 2007)—, the framing of contested discourse (Boin et al., 2009) or the influence on, and change of, the arena for negotiation (Huiteima & Meijerink, 2010). Although the initial focus of the Policy Entrepreneurs was on agenda setting, the concept has now widened retaining and merging the main interesting notions developed in other independent policy analysis theories. Similarly, some of its components have also been blended in the ACF in particular, making the previously detailed theories interrelated.

2.2.2.4. Gap in policy change process from a social perspective

Each of these theories proposes very useful concepts when analysing policy processes from a social perspective. However, these concepts can easily coexist and even complement each other. Therefore, the fragmentation of these theories suggests the lack of a comprehensive theory reflecting a complete analysis of a policy system. Further, these theories tend to look at the way a policy is changed only from a stakeholder perspective, by detailing the various strategies available for them to push their policy innovation and influence the participatory decision-making—advocacy coalition, window of opportunity, policy entrepreneurs, framing contests, etc. However, there is little research on the impact of these strategies on the fairness principle during community engagement processes in which strong interests conflict (Ingram, 1973; Howard, 2007). In addition, the process of change itself is not yet fully understood, casting doubt upon the course and development of the change. The Punctuated-Equilibrium theory—and ACF in a lesser degree—discusses more clearly the pace of change by looking specifically at the conditions behind equilibrium and proposing incremental or radical change in the policy system (Baumgartner & Jones, 1991). But that theory does not provide guidance for the study of how change actually happens, nor does it acknowledge the stakeholders’ role; thus, the social perspective of public policy is emphasised in this research.

The focus on actors by the policy analysis theories that are relevant to the social perspective should be matched with emphasis on the process according to the social sustainability literature. The recent connections established between policy analysis

and institutionalism, or the study of institutions understood as collective norms and rules, could assist in filling this void. Despite the significant distinctions between policies and institutions, an emerging bond assumes that the former sometimes define collective rules, therefore acting as the latter although in a more formal manner (Kay, 2006). Furthermore, the parallel evolution of both policy and institution analyses towards a recent interest in the process of change suggests that research from an institutional change perspective could be useful for understanding the policy change process. In addition, the social concerns that are presumed under the institutions concept add an advantage to merge both literatures for this research focusing on the social sustainability of water plans.

2.2.3. Contributions of the institutional change literature to a dynamic analysis of transitions in water governance

Institutions not only pertain to the social spheres as mentioned previously (Figure 2.1), but also have mutual influence with the individual level (Schmid, 2004). Institutions are also part of the multi-levelled water governance and as such are considered as another ‘environmental-social interface of sustainable development’ (Lehtonen, 2004, p. 199). The link with social sustainability is further tightened because institutions dealing with water management ‘reflect society's values towards equity, freedom, and justice’ (Delli Priscoli, 1989, p. 34).

Institutional economists have contributed most to the study of institutions. Two main authors have shaped the foundations of institutional economics. First, North’s institutional theory (North, 1990), which defines the term institutions as ‘a set of formal and informal rules and norms that shape interactions of humans with others and with nature’ (Brunckhorst, 2002, p. 108), plays central role in the social sciences. Second, and closer to the natural resources management field, Ostrom proposes a theory on common-pool resources (CPR), derived from the game theory (Ostrom, 1990; Delville, 1997) and promoting collective actions for the management of natural resources through institutions. The CPR theory revises the initial ‘Tragedy of the Commons’ (Hardin, 1968) and, based on case studies, argues that robust sharing institutions of collective resources does occur in some societies and can ensure sustainable management of the resources. The information available to the users, their subsequent perceptions as well as collective negotiations, are essential in the design of institutions to ensure their commitment and mutual monitoring (Ostrom, 1990). Ostrom later builds on her Institutional Analysis Development (IAD)

framework grounded on the institutional rational choice model—akin to the ACF and Punctuated Equilibrium theories and assuming a bounded rational individual motivated by material self-interest. This framework has been applied worldwide, as well as in Australia (Smajgl et al., 2009), and is the rationale of the community-based approach employed in the recent Australian policies on natural resources management (Marshall, 2008). However, based on empirical studies, Sabatier criticises the IAD framework in the context of watershed management, as not predicting as well as the ACF (Sabatier & Weible, 2007). Moreover, two decades of institutional framework construction only brought limited results in addressing water issues, such as that of the over-use of aquifers (Caldera Ortega, 2009; Lopez-Gunn, 2009b).

2.2.3.1. Institutional change

Subsequently, North (1993) and Schmid (2004) recently appealed the research community to focus on institutional change in order to understand where it comes from and which direction it takes (Ostrom, 2008). Institutional change theories encompass a wide range of disciplines, including political science, institutional economics and organisational sciences, but current studies mainly focus on theories of institutional change for policy analysis. North's contribution regarding institutional change (North, 1990) is acknowledged as a foundation in almost all recent publications related to institutional change. He defines a framework based on four elements: the agent, the source, the process and the direction of change (North, 1993). Another common argument mentioned in studies on institutional change is the importance of considering a dynamic approach to institutional change for improved outcome prediction (Greif & Laitin, 2004; Schmid, 2004; Fischer et al., 2007; Ostrom, 2008) as a means to replace the static institutional analysis of traditional institutional economic approaches.

With this intention, some authors have initiated typologies of the various institutional changes, based on the origin or incentives of change, from which others formulate frameworks for the analysis of institutional change.

2.2.3.2. Typologies of institutional changes

The origin of change is the most common criteria used for a classification of institutional changes into typologies. Change can be internally or externally induced: referred to, indifferently, as induced or imposed (Lin, 1989), demand- or supply-

induced (Wegerich, 2001), or exogenous or endogenous (Greif & Laitin, 2004). But the origin of change hosts most of the debates on institutional change. Indeed, the external cause of institutional change advocated by both game theorists and historical institutionalists, does not permit an appropriate prediction of change, according to Greif and Laitin (2004).

Alternatively, the type of incentives for change is the criterion used in parallel by both Van de Ven and Hargrave (2004) and Schmid (2004) to recently organised approaches of institutional change. Based on the existing literature on institutional change, the former distinguish four perspectives: i) institutional design, ii) institutional adaptation, iii) institutional diffusion and iv) collective action. These approaches almost match the four incentives of change proposed by the latter: i) function, ii) social learning, iii) isomorphism including path dependency and iv) power. These models are based, respectively, on a rational actor, a change in context or human knowledge, an existing alternative institution or a dominant group. They may all operate conjointly or in sequence, depending on the change considered. A good illustration of the interplay of these four elements is the evolution of water rights in the 19th century in Victoria: i) selection of functional growth-enhancing institutions thanks to ii) collective learning capacities inherited from the British colonisation, iii) the use of model from the western States of the United States of America and iv) a restructuration of the society giving more power to the rural settlements (Harris, 2007).

However, whereas the new institutional economists argue that change is mainly functional (Nabli & Nugent, 1989 cited in Wegerich, 2001)—increasing the efficiency and reducing the transaction costs—, some authors propose that the power component is the central incentive for change, assuming that stakeholders support conflicting interests (Ingram et al., 1984; Wegerich, 2001). In the Australian water planning process, a public consultation step is required by the National Water Initiative (NWI) (see Chapter 4 for the South Australian implementation and the compulsory consultations to develop a water plan). It creates opportunity for the community to interfere with the rules that are generated by of the local water plans (Fischer et al., 2007) on issues such as markets, water allocation and environmental allocations—within the bounds that the plans promote ESD—and therefore modify the direction of the institutional change according to the resources that stakeholders have available to advertise their interests (Ingram et al., 1984). Similarly,

isomorphic—in particular path dependency (Livingston, 2005)—or learning components—especially social adaptive capacity or social capital (Keremane & McKay, 2008)—have been suggested as substantial elements in the success of water projects.

Furthermore and more importantly, Schmid's four drivers of change only deal with one of the four elements of North's framework of institutional change (1993), namely the source of change. Therefore, as useful as this typology can be, it is limited in that it does not allow a comprehensive examination of the institutional change under study. To have a complete view of the change, the agent, direction and more significantly the process of change require careful scrutiny. In particular, to counterbalance Schmid's incentives of change, the barriers will have great consequences not only on the pace of the process itself, but also on the direction and final agent of change. Through these indirect influences, the exploration of the source and the process of change should thus be sufficient to gain an extensive characterisation of the institutional change under study (Figure 2.4). Another strong rivalry among institutional change scholars is embodied in the speed of the process, whether change is 'continuous and evolutionary or discontinuous and revolutionary' (Van de Ven & Hargrave, 2004, p. 7), mirroring thus the dual policy perception of the pace of policy change—incremental or radical.

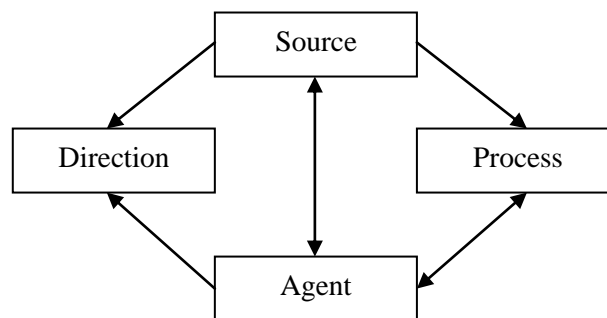


Figure 2.4. Influences among the four main characteristics of institutional change

The above incomplete framework and the conflicting findings in the literature prompt the need for social studies on the source and process of institutional change, and, in particular, on its drivers and barriers. Research to support socio-political processes of change and their uncertainty was indeed requested in the recent comprehensive assessment for water management in agriculture (Merrey et al., 2007). Logically, analytical frameworks for institutional change are only emerging.

2.2.3.3. Emerging analytical frameworks of institutional change

The foregoing typologies of institutional change also set some starting points for more practical and analytical frameworks for the analysis of institutional change. From his four-type classification, Schmid (2004) proposes a six-step design to institutional change analysis that still needs to be tested, but in line with his typology only addresses the source of change. Likewise, based on her previous work of Institutional Analysis Development (IAD), Ostrom's attempts to design an analytical framework of institutional change are at an initial stage (Ostrom, 2008). Fischer et al. (2007) also drew on IAD to develop an analytical framework that has been applied in numerous development projects. Nevertheless, in those cases, the nested levels of institutions (Ostrom, 1990) have not been fully considered in the analytical framework. Livingston, on the contrary, focuses on the 'micro- and meso-levels of analysis in evaluating changes in water institutions' (Livingston, 2005, p. 21), but does not present any analytical design. This points to the need of further refinement of analytical framework for institution change examination, in particular through case study, as it is considered the best approach to deepen the theories of institutional change (Alston, 1996) and to gain insight on the outcomes of the process at the field level.

These main findings from the review of the water governance literature through the dynamic analysis of water policy and institutions will be combined with the significant features of the social sustainability literature that were critically discussed in the first section of this chapter. The deep connections between both fields will emerge in the specific context of Australian water allocation plans to establish the significance of this research.

2.3. EXAMINATION OF THE SOCIAL SUSTAINABILITY IN WATER ALLOCATION PLANNING PROCESS

From the convergences of the two main sectors covered in the literature in the two first sections of this chapter emerge the research questions for this study. Their theoretical significance and interest in addressing the research problem is then presented.

2.3.1. Convergences of the social sustainability and water governance literatures

The literature on social sustainability and on policy analysis and institutional change from water governance exhibit, in this review, two main convergences. Firstly, the interest for dynamic studies on the process of change is pointed in both fields. From a social sustainability perspective, despite rival interpretations understanding the concept as a state or a process, its future focus and its fairness principle, encompassing distributive, procedural and interactive justice, reject social sustainability as being only a final state. This indicates the need to examine the process of change in social sustainability evaluation. From a water policy and institutional standpoint, the recent literature on institutional change can assist in overcome the shortcomings of policy analysis theories, focusing mainly on the source of change through actors' strategies. However, the existing institutional change frameworks do not encompass all elements of change and tend to focus on the source of change, although not only from actors. Therefore, dynamic studies of institutional change, including not only drivers but also barriers of change, will contribute to the filling of this gap. Secondly, the importance of placing people at the centre of the study is advised by literature both on social sustainability and on water policy and institutional change analyses. The social sustainability literature calls for an approach that would not be biased by economic or environmental traditions and therefore would start with people as the main interest of the social spheres, while literature on institutional change already acknowledges its unique mutual influence with people thanks to a strong focus on stakeholders' strategies. Placing people at the centre of the study enables a full social perspective as they form groups, communities and institutions for collective actions, thereby avoiding biases from the economic and environmental perspectives. Thus, conditions in the development of the water allocation plan that should be first considered are those affecting people: the social conditions constituting the social sustainability.

These two convergences prompt the two research questions embraced in this study's research problem: the interactions between the water planning process and the community of users.

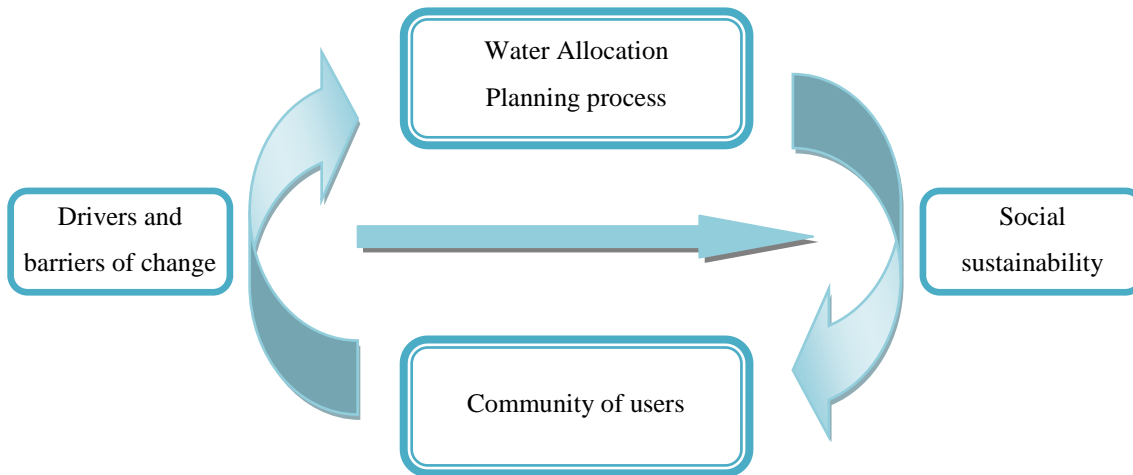


Figure 2.5. How well does the water allocation planning process address social sustainability from a community's perspective?

2.3.1.1. Dynamic institutional change analysis of the water allocation planning process

The reviewed institutional change literature provides interesting insights on process of change to be applied to transitions in water governance. Indeed the social sustainability perspective confirms that emphasis on carefully considering the process of change for social water allocations is needed. The water allocation plans once reviewed may potentially bring forth new institutional arrangements. From the combination of these literatures emerges the first research question that relates to the community's influences on the water planning process:

What are the main drivers of and barriers to change directing the water planning process from a community perspective?

The drivers and barriers influencing the institutional change during the water planning process will affect the social sustainability of the resulting water plans, in particular if the power component mostly applies. The answer to this first question will help exploring the second research question, as represented in Figure 2.5 by the horizontal arrow.

The examination of a community's perceived influence will not be only restricted to direct influences of the stakeholders but will build on the limitations noticed in the

policy analysis theories and will include any indirect influence of community through any of the level of the social spheres, for example, with institutional barriers preventing the change.

2.3.1.2. Social conditions involved in the water allocation planning process

The five proposed synthesising principles offer initial guidance in the study of these social conditions. Their application to the water allocation planning process combined with the learning of the policy analysis theories reinforces the doubt that was previously mentioned on the causal relationship at the environmental and social interface of sustainability. Indeed, on one hand policy analysis theories tend to evidence that community involvement in the water allocation planning process might alter the resulting plan, especially when strong conflicting interests exist, through imbalance of resourced stakeholders; thus, threatening the fairness principle of social sustainability. On the other hand, mediation occurring during public consultation may increase the dialogue and exchange of values occurring among the various stakeholders, and therefore enhances social capital, resilience and thereby sustainability. Thus the second research question, concerned with efforts to promote social sustainability in the water planning process appears:

What considerations of social sustainability does the water planning encompass?

When merged with the answer to the first research question, results of this second question will enable to apprehend how well the water allocation plan addresses social sustainability.

2.3.2. Theoretical significance of research

The institutional change literature proposes elements that have significant influence on the change to be considered, but does not suggest a robust analytical framework to examine them in the water management field and, with limitations, to the sources of change. Therefore, this research can assist in developing a consolidated analytical framework examining every feature of institutional change that could also be applied to the water policy field.

The social sustainability literature embraces various ambiguities but still proposes principles against which the social dimension can be assessed. But considerable refinements are still needed for the emergence of a comprehensive social

sustainability theory that, once applied to water management, can improve community resilience to changes in water allocations.

Finally, in the water governance field, the application of the social sustainability perspective would assist in clearly articulating the boundary between public and private domains; in the Australian context, a boundary that the recent change in water doctrines has entangled. Additionally, the use of the institutional change theories in the study of water allocation planning processes will contribute to clarifying how transitions occur in water governance.

These potential contributions rest on the deep connections between the combined fields as well as on the lack of research merging these theoretical frameworks in the field of water management, in particular in the Australian context.

2.3.2.1. Connections between social sustainability and water governance

The deep connections between water allocations and social sustainability have already been widely detailed in section 2.2.1. Further, the water policies and institutions, as reviewed through the policy analysis and institutional change theories, also align with features of social sustainability. The Social Construction theory, the Advocacy Coalition Framework and the concept of Policy Entrepreneurs are all concerned with the participation of stakeholders in decision-making. Additionally, water institutions presume a democratic government. Therefore, water policies and institutions clearly affect the community engagement principle of social sustainability. Moreover, institutions also represent ‘conventions of social life’ (Magis & Shinn, 2008). Values and power, considered to be critical sources of change in institutions, are believed to contribute to the sustainability debate (Cheney et al., 2004). Finally, both water management (Agarwal et al., 2000) and social sustainability (Larsen, 2008) call for integrative policies and institutions.

2.3.2.2. Lack of research combining these frameworks in the field of water policy

The limited research efforts to date from a social sustainability perspective promise results especially where combine with connected frameworks such as the institutional change one in the field of water management.

One of the closest attempts to merge these literatures is the research done by Kuks (2004) that looks at institutional change from the water governance perspective only. This research explores the limits between public and private domains in water

management and uses three types of drivers of change: value, cognition and resources that are equivalent to Schmid's functional, social-learning and power drivers. The isomorphism driver is reduced to path dependency that is assumed to constantly affect any institutional change. Additionally, Kuks' work concentrates on European water management where water doctrines traditions and biophysical context are dramatically different to Australia.

Another related study is Caldera Ortega's research (2009) on governance and sustainability of water, which tackles both water governance and sustainability, using an institutional change perspective. He, however, bases the analysis of institutional change only on ideas and discourses and neglects the process of change. Further, while integrating the sustainability concept, this work has no specific focus on the social dimension and is based in Mexico.

Likewise in Australia, while current research interest evolves in environmental sustainable development and thus acknowledges the three dimensions of sustainability, studies are restricted to social justice and the incorporation of equity and fairness in water management plans (McKay & Bjornlund, 2001; Tisdell, 2003; Potter et al., 2007; Syme & Nancarrow, 2008).

While the present research may initially seem very large, the integrative character of social sustainability and water governance requires such scale. Water management occurs at the interface between social and environmental sustainability, but also 'at the interfaces between science, community and governance' (Jeffrey, 2006, p. 14). Moreover, the convergences displayed in the reviewed literatures, the combination of frameworks and the deep connections between the various sectors will facilitate the research by restricting its field of study. Finally, the research, even if placed in the wider field of water governance, only looks at one of its component, the water allocation planning process; a process that crystallises the water issues identified in the reviewed literature.

2.4. SUMMARY

The diversity included in the term ‘social’, and the dispute over the theoretical foundation involved in the sustainability concept, are only partly responsible for the still unachieved definition of social sustainability. The reflexive nature of social sustainability and its lack of comprehensive theory intensify its complexity. Two main findings emerged from the literature: a continuous controversy regarding social sustainability being a state or/and a process and the centrality of people in the concept. The identification of analytical principles for the social sustainability of water allocation suggests that the process itself is of great significance and points to the need to examine the process of change to gain a comprehensive overview on social sustainability. Additionally, a proper social sustainability theory would contribute to the promotion of a social sustainability that is not subdued by its economic and environmental counterparts and that would put people at the centre of the study.

A social perspective of water governance places social sustainability at the boundary between the public and private domains of water doctrines, and inventories compelling and significant examples of social objectives, uses and benefits of water. Water governance is considered through a policy analysis lens, revising the Advocacy Coalitions Framework, the Social Constructions theory and the Policy Entrepreneurs concept. While these theories identify valid strategies used by actors to influence the policy making, they do not provide guidance for the examination of a process of change. Fortunately, the literature on institutional change fills this gap; however, this emerging field of literature still lacks comprehensiveness and analytical framework.

Finally, the social sustainability and water governance literatures display two main convergences of interests: on the process of the change and on placing people at the centre of the study. From these convergences emerge the two research questions of this study that address the research problem that was presented in the first chapter. This examination of the relevant theories and literatures has also provided some essential information—longitudinal analysis of change and the community’s perspective—for the research design and methodology outlined in the next chapter.

RESEARCH FRAMEWORK AND METHODS

This chapter outlines the research methodology undertaken in this study, and informed by the literature review in Chapter 2, to examine how well water plans address social sustainability. It first describes the research design based on a qualitative approach of a single case study. The rationale for selecting the particular case study and the basis for choosing the collected data and the methods to analyse it are then articulated in turn. Next, the practical details of the implementation of the collection of the selected data and its methods of analysis are presented. Finally, the theoretical and analytical limitations faced by the methodology are examined.

3.1. RESEARCH DESIGN

This research adheres to a global *post-positivism* perspective—referring to the ‘thinking after positivism’ (Creswell, 2003, p. 7)—of policy analysis (Hoppe, 1999), which introduces some subjectivity (Ostrom, 1982; Durning, 1999) and acknowledges the mutual influences between institutions and individuals. More particularly, the *social constructivism* epistemology underpins the collection and analysis of data that serves as the basis for the water planning policy analysis. Policy analysts following this current indeed formulate ‘arguments consisting of evidence’ (Durning, 1999, p. 397) inspiring the ‘argumentative turn’ of policy analysis (Fischer & Forester, 1993). The study is primarily *inductive* research and is based on the data collected (Eisenhardt, 1989) and on a combination of theories of institutional change for policy analysis reviewed in the foregoing chapter. It uses a *qualitative approach* to gain an in-depth insight into the problem (Creswell, 2003) through a *case study*. *Multi-methods* of data collection and data analysis allow for triangulation of data.

3.1.1. Case study approach

In order to analyse and examine the process of policy change in its context, a case study approach is chosen (Macpherson et al., 2000; Creswell, 2003; Tharenou et al., 2007). Experiments and surveys would also be adequate for empirical contemporary observations (Yin, 2003). However, an experimental approach was discarded since the research study has ‘minimal control’ over the conditions (Tharenou et al., 2007, p. 76). The survey approach was also rejected as the proposed research is exploratory and this methodology is not consistent with post-positivist social research according to Dryzek (1990 in Durning, 1999). Moreover, a case study is well adapted theoretically under a qualitative and inductive approach (Eisenhardt, 1989; Creswell, 2003; Tharenou et al., 2007). It is considered to be an appropriate approach for the study of processes (Yin, 2003) and especially their social context (Ragin & Becker, 1992; Baldwin, 2008). Case study is therefore well adapted to most processes of institutional changes, in particular because statistical analysis is inhibited by the fact that change is not continuous (Alston, 1996).

3.1.1.1. Case study selection

A careful selection of the case to be studied is ‘information-oriented’ (Flyvbjerg, 2006, p. 230) or based on meaningful criteria of selection (Stake, 2008). In this study, the criteria in Table 3.1 represent the greatest learning factors related to the research questions presented in Chapter 2 and were applied for the selection of the case study: the Lower Limestone Coast water allocation plan in South Australia. The area of study is presented in more details in the next chapter (see section 4.4).

Table 3.1. Selection of the area of study

Selection criteria	Lower Limestone Coast water allocation plan
Water Resources	Groundwater: Limestone Coast unconfined and confined aquifers
	Over-allocation in some water management areas
Irrigated agriculture	Largest allocation of groundwater in the Lower Limestone Coast Prescribed Wells Area
	Irrigation well developed and withdrawing two thirds of the water in South Australia
	Irrigation mosaic system with no water users association
Water Planning	Lower Limestone Coast Water Allocation Plan under revision
	Long water plan revision: from June 2004 and not yet completed in February 2011
	Difficult adoption of new water regulations on forestry

Sources: (McKay, 1994; Australian Bureau of Statistics, 2006; SENRM Board, 2007a; Jackson, 2009b)

The first two criteria in Table 3.1 suggest that this case is representative of a world-wide common situation: the over-extraction of groundwater for irrigation (Postel, 1999) in closing or closed water catchments (Molden et al., 2007). This challenging aspect of management of the commons is even greater in the absence of existing associations among groundwater users—a common form of groundwater management in Australia, as well as world-wide (Shah et al., 2000), as opposed to irrigation with surface water that very often requires water users to be grouped in associations in order to commonly maintain or manage infrastructures.

However, while the local characteristics of the water planning process, the third criterion, initially imply a water dispute that commonly occurs in limited resources conditions, some of its processes and regulations make it singular enough to conduct a single case study.

3.1.1.2. *Single case study*

A single case study approach was chosen because of the uniqueness of the policy changes to be introduced in the revised Lower Limestone Coast water allocation plan. The forestry regulations represent indeed the first attempt to account for its impacts on other water users, including the environment, in Australia (Hamstead et al., 2008; Hughes & McKay, 2009). Furthermore, because these regulations affect the water planning process itself—stretched out planning process and procedural deviations from the State-prescribed water planning process (see Chapters 5, 6 and 7)—, this case study can be considered as a unique (Stake, 1995; Yin, 2003) or as an ‘extreme or deviant’ case study (Flyvbjerg, 2006, p. 230). This uniqueness feature is an appropriate rationale to base the complete research on a single case study. In addition, the research focused on the analysis of the dynamic process of institutional change over time and therefore engaged in a *longitudinal study comparison* (Alston et al., 1996), which also weighed in favour of conducting a single-case study (Yin, 2003). Finally, the Lower Limestone Coast water allocation plan represents the case under study, and the social perspective on which it is examined includes all levels of the social spheres (as discussed in section 2.1.1.1); thus, it can be considered as an embedded case (Yin, 2003), enlarging the perspective of the single case.

3.1.2. **Qualitative and inductive approach**

The literature review (Chapter 2) indicates the need for a qualitative and inductive approach to this research due to: i) the lack of agreed social indicators for water planning process, ii) the lack of policy that reflects completely the process of policy change from a social perspective and iii) the multitude of concurrent partial policy theories implied in a policy change. Qualitative research is indeed used to gain in-depth understanding (Creswell, 2003), as well as to develop and suggest theoretical concepts (Eisenhardt, 1989; Whelan & Oliver, 2005).

In this research, the group under study is a rural community that specifically relies on water for its livelihood, but it also pays attention to individual equity, as a way to resolve the semantic ambiguity around the term ‘social’ (see section 2.1.1.1). The qualitative approach enables the collection of these stakeholders’ meanings (Creswell, 2003) of water (Strang, 2004). Indeed, of particular interest for this research are the social values involved in the development of the water plan and held by the various stakeholders, in particular those driving or hindering it and altering its

social sustainability. These elicited perceptions contribute to deconstructing the myths revolving around water and to resolving water disputes when carefully considered (Trottier, 2001), making the qualitative approach the only way ‘to understand what rules [are] considered legitimate by social actors’ (Baldwin, 2008, p. 23).

The following sections detail the rationale of the selected multi-methods of data collection and analysis that fit with this qualitative approach and describe their implementation in this research.

3.2. DATA COLLECTION METHODS

Three types of data were collected to fuel the case study from a community perspective. They represent three forms by which the community can get informed about, or be involved in, the water planning process: local newspaper's articles, submission forms and interviews of the main stakeholders who are influencing the decision making on the water plan. The following sections describe the procedures used to gather each of these three sets of data.

3.2.1. Newspaper articles

A local newspaper was selected for the analysis of news reports regarding the water allocation planning process based on the observation that it is widely read in the region (see circulation data below) and is most likely to focus on local news (Bowd, 2009) and thus give significant coverage to the water plan, its practical details and, more importantly, the community's views and attitudes towards these topics. Furthermore, Australian regional country newspapers are also essential for the community networking and engagement and thus contribute to its social capital (Bowd, 2009; Chia, 2010), which is of interest in this research.

3.2.1.1. *The Border Watch*

The local newspaper published in the region is *The Border Watch*. It is published in Mount Gambier four days per week on Tuesdays, Wednesdays, Thursdays and Fridays. Table 3.2 displays the circulation data for each of those days.

Table 3.2. Circulation data of *The Border Watch*

	Tuesdays	Wednesdays	Thursdays	Fridays
Number of copies	8 400	8 400	8 400	9 000

Source: (Rural Press Sales, 2010)

The Border Watch claims that the average audited circulation of 7 319 per edition reaches around 25 000 people in the region, i.e. over 40 per cent of the population (The Border Watch, 2008). The regional characteristic of this newspaper is well established with over 95 per cent of its total circulation concentrated within 50 km of Mount Gambier (Rural Press Sales, 2010).

However, from a practical perspective, the downside of using a regional newspaper is the absence of an available electronic version, necessitating manual selection of the articles analysed in this research, which is a time-consuming task.

3.2.1.2. *Selection procedure*

A complete newspaper coverage sample for the period June 2004 to July 2010 was accessed, either through hardcopies of *The Border Watch*'s editions from August 2007—thanks to a subscription by the UniSA Centre for Comparative Water Policies and Law—or through micro-film copies at the Mount Gambier public library for earlier editions. Each newspaper was scrutinised for reports on the Lower Limestone Coast water allocation planning process from any section of the newspaper. Selection was based on explicit mention in the news reports of the following themes:

- Lower Limestone Coast water allocation plan (LLC WAP) and its planning process: articles on other water allocation plans of the SENRM region, such as Tatiara, Tintinara-Coonalpyn or Padthaway WAPs were retained as background documents (see section 3.2.4) but were not analysed with the selected news reports.
- Any project or topic related to one of the changes introduced in the draft LLC WAP (SENRM Board, 2007b) such as volumetric conversion, regulation of forest plantations' water impacts, water dependent ecosystems and reductions to water allocations. Articles regarding water table declines or other water management projects on drainage for example were not selected, unless they explicitly indicated potential implications on the LLC WAP.

A total of 180 articles were selected based on these criteria over the period June 2004 to July 2010 (list available in Appendix 5.1). The selected news reports were part of the 'News', 'Editorial', 'Letters to the editor' or 'On the land' sections of the newspaper.

3.2.2. **Submission forms**

Submissions forms are used during a public consultation process to obtain comments on controversial issues from the community. They are interesting because they contain public opinions and values offered by some members of the community in response to a proposal—the draft water plan in this case. These forms were submitted directly to the policy developer, who maintains their confidentiality. In this

way, this format may enable a truer perspective to emerge (Cook, 2002), in particular on the social aspects of the water planning process. Furthermore, the community members' opinions are directly available without intermediaries that could distort the values and meanings attached to the responses expressed.

3.2.2.1. Submissions selection and access

Four consultations had already taken place during the LLC WAP revision process when the research began (see Figure 5.1). However, the last one (December 2007) was the only one including the proposed draft WAP regulations that crystallise the decisions taken. The three previous consultations only discussed the issues to be included and the decision criteria. Further, the last formal consultation is still to come, at yet an unplanned date, and it is expected to provide only minor comments (SENRM Board staff, 2009). Therefore, submissions from the December 2007 consultation were analysed.

A summary of these submissions was available online from the SENRM board website (www.senrm.sa.gov.au/). The full submissions were also publicly available for viewing, on request.

3.2.2.2. Submissions confidentiality codes

The December 2007 consultation attracted 65 submissions. The full submissions provided by SENRM board were numbered in order of their reception. For ease of reference and text retrieval, the same numbering was kept for coding purposes within this research. Therefore, Chapter 6 uses citations ranging from 'Submission 1' to 'Submission 65'.

This numbering was particularly useful because of the strict confidentiality requirements of the full submissions. The first section on personal information of the submission form (see Appendix 6.1) had indeed been removed by the SENRM board. However, some identifying information within the text of the submissions sometimes appeared, in particular for corporate companies. So in this study and according to its ethics approval, all personal identifying information was blocked out. In particular, when names appeared in illustrative citations, they have been replaced by 'X' to ensure that confidentiality is preserved.

3.2.3. In-depth semi-structured interviews

Despite being time-consuming and costly (Baldwin, 2008), semi-structured interviews have a number of advantages compared with other data collection methods: i) they attract high response rate, ii) non-verbal elements can be recorded and iii) the participants responses are not altered by a third party (Barriball & While, 1994). However, in-depth semi-structured interviews were selected in this research because of: i) their suitability for the exploration of attitudes, values and opinions through the indirect form of information they provide—in particular historical—(Creswell, 2003); ii) their ability to adapt the wording of the questions to the respondents' background (Denzin & Lincoln, 2000), which is diverse in the selected group; and iii) their possibility to use probes (Stake, 1995), which is especially interesting in exploratory studies.

3.2.3.1. *Interview design*

The development of an interview guide was intended to elicit the participants' perceptions and values regarding various elements of the water planning process, in particular from a social perspective. An extensive review of the literature informed the identification of the elements that needed to be covered by the interview. The relevance of these elements for the local context was ascertained through:

- internal testing by:
 - reviewing elements of the news reports' and submissions' analyses;
 - discussing with researchers involved in other research projects on water management in the region (McKay et al., 2010); and
- external testing by:
 - participating to their discussion sessions with local stakeholders also involved in the water planning process; and
 - meeting with some SENRM board staff involved in the water plan development.

However, the use of open-ended questions gave opportunities to the participants to expand the range of these initial elements, enabling unexpected themes and perspectives to emerge (Creswell, 2003). The resulting semi-structured interview guide is shown in Appendix 7.1.

3.2.3.2. Selection of participants

On the basis of the above research questions, people were approached for interviews based on their influence in the decision-making process of the water plan.

Thus, the initial design only included the SENRM Board Members who are in charge of developing the plan. Both current and former SENRM Board Members were targeted in order to gain both current and former opinions on the water planning process for the longitudinal analysis and because the revision of the water plan spanned over various members' mandates. The SENRM board executive officer in charge of implementing all SENRM Board Members' decision and who sits in all SENRM board meetings was also invited to participate for the practical implementation of the SENRM board decisions. Similarly, 'supporting officials' also sitting in the board for the expert advice were also invited.

However, the targeted group was later extended through 'snowball' sampling and following the analysis of the news reports, which evidenced the strong involvement and influence of local politicians and industry groups through political lobbying. Ultimately, the research invited four categories of participants to participate to interviews: SENRM Board Members, supporting officials, local politicians and industry groups.

3.2.3.3. Interview procedure

The SENRM Board Members and supporting officials whose mandate were active in late 2009 were invited directly through the SENRM board. The invitation letter and a background information sheet including ethics provision was distributed to the SENRM Board Members who decided collectively in the November 2009 SENRM board meeting to participate to the research. An individual follow-up call enabled the organising of interview times and places with each member. All but one were interviewed.

Conversely, former SENRM Board Members, local politicians and representatives of industry groups were invited individually using the same documentation. The follow-up call was made one to two weeks after the invitation letter had been sent and was designed to ascertain the participant's acceptance to be involved and, if so, to schedule the interview.

In total 20 face-to-face semi-structured interviews were conducted between the 7th of December 2009 and the 9th of February 2010. Table 3.3 displays the number of interviews by participant type.

Table 3.3. Number of participants per category

	SENRM Board Members	Supporting officials	Politicians	Industry groups
Number of participants	11	3	2	4

Most interviews occurred at the participants' residence (7) or at their work place (6), but some also took place in the SENRM board office (3), in public places (2) or at the University of South Australia's Mount Gambier Regional Centre (2). The interview location were either in the Limestone Coast (Mount Gambier, Kingston, Bordertown, Naracoorte, Keith, Coonawarra, Kalangadoo or near these towns) or in Adelaide, the State capital, for some supporting officials.

The interviews lasted one hour and ten minutes (1:10) on average—from fifty-five minutes (0:55) to one hour and forty minutes (1:40)—and were audio-recorded. Transcripts of the interviews were sent to participants for their verification.

3.2.4. Participant observations of meetings and documents review

Direct observation of two SENRM board meetings, whose agendas mentioned updates on the Lower Limestone Coast water allocation plan, occurred in October 2008 and March 2009 in Mount Gambier. The rationale for these direct observations was twofold: a firsthand understanding (Creswell, 2003) of the decision-making process during these meetings and an update on the last development of the water plan under study. Practical reasons impeded the attendance of the SENRM board meeting in July 2009 or the update on the LLC WAP shared therein.

In addition, publicly available documents were gathered through a systematic review, a rigorous method to collect evidences from previous studies (Solesbury, 2001). Any document mentioned in the newspaper articles, submission forms or interviews was therefore systematically added to the initial list below. This background information fuelled, in particular, the first research question by exploring the context in which the change of water institutions (due to WAP revision) was occurring, and thus the factors of change needed to analyse the dynamics of institutional change involved in the water planning processes. But it also allowed comparison of values and

perspectives associated with water and the water plan, either at local or State levels, in these documents (formal position) from the (informal) rationale behind the position expressed in the collected data. The following documents are therefore frequently cited in the next chapters:

- SENRM board annual reports
- SENRM board meetings' agendas and minutes
- Other water plans in the SENRM region
- State and regional NRM plans
- SENRM and Department For Water (DFW, previously Department of Water, Land and Biodiversity Conservation or DWLBC) websites, as well as their documents and reports
- Legislative documents: Acts, Regulations, Bills and Inter-State Agreements relevant for the water planning process
- Hansard from the South Australian Parliament
- Reports from the 1999 and 2001 Parliamentary Select Committees on water management in the Limestone Coast
- Scientific research on forestry water impact, water trading, shares of the resources done in the region, or requested by the SENRM board or the DFW
- Articles from *The Advertiser*, a State newspaper, during periods with high frequency of WAP related articles as defined by *The Border Watch*'s analysis (Chapter 5)
- Any other documents and reports indicated either in the news reports, the submission forms or in interviews.

Document analyses occurred as much as possible prior the start of the data collection to gain familiarity with the context and help with data selection. However, it was also pursued throughout the study as mentions of documents appeared in the data and as copies were made available. The fact that these documents are publically available also provided a sense of what topics the community may be informed on and how difficult it is to access to the information.

Both document reviews and participant observations completed the triangulation of the data collected from the news reports, the submissions and the interviews. They were especially useful to check consistency of data on the accuracy of specific details of the water regulations and on historical facts in the longitudinal chronology.

3.2.5. Complementarities of the gathered data

The collected data from the three distinct sources is complementary regarding their respective intended public, the period they focus on and their interactivity with the researcher (Table 3.4).

Table 3.4. Complementarities of the collected data

	Newspapers	Submissions	Interviews
Intended public	General community (non-purposive data)	Policy makers (non-purposive data)	Researchers (purposive data)
Period covered	June 2004 to July 2010	December 2007	Late 2009 to Early 2010 (although history discussed)
Interactivity	Unobtrusive	Unobtrusive	Obtrusive

The complementary features of the data ensure that the perspectives uncovered in the research are not just a result of the researcher alteration of data (Webb et al., 1966), but that they do provide results relevant to the research questions, thanks to being purposive data (Richards, 2009), i.e. specifically generated for the research. Moreover, the full period of the case under longitudinal study is being covered. Further, and more importantly, it enables triangulation of the data over a wide range of characteristics to validate the research findings (Creswell, 2003). Triangulation and validity of the research data is further discussed in section 3.4.2.

3.2.6. Ethical considerations

A Human Research Ethics Considerations Approval was granted from the University of South Australia before data collection was initiated. Since newspaper and submissions were publicly available, the approval referred more specifically to the interviews that were described in the foregoing methodology (see section 3.2.3). However, in some submissions, names that were still evident were removed to protect confidentiality. In addition, although the interviewed people were not initially perceived to be at risk, their voluntary and informed consent was sought prior to obtaining their contribution. To date, no unexpected ethical issues have been reported. It is anticipated that no such issues will arise thanks to the protection of respondent anonymity by removal of identifying information in the reporting. The ethics approval also planned for secure storage of data during and after the research.

3.3. DATA ANALYSIS METHODS

News reports, submission forms and interviews were analysed for content. Content analysis is indeed highly relevant in policy sciences (Howland et al., 2006) and is a reliable and widely used method to analyse political discourse (Neuendorf, 2002). Further, ‘institutional change takes place within discourse’ according to Wegerich (2001, p. 13); thus, content analysis appears very appropriate to understand stakeholders’ perspectives on water institution changes. Ultimately, content analysis allows the examination of trends over time in order to explore water allocation planning process and therefore is appropriate for a longitudinal analysis (Tregida & Milne, 2006) especially through the development phases of the process (Howland et al., 2006). In particular, content analysis of local newspaper is a reliable method to understand past public opinions and values (Ingram et al., 1984), which are otherwise difficult to pinpoint without distortions from current values.

However, there is often confusion on what content analysis actually implies at the implementation phase (Neuendorf, 2002). Some researchers indicate that content analysis is ‘a systematic, objective, quantitative analysis of message characteristics’ (Neuendorf, 2002, p. 1), while others suggest it is a qualitative in-depth exploratory method (Hsieh & Shannon, 2005; Elo & Kyngäs, 2007; Forman & Damschroder, 2008). But a last view, and the one adopted in this research, argues that ‘both [quantitative and qualitative approaches] are indispensable’ for text analysis (Miles & Huberman, 1994; Krippendorff, 2004, p. 87). Used in conjunction, they become mixed methods ‘that may be complements to, rather than substitutes for, each other’ (Australian Competition and Consumer Commission, 2010, p. 148). Therefore, this research used first a limited quantitative content analysis to complement the substantial qualitative content analysis done in a second step. The use of computer software for both analyses allows a more rigorous analysis of a greater number of documents.

3.3.1. Quantitative content analysis

Quantitative content analysis is a widely used research techniques, in particular for the analysis of newspapers’ content (McKay, 1996; Richardson, 2007), but also for all document types (Neuendorf, 2002). In this research, it was implemented through two tools: word frequency and themes coding for each type of collected data; however, word frequency analysis of interviews could not be used because of the

inability to eliminate the research questions from the counted words, which could have altered the results. In the case of the submissions forms, the questions being exactly the same in each submission neutralise their impact on the relative occurrence of the counted words.

Themes coding, however, only coded the participants' responses from submissions and interviews. Themes were identified and listed before the coding of each type of collected data, thus requiring only a single stage of coding as is common in quantitative coding (Richards, 2009). Themes revolve around the changes that are to be introduced in the revised water plan: i) volumetric conversion, ii) forestry regulations, iii) reductions to water allocations and iv) water dependent ecosystems. Themes in the submission forms mirror the form's organisation into questions. In the interview data, a significant theme on social sustainability was added to those four changes to reflect the research questions.

Results of the quantitative content analyses are displayed in the initial graphs and tables of Chapters 5, 6 and 7 (i.e., Figures 5.2, 6.4, 7.3 and 7.4 and Tables 5.1., 5.2., 5.3. and 6.6).

3.3.2. Qualitative content analysis

Until recently, content analysis has been mostly grounded in quantitative analysis, but its qualitative counterpart is becoming progressively better recognised, even for newspaper data that is traditionally analysed quantitatively (Altheide, 1996; Richardson, 2007). Qualitative content analysis does not have a finalised codebook in advance as does quantitative content analysis; on the contrary, it is inductive and 'generates categories throughout the research' (Richards, 2005, p. 86). Following Richards' method to elicit values from qualitative data (Richards, 2009), three types of coding occurred for each document (see also the coding frame in Appendix 3.1):

- Descriptive coding: assigns characteristics to each document for their later classification according to the analytical codes (step 3)
- Topic coding or 'literal reading' (Mason, 2002, p. 149): intends to create as many topic codes as the subject, issues and values that were discuss
- Analytical coding or 'interpretative reading' (Mason, 2002, p. 149): analyses why the topics mentioned are interesting for this research and organises the topics into categories aimed at answering the two research questions.

Each document—news report, submission or interview transcript—was first globally assigned general characteristics (see attributes list for each type of data in Appendix 3.1). The document was then coded for topics and analytical categories. Their initial list (see Appendix 3.1) was anticipated from the literature and local context (Chapter 2 and Chapter 4), but open coding was also used, i.e. additional coding as emerging topics were detected in the data. For example, in the submission forms the adjectives related to over-allocation and its description induced the creation of the ‘virtual over-allocation’ topic that was later understood as a factor of change for the planning process, i.e. an additional analytical code. Thus codes emerged and were refined through an iterative process up to the time of writing of the results, supporting the concept of parallel refinement of interpretative analysis (Richards, 2009). Each document was therefore revisited several times before coding was finalised.

Results of the themes that emerged through qualitative content analysis are presented in graph forms in Chapters 5, 6 and 7 for their compilation clarity but the numerical information is not as important as the information on the relative weight of each theme. Therefore, the graphs have been presented in such way that relative significance rather than numerical occurrence is emphasised, mostly by using percentages but sometimes numbers when comparing within a time series or between groups. The validity of the relative significance of each presented theme is verified and illustrated by citations from the original documents analysed.

3.3.3. Analysis implementation in NVivo

To help with organising, coding, analysis and retrieving of rich qualitative data (Godau, 2004; Richards, 2004; Bazeley, 2007), the NVivo software programme (QSR International, 2008) was chosen on the basis of its wide use among social scientists and its highly integrative analysing capacities.

3.3.3.1. Preparation of the data

The selected articles from *The Border Watch* were scanned from either hard copies or microfilm. They were then converted into text, similarly to submission forms obtained as electronic images by using an OCR (Optical Character Recognition) converter tool. However the low reliability of these conversions required a subsequent extensive manual revision. This enabled their importation into software as text rather than as images allowing the use of search and query tools to refine the analysis.

The audio-taped interviews were transcribed by the researcher, as it helps familiarise the investigator with the data (Richards, 2009), directly in NVivo.

3.3.3.2. *Coding*

The coding was realised in three phases: one for each type of collected data. During each phase, each of the documents was first quantitatively and then qualitatively coded according to the descriptions provided in the foregoing sections (3.3.1 and 3.3.2). The same type of coding for each type of data allows possible comparisons between newspaper's accounts, perspectives expressed in the submission forms and comments in the interviews. For the two latter data types, only the participants' answers were coded, not the questions, to guarantee that the emerging themes and ideas did not arise from the researcher's perceptions.

3.3.3.3. *NVivo analytical tools*

Both quantitative and qualitative analysis relied on the use of NVivo8 software. Its organisational functions (Table 3.5) indeed allow easy tracking of specific codes, in particular the more complex three-stage codes used for qualitative analysis, thereby linking data to the emerging ideas (Richards, 1999).

Table 3.5. Linkages between the content analyses and NVivo's functions

Qualitative analysis	NVivo's functions	Quantitative analysis
Document	Cases (unit of analysis)	Document
Descriptive codes	Attributes	-
Topic codes	Free Nodes	-
Analytical codes	Nodes tree	Themes codes

Word frequency and matrix coding queries, as well as the model building tools were used to support the emergence of ideas and answers relevant to the research questions, but also to help in the presentation of data in the final report. In particular, through the software's matrix coding query, which produced qualitative cross-tabulations (Miles & Huberman, 1994), basic forms of variable analyses examining the distribution and relationships of emerging codes within and among the distinct stakeholders groups.

Globally, the methodical, thorough and routine examination of the data by using NVivo contributes to distancing the data from the researcher (Baldwin, 2008) and

therefore provides a qualitative rigor to the analyses (Bazeley, 2007). Regardless, section 3.4 reviews the methodological and analytical limitations of this research.

3.3.4. Validation of the research findings

A final report on the case study report including research findings for each type of collected data was sent for validation (Creswell, 2003) to one long-term influential stakeholder of the water planning process—displaying most of the policy entrepreneur’s characteristics—who was included in the initial selection of interview participants, but was not available at that time. As a result of that validation process, the findings were confirmed and some practical details were added.

3.4. METHODOLOGICAL AND ANALYTICAL LIMITATIONS

Qualitative analysis often implies time-consuming data collection and analysis. While this was the case in this research, the methodological selection of a single case study loosened the time constraint, as well, the researcher was based in the region under scrutiny. However, despite the geographical proximity, the research was not directly involved in the water planning process, as a research-action methodology could have been, which meant that the decision-making process could not always be witnessed directly; thus, some resulting decisions that were not systematically made public could not be included in this research. This had two specific implications.

First, the timing of the water planning process was completely out of control—and may also have been even with a research-action methodology due to the political interferences—and resulted in the research finalising before the completion and adoption of the revised water plan. While it would have been interesting to examine the final version before drawing the final research conclusion, the stretched out process did result in a very illustrative case study. Secondly, the inability to access a more recent draft of the water plan restricted those discussions that were based on the research findings, especially from the interviews, because the proposal supporting the interview questions and answers was already two years old. However, this position on restricted access to information about the last water plan's decisions was the same as that experience by the broader community during this period. It was overcome by using validation with an influential stakeholder who participated in the latest discussions (see section 3.3.4).

3.4.1. Limitations in the collected data

Perspectives offered in regional newspaper are often highly dependent on the editor and/or owner, as well as on local advertising (Bowd, 2009). This is counterbalanced for *The Border Watch*, the selected regional newspaper, by the fact that the local owner and editor were consistent over the studied period.

Submission forms originate from a self-selected group of community members (Syme & Hatfield-Dodds, 2007), due to the resources that they require (Ingram et al., 1984; Cook, 2002) and there may be over-representation of stakeholders that disagree with the proposal (Tan, 2006). These characteristics of the submissions represent a limit of this study. Nonetheless, from a social perspective these

complaints are highly interesting as a means to anticipate potential social impacts, but they need to be balanced with other data to confirm that less-resourced stakeholders do not miss out.

Finally, another way to elicit past and current public values would have been the use data from debates over the water plan that were held by local radio, or undertake interviews of radio hosts to recall with them how much water had featured in their discussions and for which issues. Similarly, a wider range of stakeholders involved in the water planning process could have been used to confirm and validate the findings. However, time constraints did not allow further investigating these sources.

3.4.2. Research validity

The internal validity of this qualitative study relies on the triangulation of data (Tharenou et al., 2007) through:

- A range of data sources and collection techniques: news reports, submission forms, interviews, documents and observation from various perspectives (local farmers, foresters, government officials, NRM board members), as the use of multiple sources of data constructs validity in the case study design (Yin, 2003).
- The use of two data analysis techniques: quantitative and qualitative content analysis.

In addition, the longitudinal analysis as a special form of time series analysis, establishes a chain of evidence that further improves explanation building and internal validity. Moreover, in reporting the results (in Chapters 5, 6 and 7), the argument made through the qualitative analysis is validated by the presentation of the range of perspectives and opinions and by using quotations from the data as supporting evidence (Creswell, 2003). Ultimately, the use of a combination of policy and institutional change theories to build explanations, and the validation of the draft findings with a community member, also increases confidence in the data (Creswell, 2003).

Subsequently, the triangulation of data collection and analysis overcomes the risk associated with qualitative studies of drawing conclusions based on a small sample size. It also reduces bias introduced from the identification of the researcher with

participants and from interpretative coding, along with the use of software that enables independent revision of individual paragraphs.

The next four chapters focus on the results from these aforementioned methods that fuel the case study. Chapter 4 provides a detailed context of the water management in the Limestone Coast, South Australia. The three following chapters present the findings of the analyses when the above methods were applied to each of the gathered data sets: news reports in Chapter 5, submissions in Chapter 6 and interviews in Chapter 7.

AUSTRALIAN WATER PLANNING EVOLUTION TOWARDS SOCIAL SUSTAINABILITY

This chapter aims at reviewing the legal and institutional framework of water management in Australia and their application in the development of water plans in the area of study. It provides a policy background and describes the research context for the study. It begins with a short history of the Australian water institutional framework at the Federal level that resulted in the current water management and institutions. Emphasis is placed on the framework that regulates rural and agricultural water because of the significance of irrigation as the main water user and as the focus of interest in this research. Then the literature on the two policy tools commonly employed for Australian water allocations—water markets and water plans—is examined from a social sustainability perspective, in particular to evaluate their respective fitness to address social sustainability. The third section describes the introduction of these Federal approaches into South Australian policies and the current legislation that governs the water planning processes in that State, in particular its social consideration. Finally these frameworks and approaches are applied in the study area, the South East Limestone Coast, to apprehend the practical development and implementation of its water allocation plans.

4.1. INSTITUTIONAL FRAMEWORK FOR WATER MANAGEMENT IN AUSTRALIA: FROM THE RIPARIAN DOCTRINE TO WATER MARKETS

Current water institutions are highly dependent on the historical institutional frameworks that evolved to reflect changes in the economic, environmental or social context—concept of path dependency (Livingston, 2005). To better comprehend the policy under analysis in this study, the following sections briefly track the evolution of the water institutional framework in Australia towards market-based instruments. The social values associated with the latter are then examined to determine whether they address social sustainability.

4.1.1. Path to the current institutions

The Australian water institutional framework has been commonly described as evolving through four main phases from white settlement to the current situation (Hussey & Dovers, 2006; McKay, 2008; McKay & Marsden, 2009, p. 13). Previously, and concurrent to the evolution of the administrative water framework, Aboriginal people had, and still have, strong bonds to water at both practical and spiritual levels as evidenced in their languages, cultural practices and tribal boundaries (Strang, 2002; McKay, 2005). Without attaching less significance to these informal connections, this chapter focuses on the formal institutional framework due to their relevance for the water planning policies. Aboriginal custodial water rights (Tan, 2006) and the associated traditional values will nonetheless be largely examined from a social sustainability perspective.

The first phase introduced, simultaneous to white settlements (nineteenth century), the English Common Law, based on the *Terra Nullius* concept, denying any existing Aboriginal inhabitants and their water practices. Its Riparian doctrine defined surface water use and limited the withdrawal by riparian owners of this society-owned resource to a ‘reasonable extent’. But groundwater extractions remained unlimited (McKay, 2006; McKay & Marsden, 2009). The Australian Commonwealth Constitution in 1901, and in particular its section 100, launched the second phase of the Australian institutional water framework by vesting the States and Territories with control over water. The Federal government could still use financial incentives under the section 96 to influence State water management. During this phase, intensification of water development created competition among users and damage to the environment (McKay & Marsden, 2009). Since the 1980s, increasing

environmental concerns and social movements have triggered a third phase (McKay, 2005), which acknowledged the concept of ‘environmental flow’ (Hussey & Dovers, 2006). Finally, the fourth phase witnessed an expanding involvement by the Commonwealth, resulting in the 1994 National Water Reform Framework, agreed to by the Council of Australian Governments (CoAG) (McKay, 2005, 2008).

The 1994 CoAG reform was indeed based on fiscal federalism, that is, financial assistance from the Commonwealth to the individual States and Territories through the National Competition Reform initiated in 1995 (McKay & Marsden, 2009). It was then complemented in 2004 by the CoAG National Water Initiative (NWI). Both CoAG water agreements were driven by the triple bottom line concept (McKay, 2001) for economic, environmental and social sustainability. The water reform also reflects the four global trends in institutional change identified by Saleth & Dinar (2000, in Shi & Meyer, 2009, p. 768) as:

From development to allocation, toward decentralisation and privatisation, towards integrated water resources management and towards economic viability and ecological sustainability.

The allocation trend is particularly implemented through a water planning process, while water markets were created through a series of measures (separation of water from land title, definition of water rights, etc.) to pursue water and economic efficiency. The creation of 56 natural resources management regions across Australia and their increasing role at catchment or regional levels (McKay, 2006/07) represent both decentralisation and an increase in integration of the water resource management (Hussey & Dovers, 2006). The ecological sustainability shift induced several of the reform objectives: the need to address over-allocation, the restriction placed on water diversions from the Murray Darling Basin (the Cap was introduced in 1995, based on the 1993/94 level of development), which is also an example of greater allocation management, as well as various highly contested programmes aiming at buying back some water allocations to provide environmental flows to the same basin (see Box 4.1).

Box 4.1. Water buy-back in Australia

The Federal funded water buy-back schemes, buying water entitlements back from consumptive uses (mostly irrigators) to be reallocated to the environment to restore the critical health state of the Murray River and its tributaries, are numerous: the Living Murray initiative, the RiverBank program, Water for Rivers, the River Environmental Restorations Program, the Wetland Recovery Program, the Restoring the Balance Program (National Water Commission, 2009; Hone et al., 2010) and, more recently, the Water for the Future plan.

These buy-back schemes initially triggered strong resistance from the community—for example the \$23 billion dollar purchase of Toorale Station water (Roberts, 2008; Franklin, 2010)—and the debate regarding their effective impact on the environment continues (Cruse et al., 2009a; Hone et al., 2010).

Federal participation in water management culminates in 2007 with the devolution of the States' water control of the Murray-Darling Basin (MDB) to the Federal government through the *Water Act 2007* and corresponding State legislation—the *Water Commonwealth Power Act 2008* in South Australia. The Murray Darling Basin Authority (MDBA), replacing the Murray Darling Basin Commission (MDBC), currently prepares the basin plan. Within the MDB, all local water plans are to be consistent with this basin plan, enabling both their revision and adoption by the Commonwealth (McKay, 2010a). This centralism emerging from the MDB has become common in water planning as a way to fulfil Federal goals (Baldwin, 2008; McKay, 2010b). However, this approach conflicts with decentralisation and the subsidiary principle that are being promoted both internationally and nationally.

Thanks to these 1994 and 2004 reforms, the current Australian water governance regime provides for two alternatives for the distribution, allocation and sharing of water resources among the various users: water markets (or water market-based instruments) and water plans. With a strong focus on water trading, Australia is now considered as a mature water economy that is striving for maximisation of its water use (Shi & Meyer, 2009). However, this economic emphasis is contrary to the recommended triple bottom line concept that seeks balance between economic, environmental and social sustainability (Connell et al., 2005; Turrall et al., 2009). Furthermore, at the international level, water markets are still regarded as experimental, in particular because of scepticism about their ability to deal with environmental and social sustainability (Chatterton & Chatterton, 2001). Indeed, in Australia 26 per cent of the 340 surface water management areas (WMAs) and one third of the 538 groundwater management areas are either, close to, or overused/over-allocated (McKay, 2001). But integrity of the environmental system is a pre-condition for water markets to avoid economic, environmental and social

disasters (Young, 1992). Additionally, social concerns relate in particular to theoretical antagonisms between water markets and social considerations (Syme & Hatfield-Dodds, 2007; Alston & Mason, 2008; McKay & Marsden, 2009). Therefore, economic maturity now needs to be matched by environmental and social integrity.

The following sections evaluate in turn the fitness of water markets and water plans in the social sustainability debate.

4.1.2. Are water markets the appropriate tool to address social sustainability?

The examination of social values associated with water trading suggests that despite the common expectation that water markets are equitable and therefore allow for social considerations, they are not adequate tools to address social sustainability.

4.1.2.1. Expectations that water markets can solve social issues

Traditional economists claim equity or equality of marginal social benefit for all users through the Pareto equilibrium of the perfect free market of water allocation along with its economic benefits of maximisation of water efficiency and reallocation to high value uses (Freebairn, 2003). Moreover, from the same traditional perspective ‘trading water would clearly promote an allocation superior to social regulation’ (Swaney, 1988, p. 38). Likewise, the so-called equity principles—polluter pays, impacter pays and beneficiary pays (Wu, 2009)—that are based on markets, only relate to cost sharing distributions and thus contain clear economic bias and do not provide socially efficient outcomes (Hartfield-Dodds, 2006). These attempts to use social terms assume that social considerations have been looked after, but they clearly overlook the qualitative social value of water.

Decision-makers easily make the jump that social considerations are therefore accounted for in water markets, and expect the markets to operate socially equitable re-allocation (Bjornlund & McKay, 2000) and to solve social issues (Nancarrow & Syme, 2001). This assumption is further confirmed by the observation that water trading, as part of a broader reform trend to protect and conserve the resource, not only enhances social values that are enjoyed in healthy ecosystems (Swaney, 1988), but also the spiritual values associated with connection with, compassion about, and respect of, the environment. All of the above contribute to the maintenance of social cohesion (Mollard, 2008). Nevertheless, the negative social impacts of a free water market are such that an administered form of water trading is commonly adopted

(Swaney, 1988), and currently prevails in Australia. Administration of a water market allows for a greater social control over the created externalities. But it also means that it cannot deliver to a full extent the expected benefits, in particular economic ones, such as the equal benefits associated with a free market.

The debate around water trading in Australia is currently limited to the definition of water entitlements in order to allocate water resources through a free market: separation of water from land (CoAG, 1994), entitlement rationalisation (Shi, 2006), etc. However, notions of fairness, inter-generational equity and therefore more generally notions of social sustainability are often overlooked. The initial expectations that the water market will solve social issues should be overcome due to the negative social values associated with water trading.

4.1.2.2. Antagonisms between water trading and social sustainability

Social aspects of the Australian water reform are lagging behind the economic considerations (Alston & Mason, 2008; Baldwin, 2008) that have had emphasised priority. In addition, water markets, which were frequently considered during the water reform as the solution to all Australian water problems (Cox & Warner, 2009), conflict with sustainable communities, in particular because they degrade social norms and promote individual strategies rather than community cooperation (Table 4.1).

Water markets have been argued to degrade social norms (Sandel, 2009) and as far as water is concerned they ‘destroy[s] the water’s non-market functions’ (Swaney, 1988, p. 42). As a result, the cultural and spiritual values of water fade and the resource is converted completely into an economic good. However, research has suggested that agricultural water users in New South Wales do not base their decisions only on an economic rationale (Kuehne & Bjornlund, 2007), in particular, because water is not produced by the economy (Swaney, 1988). However, water does carry strong social and in particular identity values (Strang, 2006) that are not reflected in water markets.

Water markets do not obviously promote community cooperation (Strang, 2004 in Baldwin, 2008) as they are based on individual strategies (Hatfield-Dodds et al., 2006/07). Furthermore, individual preferences do not always result in positive outcomes for society as a whole (Swaney, 1988)—the tyranny of small decisions. As a consequence, social objectives associated with the allocation of the resource are

altered, and economic logic prevails over social goals, as in maintaining rural communities or distributive justice (Connell et al., 2005; Turrall et al., 2009). Indeed, the reallocation of water to ‘higher value uses’ may not result in an improved allocation from a social perspective (Swaney, 1988). This is due to the opportunities that water markets create for potential accumulation of water property by a few (Connell et al., 2005), in particular by corporate-owned businesses. The latter tend to drain financial capital out of the rural areas (Stubbs & Cocklin, 2007). Corporations also gradually supersede family farming that are believed to promote a ‘vibrant sustainable rural community’ (Edwards et al., 2007, p. 3); such supplanting may thus end the dream of family farms in rural Australia (Smith, 1998). Water markets also induce misunderstandings among decision-makers, focusing generally on economics, and the community that tends to adopt a social perspective (Edwards et al., 2007). Finally, water markets do not anticipate shifts in social values (Swaney, 1988). Consequently, such markets engender social disruption (McKay, 1994), which may explain why communities do not trust the market to be a potential solution to water allocation problems (Syme & Nancarrow, 1996).

Table 4.1. Theoretical antagonisms between water market and social water management

Water market	≠	Social sustainability of water management
Water as an economic good only		Water holds strong social and identity values
Individual strategies		Community cooperation
Reallocation to higher value uses		Distributive justice
Potential accumulation by corporations		Maintaining rural communities
Decision-makers adopts economic perspective		Community adopts social perspective

Some have attempted to reconcile these theoretical antagonisms. For instance, the corporate social responsibility literature aims to value stakeholder relationships through a stakeholder theory in which the firm enlarges the economic role of businesses to encompass social responsibilities. However, such literature never contests their economic ascendancy. Additionally even management examples, including community development approaches, still cannot relate their results to enhanced community values (Stubbs & Cocklin, 2007).

Water markets promoted by the Australian water reform do not favour, and rather threaten, the social sustainability of rural communities relying on irrigation, through economic precedence and the mentality that it engenders. As market mechanisms are not adapted to social considerations, there are high expectations that water planning promote social objectives and counteract the potential social disruptions that water markets can induce. An examination of the Australian water planning approaches provides evidence of how well such water plans can fulfil these tasks.

4.2. AUSTRALIAN WATER PLANNING EVOLUTION TOWARDS WATER ALLOCATION AND SOCIAL SUSTAINABILITY

Facing the emphasis on water market and environmental flows, the National Water Initiative engaging the Australian water reform, does not include any social tools to favour the social dimension of the three-fold sustainability in the current water governance. However, a water plan can have, as Cullen noted, ‘differentiated impact depending on groups within the community’ (Cullen, 2006, p. 4). Therefore the appropriateness of water plans to consider social sustainability when allocating water resources is examined here through the evolution of the planning approaches. Initially, strongly oriented towards water development, water planning policies have evolved gradually towards allocation management, as opposed to supply development.

4.2.1. Evolution of the planning approaches towards allocation of the resource

Australian water planning approaches intricate over time as both a reflection and an impulse of the institutional evolution’s stages (Sewell et al., 1985) due to the introspective character of the Australian water resources management (McKay, 2002). Water planning has indeed a long history in Australia, but in the first two phases of the Australian water institutional framework, it was generally directed towards infrastructure planning, technical solutions and supply management (Sewell, 1985). These approaches also tended to reflect different stages of economic development (Sewell et al., 1985) rather than social development. From the late 1970s, water planning shifted to demand management based on the allocation of the existing water resources and later to reallocation among uses. In 1973 the ‘Proposed National Approach to Water Resources Management’ recommended the integration of water resource planning with other sector, broadening of its objectives, and involvement of the public (Killick & Ockenden, 1985).

Within the third phase of the water institutional framework, two significant events delineate the water planning process. In 1983, the Commonwealth published a study titled ‘Water 2000: A perspective on Australia’s Water Resources to the Year 2000’ impressing on the preparation of comprehensive water management plans (Sewell et al., 1985). The inclusion of all competitive uses under the same framework was the first step towards integrated water planning dealing with water allocation and sharing among uses. Furthermore, environmental considerations were to be included in water

planning through community debate, according to the 1984 National Conservation Strategy. Increased environmental priority was assigned in 1992 by the National Strategy for Ecologically Sustainable Development (ESD). Indeed, the ESD principle, the basis of any legislation regulating water management at Federal, State and regional levels, gives precedence to the environment over any of the consumptive uses (Mooney, 2005).

The fourth phase consecrated this new environmental position, with the 1994 CoAG introducing and reserving environmental allocations in water plans (CoAG, 1994) whereas the second and more limitedly the third phases of the Australian water frameworks largely encouraged over-allocation of rural water entitlements resulting in over-allocated and over-used systems (McKay, 2008). In these systems, environmental priority translated into reallocations from consumptive uses to the environment. Thus environmental flow was to be recovered through reductions to irrigators' water allocations (McKay, 2003; McKay & Marsden, 2009) enabled either through market-based instruments (ballot, buy-back schemes, etc) or water planning. These reallocations potentially impose high social impacts on agricultural water users as well as on the whole rural community (Freeman, 2005; Meinzen-Dick & Ringler, 2006; Molden et al., 2007). Therefore the allocation orientation of water planning approaches needed to be more closely matched to social concerns. Thus, the environment became a non-consumptive water user of its own, as opposed to the previous approach of considering a project's impacts on the environment.

Equally important in this last phase, was that the water planning process gained a central role in this first wave of water reform. The 2004 NWI reinforces again regional water plans as 'its foundation' (Cullen, 2006, p. 1), in using it as the 'operational framework for delivering much of the [...] water reforms' (Gentle & Olszak, 2006, p. 59), in particular to achieve water use sustainability (Hamstead et al., 2008). Water plans then become statutory through amended or new State legislation (Gentle & Olszak, 2006). Furthermore, water planning henceforth is nested in more comprehensive NRM planning, consistent with the integration of water with other natural resources management in the Australian frameworks evolution, resulting in nested plans from national to local levels and creating a complex network of interlinked plans (Dale & Cowell, 2004). Expectations are such that State and Territories have spent large amounts on water planning (Hamstead et al., 2008).

However, implementation of various water reform elements through water planning may reinforce the status quo and hinder change without careful consideration. For example, strengthening of property rights makes it more difficult to ask for uncompensated reductions to allocations (Gentle & Olszak, 2006). Additionally, very limited guidelines were provided for the practical design of these complex water plans (Gentle & Olszak, 2006). Previously, ‘technical’ water plans could be designed in less than a couple of years (Sewell et al., 1985) while now, increased timing is often experienced, as well as increased costs. These delays create ‘tensions between the NWI and water plans’ as they are claimed to originate in the water reform (Gentle & Olszak, 2006, p. 61). Further, increased timing in planning processes leads to new problems in changing social values within the planning timeframe (Sewell et al., 1985).

In the water planning reorientation, the Australian water institutional framework witnessed the complete replacement of the previous supply development objective by a careful allocation of the resource, in particular, with the specific creation of an environmental allocation. Potential development trends may however re-emerge because of the massive amount of public funding aiming at water efficiency (Crase et al., 2009b). Importantly for this research, best practices of water planning also evolved to match principles of social sustainability.

4.2.2. Evolution of the planning approaches towards social sustainability

With this rising interest in water plans, greater attention was given to the planning process itself as well as to the resulting plan. Gradually, new concepts were considered for their comprehensiveness and effectiveness into planning best practices:

4.2.2.1. Community engagement

Public participation is considered a best practice in water planning since the 1970s and enables community engagement in the planning process to achieve both democracy and improved social capital (Syme & Sadler, 1994; Beierle & Konisky, 2000). Only in the 1990s was it introduced as statutory in water planning development by some Australian State legislations. Communities are involved either as community representatives in committees in charge of developing the water plans, or during a community consultation period. Community engagement in water planning enables social acceptability (Cullen, 2006) and transparency (CoAG,

2004a) but also decisions that integrate community's perspectives and objectives (Baldwin, 2008). However, indirect Federal centralisation in water planning, through the management of the Murray River, contradicts this current tendency towards a participative planning process. Community-based planning (Whelan & Oliver, 2005; Marshall, 2008) is nevertheless now reinforced with new approaches to water planning more concerned with the social dimension through increased participation of the community: collaborative water planning (Tan et al., 2008) and consensus-building approach (Baldwin, 2008).

4.2.2.2. Future focus for adaptive management and resilience

Planning is clearly future oriented and should provide options for, or scenarios of, water management (Sewell, 1985) for adaptive management and greater resilience of communities (Connell et al., 2005). Adaptive management requires thinking about a community's future. The type of future the community wants is of prime concern in water planning as environmental and social benefits of water project have been identified as a 'shaper' of rural community resilience (Schwarz & McRae Williams, 2009). Often, however, planning presumes future generations' lifestyles will be close to the current ones; it is indeed difficult to think about the future, even more so from a social perspective (Sewell et al., 1985; Nancarrow & Syme, 2001). The Australian State legislation imposes regular reviews of water plans as a minimum requirement for adaptive management (for example every five years in South Australia, which is likely to be changed to 10 years in the Murray Darling Region under the forthcoming Murray Darling Basin Plan). Clear objectives for easy monitoring and evaluation are required for adequate adaptive management (National Water Commission, 2009). The future focus of a plan is also understood within the concept of inter-generational equity, which includes, in part, the fairness concept.

4.2.2.3. Fairness

Water allocation or water sharing is concerned first of all with distributive justice of the resource among the water users, including the environment. Additionally, procedural justice is now more controlled through additional prescriptive State legislation on both the planning content and process (Mooney, 2005), especially enacted to ensure fairness. Procedural justice could be improved by increased transparency during the planning process, according to the National Water Commission (2009). Systematic consideration of Aboriginal and cultural accesses to

water is also recommended (National Water Commission, 2009) for equity. At present, only occasional access is granted to Aboriginal people in water planning throughout Australia (Jackson, 2009a). In the planning exercise, fairness or justice is one perspective among numerous others that is often viewed as more dependent on the political world and as being very subjective (Nancarrow & Syme, 2001). Indeed, the notion of equity varies depending on the water doctrine selected (Tisdell, 2003).

4.2.2.4. *Quality of life and social values of water*

The human dimension of water planning was finally acknowledged in the 1970s and 1980s as its ‘ultimate goal is to improve the quality of human life’ (Harris, 1977, p. 242). Social criteria through socio-economic analysis became an important element to inform water planning decisions (CoAG, 2004a). From the social perspective, this is done in particular through social impact assessment that especially evaluates the impact of the proposed plan on the quality of life for the local community (Dale et al., 2001). However, socio-economic impact assessment of water plans are not used systematically (Baldwin et al., 2008; Hamstead et al., 2008), and when implemented social impacts are evaluated in economic terms only—for instance employment or household income (NSW Department of Water & Energy, 2007; EconSearch, 2008). More elaborate social indices in relation with water are currently developed—social resilience and community dependence on water and water access changes—but their local application still needs complementary qualitative data (Herreira et al., 2008). The economic evaluation of the social values of water do not provide ‘a comprehensive overview of the qualitative value of social uses and cultural significance of water to communities’ (Alston & Mason, 2008, p. 138).

These new concepts introduced in the water planning approaches, even if arguably implemented, correspond also to the five principles of social sustainability that are commonly agreed upon (see Figure 2.3): community engagement, future focus, fairness, quality of life and social values of water (Koning, 2001; McKenzie, 2004; Partridge, 2005a; Dillard et al., 2009). In matching these principles, water plans become a clearly adapted tool to boost the social dimension of sustainable allocation of water. Furthermore, water plans provide opportunities to solve conflicts—whether between individuals, interest groups or communities—and to propose changes to institutions in order to achieve social objectives (Lindner, 1985; Sewell et al., 1985). The significance of water plans in the implementation of the Australian water reform associated with these new planning approaches, converts them into perfect tools to

reconcile the currently overlooked social sustainability with its economic and environmental dimensions.

Despite the NWI modelling its water plans on existing plans in various Australian States, the latter had to significantly amend or renew their corresponding legislation. The current water plans vary among the States and Territories depending on the respective State's historical water institutions and laws. This diversity first manifests itself in distinct label of the water plans at State level: Water Allocation Plans in South Australia and Northern Territories, Water Sharing Plans in New South Wales, Water Resources Plans in Queensland, Water Management Plans in Tasmania and Western Australia and Sustainable Water Strategies in Victoria. The South Australian approach to the water planning process is reviewed in the following section to explore the specific institutions, on which was built the water allocation plan under study in this research.

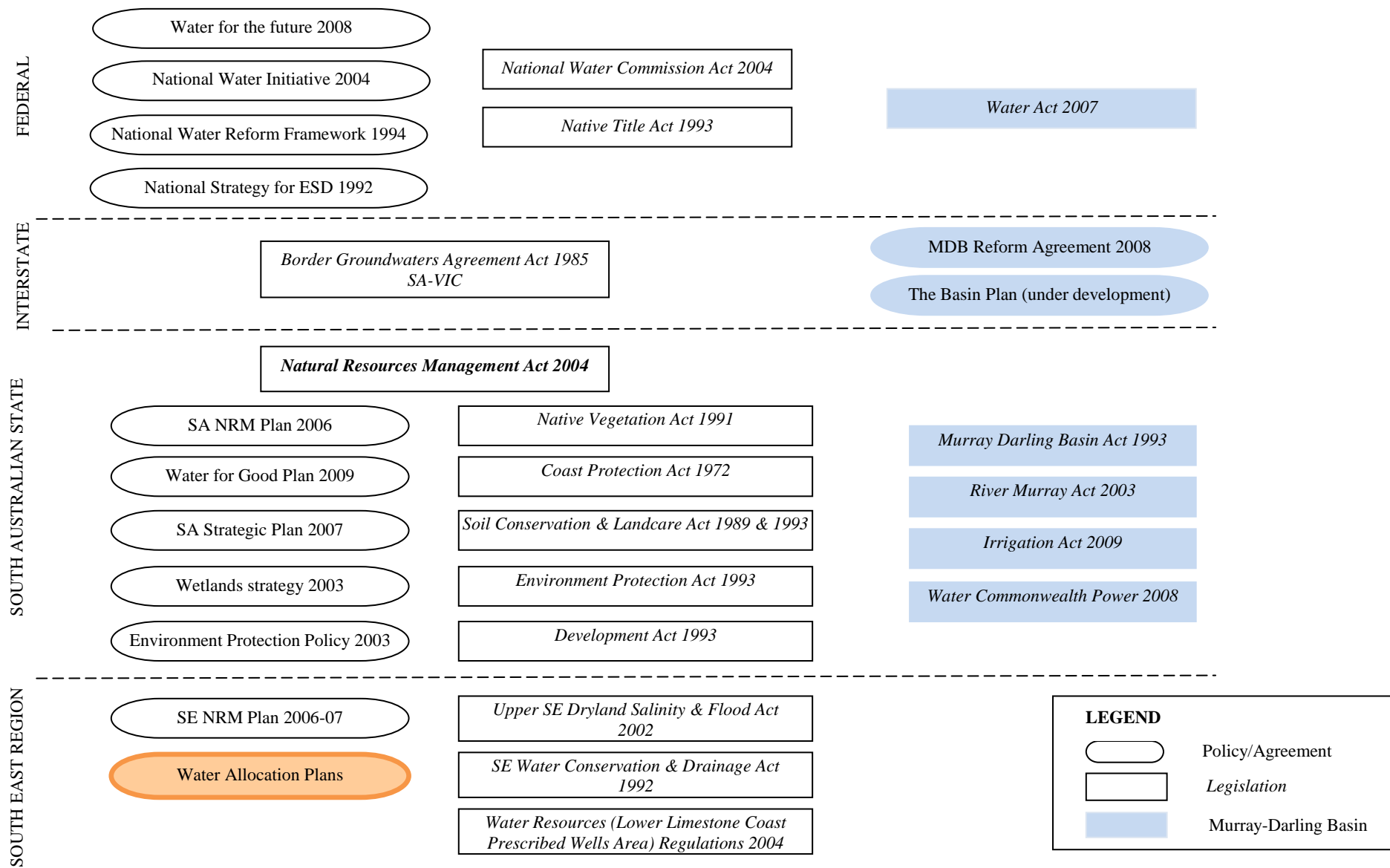


Figure 4.1. Cascading legislations & policies from the Federal level to the Limestone Coast (or South East) region

4.3. SOUTH AUSTRALIAN WATER PLANNING FRAMEWORKS

Water management is regulated by a multitude of legislation and policies, applied State-wide or only at a regional scale, that are highly influenced by Federal strategies and policies (see Figure 4.1). Even though a single legislation at State level that governs water planning, the *Natural Resources Management Act 2004* in South Australia (in bold in Figure 4.1, NRM Act 2004), water plans have to be consistent with an increasing number of other plans, policies and laws. The section below details the path to the current legislation on water planning in South Australia.

4.3.1. Path to the Natural Resources Management Act 2004

The water planning process was initiated in the 1980s in South Australia even though the *Water Resources Act 1976* did not promote it. This Act was enacted as a single legislation governing all water resources (surface, groundwater and water quality) due to an already perceived water over-allocation by the late 1960s and in order to implement the 1973 Proposed National Approach to Water Resources Management endorsed by South Australia (Killick & Ockenden, 1985). The Act pursued the proclamation of developed water regions, where water extraction became regulated and allocated thanks to compulsory water licences (McKay, 1994). Under this Act, planning efforts focused only on emerging issues (for example salinity problems in the River Murray area) and mostly from a supply development perspective (as performed by the Engineering and Water Supply Department). Nonetheless, water resources were considered in most Local Government Supplementary Development Plans required by the *Planning Act 1982*, later replaced by the *Development Act 1993*. Additionally, a cyclic State Water Resources Management Plan (first published in 1986) was based on regional reviews assessing local water resources management arrangements (Killick & Ockenden, 1985).

Water management, not yet organised in water plans, was also influenced by the *Border Groundwaters Agreement 1985* signed with the State of Victoria to regulate the Border Designated Zone—a 20 km strip each side of the border sharing two common aquifers. This inter-State agreement, implemented in South Australia through the *Groundwater (Border Agreement) Act 1985*, dominates any other State law.

Water plans at the regional level appeared for the first time in South Australian legislation in the *Water Resources Act 1990* as ‘plans of management of water resources’. Their only mention in this Act refers to their formulation as one of the Minister’s functions (section 9). Their objective, contents, scope and process remained open. Conversely, the water management by catchment unit was regulated by the *Catchment Water Management Act 1995* (Mooney, 2005).

Both acts were repealed by the *Water Resources Act 1997* (South Australian Government, 1997), which introduced the designation ‘Water Allocation Plans’ (WAP) and significant changes to South Australian water resources management. It converted the previous proclamation into a prescription and abolished any reference to the Common Law; in particular, the riparian right that still existed in the 1990 Act (section 7). It also established that a permit was required for any water affecting activities (divert, drain, etc). Commercial forestry was prescribed as a water affecting activity with the amendment in 2004 of the *Water Resources Regulations 1997* (section 13AB) under the *1997 Water Resources Act*. Under the prescribed areas—therefore leaving unregulated sources that are limitedly developed—water extraction is restricted to holders of water taking and water holding licences for irrigation, industry and public water supply. A holding licence needs to be converted into a water taking licence before water extraction can occur. Pre-existing dairy operations, intensive animal keeping and plant production and recreational uses were licensed in 2002 following a change to definitions in the *Water Resources Act 1997*. Extraction of water for domestic purposes and watering stock is authorised without licence.

The *Water Resources Act 1997* became more prescriptive in relation to water planning as it detailed the planning process in its sections 101 to 107, and it requested a WAP for any prescribed resource. Its regulated water planning design included the planning process steps and involved stakeholders. It required four statutory community consultations: one before and one at the Proposal Statement stage, one during the preparation of the water plan, and one for the final draft plan. The local catchment water management board or water resource planning committee was to prepare the WAP, obtain comment from all interested departments or agencies—in particular the Department for Water Resources (DWR) created in 2000 and replaced in 2003 by the Department of Water, Land and Biodiversity Conservation (DWLBC), itself replaced in 2010 by the Department For Water (DFW)—and the community before final adoption by the Minister. The WAP should

consider the present and future needs of users of the water resource as well as users of any other affected resource. Moreover, WAPs were nested in a hierarchical water planning: State Water Plan→Catchment Water Management Plan→WAP.

The *Natural Resources Management Act 2004*, implemented from July 2005 (SENRM Board, 2006), replaced the *Water Resources Act 1997* and introduced further changes required by the NWI, in particular, the integration of water within natural resources management.

4.3.2. The current South Australian water planning approach under the NRM Act 2004

The *NRM Act 2004* requires, for any WAP, a public consultation once the plan has been drafted consisting of a public meeting and written submissions (South Australian Government, 2004a, section 79), and not allowing for adaptation of the consultation method to the local situation (Hamstead et al., 2008). Without a previous referral of the Concept Statement for comment to the public (section 78), one could have contested the interest of holding a consultation after the drafting of the plan and the making of decisions (Ker Rault & Jeffrey, 2008). The regional Natural Resource Management (NRM) Boards—built on the former catchment water management boards—prepare WAPs. They are permanent bodies, allowing constant participation of the community. Indeed a majority of the Boards Members reside in the region, are community representatives and are joined by local and State government officers. Board appointments, made by the Minister for Environment and Conservation, are done on a skill basis (South Australian Government, 2004a, section 25) enabling to go beyond the ‘interest’ of more powerful interest groups within the community. However, the NRM Council, which makes recommendations to the Minister regarding these appointments, is partly formed with representatives of interest groups—Local Government Association, Conservation Council and South Australian Farmers Federation (SAFF). Furthermore, the selection leads to a lack of Aboriginal people representation, unless personal particular interest of a selected community member. This significant omission is reflected in the absence of a ‘specific allocation to Aboriginal communities or individuals’ within the SA water management system (Jackson, 2009a, p. 41). It is also unclear whether they have to ‘report’ and ‘consult’ with the larger community (Mooney, 2005).

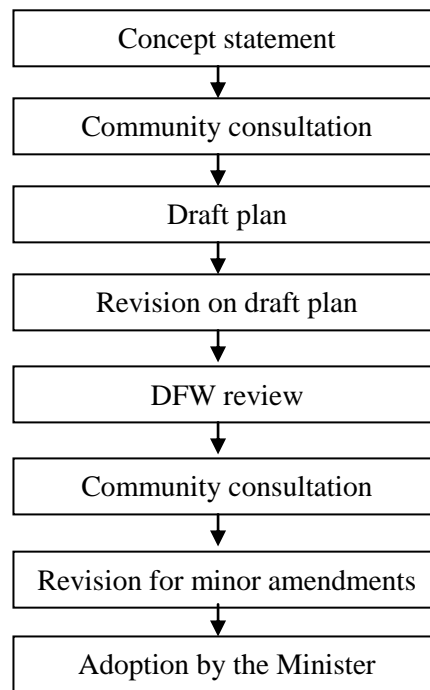


Figure 4.2. WAP planning process in South Australia

As previously mentioned, a WAP is nested within hierarchical planning and needs to be consistent with the NRM plan of its region and the South Australian NRM Plan 2006 ‘set[ting] out the ‘principles and policies for achieving the objects of the [2004 NRM] Act throughout the State’ (South Australian Government, 2006, p. 13), as well as with all other Federal, State and regional legislation displayed in Figure 4.1. The SA NRM Plan 2006 replaced the South Australian State Water Plan 2000 and is prepared and reviewed every five years by the NRM Council. The same lifespan applies to the regional NRM plans and WAPs that are also nested together: State NRM Plan→Regional NRM Plan→WAP. But the current *NRM Review (amendment) Bill 2010* proposes ten-year plan lifecycle (South Australian Government, 2010b) for consistency with the South Australian NRM region included in the Murray Darling Basin and its governing *Water Act 2007*.

Despite the need for consistency with higher plans and legislation, a WAP cannot be considered invalid, just because it is not consistent with the State NRM Plan. The only appeal to the Environment, Resources and Development Court allowed relates to a particular decision or condition regarding the water licence, water allocation or water transfer. A WAP cannot therefore be challenged.

4.3.3. Social approach of the legislation influencing and governing the South Australian water plans

Social dimensions of water planning, immediately after their recognition by planners in the 1970s, were considered as difficult to grasp and to deal with (Harris, 1977; Sewell et al., 1985). Social concerns regarding water management and water planning rested previously—in the *Water Resources Act 1997*—mainly into inter-generational equity. But this legislation had a weak social approach due to the lack of operational rules for the provision of future generations needs (Mooney, 2005). The new State legislation—*NRM Act 2004*—did not evolve greatly, as far as social objectives are concerned, as summarised in Table 4.2.

Table 4.2. Summary of social sustainability principles encountered in the main water planning legislations

Principles	NWI 2004	Groundwater Border Agreement 1985	NRM Act 2004
Fairness	Parties [...] deal with change fairly	Equitable sharing of resources	Minister [...] acts fairly Equitable sharing and allocation
Community engagement	Community input	-	2 public consultations Majority of NRM Board members live in region
Future focus	Adaptive management Future availability	-	5-year review Future generations
Quality of life	Social objectives Social impact	-	Social well-being Life-supporting capacities
Social values of water	Aboriginal cultural, spiritual and customary values Recreation Stock and domestic	-	Social needs Recreational licence Public water supply Stock and domestic uses

The social sustainability principles tend to have greater presence at State than Federal levels. This might stem from the difficulty to adapt to the diversity of communities at the national level. The State legislation however offers very limited operative rules for the considerations of the social sustainability principles, except for the community engagement principle where the legislation did detail a participation process for the consultation or the community representation in committees as described in section 4.3.2.

The *Groundwater Border Agreement 1985*, an older legislation, does not acknowledge the social sustainability principles. The triple bottom line concept, first reported in 1994 (Mitchell et al., 2007) was not yet among the Australian objectives. This inter-State agreement is also the only regulation that does not involve community input.

In the *NRM Act 2004*, the future principle is viewed through the future availability of water resources and the needs of future generations. The only immediate and arguable operational rule for adaptive management in the examined water plans is the regular review—five years, but proposed to be changed to 10 years. Social objectives of the quality of life are mentioned—social well-being and life-supporting capacities—but not operationalised and they remain too vague to be achieved in the long term or monitored in the short term. The overall fairness principle appears as very broad and is restricted to high level institutions, with no direct reference to procedural justice. But the prescriptive process of community engagement and the compulsory steps for the water plan development provide some initial consideration of procedural justice. Equity strongly focuses on distributional justice whether between the current users or indirectly between generations. On the contrary, the *Federal Water Act 2007 Cwlth*, applying only to the Murray Darling Basin region of South Australia, mentions directly inter-generational equity. A judge in neighbouring New South Wales determined three elements of inter-generational equity—conservation of options, quality and access principles (*Bentley v BGP Properties Pty Limited*, 2006 in McKay, 2010a).

The legislation influencing or governing the South Australian water planning approach do not promote strong consideration of the principles of social sustainability. This weak social approach may partly explain why the social sustainability of water plans is still lagging behind the economic and environmental dimensions, despite water plans being an appropriate tool to address social sustainability. This is particularly due to vaguely defined social objectives. At the Federal or State level it would be difficult to refine social objectives to encompass every community's situation without being too prescriptive. Nonetheless, these wide social objectives are also institutional opportunities to provide their more precise definition in a specific water plan.

The following section furthers its travel down the institutional levels to the regional water plan under study in this research: the Lower Limestone Coast water allocation

plan. This will provide an opportunity to see how the water planning approaches that were detailed previously are converted practically into local water plans.

4.4. WATER ALLOCATION PLANS IN THE LIMESTONE COAST, SOUTH EAST OF SOUTH AUSTRALIA

A short overview of the regional context gives the necessary background to the development of the water management regulations in the region, resulting in the current water allocation plans.

4.4.1. The South East's biophysical context

Originally inhabited by Tanganekald, Meintangk, Bunganditj, Ngarakt, Portaruwutj (SENRM Board, 2006) and Pinejunga Aboriginal peoples (Hanna et al., 2001), the reliable rainfall and water resources of the South East or Limestone Coast region attracted white settlers from the 1840s. Today, over 64 000 inhabitants—i.e. 4.2 per cent of the State's total population—populate the South East region, mostly in the Lower South East with over 40 per cent in Mount Gambier (2006 data in SENRM Board, 2010a).

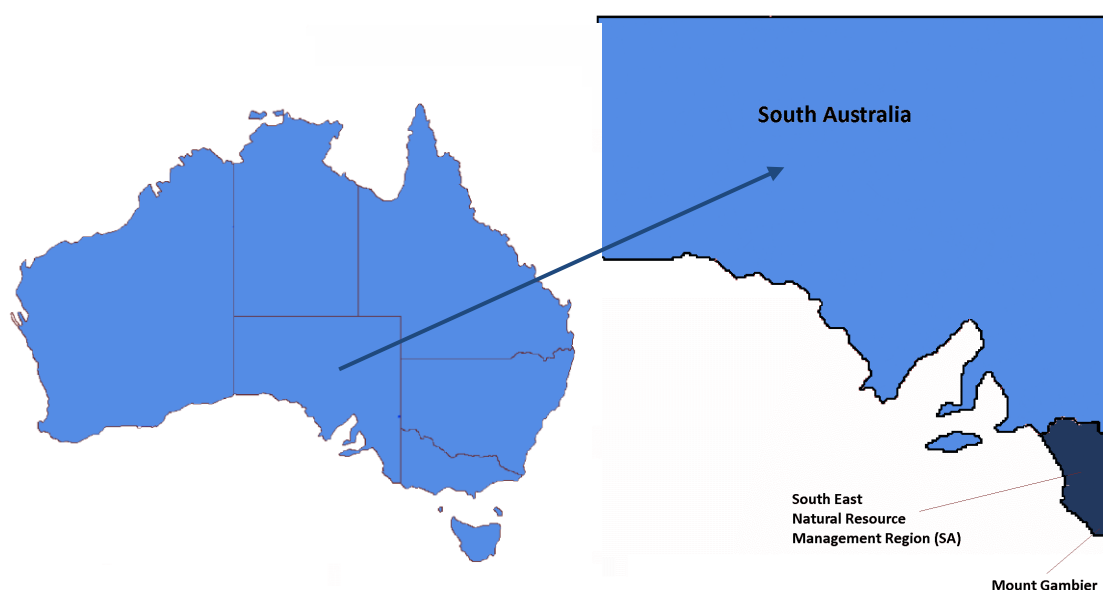
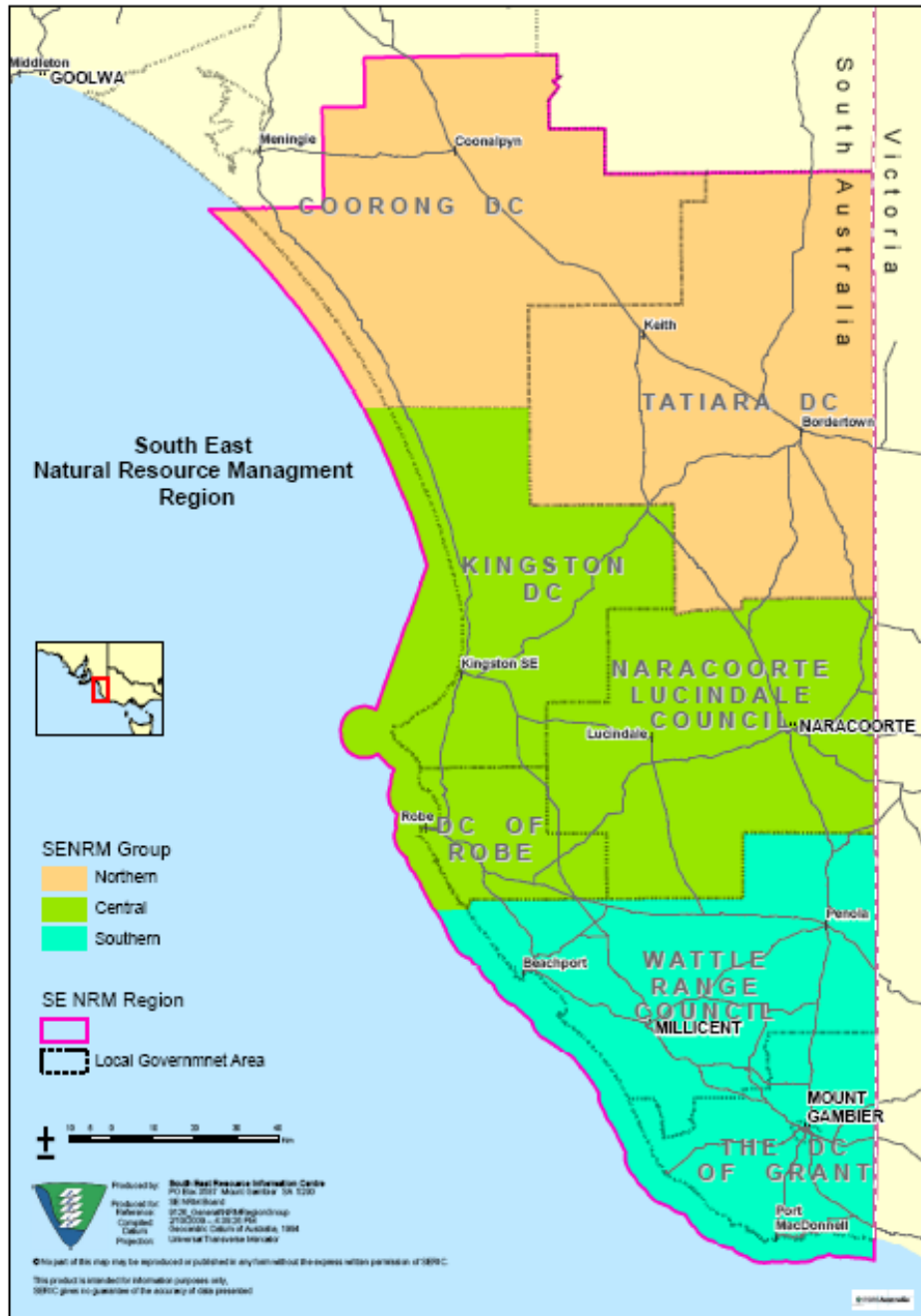


Figure 4.3. Limestone Coast location in South Australia and Australia

The South East Natural Resources Management Region (SENRM) is one of the 8 NRM regions of South Australia. It stretches over 28 120 km² between the Victorian Border and the Coast at the extreme South-East of South Australia (Figure 4.3) from Coonalpyn to Port MacDonnell (Figure 4.4). Two landscapes divide the region: low mallee covers the sandy Upper South East, and a series of dunes, 20–50 m high and parallel to the Coast, with inter-dune flats of forests and grasslands prone to wetlands

distinguishing the Lower South East. The South East wetlands are nationally recognised for their ecological importance; among them two are Ramsar classified, and thus of international significance: Bool Lagoon and the Coorong and Lower Lakes.



Source: (SENRM Board, 2010a)

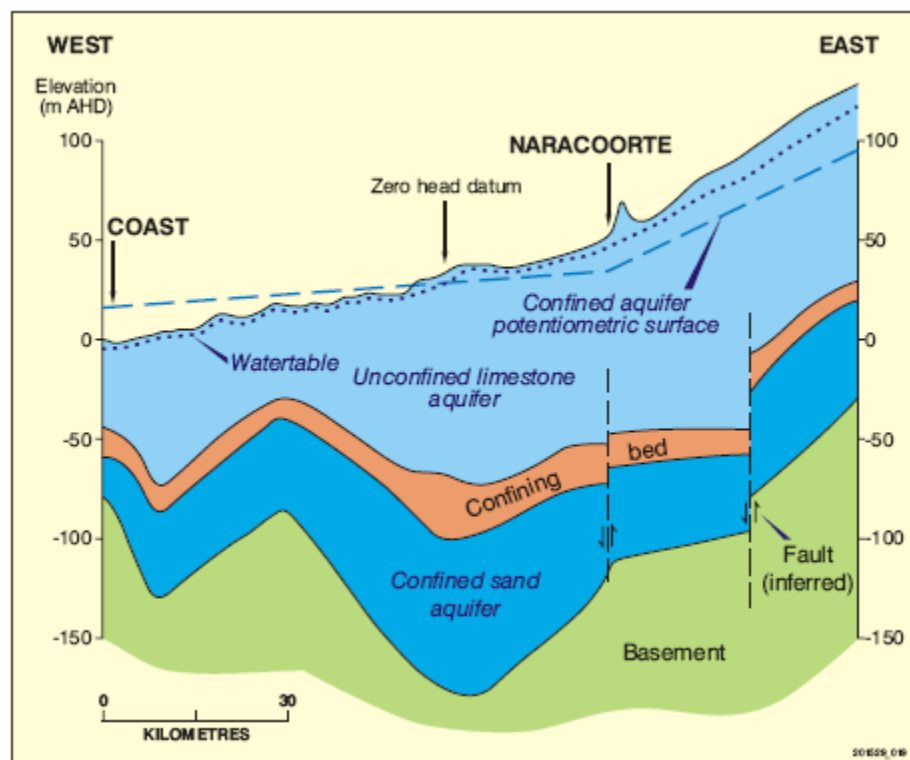
Figure 4.4. Map of the South East NRM region

With 450 to 800 mm of rainfall per year, the region is among the wettest of South Australia; however, the very hot summers result in high evaporation rates—from

1 330 mm in the north to 1 000 mm in the south (Paydar et al., 2009)—and therefore compulsory irrigation is needed for summer and perennial crops.

4.4.2. The South East's water resources

The SENRM region is considered to hold one of the largest water availabilities in the State (South Australian Government, 2000) with its two aquifers (Figure 4.5). The upper unconfined aquifer, the Tertiary Limestone Aquifer, provides over 95 per cent of the total water extractions due to ease of access—the water table lies between 2 and 45 m—and recharges mostly from local rainfall thanks to the permeable soils. Conversely the confined aquifer, the Tertiary Confined Sand Aquifer, is deeper—50 to 300 m—with very low recharge that flows from Victoria State and is of very good quality. The aquitard separating the two aquifers is believed to allow limited hydraulic connectivity in some areas but this is yet to be investigated (Paydar et al., 2009).



Source: (Rammers & Stadter, 2002, p. 5)

Figure 4.5. Schematic cross-section of the South East groundwater aquifers

There are no perennial surface water streams but the four ephemeral creeks originating from Victoria State (SENRM Board, 2006) are now seen as an ‘untapped resource’ (South Australian Government, 2000, p. 94). The surface water moves west slowly and towards the coast, but does not have a natural outlet. The extensive

drainage system (over 2000 km of drains) holds most of the region's surface water. Coastal and crater lakes are a significant highlight of the South East water landscape (see Box 4.2).

Box 4.2. The Blue Lake

The Blue Lake is famous throughout Australia for its changing colour: from grey in winter, it turns to brilliant turquoise from November to March (see opposite picture). Located in an extinct volcanic crater, this significant touristic attraction is also the source of water supply for the town of Mount Gambier. The lake is predominantly groundwater fed, thus representing a window into the region's groundwater aquifer. Decreases in water levels in recent years—three meters since a rainfall decline starting in 1994—is clearly noticeable from the vegetation line. Strong cultural values tie Aboriginal people with the lake, whose creation is attributed to Craitbul, a giant hero digging an oven for his family according to a Boandik legend (SENRM Board, 2010a).



4.4.3. The South East's farming systems

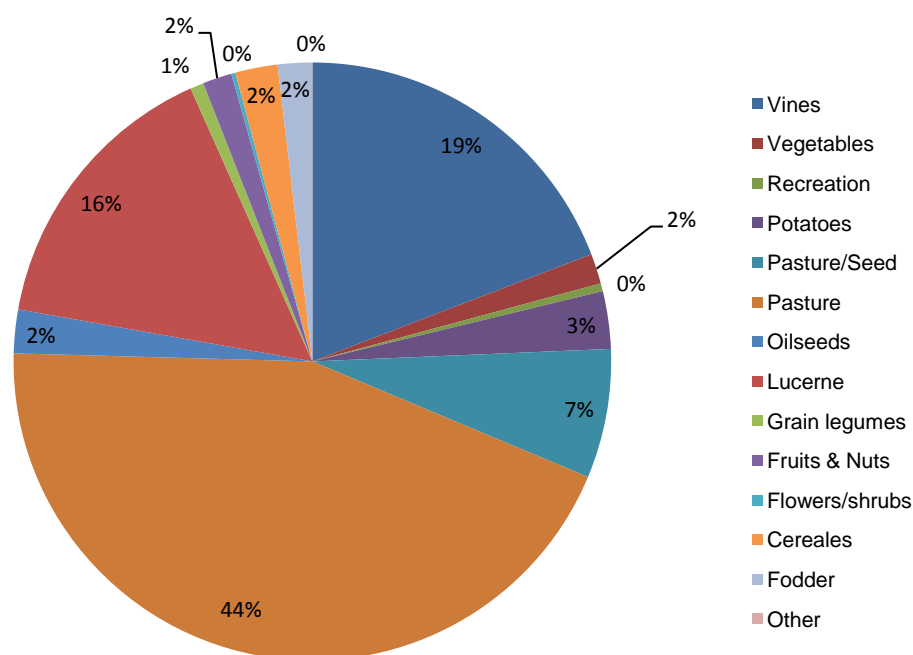
Both agriculture and forestry were developed by the first white settlers from the 1840s, a result, in particular, related to extensive drainage schemes initiated from 1864.

4.4.3.1. Agriculture

The initial agricultural production in the South East (wool and meat) did not rely significantly on water resources. Broad acre irrigation commenced in the late 1940s and early 1950s in the Tatiara area, spreading south along the Victorian border (in 1950s into the Padthaway and Naracoorte Ranges, in the late 1950s to early 1960s in Comaum-Caroline) and to the west (in the 1960s in the Lacepede-Kongorong area) (SECWM Board, 2001a). However, recent crop diversification—wine grapes, potatoes and dairy productions (Figure 4.6)—has triggered a more intensive and rapidly expanding irrigation industry (Select Committee on Water Allocations in the South East, 1999).

The South East region now comprises some of the most productive land in the State, with 75 per cent of its total forests and one third of its improved pastures (South Australian Government, 2000), but also of Australia thanks to its groundwater

resources (Select Committee on Water Allocations in the South East, 1999). Numerous individual wells irrigate less than 5 per cent of the region with around 80 000 ha spread over the 1 690 000 ha of farmland and the 2 300 farms of the region, constituting an irrigation mosaic. Pressurised irrigation systems prevail in the region in over approximately 70 per cent of the total irrigated areas (Jackson, 2009b). The region's agriculture contributes around 15 per cent of the State's farm gate value (SENRM Board, 2006).



Source: (EconSearch, 2005)

Figure 4.6. Irrigated crops' superficies in the South East

4.4.3.2. Forestry

Large scale plantation forestry begun in the South East from 1907, after well-adapted softwood species—mostly Radiata pine (*Pinus radiata*)—had been selected for planting on limited surfaces beginning in 1876. From the 1930s, enough timber was produced to supply a local timber processing plant and the private sector started to plant in the region. By the 1950s, the large amounts of timber produced justified the construction of the then largest sawmill of the southern hemisphere (PIRSA Forestry, 2010). From the late 1990s, plantations of Tasmanian blue gums (*Eucalyptus globulus*), a hardwood species, rapidly spread in the South East due to a Management Investment Scheme (MIS)—a Federal scheme for tax benefits deduction that can invest in forestry—incentive to the private sector (Table 4.3). Along with those in

Western Victoria, the South East's plantations form the Green Triangle region comprising approximately one fifth of Australia's plantations with 300 000 ha of Radiata pines and 150 000 ha of Tasmanian blue gums (Commonwealth of Australia, 2008). Currently, forest plantations cover around 14 per cent of the Lower South East accessible land (i.e. under *the Development Act 1993* surface excluding natural and urban areas, Department For Water, 2010).

Table 4.3. Evolution of the forestry plantations superficies (in hectares) in the South East

Plantation type	1939	Before 2000	2001	2005	2007	2008	2009
Pine	37 000	92 628	94 369	104 259	102 700*	107 611	107 826
Bluegum	-	3 706	16 136	33 330	38 500	42 368	42 154
TOTAL	37 000	96 336	110 507	138 207		149 979	149 980

Note: * for the Lower South East only. The use of diverse sources explains the discontinuities in the geographical unit.

Sources: (SECWM Board, 2001a; National Plantation Inventory, 2006; Green Triangle Regional Plantation Committee, 2010; National Association of Forest Industries, 2010).

The already small number of timber companies operating in the region was further reduced in 2007 and 2008 with significant ownership transfers, currently resulting in three private and one State-owned companies sharing the regional plantations estate.

Despite the beneficial impact of the forestry plantations on dryland salinity (in particular in the Upper South East) and on the State carbon balance, they now compete with agriculture for the local water resources in the Lower South East. They have both indirect and direct impacts on the water resources, respectively, through aquifer recharge interception and extraction from shallow water table (around 6 m). One third of the South East's plantations are considered to be above the shallow groundwater table (see map in Appendix 4.1).

Both recent expanding industries—irrigation and (blue gum) forestry—induce rapid land use changes (Williams et al., 2008) and are creating pressure on the local water resources, resulting in water table decline, water over-allocation and dryland salinity. These severe water resources problems, faced by the South East, result in water management being at the 'centre of the most intense community debate' (Select Committee on Water Allocations in the South East, 1999, p. 22) in the last decade, as evidenced by the numerous articles in the local newspaper (see Chapter 5).

4.4.4. The South East's water allocation plans

4.4.4.1. Proclamation of the five prescribed wells areas in the South East

Broad acre irrigation commenced in the Limestone Coast in the 1950s in particular in the Padthaway, Tatiara and Naracoorte Ranges. In 1975, the Padthaway prescribed wells area (PWA) was the first proclaimed in the region, as a result of a salinity increase, which is still the main problem in the area. In 1984, for the same reason, the Tatiara PWA was proclaimed, whose area was extended one year later. The PWAs of Comaum-Caroline—where irrigation began slightly later (1960s)—and Naracoorte Ranges were created in 1986 to give effect to the *Border Groundwaters Agreement 1985* to regulate the Border Designated Zone, as they share their two aquifers with their Victoria State neighbours. The Naracoorte Ranges PWA was expanded in 1993 with inclusion of the Naracoorte plains. These early proclamations were done pursuant to the *Water Resources Act 1976* and the *Water Resources Act 1990*. In 1997 the Lapecede-Kongorong PWA was proclaimed under the *Water Resources Act 1997* as a way to prevent over-allocation. It is amalgamated with the Naracoorte Ranges and the Comaum-Caroline PWAs in 2004 into the Lower Limestone Coast PWA (South Australian Government, 2004b). The Tintinara-Coonalpyn PWA was only prescribed in 2000.

Surface water is not yet prescribed in the South East region, except for the Morambro Creek and Nyroca Channel Prescribed Watercourses prescribed in 2001 (Figure 4.7). Once an area is prescribed, water rights are granted, as long as the resource is available, by the State and upon application. The application in the Lower South East also includes an Irrigation Development Plan that specifies the condition upon which the allocated water will be used (crop, irrigation system, etc.).

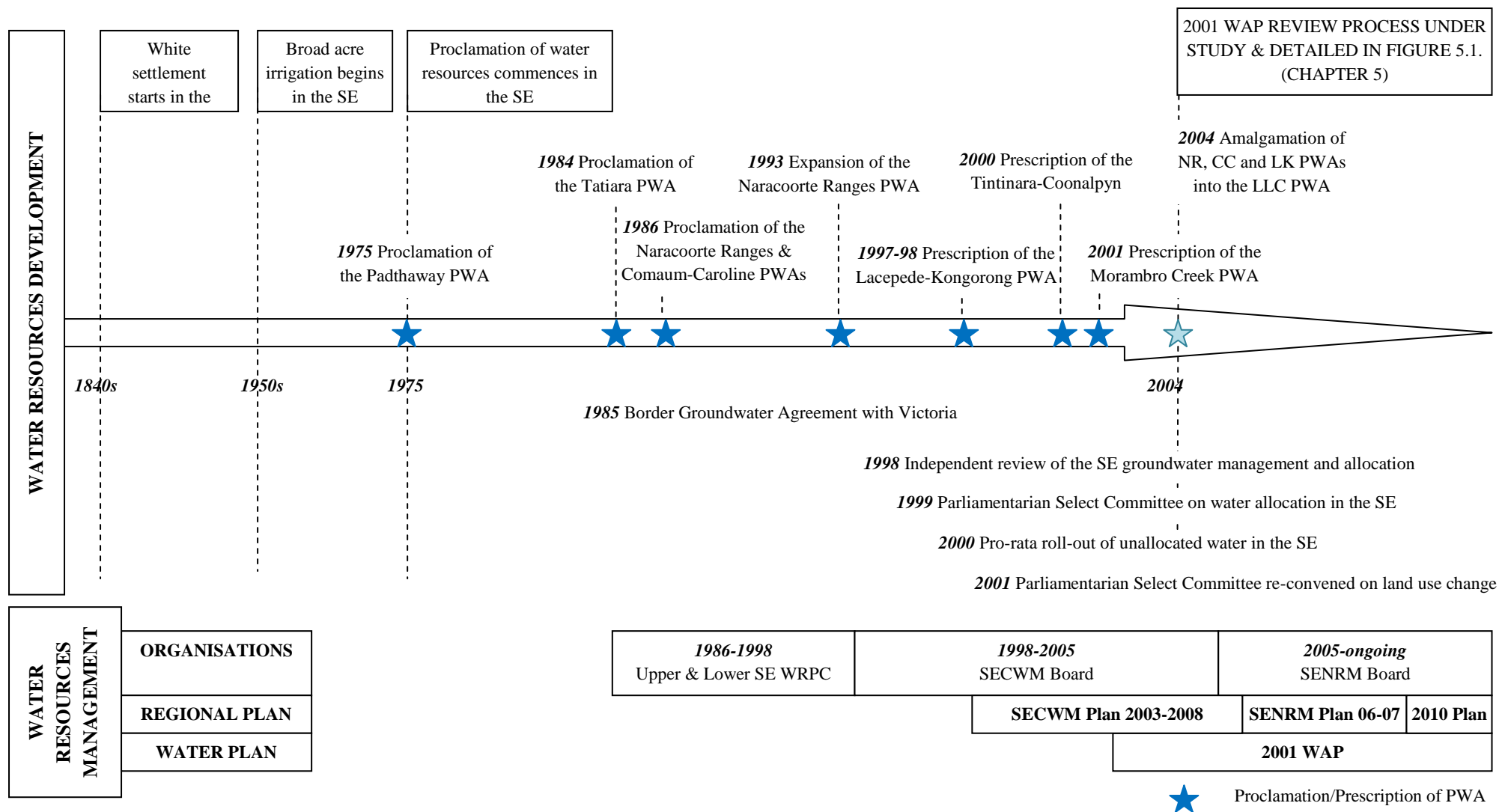
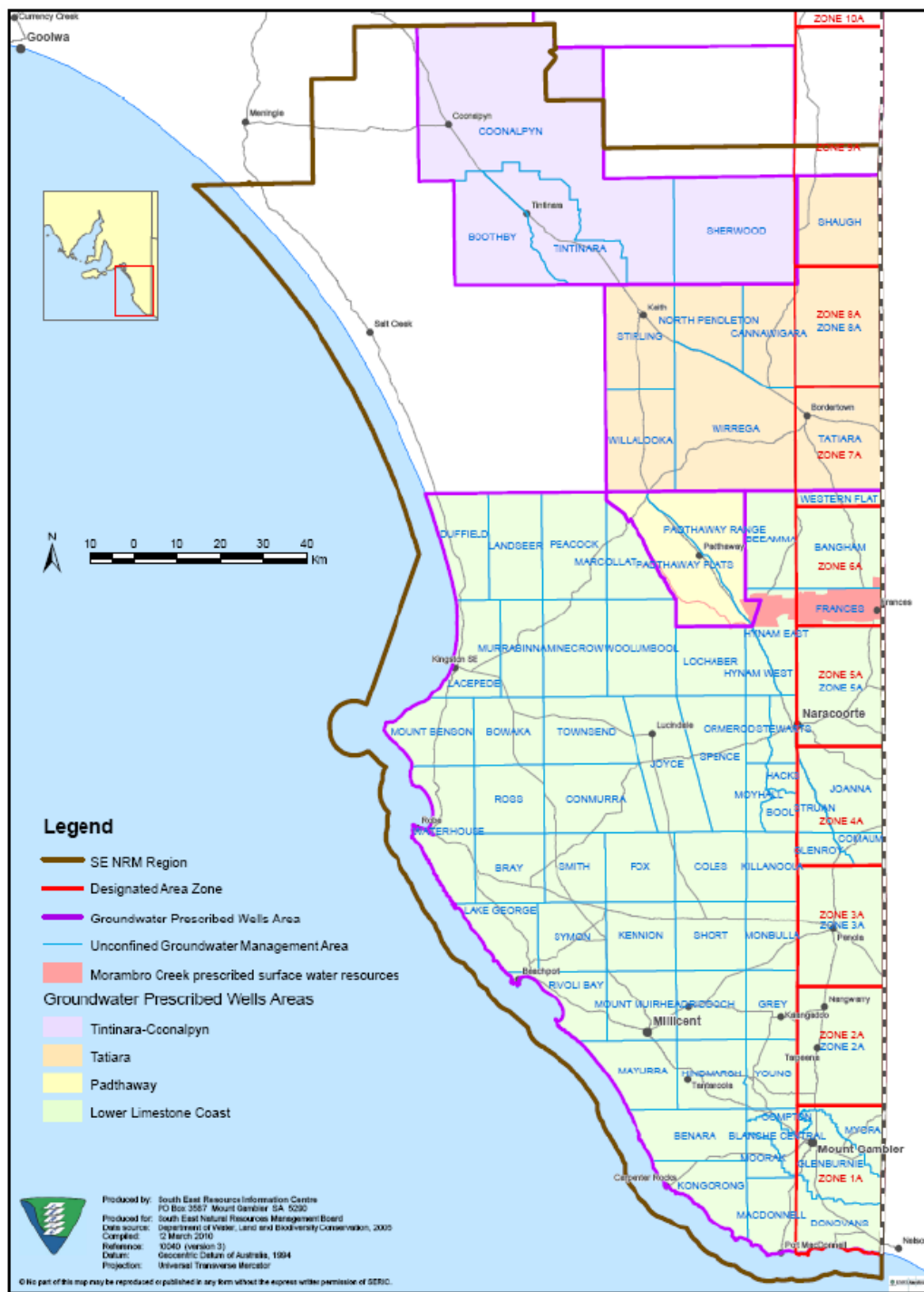


Figure 4.7. Intensification of water resources development and management in the South East Limestone Coast, South Australia

As a result, the SENRM region comprises now five PWAs: Morambro Creek, as the only prescribed surface water, while the remaining four Tatiara, Padthaway, Tintinara-Coonalpyn and the Lower Limestone Coast (LLC) regulate groundwater (Figure 4.8). Each of these five PWAs has its own Water Allocation Plan (WAP).



Source: (SENRM Board, 2010c)

Figure 4.8. PWA boundaries in the South East NRM region

The Upper South East and Lower South East Water Resources Planning Committees (WRPC) were established in 1985 to regulate the South Australian part of the Border

Designated Zone. The water allocation policies developed by the WRPC were generally similar across the region and the various PWAs, and they arose from local common resource management, before adoption by the Water Resources Council at the State level (SECWM Board, 2001a). Some of these regulations still exist: the Irrigation Development Management Plans, trading rules and the basis for hydrogeological tests (Young & Hatton MacDonald, 2003).

The South East Catchment Water Management Board (SECWM board), established pursuant to the *Water Resources Act 1997*, replaced the two WRPC in 1998. The water allocation planning process started in 1997 under this Act. In 1999, Water Allocation Planning Committees were formed in Comaum-Caroline, Lacepede-Kongorong, Naracoorte Ranges, Padthaway and Tatiara. Those five PWAs had their respective Water Allocation Plans (WAPs) adopted in October 2001, while the Tintinara-Coonalpyn PWA and the Morambro Creek PWA prescribed later had their WAPs adopted in January 2003 and January 2006, respectively.

The revision of the five initial WAPs started in June 2004 as only three WAPs, due to the amalgamation of the Comaum-Caroline, Lacepede-Kongorong and Naracoorte Ranges PWAs into the single Lower Limestone Coast PWA. The respective WAP Committees were replaced initially by a Lower Limestone Coast Reference Group (SECWM Board, 2005), which did not continue. The SECWM Board also prepared the South East Catchment Water Management Plan 2003–2008 at the regional level.

Parallel to these regional permanent committees, a Select Committee of the South Australian Parliament on water allocations in the South East was convened in 1999, and re-convened in 2001 to examine the impacts of land use change on water allocations and recharge. The 1999 report recommended a pro-rata roll out, which took place in 2000 in the Lacepede-Kongorong and Naracoorte Ranges and in some water management areas of Comaum-Caroline and Tatiara, in order to allocate all unallocated water as a pre-condition for the creation of a water market in the South East (Select Committee on Water Allocations in the South East, 1999). The 2001 report advised on conflicting views related to ways to account for land use change and, in particular, to account for forestry in the water budget of the Lower Limestone Coast PWA (Select Committee on Groundwater Resources in the South East, 2001).

The South East Natural Management Board (SENRM board) superseded the SECWM board and consolidated a number of other existing bodies—such as the Animal and Plant Boards, the Soil Boards and the South East Natural Resources Consultative Committee (SEN RCC)—from 2005 under the application of the *NRM Act 2004* and pursued revision of the three WAPs. The Initial South East Natural Resources Management plan 2006–2007 substituted the previous catchment plan (2003–2008) and a community consultation from December 2009 to February 2010 assisted in the adoption of a renew SENRM plan. The Tintinara-Coonalpyn WAP’s revision commenced in October 2007. Table 4.4 presents the timetable for the revision of the various WAPs in the South East Natural Resource region.

Table 4.4. Timetable of WAP revision in the South East NRM regions

Planning stage	Lower Limestone Coast WAP	Tatiara WAP	Padthaway WAP	Tintinara-Coonalpyn WAP
A1 consultation	September 2005	September 2005	September 2005	October 2007
A2 consultation	December 2007	November 2007	December 2006	
DWLBC review	From 13/03/2009	From February 2009	unknown	
B consultation		November 2009	September 2008	
WAP adopted		June 2010	26 April 2009	

Note: Grey shading indicates steps that are still to come.

The Padthaway and Tatiara WAPs have been adopted; at the time of writing, considerable delay has occurred in the Lower Limestone Coast WAP. The Border Designated Area affects both the Tatiara and Lower Limestone Coast PWAs, but only the latter has to deal with large areas of commercial forestry plantations and therefore with plantation accountability in the water balance.

The increasing development of water in the Limestone Coast, similar to that at the Federal and State levels, induced accelerated management through regulations and local organisations. The water planning approach, however, did not happen before the *Water Resources Act 1997*, with the first WAP in the region being adopted in 2001. Previous water regulations were not labelled as ‘water plans’ but they did influence the 2001 WAPs, except that remaining unallocated water focused the management more on development than allocation.

Most of the regulations described below for the Lower Limestone Coast PWA are also valid for the other PWAs in the SENRM region due to the parallel evolution just

described. Those regulations are the ones implemented at the time of writing, i.e. those included in the 2001 WAP.

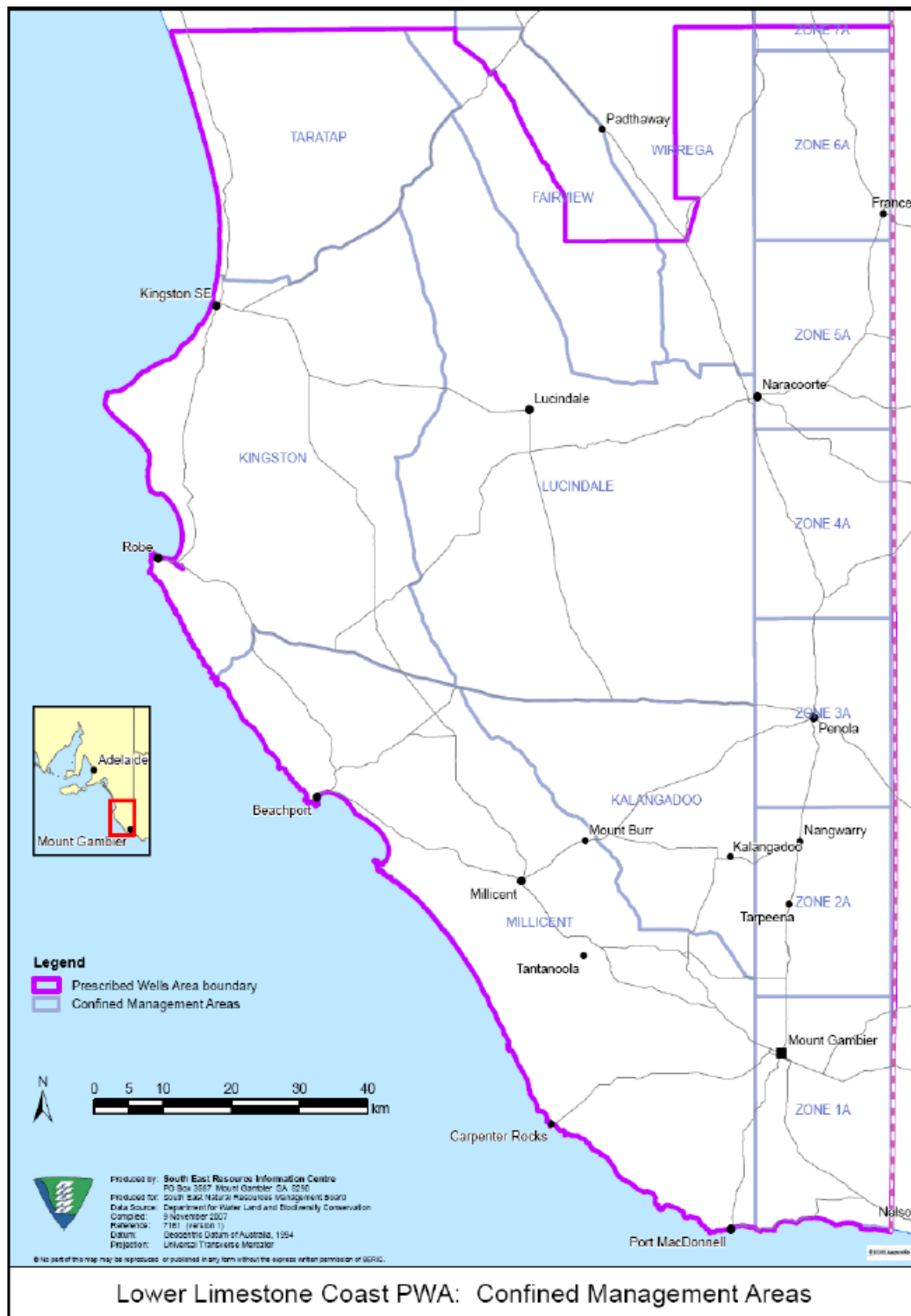
4.4.4.2. *Water management in the Lower Limestone Coast prescribed wells area*

For more localised administration in each PWA, water management in the South East is done at a water management area level. The LLC PWA encompasses 61 Water Management Areas (WMA) in the unconfined aquifer—out of the 77 WMAs in the NRM region—and 14 WMAs in the confined aquifer (Figure 4.9 and Figure 4.10). However, these WMAs are based on cadastral unit called Hundreds (see Box 4.3), rather than on catchment-based units.

Box 4.3. Hundreds, cadastral units serving as water management areas

The term Hundreds originates from the white settlements in South Australia when the land had to be proclaimed as a Hundred to be surveyed and then sold to settlers. Each Hundred was approximately 100 square miles. They remain as a cadastral unit up to present time (Toms et al., 1986).

The allocation method under the 2001 WAPs is area-based, using a hectare Irrigation Equivalents (haIE) unit that is based on the irrigation requirements for a reference crop. Irrigation is limited to an area calculated according the crop grown (with a crop area ratio reporting the irrigation requirements' difference for this specific crop) and each water licence indicates the number of haIE that it is entitled to irrigate. A limited number of licences have been granted on a volumetric basis since 2001 (SECWM Board, 2001a). The area-based allocation does not provide for water efficiency, as the volume of water is not limited. Therefore, a volumetric conversion was initiated in 2002 to comply with that in the 1994 water reform provision, and it will be implemented in the revised WAP. The area-based allocation remains only in the Lower Limestone Coast and Tintinara-Coonalpyn PWAs.



Source: (SENRM Board, 2007b)

Figure 4.10. Water management areas in the Lower Limestone Coast PWA for the confined aquifer

Irrigation, industry and public water supply, and since 2002, dairy operations, intensive animal keeping and plant production as well as recreation activities require a licence and amount to a maximum extraction limit called the Permissible Annual Volume (PAV). The native vegetation and forest plantations uses are taken directly

into account for the calculation of the aquifer recharge during the calculation of the PAV. Domestic and stock uses do not require a licence, but their evaluated volumes are discounted from the available resource. Industry, recreational and public water supply licences are exempted from any potential reduction to their allocation, therefore irrigation is the only consumptive use that potentially bears reductions (or cutbacks) to its water allocation (Figure 4.11).



Note: Proportions in the above graph do not indicate respective volumes of each use.

Figure 4.11. Water budgeting method in the Limestone Coast

In September 2005, the SENRM region accounted for 3 120 water taking licences and 1 087 water holding licences (SENRM Board, 2006). In the LLC PWA, the licensed volume amounted around 500 000 ML (Table 4.5). However, the level of use equalled only one-half of the allocation in 1998/99 in the SENRM region (SECWM Board, 2001a), which required the introduction of an ‘active and expeditious use’ section in the WAPs to maximise water development by claiming that the allocated water would be returned to the State if not developed within three years.

Table 4.5. Evolution of the volume of water allocated in megalitres (ML) from the unconfined aquifer since 2001 in the LLC PWA

	2001	2003/2004	2004	Estimated volumes after volumetric conversion
Allocated volume (in ML)	470 852	481 807	500 108	696 652

Sources: (SECWM Board, 2001d, c, b, 2005; DWLBC, 2006b; SENRM Board, 2007b).

The total volume available for extraction for each aquifer was described as the Permissible Annual Volume (PAV) in the 2001 WAPs, and that term is still used in the Border Designated Zone. The PAV of the four PWAs, as calculated in 2006, was 909 000 ML for the unconfined aquifer and 84 500 ML for the confined aquifer, on an annual basis (SENRM Board, 2006).

4.5. SUMMARY

The Australian water reform requires the economic, environmental and social sustainability to be considered when formulating water plans. However, the focus on reallocation of water for environmental flows through water markets conflicts with and threatens social objectives. The examination of the social values associated with water trading suggests that despite the common expectation that water markets are equitable, and therefore allow for social considerations, they are inadequate tools for appropriate consideration of social sustainability. A review of the evolution of the Australian water planning approaches indicates that best practices progressively included community engagement, adaptive management, fairness and quality of life, matching therefore some of the social sustainability principles. Water plans, being the main implementation tool of the reform, are thus an appropriate tool to reconcile the currently overlooked social sustainability with its economic and environmental dimensions. However, the weak social approach proposed by the policies influencing and governing the South Australian water planning processes may be responsible for a superficial consideration of social sustainability in water management. The Federal and State approaches are then illustrated by their practical application in the Limestone Coast region, whose water allocation plan is examined here. Subsequent to this description of the institutional frameworks governing water planning processes in the studied area, the following chapter examines how well local water plans address social sustainability, attempting to answer therefore the research questions of this study.

ANALYSIS OF LOCAL NEWSPAPER REPORTS OF THE LOWER LIMESTONE COAST WATER ALLOCATION PLANNING PROCESS

An analysis of newspaper articles on the Lower Limestone Coast water allocation plan over a period of 6 years (June 2004 to July 2010) forms the basis of this chapter. It opens with an overview of the planning process as reported in a local newspaper that evidences the main issues debated in the community. This longitudinal outline also captures the main phases of the water allocation plan policy development, reflecting two policy aspects of the accountability of forestry on water—the aquifer recharge interception and the direct extraction impacts. Important issues lacking in the local news reports are also discussed. The two research questions are then examined in light of the newspaper reports. The news reports are investigated to discover the drivers and barriers of change, and in order to understand the process of institutional change. Lastly, reading of the newspaper articles from a social sustainability perspective uses the five principles proposed in Chapter 2 to obtain an initial overview of the social sustainability issues accompanying these policies.

5.1. OVERVIEW OF THE WATER ALLOCATION PLANNING PROCESS

The planning development stages prescribed by the *NRM Act 2004* in South Australia have already been detailed previously (see section 4.3.2). This section therefore focuses on its practical implementation in the study area and how it is pictured in the local newspaper in order to uncover the main phases of the planning development.

5.1.1. Longitudinal analysis of water allocation articles in the local newspaper

A total of 180 articles were selected from June 2004 to July 2010 (see Appendix 5.1) corresponding to the commencement of the review of the Lower Limestone Coast Water Allocation Plan (LLC WAP) up to the completion of this research. Over this period, water management evolved due to adoption of regulations, in particular to account for forestry interception. However other planned policies still await final deliberations and LLC WAP adoption.

The number of *The Border Watch*'s articles debating the LLC WAP is related more to the local events and announcements from the government than to the water allocation planning process itself (see section 3.2.1.1 for background information on *The Border Watch*). Figure 5.1 presents this correlation, but also shows the steps in the LLC WAP process at the local level and, from 2009, at the State level.

This initial graph already underlines the major place that forestry holds in the LLC WAP debate, as the two peaks of articles selected correspond to two important changes in the forestry regulations: the introduction of the forestry threshold in 2004 and the introduction of a water licensing system for forest plantations in 2007. Forestry, as a significant land use change in the region, is indeed a core issue of the LLC WAP and had previously attracted the inquiry of a Select Committee in 2001 (Select Committee on Groundwater Resources in the South East, 2001) (see section 4.4.4.1).

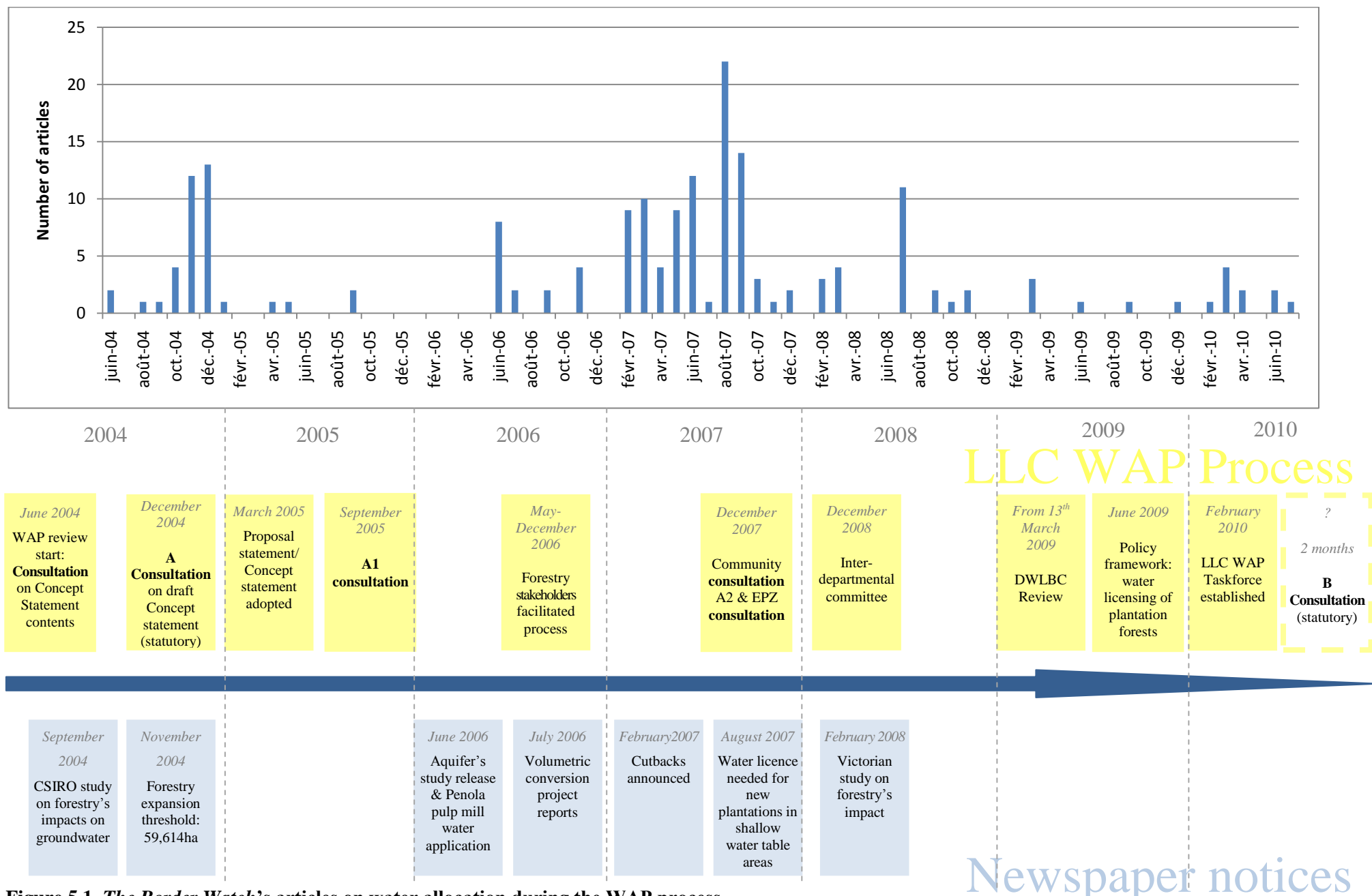


Figure 5.1. The Border Watch's articles on water allocation during the WAP process

During the peak month (August 2007), the LLC WAP articles represented however only 1.25 per cent of the non-advertising news space of the local newspaper, but up to 4.8 per cent of the 23rd of August 2007 edition. This is, however, significantly less than the coverage of a sudden disaster in a local newspaper—McKay (1996) estimated up to 80 per cent of the news space was dedicated to the 1994 New South Wales bushfires. Additionally, out of the 180 LLC WAP related articles, only 25 made the front page, and most of those during two peak periods (15 were published in 2004 and 2007). Similarly 21 out of the 25 selected ‘letters to the Editor’ written by the community were also published during the two peak periods. This suggests that despite some members of the community having strong interests in the LLC WAP, the general community does not relate to the process and does not engage in the debate, as interviews to be reported in Chapter 7 will confirm (SENRM Board Member 10, 2010). This is often the reason evoked by governmental officers for explaining unsatisfactory public participation (Hill & Zammit, 2001). Moreover, even the more interested community members may see their concern diluted, due to the long period before change occurs.

5.1.2. Forestry water licensing as the main debate

The Lower Limestone Coast Water Allocation Plan review did intend to introduce four main changes (SECWM Board, 2004):

- *Water accountability change for commercial forest plantations:* recent research on the forestry’s impacts on groundwater, as well as the recognition of large-scale plantation forestry as a water interceptor by the National Water Initiative (CoAG, 2004a), prompt an alteration in the way forestry is accounted in the regional water balance in order to integrate more accurately its two impacts: i) rainfall interception or aquifer recharge interception and ii) direct extraction of groundwater in shallow water table areas (less than 6 m from the surface) (Benyon, 2002; Benyon & Doody, 2004).
- *Reduction to water allocations (or cutbacks) in order to address over-allocation:* ‘substantial progress toward adjusting all over-allocated and/or over-used systems’ is expected by the National Water Initiative by the end of 2010 (CoAG, 2004a, p. 24, author’s emphasis). Water allocations could be reduced in up to 29 out of the 61 water management areas of the LLC WAP showing some stress (SENRM Board, 2007b).

- *Volumetric conversion of water licences*: 2500 area-based licences (or Irrigation Equivalent, haIE) are to be converted to volumetric, using the results of a four year volumetric conversion project (DWLBC, 2006d) initiated in 2002 by the Department of Water, Land and Biodiversity Conservation in collaboration with the SECWM Board, later replaced by the Department For Water and the SENRM board, respectively. Based on a widely recommended water crop requirements calculation method (FAO, 1998), conversion considers climate, soil types, water quality (see map of defined zones in Appendix 5.2), crop types and irrigation management and systems. Conversion was required under the South Australian commitment to the NWI and by the South Australian State Water Plan 2000 by the end of 2005. However, it will be implemented only at adoption of the revised LLC WAP.
- *Protection of water dependent ecosystems*: Selected wetlands of particular interest are proposed to be protected by surrounding environmental protection zones (see map in Appendix 5.3).

Reductions to water allocations are highly controversial in Australia (*Elandes Nominees Pty Ltd v Minister for Water Resources*, 2002 in South Australia; *Murrumbidgee Groundwater Preservation Association Inc v Minister for Natural Resources*, 2005 in New South Wales) as they are worldwide (Meinzen-Dick & Ringler, 2006; Thoyer, 2006). However, in Australia, reductions can be done through water plans, which allow for community consultation and political lobbying. Reductions therefore tended to be accepted by licensees (Syme & Sadler, 1994) in the first generation of the plans. However, recent years have witnessed an increase in legal challenges and more are expected as the *Water Act 2007* allows review of State water plans (McKay, 2010a). Precedents have nonetheless supported the reductions that were proposed in water plans based on achievement of ecologically sustainable development (see section 2.2.1.2).

Moreover, to convert area-based licences to volume-based and to properly address the current movement for environmental protection are problematic tasks. Regardless, the vast majority of the LLC WAP related articles are concerned with the forestry component (Figure 5.2 and Table 5.1).

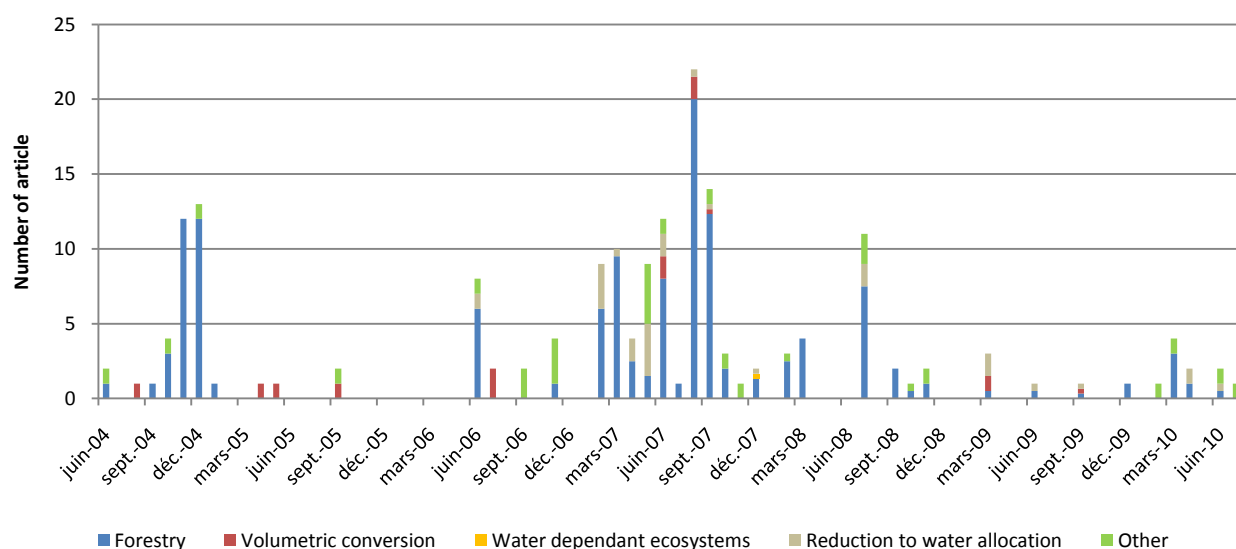


Figure 5.2. Main themes debates in the selected articles

Table 5.1. Percentages of articles per theme per year

Theme	2004	2005	2006	2007	2008	2009	2010	Total
Forestry	87.9	20	43.7	73.8	76.1	38.9	45	69.7
Volumetric conversion	3	60	12.5	3.8	0	22.2	0	5.9
Reductions to allocations	0	0	6.3	12.8	6.5	38.9	15	0.2
Water dependent ecosystems	0	0	0	0.4	0	0	0	9.7
Other	9.1	20	37.5	9.2	17.4	0	40	14.5

Source: Analysis of *The Border Watch*

The articles' coding references by theme in NVivo (Table 5.2 and the analytical coding tree in Appendix 5.4), as well as a word count of the articles (Table 5.3) also indicate the predominance of the forestry debate over the other changes to be introduced.

Table 5.2. Coding references for the LLC WAP changes

Change	Number of articles	Number of references
Forestry accountability	92	169
Reduction to allocations	41	80
Volumetric conversion	21	49
Water dependent ecosystems	4	4

Source: Analysis of *The Border Watch*

Table 5.3. Twenty most frequently occurring nouns in the selected articles

Noun	Count (percentage of total words)	Noun	Count (percentage of total words)
water	1 904 (3.5%)	mill	208 (0.38%)
forestry	615 (1.15%)	plantations	204 (0.38%)
industry	386 (0.71%)	land	203 (0.37%)
region	319 (0.59%)	plan	189 (0.35%)
allocation	289 (0.53%)	areas	184 (0.34%)
board	279 (0.52%)	plantation	183 (0.34%)
management	245 (0.45%)	resource	181 (0.33%)
resources	223 (0.41%)	pulp	171 (0.32%)
farmers	213 (0.39%)	irrigation	157 (0.29%)
government	211 (0.39%)	policy	153 (0.28%)

Source: Analysis of *The Border Watch*

Note: Shading highlights the forestry related nouns

The forestry element not only prevails in the local debate, but also attracts outside attention as the LLC WAP ‘was the first area in Australia to include the impact of forestry activity in water allocations’ (*The Border Watch*, 6 June 2007, p. 6), according to a former presiding member of the SENRM board. This is indeed a major precedent in Australia as underlined by the then Environment Minister:

South Australia is leading the way to ensure the future sustainability of our precious groundwater resources and other States are moving in the same direction (*The Border Watch*, 15 August 2007, p. 1&2).

The forestry and water relationships are actually complex. While forestry is recommended as a means to protect a watershed from pollution and erosion as well as to ‘attract’ rainfall in large scale forestry (even sometimes rewarded to do so through payment for environmental services), its influences on stream flow and groundwater recharge are more and more recognised worldwide (DWLBC, 2004; Department For Water, 2010). The United States’ Federal Reserve Right Doctrine grants some water rights ‘for the purpose of securing favourable conditions of water flows and to furnish continuous supply of timber’ when national forests are created (USDA Forest Service, 2006). However, except in the South East of South Australia, only the South African *National Water Act 1998* partly identified forestry’s impacts on water by classifying commercial forestry as a major ‘stream flow reduction activity’ (Republic of South Africa, 1998, section 36). A licence to protect stream flow regime replaces the previous afforestation permit (Tewari, 2001) but regulations

to prescribe ‘methods for making a volumetric determination of water to be ascribed to a stream flow reduction activity’ are still to come ‘for purposes of water use allocation and the imposition of charges’ (Republic of South Africa, 1998, section 26). However, the Act does not acknowledge its direct extraction of groundwater.

Over the studied period, the forestry debate is almost balanced (Figure 5.3) with slightly more articles in favour of forestry changes than those opposing change (36 per cent in favour and 27 per cent against in Table 5.4).

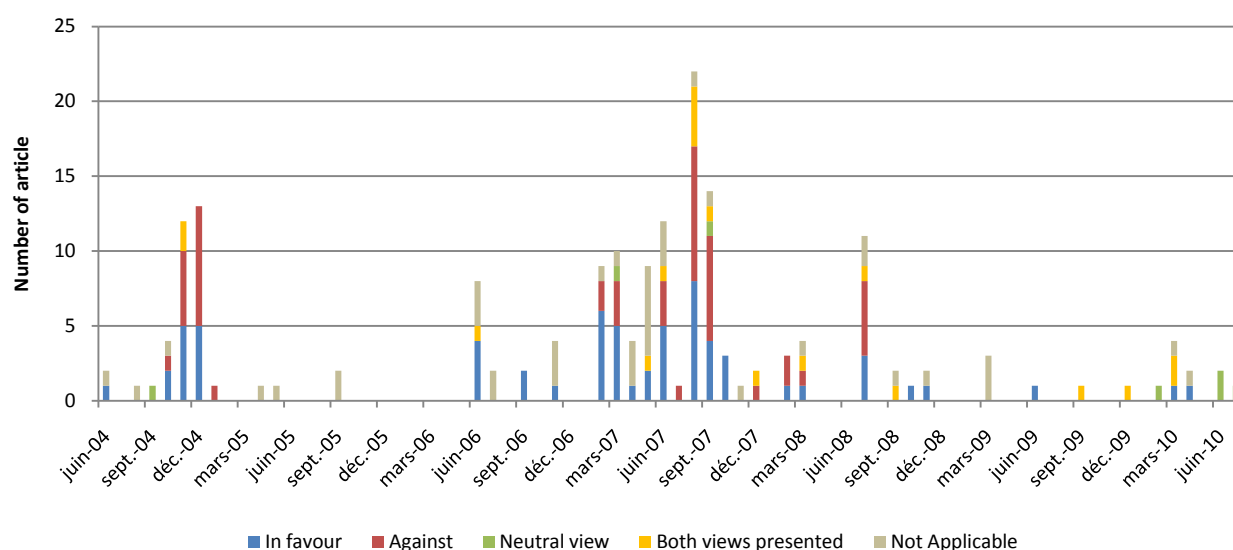


Figure 5.3. Positions regarding forestry changes in the selected articles

Table 5.4. Positions regarding forestry changes by year

Percentage of articles	In favour	Against	Both views	Neutral	n.a.
2004	39.4	42.4	3	6.1	9.1
2005	-	20	-	-	80
2006	43.7	-	-	6.3	50
2007	39.1	29.9	2.3	9.2	19.5
2008	30.5	34.8	-	13	21.7
2009	16.7	-	-	33.3	50
2010	20	-	40	20	20
Total	35.6	27.2	3.9	10	23.3

Source: Analysis of *The Border Watch*

But more importantly, the articles promoting forestry change are spread over the full period, while the opposition articles are concentrated during the two peaks of

LLC WAP reporting. However, the 25 front page articles suggest a stronger opposition (Figure 5.4), which certainly overcomes the general favourable opinion due to their greater readership (Tichenor et al., 1970).

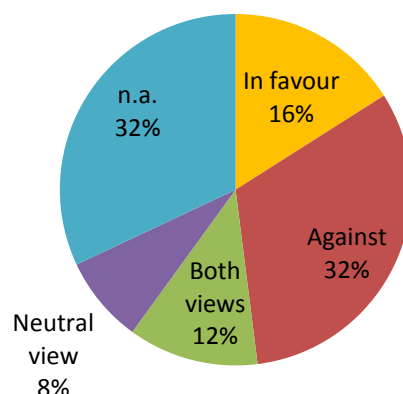


Figure 5.4. Front page articles' positions regarding forestry changes

Forestry changes, being the more disputed element to be introduced in the revised LLC WAP, determined therefore the development phases of the planning process in the Lower Limestone Coast.

5.1.3. Phases of planning development

From the longitudinal analysis of the selected articles, the water plan review can be divided into two phases, representing a gradual introduction of the forestry's impacts on water. The first phase, from June 2004 to July 2007, is dominated by a forestry expansion threshold, accounting for the recharge interception impact of forestry. The second phase, from August 2007, expands the forestry's water accountability with the introduction of a water licensing system for forestry plantations, initially accounting for its direct extraction impact.

5.1.3.1. June 2004–July 2007: Accounting for the recharge interception through the forestry expansion threshold

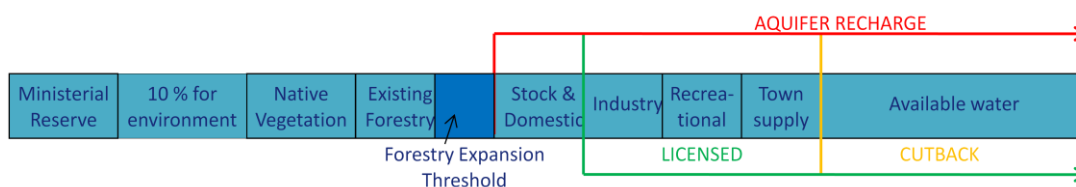
From June 2004, commercial forestry was prescribed as a water-affecting activity in the Lower South East, thus requiring a permit (through the *Water Resources Regulations*: South Australian Government, 2004c, section 13AB), except for farm forestry—up to 10 per cent of the farm area. Appendix 5.5 displays a map of the area affected by this regulation. Only areas of high concentration of commercial plantations are concerned, so that environmental plantations—such as those to avoid

salinity in the neighbouring Padthaway prescribed well area—are not discouraged. The prescription was due to a significant forestry expansion beginning in 2000—35 per cent over two years—that highlighted a flaw in the water budget: a land use change would always unbalance the budget requiring reductions to water allocations and threatening water dependent ecosystems (Department For Water, 2010). The National Water Initiative confirmed that this was a countrywide issue by recognising forestry as a water interceptor (CoAG, 2004a).

Simultaneously, in June 2004, a forestry expansion threshold was proposed (under the *Water Resources Act 1997 regulation 'Lower South East – Commercial Forestry'*). The threshold consists of 59 416 ha reserved for forest plantations expansion with no need for water licences and it accounts only for the recharge interception of forestry. The threshold comprises two separate pools dedicated to softwood and hardwood of approximately 28 000 ha and 31 000 ha, respectively, and matching water management areas with the available water. This reserve is the result of the recognition that there is some water recharge under forest plantation, although it was previously assumed to be nil, and it corresponds to this recharge benefit (Select Committee on Groundwater Resources in the South East, 2001). The threshold also encompasses:

Planned hardwood forest expansion allowed in 2000 PAV assessment, but remaining undeveloped at 2002, and the shared softwood and hardwood expansion offset against portion of the unallocated water that is reserved (Department For Water, 2010).

It enables approximately 45 per cent of both farm and commercial forestry growth—10 to 15 years (South Australian House of Assembly, 2004)—but also effectively fixes a maximum limit of recharge interception from forestry. As a result, the available water is no longer reduced to the detriment of the consumptive pool users (Figure 5.5).



Note: Proportions in the above graph do not indicate respective volumes of each use.

Figure 5.5. Alteration of the water budget calculation by the forestry expansion threshold

The extent of the reserved area, despite being contested (Table 5.5), is not the origin of the peak reporting period in *The Border Watch* that relates to the disallowance of the threshold regulation by a local Member of Parliament. The reason behind this move is two-fold: a simultaneous forestry prescription and a disagreement over the separation of water from the land title (and the landowner's entitlement to the rainfall over his land). Both reasons clearly create a political debate on whether forestry is a dryland crop. The difference between irrigated and dryland crops is usually quite clear: 'Dryland crops are typically grown on a broad hectare scale and rely on seasonal rainfall rather than irrigation' (Department of Water, 2006, p. 1). However, with no water applied to the plantation forest, but with some groundwater directly extracted, it cannot be labelled as 'irrigated' nor as 'rainfed' as not only rainfall contributes to its development. The use of the 'dryland' term thus is ambiguous. This debate therefore expanded to include dryland farmers in this threshold negotiation as the result could set a precedent for other dryland crops. However, because the NWI recommends inclusion in water accounting of any land use change activities that 'intercept significant volume of' water (CoAG, 2004a, section 55, author's emphasis), any South East regulation of forestry accountability would not systematically be applied to other crops or in other areas or States.

Table 5.5. Opinions on the forestry expansion threshold area

Stakeholder	Opinion	<i>The Border Watch</i> edition
Auspine	'Very generous'	18 November 2004, p. 2
Opposition Upper House member	'Backdated to 2000'	12 November 2004, p. 6
National Association of Forest Industries (NAFI)	'In real terms the expansion would be less than 13 000 ha for the bluegum industry because of a mismatch between suitable land and water'.	24 November 2004, p. 3

Despite this strong debate on its future, the forestry industry is hardly participating in the debate. The opposition is mostly voiced by politicians from the Shadow government, with the exception of a unique intervention from the National Association of Forest Industries (*The Border Watch*, 24 November 2004, p. 3). The softwood sector—through Auspine, then the region's largest timber company—joined irrigation groups to publicly express its approval of the forestry threshold, hoping for future certainty. During this first phase, coalitions divide the industry sectors (Sabatier & Weible, 2007), as the dryland farmers opposing the threshold

policy were frightened by any precedent it could set for dryland crops in general. Independently, the hardwood sector remained silent, as a strategy to demonstrate they were a land-based activity and thus not involved with water, contradicting the view of a forestry ‘united front’ (Hughes & McKay, 2009, p. 187).

The forestry expansion threshold sets the need for a forestry water licensing system once it is exceeded. But most of the foresters were not prepared to see it gradually erode less than three years after its introduction (Table 5.6) as a result of the over-allocation and subsequent late introduction of reductions to water allocations in the LLC WAP review (which were warned of in June 2006 but only announced in February 2007). In parallel existing plantations are also threatened (grey shade in Table 5.6) even though ‘the NWI framework on interception is intended to apply to future proposals for land-use change rather than retrospectively’ (CoAG, 2004c, p. 3).

Table 5.6. Gradual erosion of the forestry expansion threshold from February 2007

Erosion	<i>The Border Watch</i> edition
‘Reduction in the bluegum area by 11 000 ha and the pine area by about 15 000	21 February 2007, p. 1&2
‘The South East Natural Resources Management Board [...] could not ride out changing the 59 000 ha plantation expansion policy’	22 February 2007, p. 1&4
‘...no decision has been made over forestry, but could not rule out changing the 59 000 ha policy which allowed the sector to expand without obtaining water licences’	22 February 2007, p. 4
Farmers urged to ‘soak up’ water allocations	9 March 2007, p. 5
‘And the water threshold for forestry has been reduced in eight areas	9 March 2007, p. 6
‘...authorities will block forestry expansion and relocate unused allocations to a reserve’	4 April 2007, p. 3
‘Plantation companies [...] might not be allowed to replant a second crop in some areas’	16 May 2007, p. 6
‘WAP [...] which will deny the second planting of several thousands of hectares of trees without compensation.’	12 June 2007, p. 6

The forestry expansion threshold and its later erosion eventually set the path for a forestry water licensing system. Additionally, the direct extraction by forestry from shallow water tables, which was still not accounted for, motivated farmers to insist on more forestry regulations and constitutes the main debate in the second period.

5.1.3.2. *From August 2007: Forestry water licensing system*

In addition to the forestry expansion threshold, the South Australian government announced its intention to account for the direct extraction of groundwater by new forest plantations in shallow water table areas on July 31st 2007 (South Australian Legislative Council, 2007). This was reported in *The Border Watch* on the 2nd of August 2007 and was to be done through forestry water licences that would provide a corresponding water allocation. It was soon labelled a ‘rainfall tax’ by the opposition (*The Border Watch*, 8 June 2007, p. 9)—using the designation used initially in 2000 when a similar system was first proposed—creating, immediately, confusion about the forestry impact concerned by these water licences. The forestry expansion threshold regulation, which nevertheless accounts for rainfall interception, never attracted such a term. This attests to the existence of confusion in the water planning process in the Lower South East of South Australia, which has also been reported in other places (Kuehne & Bjornlund, 2006).

As a result of the new context based on the government announcement of a forestry water licensing system, the previous stakeholders’ coalitions evolved in order to adjust to the new objective (Sabatier & Weible, 2007): the softwood sector reunited with the hardwood sector (*The Border Watch*, 15 August 2007, p. 1&2) to ‘join forces’ (Hughes & McKay, 2009, p. 187), while dryland farmers joined irrigators. This eventually resulted in two opposite coalitions: agriculture versus forestry. The strong polarisation featured in *The Border Watch* may however be a result of media reporting techniques, a balanced account requiring two versions (Schudson, 2000). Conflict is also the way ‘environmental risk [...] enters news’ along with ‘newsworthy events’ (Miller & Parnell Riechert, 2000, p. 48). Discourses and strategies displayed in the local newspaper were nonetheless different for each group.

On the one side, farmers appeared to be very proactive in demanding more stringent regulation on forestry accountability, with repetitive calls for a moratorium on water allocation and in applying to forestry permit under the threshold regulation (Table 5.7). They also regularly praised the SENRM board and State government for their decisions. To promote their view, two ‘policy entrepreneurs’ (Huitema & Meijerink, 2009) also appear in the local newspaper: one from the farming sector and one from the SENRM board who paradoxically was a forester (Hughes & McKay, 2009).

Table 5.7. Farming proactive discourse

Farming discourse	<i>The Border Watch</i> edition
‘SAFF farming leader calls for moratorium’	23 February 2007, p. 6
‘Farmers urge to ‘soak up’ water allocations’	9 March 2007, p. 5
‘SAFF slams forest water use’, ‘...called for the NRM Act to be amended to include plantation forestry’, ‘support for the future growth of the City of Mount Gambier by freezing the threshold forestry opportunities’	3 October 2007, p. 18
‘Forestry water freeze urged’	9 July 2008, p. 1&5
‘SAFF calls for halt to water allocation’	10 October 2008, p. 24

Opposition to forestry suggests that the core values binding the farming industry together—as needed for an advocacy coalition (Sabatier & Weible, 2007)—are agriculture, land value and family farms in rural areas inherited from European settlers (Smith, 1998; Diamond, 2005b). Indeed, this is supported by the results of recent research demonstrating that foresters tend to live in regional centres (Schirmer, 2006) and will be confirmed by the analysis of interviews (Chapter 7).

On the other side, the forestry sector, now voicing its opposition along with politicians in a lesser degree, featured a ‘victim’ discourse (Table 5.8). It also employed metaphors to reinforce the ecological nature of forestry (bottom two lines of Table 5.8).

Table 5.8. Forestry ‘victim’ discourse

Forestry discourse	<i>The Border Watch</i> edition
‘[...] as the government clearly attempts to squeeze the industry out of the region.’	3 August 2007, p. 6
‘It’s a deforestation policy’	15 August 2007, p. 1
‘A balanced policy would not arbitrarily impose punitive measures...’	15 August 2007, p. 8
‘Forestry industry calls for independent review’	11 September 2007, p. 6
‘Farming rort: forestry sector in limbo’	9 July 2008, p. 1&5
‘Yet the SENRM board singled out forestry and wants to license the water used by trees in the same way they would for water used by an irrigator.’	5 March 2010, p. 1
‘Trees are not like a centre-pivot that can be switch on or off’	16 May 2007, p. 6
‘I’m still looking for an example of plantation that has a centre pivot in the middle of it’	25 March 2008, p. 3

This ‘victim’ discourse was however preceded by statements that infer doubt on its actuality:

The bluegum committee at its last committee meeting resolved to take a more active stance against any organisation or group competing unfairly for water or land-no more free kicks (The Border Watch, 23 February 2007, p. 6).

The increased opposition from the forestry sector in the second phase (Figure 5.6) soon argued a retrospectivity issue. Foresters indicated (from 15 August 2007) that compensation will be asked if the ‘pre-existing legal right of foresters’ get revoked (*The Border Watch*, 24 August 2007, p. 6). With no argument contradicting the existence of direct extraction, they reduced the opposition of the forestry water licensing system to the way existing plantations might be exposed to future reduction or relocation in over-allocated water management areas (grey shading in Table 5.6). However, it is not before the draft LLC WAP is released in December 2007 that they obtain a formal document confirming these threats.

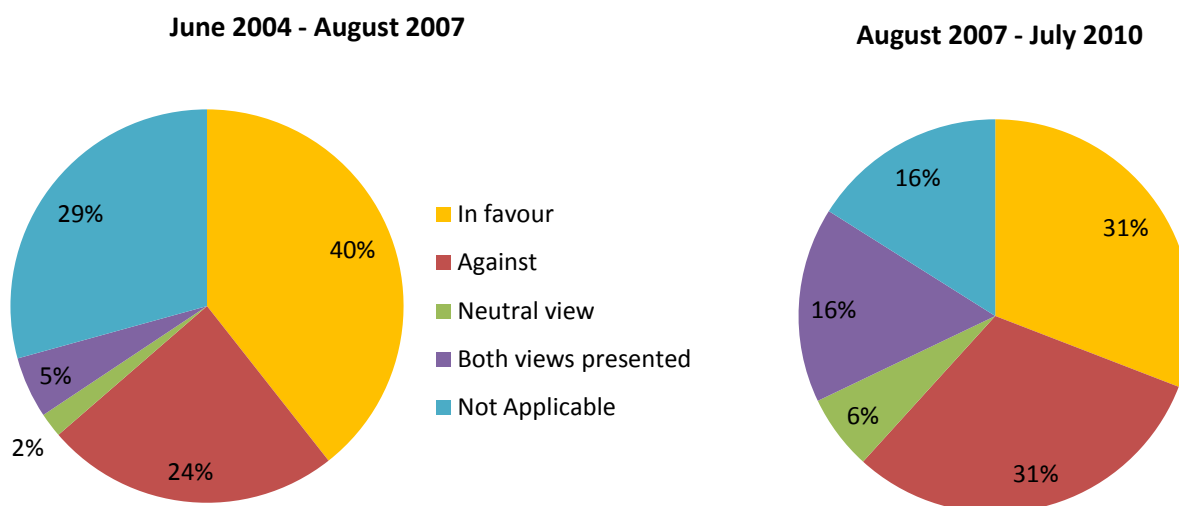


Figure 5.6. Comparison of the position of *The Border Watch*'s articles regarding forestry accountability before and after August 2007

Only in September 2007 (*The Border Watch*, 21 September 2007, p. 6) was it publicly noticed by foresters that the State legislation does not allow water licences for forestry but only allows permits (South Australian Government, 2004a), requiring therefore the *NRM Act 2004* to be amended to enable a forestry water licensing system. This displaces the negotiations from a local level to a State debate—from December 2008 when an Inter-Departmental Committee is established to produce a State-wide forestry policy. The State debate phase, in spite of its potential implications locally, is not pursued in the local newspaper (Figure 5.1). This move also results in the search for a more receptive arena for the forestry sector (Huitema & Meijerink, 2010).

The initial regional interest in this water planning is also supported by the modest number of related articles published in *The Advertiser*—a State newspaper—during the two *Border Watch* peak periods (Table 5.9). This is due to the newspapers' need of proximity to attract readers (Miller & Parnell Riechert, 2000).

Table 5.9. Comparison LLC WAP articles in State and regional newspaper

	<i>The Advertiser</i>	<i>The Border Watch</i>
November-December 2004	5	25
August 2007	3	22

However, although *The Border Watch* intends to cover both sides of the South Australian-Victorian border, only a very limited Victorian perspective was proposed

in the LLC WAP related articles. This is surprising because of the significant precedent that South Australian forestry regulations could create for commercial plantations in Western Victoria (also part of the Green Triangle) and for their common water management of the shared aquifer through the Border Agreement. However, the lack of interest from a Victorian will be confirmed in the next Chapter with very few submission forms originating from Victoria (see Figure 6.4).

The forestry licensing proposed in this second phase as a solution to the previous farmers issue became a forestry problem, which is what can be labelled as a ‘wicked problem’ (Freeman, 2000). A wicked problem, as water allocation issues often are (Hatfield-Dodds et al., 2006/07), is mainly a social process (Jeffrey, 2006).

5.1.4. What does not appear in *The Border Watch*?

There are several issues that the newspaper did not cover. These are presented below.

5.1.4.1. Lack of consensus during the forestry facilitated stakeholder process

The Facilitated Forestry Stakeholder Process, which involved stakeholders, the Board and the Department of Water, Land and Biodiversity was held from May to December 2006. This process resulted in an agreed rate of recharge interception and direct groundwater extraction for softwood and hardwood forests, for use in estimating the impact of plantation forestry (SENRM Board, 2010b).

This is the only publicly available information regarding these negotiations. *The Border Watch* only mentioned that ‘discussions [...] will include industry representatives from forestry, farming, regional development and peak local government bodies’ and be ‘conducted with the assistance of an independent facilitator’ (*The Border Watch*, 22 September 2006, p. 22). This could refer to discussions other than those in the specific facilitated forestry stakeholder process. No outcomes were later reported. Moreover, in August 2007 when water licences were announced for forestry, the timber industry argued they were not involved in the decision, despite the SENRM board claim that they had all participated. In addition, the ‘agreed rate’ was also rejected by the forestry sector in the following consultation (see section 6.2.3). So the absence of news reports on this process may reflect a lack of significant consensus from all parties, in particular on the way to account for the direct extraction of forestry, at the end of the assigned period requiring an administrative decision (Mollard, 2008).

5.1.4.2. State debate from March 2009

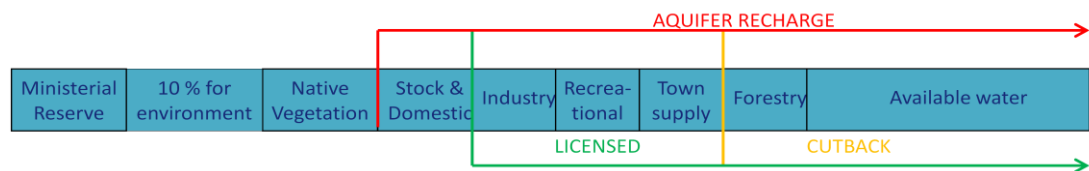
In December 2008 an Interdepartmental Committee was formed when the South Australian Government identified a need to develop a State wide policy framework to manage the water resource impacts of plantation forests. The primary objective of the Committee was to develop whole of government principles and a policy framework to sustainably manage the water resource impacts of forests in South Australia (DWLBC, 2010a).

No mention of this Inter-Departmental Committee (IDC) appears in *The Border Watch*. Only the State-wide policy framework on the water resource impacts of plantation forest (South Australian Government, 2009a), which was released simultaneously with the introduction of the *NRM (Commercial Forestry) Bill 2009* (South Australian Government, 2009b) in June 2009 to amend the *NRM Act 2004*, appeared in *The Border Watch* on the 23rd of June 2009. The establishment in February 2010 of the LLC WAP Taskforce recommended by the IDC (DWLBC, 2010a) was also not reported locally.

The State debate on forestry water accountability in the Lower Limestone Coast was unclear to the general community that was not involved directly in the process. It also contradicts the subsidiary principle that recommends devolving decision-making power to the lowest appropriate level (Marshall, 2008).

5.1.4.3. The modified forestry water licensing system proposed in the draft LLC WAP

The major debate on the forestry water licensing system happened in August and September 2007, at which time the licences were still limited to new forestry plantations in shallow water table areas. However, there was not such a debate in December 2007 when the draft LLC WAP was disclosed for public consultation with its forestry water licensing system for all new and existing commercial forest plantations in deep and shallow water table areas throughout the Lower Limestone Coast. It nevertheless altered the retrospectivity condition and expanded the licensing from direct extraction only to include recharge interception, suggesting that forestry may potentially endure reductions in their water allocation (reduction of areas, relocation, etc.) (Figure 5.7).



Note: Proportions in the above graph do not indicate respective volumes of each use.

Figure 5.7. Alteration of the water budget calculation by the forestry water licensing system

The forestry sector had anticipated this proposal, in the informal announcement of the SENRM board in *The Border Watch* (grey shading in Table 5.6), but it did not react further upon receiving formal notification in the draft LLC WAP. However, legal challenges can be expected from the forestry sector to obtain compensation, if forestry is eventually licensed and experience water reductions in over-allocated water management areas:

Auspine's Phil Lloyd believes the current draft water plan, if implemented, opens the door for a long legal battle (The Border Watch, 15 February 2008, p. 9).

5.1.4.4. Absent in the LLC WAP debate: Aboriginal people

With the National Water Initiative impressing for Aboriginal access to cultural water to be included in water plans (CoAG, 2004a, sections 52-54) and in national forum (Jackson, 2009a; Jackson et al., 2009), as well as in recent research on their participation in planning processes (Ross, 2006/07; Simpson, 2008), it is striking to realise that Aboriginal people are not mentioned in any of the selected articles of *The Border Watch* regarding the LLC WAP. This discussion will be pursued in light of the additional data from submissions and interviews in Chapters 6 and 7.

5.2. PROCESS OF CHANGE

This section examines the factors promoting, hindering or having both effects on the planning process and on the introduction of the proposed changes in water management. Figure 5.8 displays the relative significance and direction of these factors during the reviewed period, while Figure 5.9, Figure 5.10 and Figure 5.11 detail the nature of these three factors.

Consistent with their general supportive position regarding the forestry changes (Figure 5.3), the news reports mentioning drivers of the LLC WAP tend to prevail over those describing its barriers (Figure 5.8). The latter are reported mostly during the two peak periods (2004 and 2007), when the opposition is mostly voiced. However, the draft LLC WAP release also attracted few, but strong, opposition comments from politicians, rectifying the initial perception of a lack of debate in December 2007:

Mr Williams said the plan removed from property owners the right to use rainfall, was based on poor science and failed to take into account native vegetation or drainage (The Border Watch, 12 December 2007, p. 7).

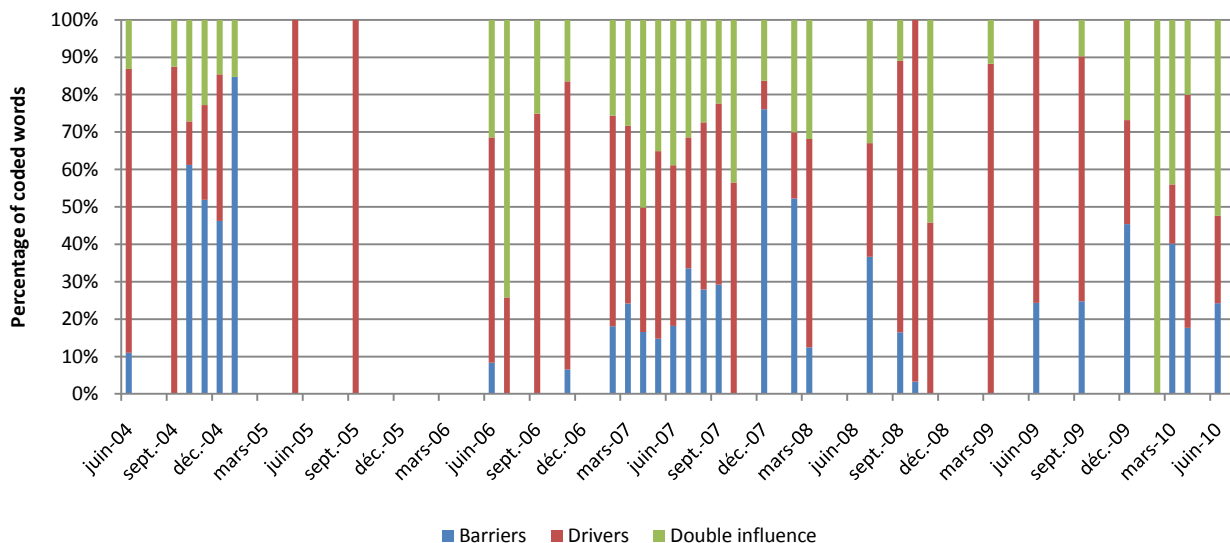


Figure 5.8. Factors influencing the policy process

5.2.1. Functional drivers of change

The main drivers of the LLC WAP changes identified from in the local news reports are presented in Figure 5.9. They consist of the objectives to achieve environmental

sustainability, account for forestry related issues and obtain a secured water allocation.

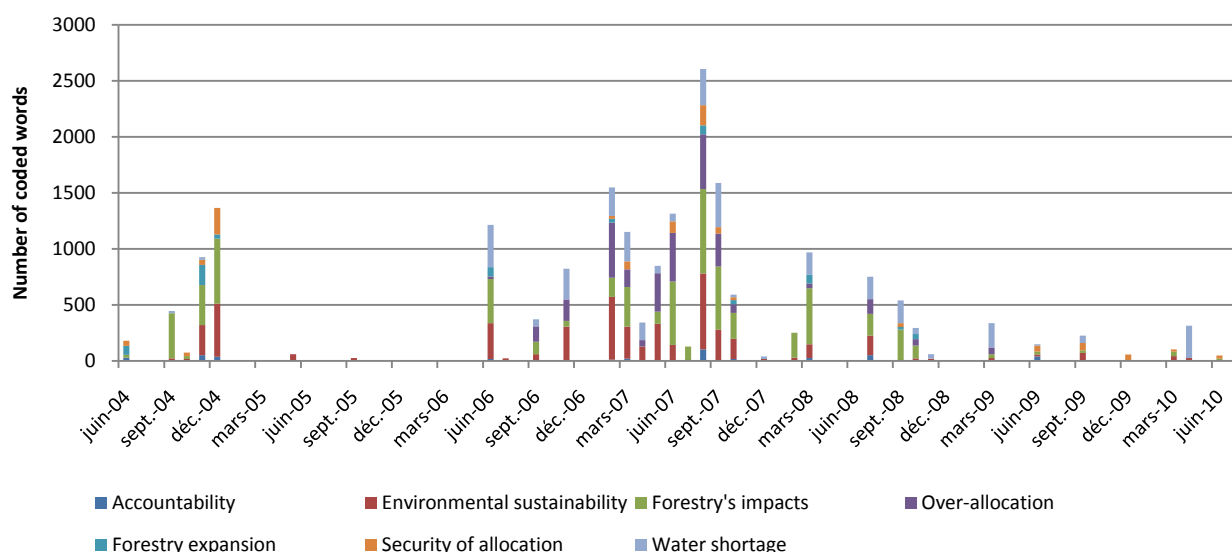


Figure 5.9. Drivers of change

Generally, environmental sustainability, associated with the specific disapproval over water decline and over-allocation as well as the praise of the accountability concept, largely dominates the driving influence of the LLC WAP. This becomes more explicit in June 2006 after the release of the aquifer study (DWLBC, 2006b), when acute pressure over the resource is also perceived, due to reporting of the water allocation to a potentially new industry: the Penola Pulp Mill (see section 5.2.3.5 for more on this subject).

Moreover, arguments about the recent rapid growth of the forestry estate in the region (as detailed in the study area presentation in Chapter 4) and its impact on the water resources were also not raised until October 2008. Similarly, most agricultural water uses are considered as unsustainable at one point in time, although less significantly, due to their impacts on water resources (Table 5.10). These negative perceptions of forestry also tend to disappear in the 2nd phase, after the forestry water licensing system proposal (Figure 5.9). This corroborates that ‘social constructions of targeted groups can change’ and that policy change can be responsible for such changes (Ingram et al., 2007, p. 108).

Table 5.10. Agricultural water use reporting

	News reports	<i>The Border Watch</i> edition
Viticulture	‘On current trends Coonawarra’s water would be too saline for irrigation in 50 years’	3 December 2004, p. 8
Pastures	‘[...] between 1990 and 2003 dairying increased by 280 000 ha and intensive cropping increased by 130 000 ha’	6 March 2008, p. 3
Irrigation	‘Suddenly those reliant on irrigation became the “baddies”’	6 June 2007, p. 6

Note: Coonawarra located 50km north of Mount Gambier is famous for its Cabernet Sauvignon wines.

Finally, more secure water allocations are also expected from the process. From these reported drivers, the main objective of the changes is to achieve a balance between water resource recharge and use. These drivers generally correspond to the irrigators’ and softwood sector’s discourse during the first phase, and to the farmers’ discourse in the second phase, as well as the SENRM board’s and State government’s discourse. Each driver fits within the functional category of Schmid’s drivers of institutional change (2004), converting the LLC WAP from a regular policy review into an institutional change in order to adapt to a change in local context.

5.2.2. Institutional barriers to change

The evolution of the main barriers at play to hinder the LLC WAP changes according to the news reports is displayed in Figure 5.10. They comprise obstacles created by the political game, the rainfall entitlement argument, the precedent set by regulations, policies conflicting with the proposed changes, the threats of a Victorian competition, as well as job and economic losses in the timber sector.

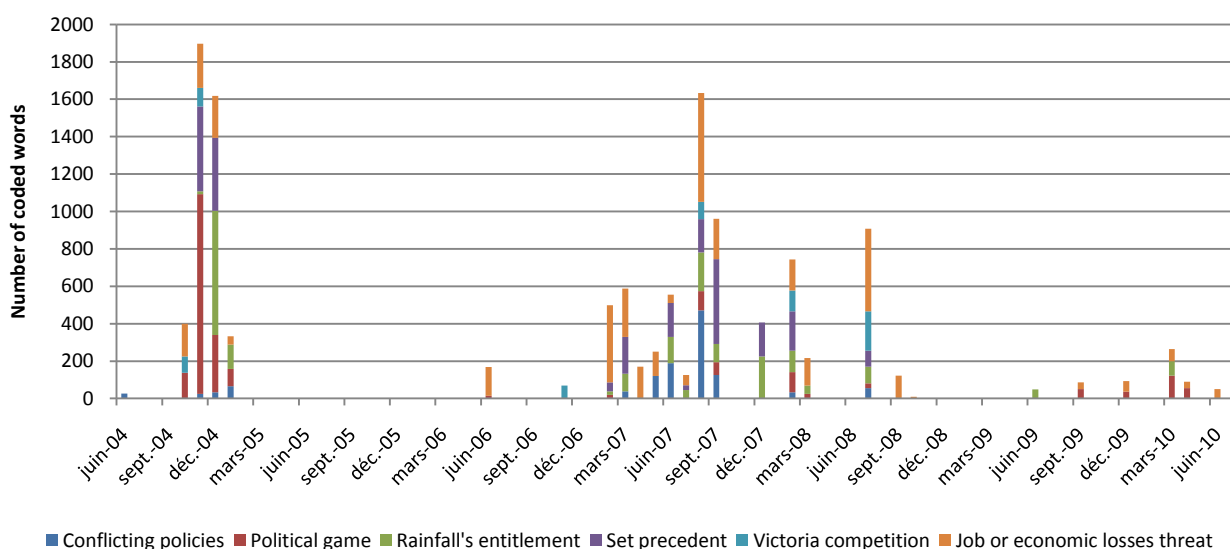


Figure 5.10. Barriers to changes

Political games were reported mostly around November 2004, when Parliamentary debate occurred regarding the forestry expansion threshold due to a disallowance motion from opposition politicians. The rainfall entitlement was, in their interpretation of an equitable water allocation, giving more attention to dryland farmers. The origin of this version can be traced back to the ‘tradeable recharge right’ option discussed in 2001 to account for land use change and corresponding to ‘new right that specifies a recharge value for every landholding reflecting the volume of rainfall that recharges the regional unconfined aquifer’ (Department of Water Resources, 2001, p. 14). This option was, however, discarded because the ‘redistribution of all existing water rights’ was considered ‘technically difficult and administratively expensive’ (Department of Water Resources, 2001, p. 14). The rainfall barrier was therefore mostly reported in December 2004 (further discussion in 5.3.2.2.). The associated argument of the forestry regulations setting precedent for other dryland crops nonetheless persisted into the second phase but converted into an equity issue with forestry being ‘unfairly target[ed]’ (*The Border Watch*, 23 August 2007, p. 6) as the only dryland crop required to obtain a water licence (discussed in section 5.3).

The practical implementation of the proposed forestry changes of the second phase conflicts with existing State or Federal legislations (Table 5.11). The first conflict identified in the news reports opposes the forestry water licence to the *NRM Act 2004*, which only provides for water permits for forestry (South Australian Government, 2004a). The second conflict arises in relation to the NWI but was

confirmed only in December 2007, when the draft LLC WAP required water licences for existing plantations, because of which they could suffer cutbacks in some over-allocated water management areas. This last contradiction has, at the time of writing, still to be addressed by the South Australian government, with respect to their obligations under the National Water Initiative.

Table 5.11. WAP regulations conflicting with existing water policies

WAP process	Contradicting water policy	Way of addressing contradiction
	<i>NRM Act 2004</i> allows only water permits for forestry	<i>NRM (Commercial Forestry) Bill 2009</i>
Forestry water licence	NWI: no retrospective regulations to secure existing rights	Existing plantation will be given a forestry water licence at no cost. But will they attract potential reductions?

Source: Analysis of *The Border Watch*

Finally, economic threats include Victorian competition for the timber industry within the Green Triangle—but not subjected to the same forestry regulations—as well as forecasts of job losses as a result of the LLC WAP changes. This barrier predominate over the entire period reviewed.

These barriers mainly correspond to the arguments of opposition politicians during the first phase as well as those of the forestry sector during the second phase. Except for the economic arguments, these obstacles to the adoption of the LLC WAP are institutional barriers. This is consistent with the first practical inclusion of forestry impacts in a water plan in Australia as well as the absence of isomorphic drivers, except for the path dependency created by the forestry expansion threshold (discussed in section 5.2.3.2). Legislation has not yet adapted to such integration and needs amendment to adjust to the specificities of the forestry water licensing system proposed. However in doing so, it will set precedent for other Australian timber regions that may want to introduce similar regulations. Tisdell (2003) recommends that policy makers be particularly aware of the social justice implication of their decisions.

5.2.3. Parallel drivers and barriers

Some factors influencing the planning process may be both a driver and a barrier. Their evolution over the examined period is shown in Figure 5.11.

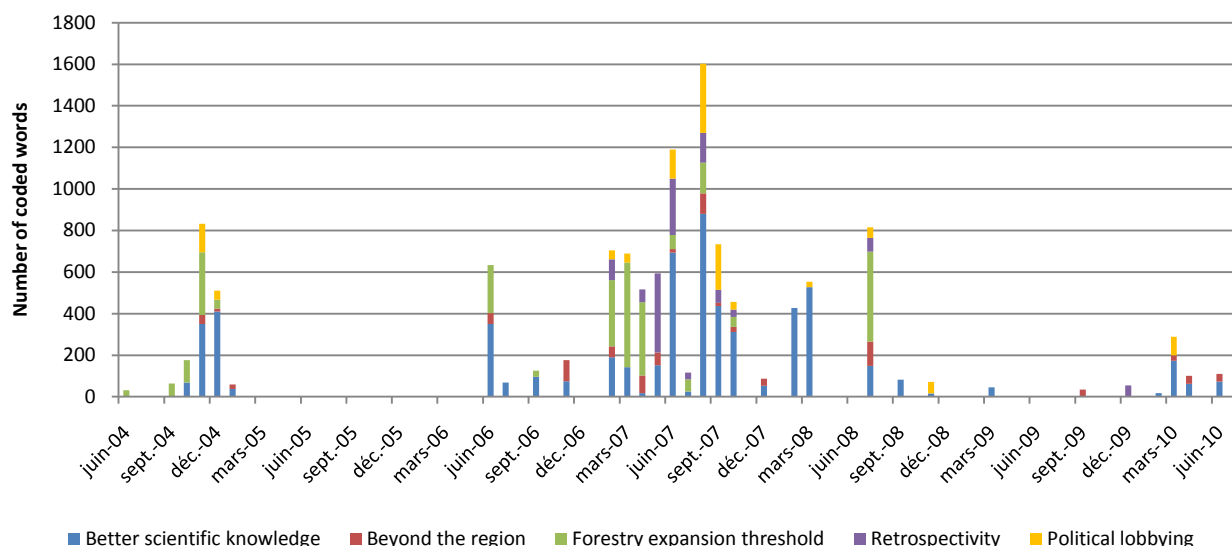


Figure 5.11. Factors having a double influence

5.2.3.1. Federal position

The water planning process is affected by external factors that are beyond the region. One very significant factor is the neighbouring example of a drought disaster in the Murray Darling Basin, a major food supply of Australia. The local community, closely observing the devastation due to a shortage of water, is ready to accept a change that could avoid such a situation in the South East:

He [the then Minister of Forests] also issued a warning that unless the water resource was sustainably managed, the region might suffer the same consequences as the troubled Murray-Darling Basin (The Border Watch, 22 February 2007, p. 1&4).

In contrast, the fact that South Australia and the region are the first in Australia to account for forestry's impact makes the change more complicated as discussed in the section 5.2.2 on institutional barriers.

Moreover, the Federal position on forestry through the NWI complicates the resolution of forestry issue locally due to the retrospectivity criteria. However, the NWI is also used as a consolidating policy (Department For Water, 2010) to encourage the change in citing the Federal policy instead of referring to the State

legislation, which introduced the same recognition of the water-affecting activity for forestry (see Appendix 5.6).

5.2.3.2. Forestry expansion threshold

Similarly, the forestry expansion threshold as previously mentioned (see section 5.1.3.1) sets the path towards a forestry water licensing system, as it was expected that water licences would be required once the threshold was exceeded. This clearly reflects path dependency and, thus, is an isomorphic driver of change (Schmid, 2004). The threshold is the result of a consistent direction in previous policy documents (Select Committee on Water Allocations in the South East, 1999; South Australian Government, 2000; Select Committee on Groundwater Resources in the South East, 2001) despite changes of parties in the government. However, the licensing system was not expected before the threshold was exceeded, and thus is challenging the change. This factor with its double influence appears in the news reports only prior to August 2007 (Figure 5.11) when it is superseded by the forestry water licensing system, with the unique exception of July 2008 when farmers are invited to apply for farm forestry permits under the threshold opportunity.

5.2.3.3. Better scientific knowledge

Science and its improvement through research prevail over other double-influence factors (Figure 5.11). News articles report each decision as being based on some new data applying, therefore, the concept of evidence-based policy (Solesbury, 2001; Young et al., 2002) and, along with Schmid (2004), clearly alluding to social learning as a driver of change. New scientific reports are highly mediated and the LLC WAP timeline (Figure 5.1) clearly evidences a correlation between the new data and the decision taken.

However, research results supporting forestry regulations are debated and interpreted among the stakeholders. Two striking examples provide a case in point: the 2004 CSIRO report 'Water use by tree plantations in South East South Australia' (Benyon & Doody, 2004) and the 2008 Victorian research 'Water and Land Use Change Study: Stage 3 Case Studies' (Sinclair Knight Mertz, 2008), both on forestry's impact on water. 'Forest clean – Plantations not drawing from underground water supply' was the title of the article that finally informed that 'in a number of locations, where the water table was within a few metres of the ground surface, some

plantations were using additional water' (*The Border Watch*, 24 September 2004, p. 1&2). Later foresters will criticise these results as not representative:

The estimate relies on a number of unproven assumptions. More importantly, what is not addressed is the unresolved question of the impact of plantations on other users of water. Factors affecting water availability elsewhere in the catchment are far more complex, and simple extrapolation of tree water use does not do justice to the need for integrated, catchment scale land use planning (*The Border Watch*, 10 August 2007, p. 8).

The second example clearly demonstrates the selection, by stakeholders, of results according their meaning to frame their discourse (Miller & Parnell Riechert, 2000). Results from a Victorian study were initially presented by a forester:

He said intensive agriculture over more than 70pc of the region would have the same or greater impacts on water resources than future plantation developments (*The Border Watch*, 6 March 2008, p. 3).

Soon after, the SENRM board sent a letter to the editor to rectify the findings (*The Border Watch*, 13 March 2008, p. 8), which was followed by a response from the consultants that undertook the cited research:

Bluegum plantations are 'likely' to affect water availability in the future, according to a recent Victorian study. [...] SKM Water and Land Use Change Study principal investigator Craig Clifton made the comments in response to claims by Tree Plantations Australia, which 'inferred the study indicated plantations would not have such an impact' (*The Border Watch*, 27 March 2008, p. 6).

The multiple use of natural resources indeed often generates 'scientific uncertainty and complexity in the planning process' (Hill & Zammit, 2001, p. 2). Scientific evidences can therefore be used both as drivers of change or as barriers to change. This corroborates the argument that 'debate about environmental issues usually is more about how to look at issues than about the facts or values involved' (Miller & Parnell Riechert, 2000, p. 45). The existing conflicting perspectives on climate change illustrate this situation. Indeed, an environmental issue is framed by 'claim-makers' (Hansen, 2000, p. 55) in selecting among the existing sources and both suggesting an argumentation promoting his view.

5.2.3.4. Political lobbying

The political lobbying factor appears in the new reports at three times: in December 2004 when the forestry expansion threshold regulations were debated in Parliament, the months surrounding the August 2007 decision on forestry water licence in

shallow areas and in March 2010 when South Australia had its State election and the LLC WAP became a political stake locally (Figure 5.11).

A practical example of political lobbying has been the introduction of ‘farm forestry’ specific to the Lower Limestone Coast and exempting it from water licensing. It was negotiated to compensate farmers who had recently returned water holding licences to the Minister’s reserve a few months before the introduction of the forestry expansion threshold, at a time when their levy was increased to match the levy of the water taking allocation (Member of the Reference group for the Lower Limestone Coast Water Allocation Plan Taskforce, 2011).

Political lobbying obviously refers to the power element of Schmid’s institutional change (2004). The two main stakeholders, farmers and forestry companies, are powerful and use this strategy to present their point to the decision makers (Hill & Zammit, 2001). The coalitions formed in each phase attempt to expand the power of each party, and in particular, to be able to lobby more for their cause. The political lobbying factor can thus be a driver or a barrier to the LLC WAP.

5.2.4. Indirect influence: the Penola Pulp Mill

The Penola pulp mill surfaces in the news report and is included in the ‘other’ category in Figure 5.2, along with the LLC WAP process. It first impresses on the perception of a water shortage in the community through the debate around its water allocation. Subsequently, the *Penola Pulp Mill Authorisation Act* (South Australian Government, 2007b), a special act granting the proposed mill a water allocation, adopted in November 2007, initially mentioned the forestry expansion threshold in its Clause 9; a mention that could be interpreted as an attempt ‘sidestep the water allocation process’ (*The Border Watch*, 6 July 2007, p. 5). But this controversial clause was deleted before the Act’s final adoption. Finally, the mill became, during the second phase, an argument to oppose the forestry water licensing system as that licensing would not allow an increase in the minimum water supply the mill needs. Regardless, this issue aggravated the dispute between the farming and forestry sectors.

After identification of the factors influencing the process of policy change, the next section focuses on how this process was implemented from a social sustainability perspective.

5.3. SOCIAL SUSTAINABILITY PERSPECTIVE

5.3.1. General lack of social sustainability consideration

The social sustainability of the LLC WAP is not debated per se in the articles contrarily to its environmental sustainability—in 117 articles including references to over-allocation and water table decline—or economic sustainability—in 56 articles only for the economic impact of forestry changes. News reports often completely ignore this social dimension:

Presiding officer [...] has written to The Border Watch stating the board is carefully developing policies that protect both the environment and economy's long-term future (The Border Watch, 23 August 2007, p. 6).

Others may suggest that the social sustainability of the LLC WAP is left to the water market, reported to be not appropriate in Chapter 4:

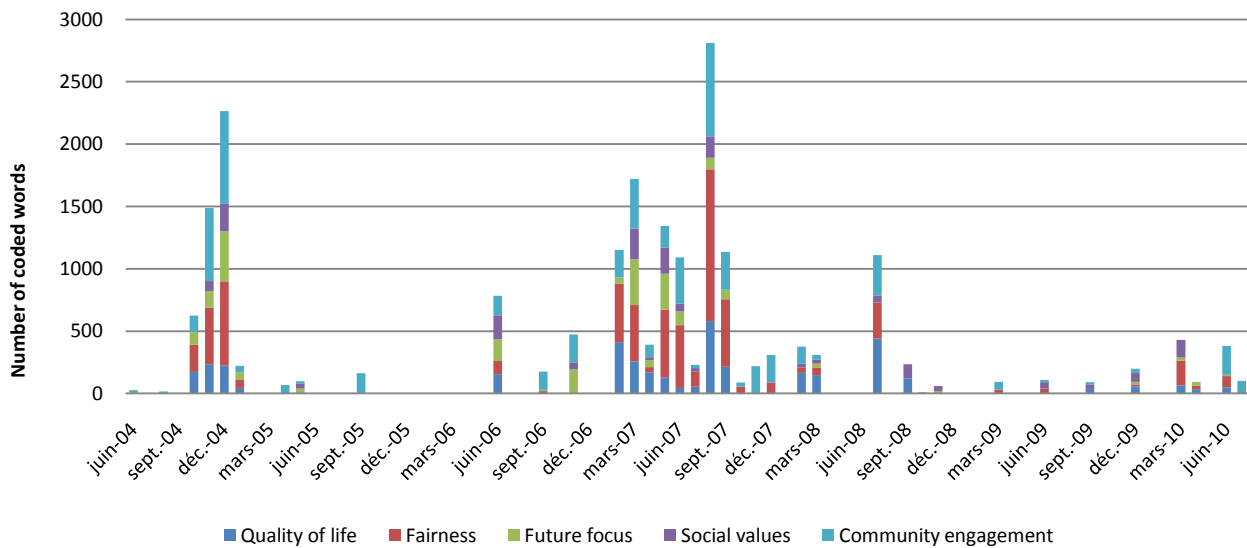
'We are trying to find a policy foundation that leads people to be flexible in the market place and from that point of view, we say instead of us trying to plan the economic future for a sector or plan the social future for a community, we say here is the policy basis', he said (The Border Watch, 18 May 2007, p. 17).

Finally, very few articles point to this lack of social consideration and then refer only to employment, which is just one side of the quality of life principle:

Timber Communities Australia SA manager [...] said social and economic factors were too often ignored when governments developed policies (The Border Watch, 29 July 2008, p. 7).

This general lack of social sustainability is supported by the fact that the term 'sustainability' often replaces 'environmental sustainability' in various news media (Dryzek, 2005).

However, there are some references to the five individual principles of social sustainability proposed in Chapter 2 (Figure 5.12). Among those, the fairness and community engagement principles received the most attention (Figure 5.13).



Note: Due to the strong relationships between the five social sustainability principles, one sentence may be coded at two or more principles.

Figure 5.12. Social sustainability principles encountered in *The Border Watch*

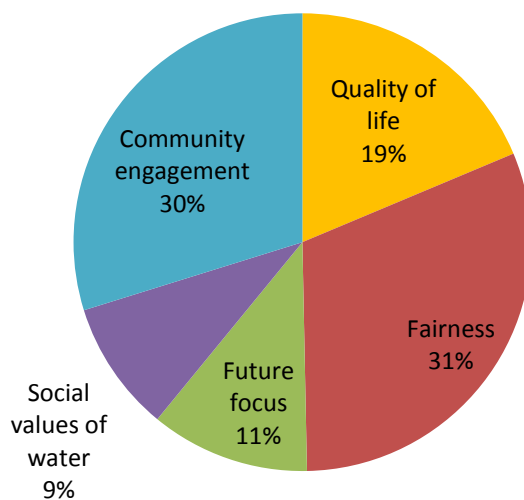


Figure 5.13. Relative coverage of the social sustainability principles in *The Border Watch*

5.3.2. Fairness

5.3.2.1. Framing justice

The fairness principle is the one most referred to in the news reports, and also in each coalition's arguments (Table 5.12).

Table 5.12. Framing justice

	1 st phase: June 2004 to July 2007	2 nd phase: From August 2007
Irrigators	<ul style="list-style-type: none"> - Procedural: direct extraction of forestry not accounted for in the water budget - Distributive: only their water allocations are reduced when drought 	<ul style="list-style-type: none"> - Distributive: water allocations and cutbacks shared by all water users
Dryland farmers	<ul style="list-style-type: none"> - Interactive: cannot enjoy the rainfall falling on their land as water gatherer for irrigators 	
Forest sector		<ul style="list-style-type: none"> - Interactive: trees automatically reduce their water consumption in dry periods contrarily to irrigators - Procedural: WAP timeline not adapted to forestry rotations - Interactive: dryland farmers not accountable

Source: Analysis of *The Border Watch*

Interactive justice is the type with which the stakeholders are more concerned (Figure 5.14); it mostly refers to the equality between them, as typified in the statement:

If any one group uses more than their entitlement then it will obviously be at the expense of other users (The Border Watch, 14 August 2007, p. 8).

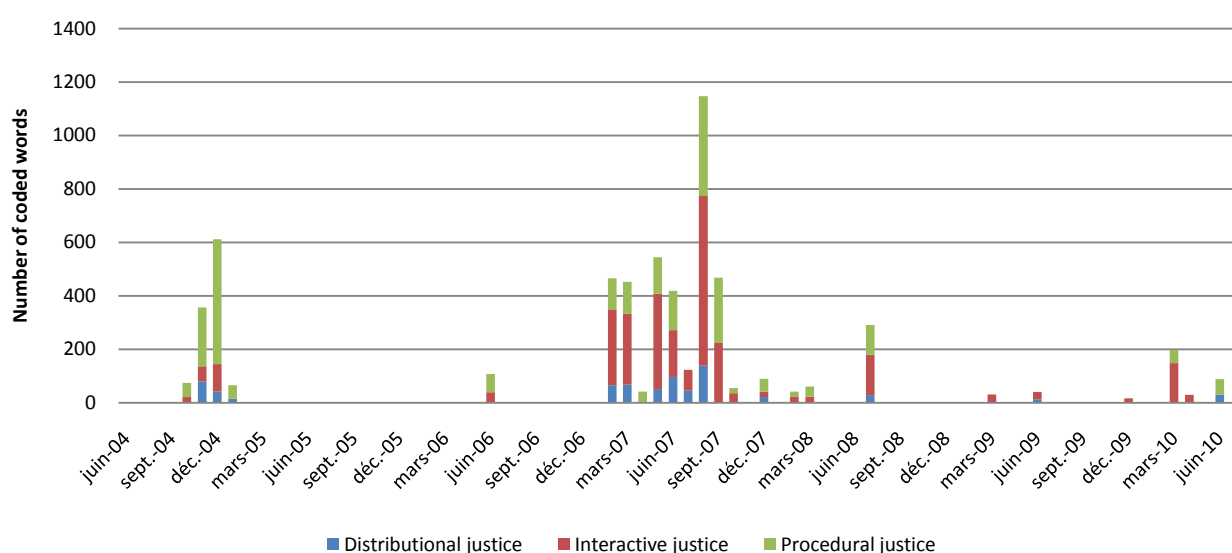


Figure 5.14. Fairness principle

But, for the forestry sector, the interactive justice issues also include the concern that specific forest characteristics are not considered under the proposed licensing system:

This is why rain-fed vegetation and crops, including trees, could not and should not be treated in the same way as irrigated crops (The Border Watch, 15 February 2008, p. 9).

This provides an excellent example of the comment that ‘abstracted water cannot be considered a homogeneous good from a societal point of view’ (Merrett, 1997, p. 155).

The distributive justice issue argued by the irrigators—‘any cuts to irrigation must be felt across all industries that used water’ (*The Border Watch*, 23 June 2009, p. 5)—provides evidence that the reduction in water allocation change is hidden behind the forestry accountability debate, such that forestry can ‘share the pain’ of water cutbacks (further discussion in section 6.2.4).

Fairness and justice are the main values shared by all stakeholders in the region and frame their respective discourses, and they therefore influence the community (Kensicki, 2004) through the construction of social norms (Boin et al., 2009; Ching, 2010). The identification of the way in which a problem is framed as a determinant in the water allocation process (Hatfield-Dodds et al., 2006/07) confirms that framing the problem appropriately might be beneficial in attempting to achieve a consensus. As a common argument backing most parties’ perspectives, the fairness principle should be given more consideration in the resolution of a dispute. In particular, the current difference in the types of justice referred to by foresters and farmers (Table 5.12) may provide room to negotiate an agreement.

5.3.2.2. *Evolution of water doctrines and resulting fairness issues*

The fairness argument supports the opposed stances in Table 5.12. This confirms the existence of different conceptions of justice in nearby water users’ associations (Garin & Loubier, 2007). It also supports the strong dependency of the equity notion in water management on the water doctrine in place (Tisdell, 2003).

So one farmer becomes an unpaid water gatherer for the other. One farmer has his farming options restricted so that the other has greater flexibility. This simply cannot be fair (The Border Watch, 2 December 2004, p. 8).

After paying high prices for land with underground water, they argued the water was being stolen from their land titles and gifted to irrigators (The Border Watch, 3 August 2007, p. 9).

From the above two citations, it is clear that the rainfall entitlement claimed by dryland farmers (Table 5.12) is a reminder of a change of water doctrine that operated in the State legislation. Under the riparian right, where water is embedded in the land title, such a claim would have been considered as just. However, such a right disappeared completely from the State legislation with the *Water Resource Act 1997* (see section 4.3.1), which also formally separated water from the land title (Young & Hatton MacDonald, 2003), consistent with the 1994 water reform. The Riparian doctrine nonetheless temporarily returned with the 2001 pro-rata roll-out that allocated water based on land ownership. As a result, most local farmers who acquired their land with the belief that ‘water comes with land’ (the riparian doctrine) have difficulty converting their thinking to what they call the ‘on demand’ doctrine (non-priority permit). This is consistent with the ‘two schools of thought’ that were identified in the region (Select Committee on Water Allocations in the South East, 1999, p. 7). Thus, evolution of the water doctrine imposes also an evolution of the equity notion (Tisdell, 2003) and now refutes the validity of the rainfall entitlement barrier to the adoption of the LLC WAP, as previously identified in section 5.2.2. Evolution of a water doctrine creates fairness issues when stakeholders do not use the same framework to assess fairness against.

5.3.2.3. Delay as a procedural justice issue

The LLC WAP is the most delayed one in the South East region despite its revision being initiated concurrent with the Padthaway and Tatiara WAPs (see Table 4.4 in Chapter 4 and Appendix 5.7). Similar to the LLC WAP, the latter WAP also include water management areas in the Border Designated Area (under the Border Agreement with the State of Victoria), complicating the planning process. Indeed, ‘given the current climate between the two States [SA and Victoria] and water planning issues, there is high risk that negotiation for the Tatiara WAP will stall or come back with a negative response’ (SENRM Board, 2009a, p. 168). It also introduced the volumetric conversion and some reductions to water allocation. However, the Tatiara WAP was finally adopted in June 2010, thus confirming that the proposed changes related to forestry accountability are responsible for the LLC WAP delay.

The State debate regarding the amendment of the *NRM Act 2004* is now seen as the practical reason delaying the LLC WAP for the forestry water licensing system. However, due to the length of the process, frequent changes of Minister (J. Hill from 2002, G. Gago from 2006, J. Weatherill from 2008, P. Caica from 2010) and State elections (in 2006 and 2010) have also hindered the process. News reports mention the LLC WAP delay beginning in September 2006 (see Appendix 5.7) and almost ever since. Despite the uncertainty created for all stakeholders, there is no time constraint to force an agreement (Mollard, 2008).

The delay in adopting the WAP is detrimental to the WAP itself and its social sustainability in particular. The trust that the community initially had in the planning process to sustainably manage the water resources is altered as a result of an eroded procedural justice, as well as because of the aggravated environmental state of the water resources due the inability to address the over-allocation. This confirms survey results showing a negative effect of delay in already controversial water planning process, in particular on the fairness perceived (Kuehne & Bjornlund, 2006).

5.3.3. Community engagement

Figure 5.15 presents the four elements encountered in *The Border Watch* articles that pertain to the community engagement principle: public consultations, democracy—both alluding to the democracy component—, cooperation and trust—referring to the social capital component. Public consultation is the most mentioned notion, which is consistent with its regular occurrence. Under the *Water Resource Act 1997*, in place when the revision started, four public consultations were required. Despite the shift to two compulsory consultations under the *NRM Act 2004*, the SENRM board pursued the four phase consultation process.

The three first public consultations regarding the LLC WAP occurred in June 2004, September 2005 and December 2007 (Figure 5.1). The fourth, called the B consultation, is still to come without any reliable anticipated date at the time of writing. Additionally, the SENRM board also organised a separate consultation on one of the changes proposed to be introduced in the LLC WAP: the water dependent ecosystems and their environmental protection zones.

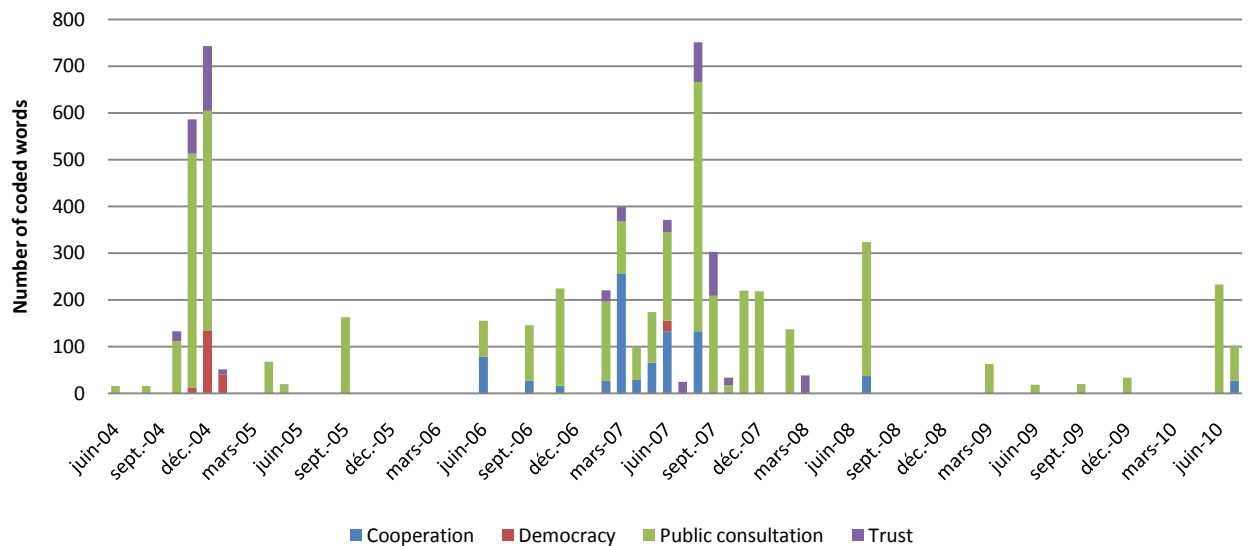


Figure 5.15. Community engagement principle

Outside of the consultation periods, August 2007 saw a great mention of consultation due to the debate around the fact that the Minister ‘aborted water stakeholder consultation meetings by announcing all new forestry plantations must have water licences’ (*The Border Watch*, 28 September 2007, p. 7). However, the SENRM Board Manager in December 2007 still indicated that forestry accountability was the area in which change might still occur.

Hence from a social sustainability point of view the numerous public consultations allowed community engagement through dialogue, in particular between foresters and farmers, in order to determine collective-choice arrangements (Ostrom, 1990; Larson, 2010) for the allocation of the water resources. Despite differences, both parties acknowledge their mutual inclusion and significance to regional vitality. However, the number of consultation may explain the LLC WAP delay.

5.3.4. Future focus

The future focus principle’s appearance in *The Border Watch* is presented in Figure 5.16. It includes reference to a long-term perspective and to the resilience of the community.

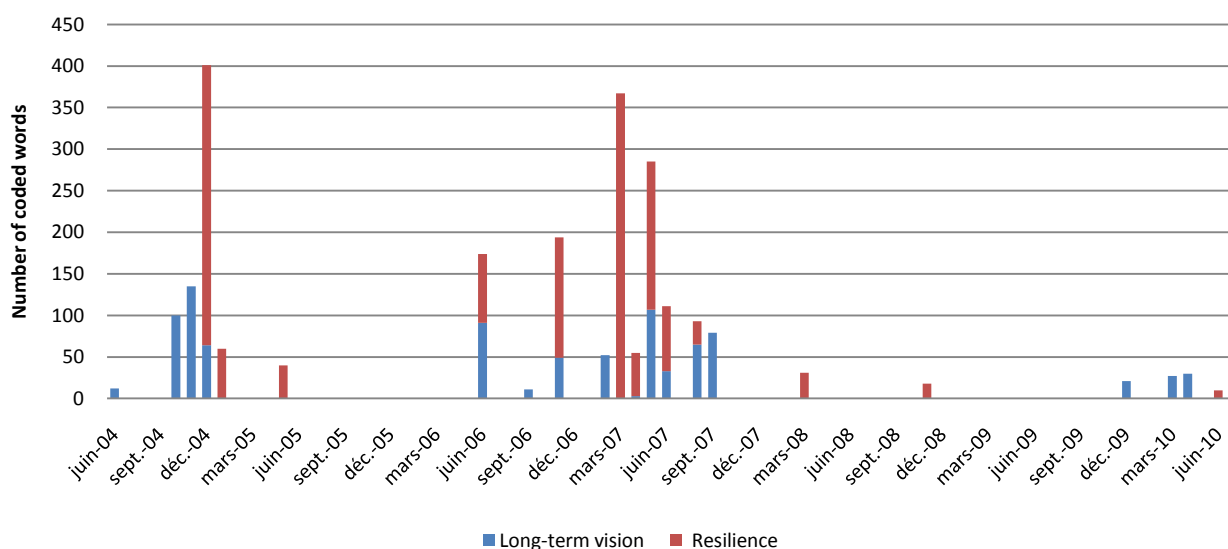


Figure 5.16. Future focus principle

Signs of resilience appear in news reports through debate over various options to manage the water resource, which reveals adaptive management (Sewell, 1985; Gurung et al., 2006): options over the water doctrine (riparian through the rainfall entitlement debate versus the current non-permit doctrine), over water management in over-allocated water management areas, etc. Diversification of the community's economic activities is also proposed as an indicator of increased resilience, in particular in the combination of farming and timber industries.

The long-term vision regarding the LLC WAP involves water budget accuracy, security of water allocation and availability of water for future generations. However, legal battles over compensation liability may also appear if the licensing system adopted does not address the retrospectivity issue, despite claims that:

The forestry company would be given 80 000 megalitres of water, worth \$81m, without cost when a new water allocation plan is adopted (The Border Watch, 17 August 2007, p. 9).

It is expected that the forestry companies will hold the largest water licences if existing plantations obtain their licences.

5.3.5. Quality of life

The only references to the quality of life principle appear through its socio-economic dimension of employment. Figure 5.17 thus only presents reports of threats of job or economic losses in the timber sector.

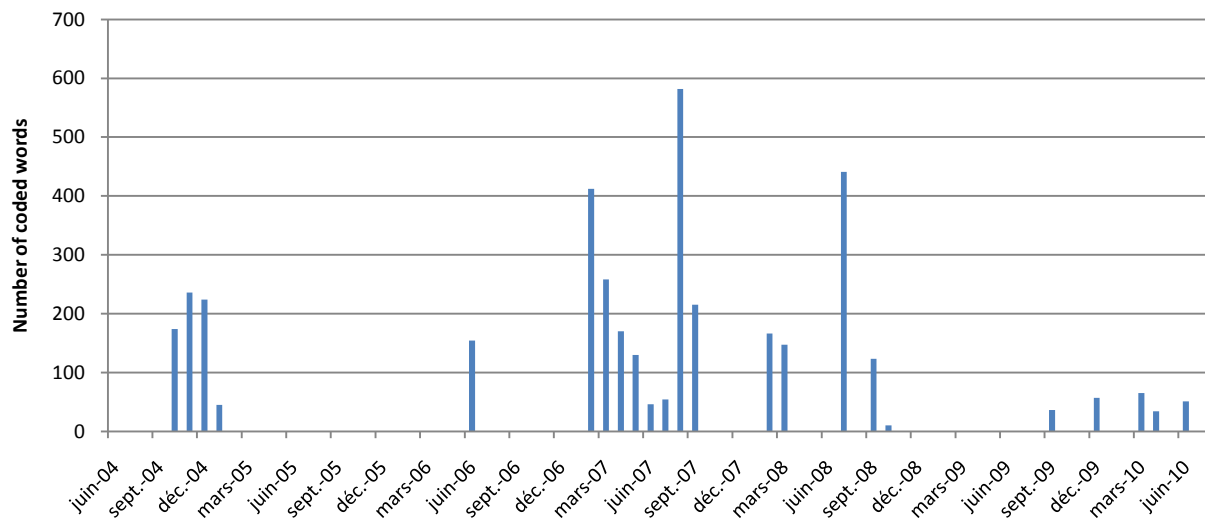


Figure 5.17. Quality of life principle

As a result of the proposed changes in forestry regulations, foresters threaten to stop their activities or at least reduce their expansion in the concerned areas, putting them in competition with plantations of neighbouring Victoria State. Precise values of potential losses due to the purchase of expensive water licence for new development are indicated in news reports before August 2007—118 million Australian dollars and 1200 jobs to the local economy due to the uneconomical capital cost of establishing plantations (*The Border Watch*, 23 February 2007, p. 1&2). However, in the second phase only vague estimates of potential losses are mentioned. Yet, farmers confirm that forestry could be reduced by 4 500 ha if foresters do not acquire the needed water licences:

Timbercorp led the charge, claiming the change put the Penola Pulp Mill in doubt, while Auspine said the decision could lead to hundreds of millions of dollars in losses as pine plantations were threatened. Meanwhile, South Australian Farmers Federation natural resources committee spokesperson [...] said the most severe impact of the change could be the loss of 4 500 hectares of blue gums (The Border Watch, 17 August 2007, p. 9).

A later socio-economic study tried to estimate those impacts for the timber sector and evidenced that reductions of allocation based on water use would have a greater impact on farming than based on allocation, but would be comparable to the impacts of a permanent reduction in plantation areas on the timber sector (EconSearch, 2008).

5.3.6. Social values of water

The social values identified in *The Border Watch* are presented in Figure 5.18 and consist in: i) carbon stores, ii) drought-proof community, iii) food security, iv) water as a common good, v) regional identity and vi) basic human needs.

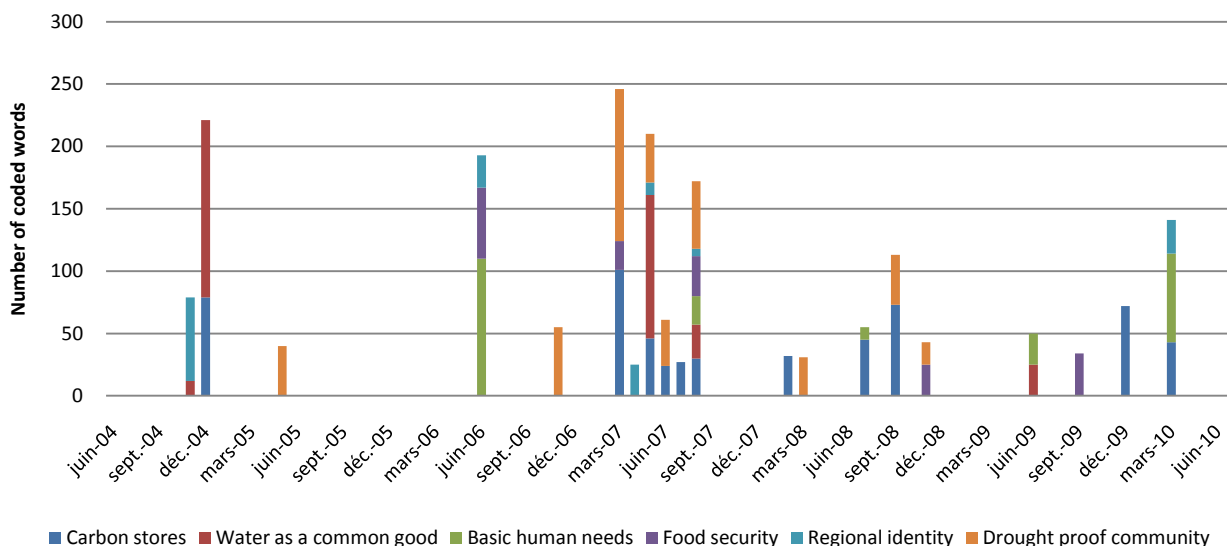


Figure 5.18. Social values of water

5.3.6.1. Carbon stores

The carbon sequestration aspect of forestry is not integrated in the draft LLC WAP but is a significant societal objective. It becomes an argument from the timber industry to refuse the forestry water licensing system:

The water allocation plan will see at least 14,000 hectares of trees not replanted and 270,000 tonnes of carbon offsets lost each year (The Border Watch, 29 July 2008, p. 7).

Indeed, the land use change debate immediately conceded that it ‘endeavours to separate the issues of beneficial and detrimental impacts of forestry on natural water resources in the South East’ (Department of Water Resources, 2001, p. 3). Carbon sequestration adds another dimension to the already complex water and energy nexus (Jackson, 2009b).

5.3.6.2. Drought-proof community

The drought-proof characteristics of a rural community are a very Australian indirect value of water management, related to the recurrence of severe droughts, which the country suffers from (Cherry, 2006/07; Voumard, 2006/07). The drought-proof

community value is mostly mentioned in 2007 when a recent dry period was at its height. Since then, good rains in winter (see section 7.2.2) have alleviated the situation and hidden this indirect social value expected from water management. This is another argument used by the forest sector to counter the change of forestry regulations in the LLC WAP:

Independent research has shown that broadening the economic base through plantation forestry development [...] has helped to economically 'drought proof' local communities over this recent drought (The Border Watch, 9 March 2007, p. 6).

The drought-proof value is interlinked with the future focus principle of social sustainability, through the resilience it enables. It also implies some sort of risk sharing within the community with the farmer being able to absorb the risk that may emanate from future potential climate change.

5.3.6.3. Food security

The food security value of water is not directly mentioned, but the region is called a 'food bowl' in some news reports and the farming industries reliance on the region's groundwater is often associated with the water resource. 'We are a serious food producing area of the State and our water needs to be protected' (*The Border Watch*, 17 August 2007, p. 9). Although the country still remains a significant net exporter of food, the recent drought was a reminder in the rural areas of the meaning of food production and resulted in a decline of Australia's food exports by 3 per cent in 2006–07 (DAFF, 2008).

5.3.6.4. Water as a common good

It is an argument mostly used by dryland farmers in the rainfall entitlement debate (December 2004 extended by one Letter to Editor in May 2007):

They did not want to pay a fair royalty or fee for the privilege of using underground water which after all, is a public property belonging to all of us (The Border Watch, 8 December 2004, p. 10).

Water however is a common-pool resource because of its competitive uses, rather than in the public good category that enjoys joint use (Ostrom & Ostrom, 1977). This is why the common good concept encompasses not only basics human needs (see 5.3.6.5), but also more generally notions of well-being and social justice in particular in regard to its management (Delli Priscoli et al., 2004).

5.3.6.5. *Basic human needs*

The basic human needs value of water is mostly invoked in June 2006, when the water table was dropping fast, as the result of a great concern for the public supply, and in March 2010 when the *Natural Resources Management (Review) Amendment Bill 2010* proposes to license stock and domestic bores:

Stock and domestic bore water in the South East Natural Resource Management (NRM) region [...] has been considered untouchable since the water resource was first prescribed some years ago (The Border Watch, 12 March 2010, p. 21).

However, a specific water right is distinct from human rights to water and may ‘negates any meaningful understanding’ in particular of their associated ‘State obligations’ (Sacher & Windfur, 2008, p. 161).

5.3.6.6. *Regional identity*

Regional identity is the recognition of the region’s uniqueness and the willingness to make the region significant: ‘the South East is a unique region’ (*The Border Watch*, 23 August 2007, p. 8). Wetlands in particular, create a cultural landscape in which the community can collectively experience connections and identification with place (Strang, 2004). Social cohesion arises from this regional identity value.

These social values of water include values reflecting both ‘water for life’ and ‘water for livelihood’ (UNDP, 2006), providing therefore a comprehensive social perspective.

5.4. DISCUSSION

The volume of reporting peaked during the early stages of each of the water planning development phases, consistent with successful environmental issues that ‘command attention’ (Solesbury, 1976). However, the low news coverage following these peaks suggests that the highlighted conflicts over changes in forestry regulation fail to retain public and political attention, as could be expected over such a long period. Analysis of the news reports published when the water plan is adopted would be necessary to complete this longitudinal study of the local water institutions.

However, from the above analysis of news reports, it appears that the four drivers of change—functional, power, isomorphism and social learning (Schmid, 2004)—coexist in the Lower Limestone Coast water planning process. This confirms a Victorian study of the water rights evolution (Harris, 2007) as discussed in section 2.2.3.2. Further, every driver identified can fit into one or several of these four types of incentives of change. Nevertheless, barriers to change, having a great impact on the actual process of change, do not fit this typology. Institutional barriers have been identified as the main current obstacle for the water planning to be adopted. In addition, some factors were also discerned from these drivers and barriers because of their double influence, corroborating the difficulty to ‘generalize the direction of their effects’ on the institutional change (Saleth & Dinar, 2005, p. 5).

The fact that greater consideration to fairness adds stability to the debate (Syme and Nancarrow, 2008) can be extended here to the social sustainability concept to remove some of the contested elements of the dispute. Indeed the following extract from a news report may be the best evidence of the lack of consideration of the social dimension of sustainability:

Mr Beck highlighted a DWLBC report which showed the 2001 WAP had failed the community in terms of sustainable water management. He said the report showed a large number of areas were over-allocated and stressed (The Border Watch, 11 May 2007, p. 5).

Framing of the water planning process in the news reports is mostly based on the fairness principle and more specifically grounded on distributive justice for the farming sector, but on interactive and procedural justice for the forestry sector. This confirms previous studies on news coverage of environmental problem that link each actor to a specific frame (Trumbo, 1996).

The social impacts identified from *The Border Watch* news reports both reinforce and impede social considerations in the process of policy change. The numerous community consultations provide for cooperation among the stakeholders and therefore nurture the local social capital. Similarly, the common use of the fairness principle to frame arguments of opposed parties offers a great opportunity for consensus. The diversity of social values that were identified also enriches the social perspective. However, the expected decline in competitiveness in the timber sector may affect the quality of life of the entire community. Besides, the transfer of the debate from the regional to the State level removes the benefits of community-based planning.

Finally, news coverage of environmental issues, such as this water planning process, is highly problematic. The environment indeed only becomes interesting from a journalistic point of view when associated with events or conflicts (Miller & Parnell Riechert, 2000). Moreover the ‘scientific uncertainty [...] inherent to [...] environmental risks runs directly counter conventional news values’ (Hansen, 2000). Additionally, strategies and frames identified for each coalition in the news reports attempt to ‘gain public and policy-maker support’ (Miller & Parnell Riechert, 2000, p. 45). But reciprocally, the newspaper reports are subject to, and influenced by, local political events (Solesbury, 1976; Hansen, 2000) and political figures—for example, a local Member of Parliament was also Minister for Forests from 2003 to 2009. They also apply a filter to facts and quotations that distort community values. Accordingly, the results of this chapter need to be triangulated with the analysis of submission forms (Chapter 6) and of interviews (Chapter 7).

5.5. SUMMARY

The analysis of *The Border Watch* articles regarding the Lower Limestone Coast water allocation plan over its revision period mostly debates regulations concerned with the accountability of forestry's impacts on water. It delineated two significantly distinct phases in the transitions of water institutions of the region, corresponding to two policy aspects related to forestry's accountability. The first one, from June 2004 to July 2007 introduced the forestry expansion threshold to account for the aquifer recharge interception of plantations. The second one, from August 2007 proposed a forestry water licensing system to initially offset any water directly extracted by plantations in shallow areas, and was later extended to all forest types. Discourses and strategies of the involved stakeholders evolved to eventually form opposing coalitions, a proactive farming sector and a 'victim' forestry sector.

The process of change is driven by incentives, fitting the functional categories of Schmid's drivers of change (Schmid, 2004) and dominated mainly by environmental sustainability. Transition is, however, simultaneously obstructed, although in a lesser degree, by institutional barriers to change due to legal contexts that need to adapt to the novelty of the proposed forestry regulations. Finally, some factors with double influences (and in particular science) support the two opposed sectors, while local events (Penola pulp mill) add complexity to this process of change.

The social sustainability perspective helps however to uncover social considerations affecting the process of change. Despite the general lack of social sustainability considerations in the news reports, there are some references to its five principles. Among those, the fairness and community engagement principles received the most attention. The former is shared by both the farming and forestry sectors to frame their arguments but with different sub-elements (procedural & interactive versus distributive justice) leaving room for consensus. The latter is dominated by public consultations that are later contradicted by the transfer of the debate from the regional to the State level.

Finally, this news reports analysis is only one technique used in this research. The results need to be triangulated with the analysis of the submission forms and interviews that are presented in the next two chapters.

PERSPECTIVE OF SELF-SELECTED COMMUNITY MEMBERS ON THE DRAFT WATER PLAN

This chapter presents an analysis of the confidential submissions establishing the perspectives of some members of the community on the December 2007 draft LLC WAP. This analysis therefore provides a punctual outlook within this stretched out water planning review. First, practical details regarding the consultation processes and the submissions received are examined. Partial answers to the two research questions are then inferred from the contents of these submissions. Newly identified factors of institutional change are discussed and compared with those previously deduced from the news reports. Finally, the social sustainability perspective of the water planning development is refined, again based on the five recommended principles.

6.1. CONSULTATION ON THE INITIAL LOWER LIMESTONE COAST DRAFT WATER ALLOCATION PLAN: PRACTICAL DETAILS

The community consultation on the initial LLC draft WAP, organised in December 2007, was the fourth of the planning process (see Figure 5.1. in Chapter 5) therefore representing one step of what can be called a sequential consultation (Leroux et al., 1998). The South Australian *NRM Act 2004* prescribes only two compulsory community consultations for the development of a water plan (as detailed in section 4.3.2); however, the LLC WAP review was initiated under the previous *Water Resources Act 1997*, which called for four statutory consultations over the water planning period (sections 102 and 103). The SEWCM Board, and subsequently the SENRM board, decided to pursue the multiple consultations (SECWM Board, 2005; Brook & Poole, 2007).

This consultation is not one of the two statutory ones—it is named as A2 in the region as only A and B consultations are statutory—and thus could have its implementation adjusted to adapt to the local situation (Hamstead et al., 2008). However, a similar format to the statutory consultation was retained: public meetings and written submissions. At the time of writing, the last compulsory consultation—the B—on the final LLC WAP draft is still to be organised.

The analysis of the written submissions obtained for the A2 public consultation forms the basis of this chapter. Despite providing for confidentiality and enabling community members to discuss openly (Cook, 2002), written consultations are often seen as a minimum requirement for public participation (Ker Rault & Jeffrey, 2008) and involve a degree of tokenism (Arnstein, 1969). However, in this case three drop-in sessions and six community meetings with a total attendance of 45 and 166 persons, respectively, also accompanied the submissions (Appendix 6.1). Both submissions and meetings only provide information (Catt & Murphy, 2003) and both require low political power—or networking capacity—and low participant interaction (Pateman, 1970 in Syme & Sadler, 1994). Yet they are complementary, as the former represent an isolated act that is ‘unlikely to promote opinion exchange, consensus building, social learning or adaptive management’ (Ker Rault & Jeffrey, 2008, p. 246) while the later is a ‘collective act’ that enables exchange within the group and thus cooperation (Glenn, 2010).

The A2 consultation was done concurrently with a separate consultation on the Environmental Protection Zones (EPZ) around Water Dependent Ecosystems. On one hand, this may suggest a consultation ‘overload’ (Cook, 2002, p. 517) for the community, supported by the interview with SENRM Board Member 1 (see section 7.3.3.1). On the other hand, it favours the continuous involvement of the community over the planning period, confirming that consultation is a process rather than a onetime exercise (Cook, 2002; Ker Rault & Jeffrey, 2008).

6.1.1. The A2 Draft Lower Limestone Coast water allocation plan

Publication of the A2 draft LLC WAP (SENRM Board, 2007b) was notified in the local newspaper (*The Border Watch*, 27 November 2007, p. 12) to inform the community that copies could be collected from the SENRM board office or downloaded from the Board’s website. The draft included only the sections describing the rules regarding water management and lacked the background and monitoring sections. A series of information sheets was also published to explain the main changes.

Among the main changes the A2 draft LLC WAP introduced were details on the forestry water licensing system. In particular, forestry water licence will be requested for all new developments and given to existing plantations, despite the South Australian government initially proposed licences only to new plantations in shallow water tables areas. The difficult implementation of the forestry regulations in the Designated Areas (Border Agreement Zone) were however not mentioned, nor were the actual amounts of additional reductions that were needed to reach the agreed PAV in this zone. The latter was only mentioned during the community meetings.

A rapid examination of the A2 draft LLC WAP from a social sustainability perspective indicated that there was very little consideration of the social dimension of sustainability (Table 6.1). The community consultation principle is implicit in the LLC WAP as the final document resulting from the consultations, and only surfaces through 15 temporary discussion boxes; thus as potential themes for discussion. Likewise the mention of procedural justice is only tacit and fairness only appears through the distributional justice of the water resource. Finally, ‘the social, economic and environment needs of current and future generations’ objective reaffirmed in each section is the only reference to the quality of life principle. This objective might

also contribute to undefined social values of water in addition to the clear allocation of water for recreational, public supply and stock and domestic uses.

Table 6.1. Summary of social sustainability principles found in the A2 Draft LLC WAP

Principles	A2 Draft LLC WAP
Fairness	Equity in access to resources
Community engagement	-
Future focus	Flexibility, Future generations
Quality of life	Social needs
Social values of water	Social needs Recreational allocation Public water supply Stock and domestic use

6.1.2. Submission form

The submissions forms (see Appendix 6.2. for a reproduction of the submission form) were available at the consultation meetings and at the SENRM board office and website. They consisted of a four page questionnaire on the following themes (Table 6.2), with closed questions and a space for comments. Additionally, the questionnaire started with space for indicating possible overall agreement and disagreement with the draft plan, as well as a final section for other comments that were not related to the listed themes.

As shown in Table 6.2, a single question could relate to up to five discussion boxes in the draft plan. Forestry accountability concentrates the highest number of potential discussion points—while volumetric conversion, reductions to allocation and environmental protection zones attracted only two, one and one discussion boxes, respectively. Furthermore, one theme—transfers of allocation across management areas boundaries and water market—added in the submission form did not attract a discussion box in the draft plan. On the contrary, there is no question in the form consulting on the *Border Groundwaters Agreement Act 1985* discussion box in the draft plan. Finally, there was generally no reference to the draft plan so that people in the community could give their opinion without reading the full draft (with information provided only at the meetings and information sheets). In particular, the submission form did not remind two options listed in the draft plan in relation with water dependent ecosystems (WDE); however, a specific consultation on WDE and their associated environmental protection zones was held separately.

Table 6.2. Correspondence between the submission form and the draft plan

Themes in submission form	Discussion boxes in A2 draft plan
No further allocation of water	1. Reason behind this choice
Volumetric conversion of allocations	1. Temporary basis for delivery component 2. Temporary basis for specialised production requirements
Bridging volumes	1. 20% reduction each year over 5 years
Industrial plantation forests and farm forestry	1. Who will get the forestry water licence 2. The development approval 3. NRM Act 2004 amendment 4. Impact assessment for new plantations 5. Farm forestry in over-allocated management areas
Environmental protection zones (EPZ)	1. Preferred options for EPZ
Transfers of allocations across management area boundaries	-
Reductions to allocations	1. Only on the additional reduction in the designated area (Border zone regulated by the Border Groundwaters Agreement 1985)
Confined aquifer	1. Temporary basis for delivery component 2. Temporary basis for specialised production requirements 3. 20% reduction each year over 5 years 4. Kingston management area over-allocation

6.1.3. Submissions

6.1.3.1. Reception

Sixty-five submissions were received from the 4th of December 2007 to the 11th of February 2008 with a peak close to the deadline (21st December 2007) and another when the SENRM board reopened after the end of year break in early January 2008 (Figure 6.1). This response is relatively very high compared to a similar A2 consultation for the neighbouring Tatiara WAP, which attracted only 16 submissions, even though a comparable number of people attended the associated meetings (190 versus 211 for the LLC WAP). This suggests a greater degree of disagreement on the draft plan proposed in the LLC WAP as higher participation is usually expected for local—such as the small Tatiara prescribed wells—compared to regional consultations—like the larger Lower Limestone Coast region (Syme et al., 1991).

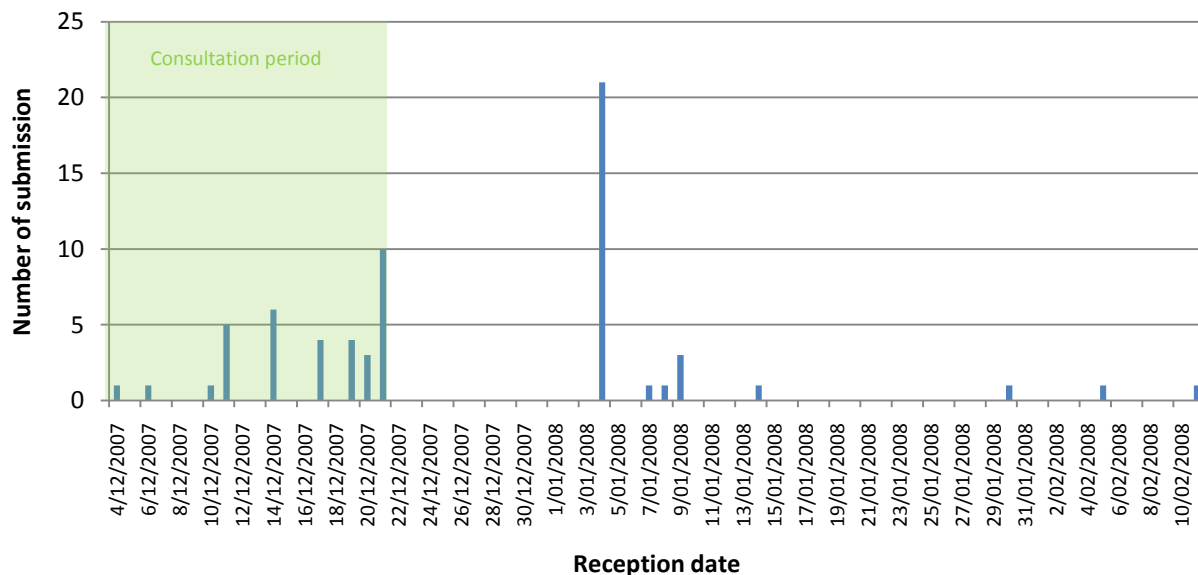


Figure 6.1. Distribution of A2 submissions' receipt over the consultation period

The A2 consultation period ended formally on the 21st of December 2007, but was informally extended as a significant number of submissions were received during the end of the year break period (from Saturday the 22nd of December 2007 to Sunday the 3rd of January 2008). The consultation actually closed in February 2008 with the last submission received on the 11th of February 2008. With the public notice published on the 27th of November 2007, the formal consultation period lasted less than a month. Its informal extension only partially lifted its time constraint (Syme & Sadler, 1994; Buchy & Race, 2001) as will be shown by some complaints in the submission (see section 6.3.3). This extension created confusion in the government, as the invitation to participate in the consultation by Minister Gail Gago in mid-February 2008 was later held against her (*The Border Watch*, 15 February 2008, p. 9).

The mode of submission (Table 6.3) and its format (Table 6.4) were unrestricted to allow for wider participation.

Table 6.3. Mode of submission

Submission mode	Number of submissions
Fax	11
Email	8
In person	2
Post	44

Table 6.4. Submissions format

Submission format	Number of submissions
Form	42
Form + additional document	4
Letter	19

An overwhelming majority of the submissions were forms sent by post. Fax and email modes represent less than one third of the submissions and were mostly favoured close to or after the deadline. Form format eased participation to the consultation for most individuals.

6.1.3.2. *Length*

Submissions contained between 10 and 13 861 words with a total of 87 352 words. Figure 6.2 shows their cumulative length per reception date. Letters tended to be longer—from 85 words up to 13 861, with an average of 3 533 words—than forms—from 10 words up to 2 132, with an average of 440 words.

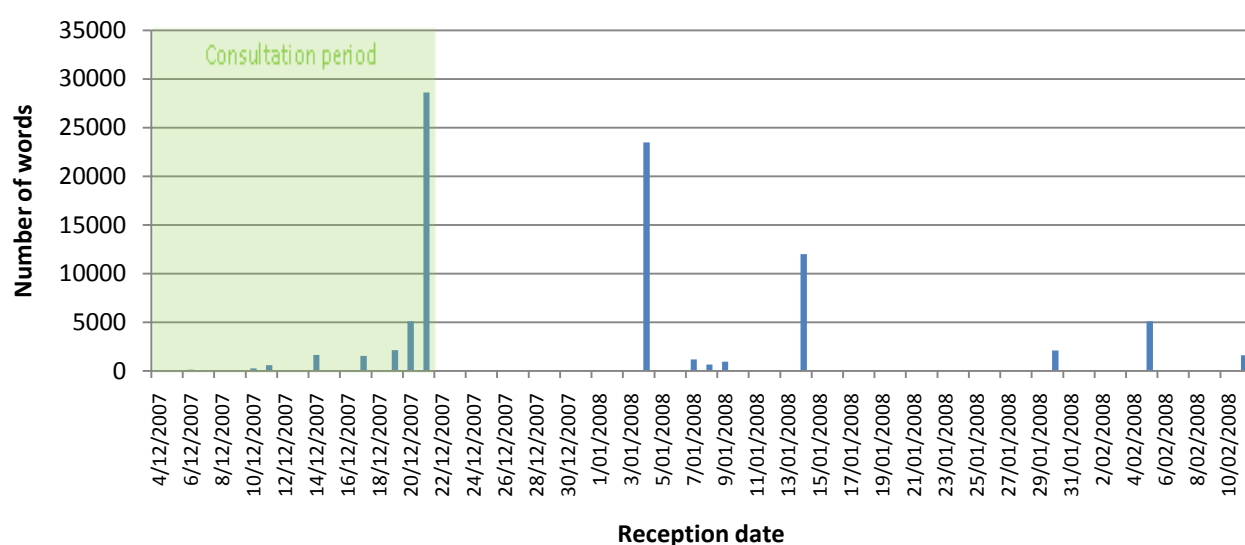


Figure 6.2. Submissions’ cumulative length per reception date

6.1.3.3. *Respondents*

Personal information of the respondents remained confidential but information within the submission enabled classification of respondents according their industry of employment into either forestry or non-forestry (Table 6.5). That division is based on the coalitions evidenced in the previous chapter at that stage of the planning development. This finding from Chapter 5 is indeed supported by the reception of one specific coalition submission—Submission 31—originating from a group of forestry companies.

Table 6.5. Classification of submissions per respondent group

Respondent groups	Number of submission	Submission format (Proforma/letter)	Number of words	Submission mode (Email/fax/post/in person)
Forestry	10	1/9	55 355	5/0/4/1
- Companies	7	0/7	27 675	4/0/2/1
- Government	2	1/1	15 441	0/0/2/0
- Joint coalition	1	0/1	12 239	1/0/0/0
Non-forestry	55	45/10	31 997	3/11/40/1
- Individuals	48	42/6	19 712	2/10/36/0
- Government	2	0/2	7 596	0/0/1/1
- Associations	5	3/2	4 689	1/1/3/0
TOTAL	65	46/19	87 352	8/11/44/2

Note: Non-forestry associations includes federations, unions, clubs, management committees and associations, but are not coalitions of stakeholders from various industries.

Additionally, it is worth noting that four government entities (Departments or State-owned companies) submitted their opinions: two from the forestry sector and two from the non-forestry sector. This suggests a difficult position for the South Australian government regarding the development of this LLC WAP as on the one hand it prompts an informed WAP review that would integrate forestry for accuracy of the water budget, but in contrast, it has its own companies potentially negatively affected by the A2 draft proposed regulations (see section 7.3.2.2).

The first striking result shown in Table 6.5 is the disproportionate number of words originating from the forestry industry. Seven out of the ten foresters' submissions had more than the average number of words and, in particular, the four longest (6 052, 12 023, 12 239 and 13 861) resulted in a total of 55 355 words from forestry, i.e. 63 per cent of the total from only 15 per cent of the submissions. Their preferred method of submission was independent letters or documents that focused only in their areas of concern rather than on the proposed submission form. This confirms the selective influence of the communicative skills needed from respondents of written submissions, compared to oral consultation, and its subsequent limited representativeness (Buchy & Race, 2001; Ker Rault & Jeffrey, 2008). An over-representation of influent voices or active members of the community (Cook, 2002) also distorts the opinions obtained. A limited number of big forestry companies have indeed greater communicative powers than a myriad of farmers, even very 'land literate' farmers as the majority of them are (Campbell, 1995), because of the

resources available to them. As a result of this unbalance, the analysis of these written submissions may tend to over-represent the forestry perspective. The greater number of submission from the non-forestry sectors was however compensated for by their relatively short contributions in comparison with the extended submissions from the forestry industry.

Individual respondents (48, all from non-forestry) were mostly from the region either from rural areas (73 per cent) or the regional centre (19 per cent). Only one respondent came from another part of South Australia with another from Victoria State, but in the Green Triangle plantation region (Figure 6.4). There was also a strong imbalance in favour of male respondents (Figure 6.3) confirming the lower participation of women in natural resources management debate (Buchy & Race, 2001).

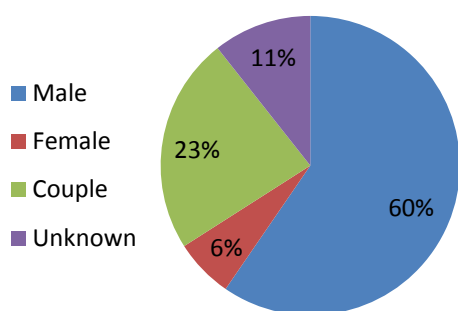


Figure 6.3. Gender of individual respondents

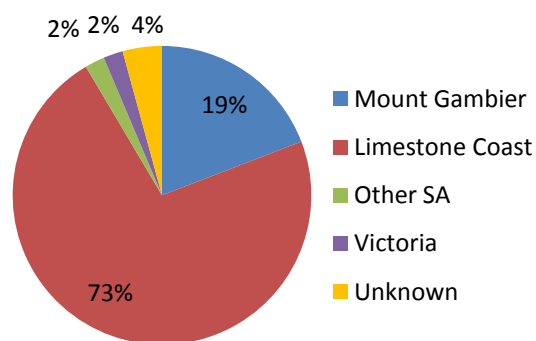


Figure 6.4. Origin of individual respondents

6.1.3.4. Themes

As a result of the number of discussion boxes on forestry in the LLC WAP, the forestry accountability predominates the debates on the volumetric conversion, the reductions to allocations and the water dependent ecosystems (Figure 6.5 and see also an analytical coding tree in Appendix 6.3). This supports the view that forestry regulations are the most controversial change, as was also evidenced in the analysis of new reports in Chapter 5. That high controversy arises because of the novelty the changes introduce in Australia's water management regimes (Hamstead et al., 2008). This is also consistent with the forestry sector's 'over-representation' in the

submissions, as discussed in the section 6.1.3.3 (63 per cent of the submissions words arise from the forestry industry in Table 6.5).

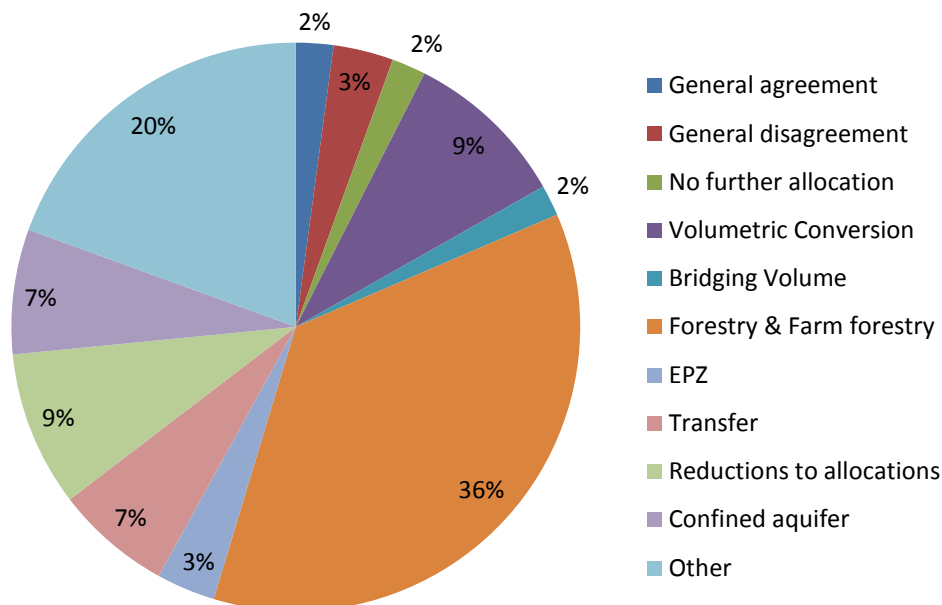


Figure 6.5. Themes discussed in submissions (percentage of length)

A word count of the submissions (Table 6.6) also validate that the forestry debate prevails within the 65 A2 consultation's written submissions.

Table 6.6. Word frequency

Change	Word (frequency)	Word rank
Forestry accountability	Forestry (596)	4 th
	Forest (524)	8 th
	Plantation (514)	9 th
Volumetric conversion	Volumes (221)	38 th
	Volumetric (178)	54 th
	Conversion (184)	51 th
Reduction of allocation	Reduction (183)	52 nd
Water dependent ecosystems	EPZ (156)	68 th

Furthermore, although forestry accountability (and farm forestry) is the main issue for stakeholders from the forestry and non forestry sectors, the remaining themes are not discussed to the same length by those two stakeholders (Figure 6.6).

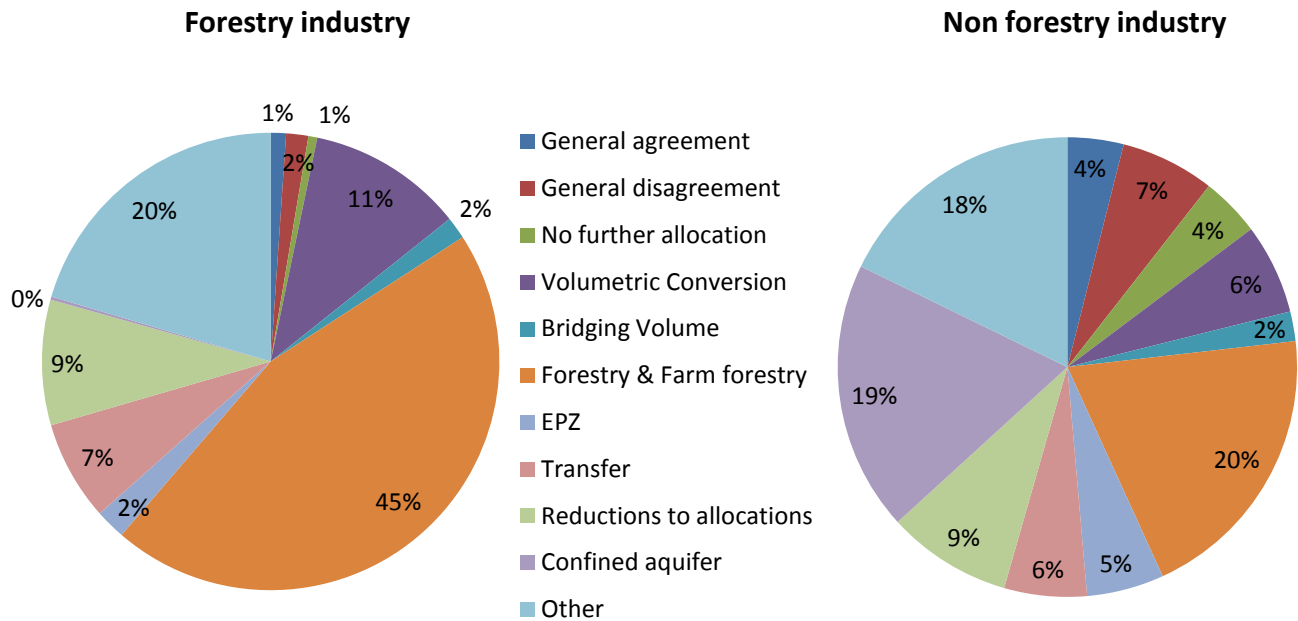


Figure 6.6. Submissions' themes distribution for forestry and non forestry industry

Assuming that submissions made by public participation challenge the decisions regarding water allocation (Tan, 2006), the forestry regulations proposed in the A2 draft LLC WAP are more problematic for the forestry industry than for the rest of the community. Forestry accountability reflects the peculiarity of wicked water problems (Freeman, 2000): it is considered by the farming community as solving (at least partially) water depletion in spite of troubling the forestry industry. The forestry regulations proposed in the draft LLC WAP thus reflects more closely the non-forestry community view.

Another significant contrast between forestry and the rest of the community lies in the confined aquifer, mostly used for industry and public water supply. The forestry industry did not comment (or at a limited length that represents less than one per cent) the proposed confined aquifer regulations. The forest plantations are not expected to have any impact on the confined aquifer due to its depth (see section 4.4.2). Most of the recharge flows from Victoria State (South Australian Government, 2000) therefore this deep aquifer is not dependant on rainfall interception by forests nor accessible for their direct extraction. The community, relying on this aquifer for its drinking water supply, is more interested in its sustainable management.

The reductions to water allocations theme represents 9 per cent of submissions by both industry groups. Most submissions refer to distributional justice with various

perceptions of what would comprise a just distribution of the cutbacks; this will be discussed later in this chapter (see section 6.3.2.1).

On the contrary, volumetric conversion appears to be more disputed by the forestry sector than the rest of the community in spite of that sector not being directly affected by it. This is consistent with the great involvement of the farming community in the volumetric conversion project (DWLBC, 2006c). The forestry industry however strongly claims that this process was very generous towards the irrigators:

While the irrigation sector will undergo significant changes if the Draft WAP is implemented, the plantation forest industry considers that irrigators have been treated very generously under the volumetric conversion process (Submission 31).

The 2004 total allocation was estimated around 500 000 ML, while the A2 draft LLC WAP anticipates a total indicative allocation of 696 652 ML per year, representing an approximately 40 per cent increase (Table 6.7), due to the volumetric conversion. As a matter of comparison, the volume used by forest plantations in the region is estimated to be around 300 000 ML per year (SENRM Board, 2010a).

Table 6.7. Evolution of the volume of water allocated from the unconfined aquifer from 2001

	2001	2003/2004	2004	Estimated volumes after volumetric conversion
Allocated volume (in ML)	470 852	481 807	500 108	696 652

Sources: (SECWM Board, 2001d, c, b, a, 2005; DWLBC, 2006b; SENRM Board, 2007b)

However, because some elements of the conversion will be granted upon request, volumetric conversion creates uncertainty over the actual final volume of water licensed.

The ‘others’ theme representing one fifth of the submissions, includes issues that were not directly invited by the SENRM board and will be discussed in the next sections.

6.2. PROCESS OF CHANGE

Similar to that in the previous chapter, this section analyses the factors influencing the water planning development and introduction of changes in the LLC WAP. Figure 6.7 displays the relative significance and direction of these factors in the submissions, as well as specifically for the forestry and non-forestry sectors.

The profusion of technical and scientific details compared to the news reports, resulting from a dialogue between experts and interested stakeholders, enables a refining of the previously identified factors of change in Chapter 5, in particular the barriers to change. Indeed, barriers to change significantly prevail over drivers of change in the submissions (Figure 6.7), in contrast to that in the news reports. This is however consistent with the high portion of barriers appearing in the December 2007 news report, and supports the idea that submissions originate from stakeholders inclined to have dissonant opinions (Tan, 2006). The higher occurrence of barriers in the submissions of the forestry sector, as against non-forestry sectors, confirms the findings in Figure 6.6 that the A2 draft LLC WAP tends to convey perspectives approaching those of the non-forestry section of the community.

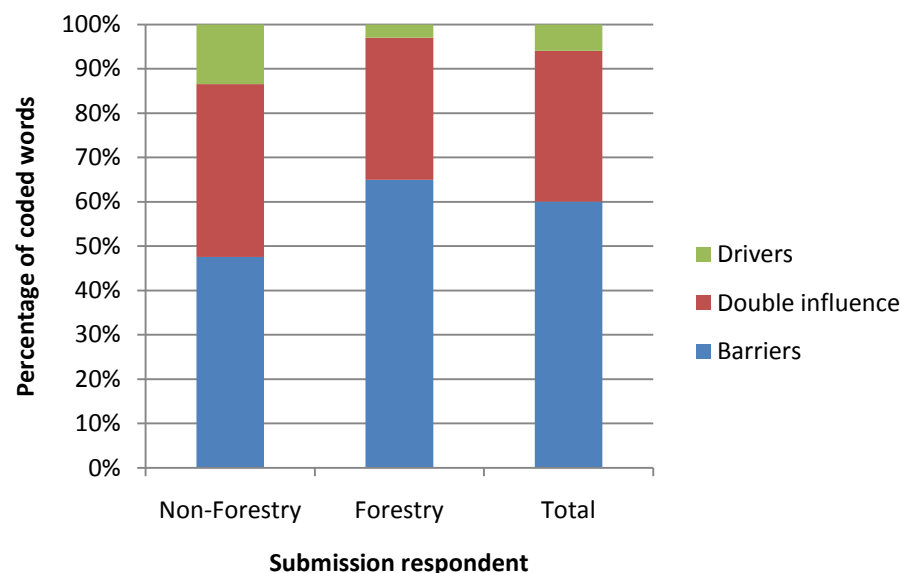


Figure 6.7. Factors influencing the water planning process

The following sections therefore concisely examine the drivers involved in the water planning process according to the submissions, before exploring in greater length the barriers to change. The new factors and the differences from those identified in the previous chapter on newspaper reports are especially emphasised.

6.2.1. Functional drivers of change

The drivers of change identified in the submissions mostly validate those determined from the news reports presented in Chapter 5. They are invariably functional, although simplified with a reduced number (Figure 6.8 and Figure 6.9).

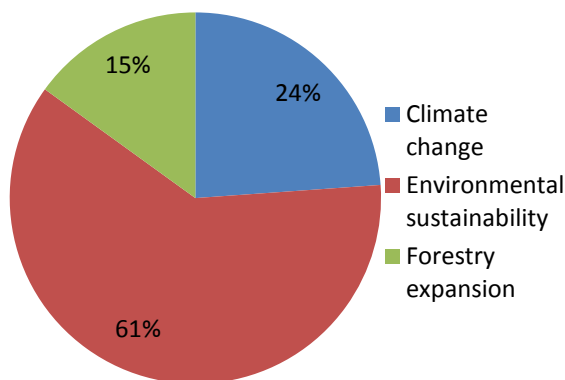


Figure 6.8. Drivers of change

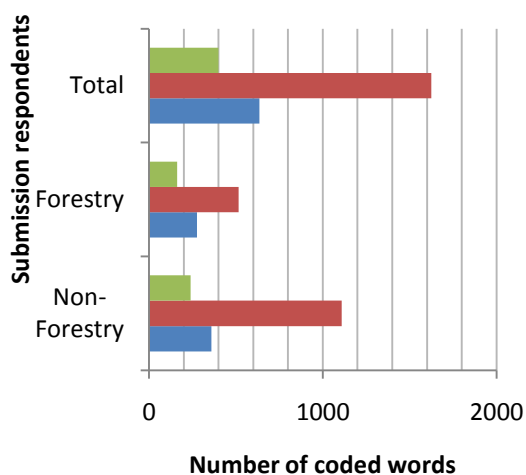


Figure 6.9. Drivers of change per industry

Environmental sustainability remains the most important single driver of change, and was mostly mentioned by the non-forestry sector. Climate change in the submissions expands the water shortage driver, representing a substantial evidence of climate change, on which news reports focus through reporting on events (Miller & Parnell Riechert, 2000) such as a new water table decline.

Compared with the previous identified drivers, the forestry impacts did not intervene in the December 2007 consultation. Even though their extent remains debated (under scientific debate), they are not questioned anymore. These findings are consistent with those of the previous chapter (Figure 5.9), which showed a decreasing frequency of this driver in the news reports in the second phase. Finally, it is interesting to note that three factors—accountability, over-allocation and security of allocation—identified as drivers in the news reports became double influence factors in the submissions. This shift results from the new barriers of change that question the accuracy of the water budget and subsequently its accountability and the estimated over-allocation, potentially jeopardising the security of the water allocation. They will be further discussed in their corresponding section (6.2.3).

6.2.2. Institutional and functional barriers to change

Barriers to change predominate in the submissions and refine significantly the previously identified factors (Figure 6.10). While the institutional barriers still exist, they are dominated by functional barriers that can be classified into two types:

- Internal barriers that relate to claims that the A2 draft LLC WAP malfunctions and is incoherent and
- External barriers that relate to elements that have not been integrated for the development of the water plan.

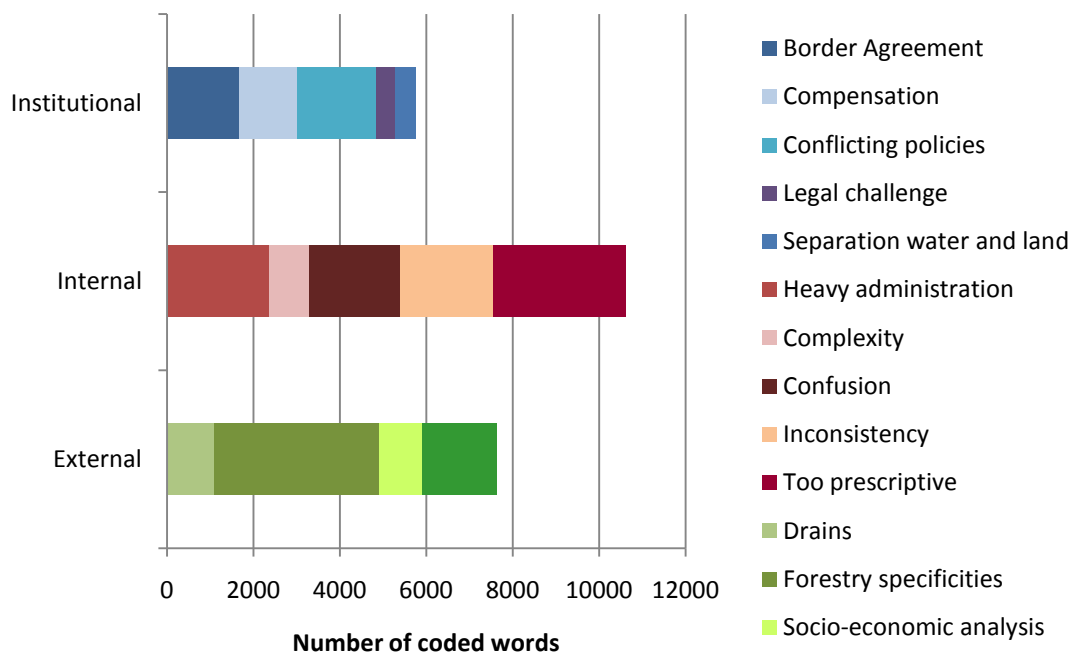


Figure 6.10. Barriers to change

6.2.2.1. Institutional barriers

The institutional barriers displayed in Figure 6.11 present some similarity with the already identified institutional barriers, but are combined with two other significant barriers: the compensations claims and the Border Agreement.

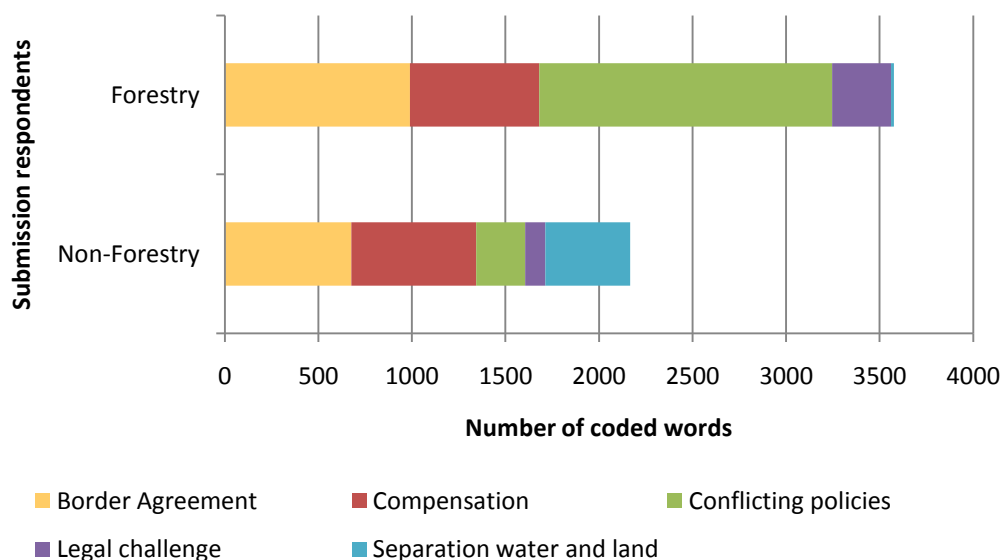


Figure 6.11. Institutional barriers of change according to the submissions' respondents

The 'separation of water from land title' barrier was included in the wider 'rainfall entitlement' barrier that prevailed among barriers in the December 2007 news reports (Figure 5.10). Despite being an argument against forestry changes in the news reports, it is here only voiced by the non-forestry stakeholders. The separation of water from land title was a pre-condition for the introduction of the water markets in 1994 in Australia by the National Water Reform (CoAG, 1994). The 'legal challenge' and 'compensation' barriers strengthen the 'conflicting policies' barrier and form a critical potential outcome of these institutional inconsistencies:

The plan or forest water allocations granted could be challenged, on the basis that the plan when consulted on was inconsistent with the Act (Submission 63).

As a case in point, a lawyer foreseeing the legal actions that the LLC WAP could attract sent in a submission (Submission 17) on behalf of one water licensee. This brings to reality the compensation claims anticipated from the news reports. However, in the submissions, such claims do not originate only from the forestry sector regarding the forestry water licensing system. The agricultural sectors also demand compensation for EPZ-affected landowners that will benefit the whole community and for reductions to water allocations. The *NRM Act 2004* does not envisage any compensation regarding change done to water allocations during the water planning process (see section 2.2.1.3). But as was stated in one submission:

Though it isn't required by legislation, lack of any talk of compensation. [...] It being legal to do it doesn't make it right (Submission 20).

Reference is also made to a buyback system, famous and controversial in the Murray Darling Basin (Freeman, 2005; Grafton & Hussey, 2007; Crase et al., 2009a), and to non-monetary compensation—water allocations in other WMAs for EPZ affected landowners—to compensate for the loss of partial water allocation or restrictive conditions for its extraction in favour of the environment. Obviously, the security of the water right backs these claims, which will be discussed in the section 6.2.3:

Water licences have been made a tradeable property right and for them to be removed without compensation is wrong (Submission 20).

The Border Agreement (South Australian Government, 1985), despite not being referred to in the questions of the submission form, received strong remarks. This inter-State agreement (see section 4.3.1) influences both the forestry accountability and reductions to water allocation changes:

The proposal cannot be implemented in the Border Hundreds where the Groundwater (Border Agreement) Act, 1985 overrides the WAP and the Natural Resources Management Act, 2004 (Submission 31).

X is concerned that the current Border Groundwaters Agreement lags behind this initiative in that it does not recognise forestry (Submission 35).

The cross border reduction of 33% on top of the 13% will cripple our industry (Submission 18).

As the previous quotation from Submission 31 evidences, the Border Agreement is believed to be outdated and ‘wrong’ (Submission 15) and therefore constitutes one of the main issues to solve: ‘Most importantly we need to win the cross border water sharing agreement argument’ (Submission 19). However, discussion between the SENRM board and the Border Groundwaters Agreement Review Committee regarding the neighbouring Tatiara WAP (not concerned with forestry regulations) did not overturn the anticipated reductions to water allocations (SENRM Board, 2009f, g).

6.2.2.2. *Internal barriers*

Internal barriers are specific of the A2 draft LLC WAP and therefore do not apply to the whole water planning development, but only to this specific proposal. Owing to their great number and weak representativeness, practical details are not described here. However, problems associated with the water regulations proposed in the A2 LLC WAP can be classified into five types as displayed in Figure 6.12.

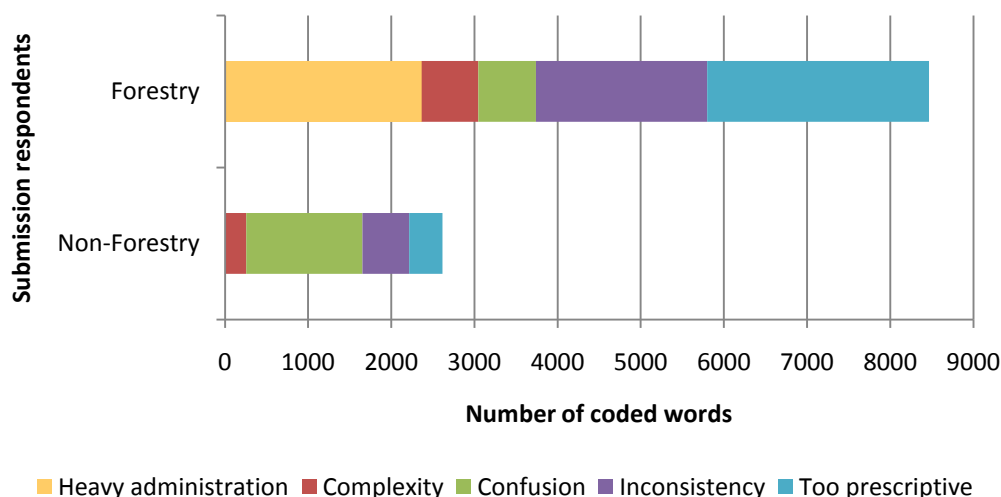


Figure 6.12. Internal barriers according the submissions’ respondents

The cumbersome administration of the proposed system was criticised only by the forestry sector. This perception might be related to the forestry recent introduction to the system. The related criticism of prescriptive regulations was however shared by all stakeholders, even though it remained more important among foresters. The main reproach from the non-forestry sectors concerned the confusion created by the plan. Farmers, constituting most of these respondents, do not usually have the resources—time, expertise or funds—available to devote to the study of the plan that would further its clarification (Ingram et al., 1984). Moreover its administrative wording may have been difficult for the non-expert (SENRM Board Member 1, 2009; SENRM Board Member 5, 2009).

Inconsistencies and confusions can be corrected based on these consultations comments and, with the help of a companion guide that would clarify the complicated points as was done in the 2001 WAP (SECWM Board, 2001a) and suggested in one submission:

An explanatory guide for the WAP is developed and used during the B consultation to assist the community in understanding what is in the plan and the intentions of the principles (Submission 63).

However it would take a redesign of the system to amend the plan in order to simplify it, make it more flexible or easier to implement.

6.2.2.3. External barriers

External barriers relate not only to the specific A2 draft LLC WAP proposal but also more generally to the planning development where they have not been considered. Four of them surface regularly in the submissions: drained water, water management areas' boundaries, forestry specificities and the absence of socio-economic assessment (Figure 6.13).

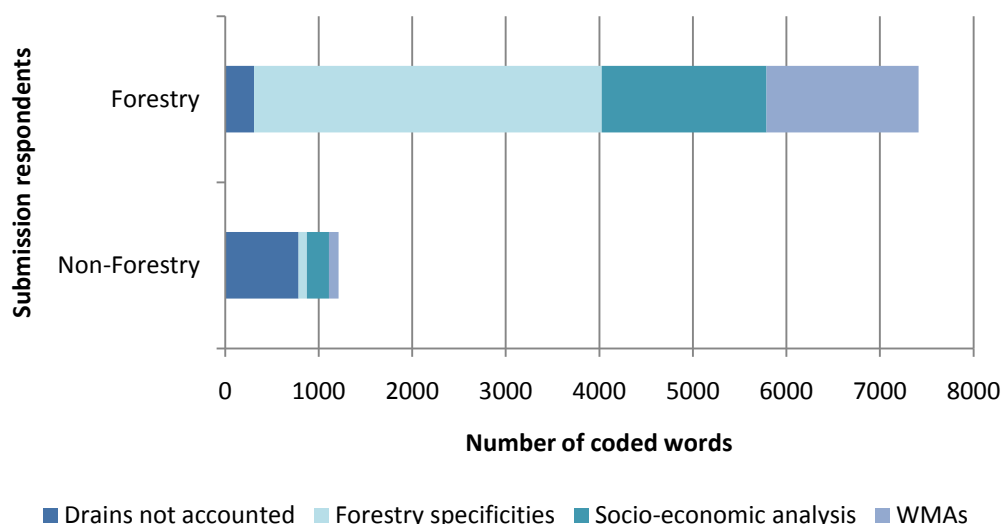


Figure 6.13. External barriers according the submissions' respondents

Drainage exacerbates water table declines by directing the aquifers' water to the sea and therefore needs to be included in the water budget. Indeed, the South East Water Conservation and Drainage Board, governed by the *South Eastern Water Conservation and Drainage Act 1992* (South Australian Government, 1992), manages 1 780km of drains and 1 200 associated structures (South Australian Government, 2000). These large-scale drainage schemes, constructed from 1864 made agriculture possible on previously temporarily inundated areas (South Australian Government, 2000; SECWM Board, 2005). However, the A2 draft LLC WAP does not encompass this amount of drained water in its water budgeting:

The use of drains to intercept and remove ground water in SE South Australia also seems to meet the definition of a significant interception activity. Drainage has been ignored in the Draft WAP despite its very significant impact on the overall water equation (Submission 31).

A more comprehensive and inclusive water allocation approach including rainfall as the main driver, but including also drains (Submission 54).

This is despite integrated water resources management and the surface and groundwater connections that impress on managing them together (Technical Advisory Committee Global Water Partnership, 2000):

X considers that surface flows and drainage should also be considered under the NRM Act, not as separate Acts exempt from the WAP (Submission 54).

That theme was particularly acute among the stakeholders during the A2 consultation because of the REFLOWS project aimed at restoring fresh water flows from the Lower to the Upper South East for fragile wetlands. A related consultation was to be held in early 2008 (DWLBC, 2008), at which an active coalition voiced concerns (Stop the drains coalition, 2007).

While drainage accountability is mainly a demand of the non-forestry sector, the boundaries of the current Water Management Areas (WMA) based on cadastral limits are mostly contested by foresters (see section 4.4.4.2 for WMA's limits definition and map in Figure 4.8). Current WMAs are also against integrated water resource management recommending the use of catchment as the unit of management of the resource (Technical Advisory Committee Global Water Partnership, 2000). Despite their review being identified in the LLC WAP Concept Statement (SECWM Board, 2004), DWLBC recommended to maintain the current WMAs for this new water plan (DWLBC, 2006b). However, there is dispute within the submissions whether first to change the delineation of areas or to address over-allocation through reductions to water allocations:

The Draft WAP requires actions by forestry in the current management areas even though new hydrogeological zones will be implemented later. The concept of balancing each hundred before implementing new zones is illogical (Submission 31).

However, the main criticism of the forestry sector regarding the accuracy of the A2 LLC WAP concerns specificities of forest plantations that were been taken into account while designing the forest water licensing system. Those specificities are listed in Table 6.8.

Table 6.8. Specificities of forest plantation claimed by foresters as not integrated into the forest water licensing system

Forest specificities	Submission number
Natural adaptation to drought and instant economic penalty	22, 31, 34, 52
Long rotations that do not fit WAP review nor temporary trading timeframes	31, 34, 36, 52, 54
Change of rotation length to supply a constant volume of wood (but temporary licences for fixed length)	34
Cost of relocation, maintenance of clearings and reinstalment	22
Forestry diffuse water extractor	36

Note: See Appendix 6.4 for list of submission number per industry group.

Most of these claims are nevertheless relevant to interactive justice when compared to agricultural water licences:

In fact we believe that the inclusion of existing plantations is inappropriate and unfair due to the contrasting properties of forestry water use and forestry water management compared to irrigation water use and irrigation water management (Submission 22).

These specificities will be further discussed in section 6.3.2.2.

Finally, a last element claimed to be missing in a comprehensive water plan is a socio-economic impact assessment. This absence of impact assessment supports the economic threats that were identified in the news reports. However, the difficulty to appropriately use those assessments that are usually partial and suggest only trends (Crase, 2010), explains their absence (SENRM Board Member 9, 2010). Furthermore, from a planners' perspective, community committees and consultations are commonly employed as socio-economic assessments in the Australian water planning (Baldwin et al., 2008).

6.2.3. Double influence factors

As with the barriers to change just examined, double influencing factors are here refined. However, these factors are used to back both agreement and disagreement on the A2 draft LLC WAP. Submissions pinpoint additional factors, but they also allow binding of some factors to specific stakeholders (Figure 6.14). In particular, the 'retrospectivity' factor is explicit only within the forestry's submissions (Figure 6.15), despite backing the farmers' view to share the water allocation reductions (see section 6.3.2.1). Science also significantly prevails in the forestry sector and includes

the rejection of the deemed rates of tree water use, which were presented as the only result of the facilitated forestry stakeholder process (see section 5.1.4.1):

Such analysis is likely to confirm the current highly precautionary ‘deemed’ extraction assumptions are gross over estimates (Submission 31).

The deemed plantation recharge interception and groundwater extraction rates are not those agreed by industry. [...] Therefore, the rates proposed for the draft WAP have not been validated by any process of scientific review (Submission 34).

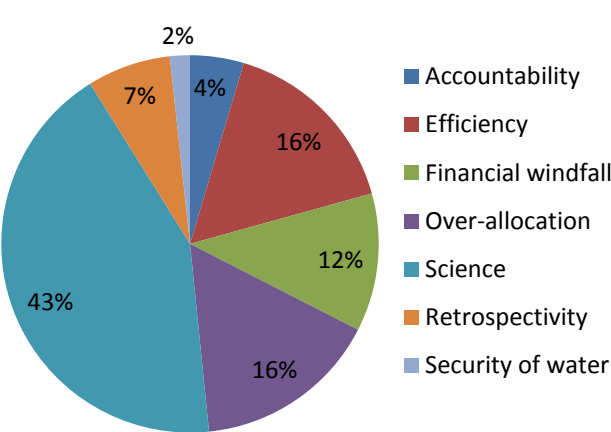


Figure 6.14. Factors having a double influence

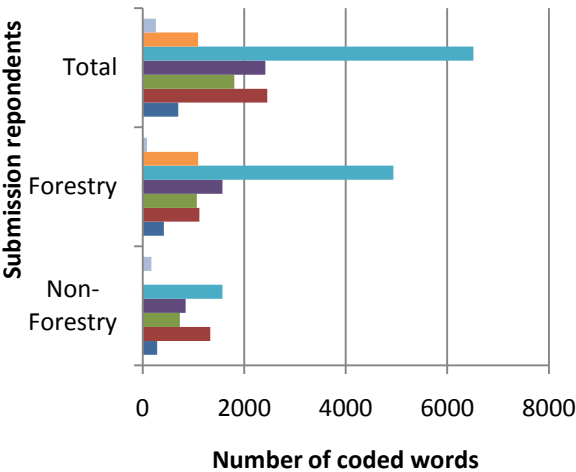


Figure 6.15. Factors having a double influence per industry

6.2.3.1. Accountability and efficiency

Accountability previously classified as driver of change from the news reports, became in the submissions, a barrier to change due to external barriers that were not considered in the water budget and in the planning process generally, as detailed in the previous section 6.2.2.3.

Efficiency on the contrary is a significant argument—based on economic grounds and conveys the view that previous irrigation methods were backward (Molle et al., 2009)—used in the Australian water reform (CoAG, 1994, 2004a) for water reallocation and was agreed upon by all stakeholders. However, while the volumetric conversion itself is perceived as promoting water efficiency, in particular through metering, some of its practical implementation details are strongly criticised for not achieving efficiency; for instance, the granting of delivery entitlements based on the 75th percentile rather than on best practices would provide more water than most farmers need.

The efficiency and accountability rationale of the water reform:

75% of existing irrigators to continue current practice under the new system, with little or no encouragement to achieve higher efficiency of water use (Submission 54).

Forestry reduction or relocation to address over-allocation is also considered highly inefficient due to the costs of relocation and maintaining fallen pieces of land that were previously planted.

6.2.3.2. *Financial windfall*

On the one hand, the non-forestry sectors can potentially make huge financial gain from their early entry in the water market:

A potentially huge financial windfall to those who already have allocations by creating new and powerful entrants to the water market) forcing up demand and the value of water allocations (Submission 22).

On the other hand, under the A2 draft LLC WAP the forestry sector will be given free water licences for their existing plantations, representing up to one third of the total water allocations in the region (SENRM Board, 2010a):

Plantation forestry companies must compensate the community for their adverse impact on the environment, not be rewarded at the community's expense (Submission 1).

However, the complex issue of deciding which entity is to receive a forestry water licence divides the forestry coalition. Alternatively, the forest developer, the landowner and the plantation manager have been proposed as the recipient. Along with the retrospectivity issues, this point is contentious enough to generate legal challenges.

6.2.3.3. *Virtual over-allocation*

As a result of the inaccuracy of the water budget, some stakeholders question the actuality of the over-allocation and suggest it is an unsubstantiated or virtual over-allocation (Table 6.9).

Table 6.9. Virtual over-allocation claims

Virtual over-allocation	Submission
‘The combined impact of these decisions is to cause <u>“on paper” over-allocation</u> in some water management areas’	31
‘Given the severity of the <u>alleged over-allocation</u> [...]’	
‘In Coles, Short and Zone 3A, the lack of process transparency is demonstrated by the <u>continual claims of water over-allocation</u> without any data being provided [...]’.	34
‘ <u>Over-allocation is theoretical</u> therefore it needs to be backed up by data [...]’.	40
‘[...] more concerned about unsustainable over use at a localised scale than <u>theoretical over-allocation</u> at a management unit scale’.	52
‘Recharge estimates and water use calculations that are transparent and auditable are necessary to define both current water use and the extent of any <u>potential over-allocation</u> issues’.	54
‘Alignment of water management boundaries to hydro-geological boundaries may alleviate many <u>perceived over-allocation</u> issues’.	
‘The <u>notional over-allocation</u> may be addressed but it will not provide any more water to those irrigators who have large blue gum plantations to their east [...]’.	62

Note: Author’s emphasis

Corporations, mainly from the forestry industry, express the sharpest attitudes towards the theoretical concept of over-allocation, which is perceived as an evolving notion dependant on the accuracy of the water budget (drains, WMAs) as well as on the quality of data used to support decisions and on the amount of water that is actually used (over-allocation versus over-use). Finally, volumetric conversion that may change the actual volumes extracted can also influence the over-allocation claims. Individuals also clearly questioned over-allocation, but based on their field experience, and suggest that the original allocation arose from government grants.

Indeed, the changing nature of the limited extraction volume, against which is set over-allocation and that has borne four different labels since 2001, may support the idea that over-allocation evolves and may not be valid. Prior to the 2001 WAPs, the extraction volume was named Permissible Annual Volume (PAV, and still used in the Designated Zone), then changed into Volume for Licensed Allocation (VLA) to account for non-licensed uses—stock and domestic use for example—(SECWM Board, 2005) and reviewed in 2007 as Total Available Recharge (TARd) to provide for a 10 per cent recharge rate for environmental needs and to account for deep drainage (d) (SENRM Board, 2007a). Finally, in 2009 the Target Management Level

(TML) was introduced for easier correspondence with the various elements of the volumetric conversion (SENRM Board, 2009e). This extraction volume is in fact scheduled for regular review in order to reflect changing climatic and aquifer recharge conditions (Young, 2005), which proves the flaws in the current water budgeting methods. Indeed, it allows land use change, and in particular forestry expansion, to the detriment of the available water for other consumptive uses (Department For Water, 2010). Similar debate about the sustainable diversion limits occurred in the Murray Darling Basin (Cruse, 2010).

Additionally, the lack of a remedial pathway to address over-allocation in areas where trigger levels have not been exceeded in the A2 draft LLC WAP may reinforce the perception of virtual over-allocation—average water table decline less than 0.1 m/year or a salinity increase less than 10 mg/L/year measured over the preceding five years (SENRM Board, 2007a). This is in line with the existing over-allocation that was not addressed in the 2001 WAP and was even exacerbated by the planning process with new licensing occurring in 2002, including licenses in fully allocated areas (SECWM Board, 2005). However, a current undertaking to reduce water allocation would lessen economic impacts on irrigated agriculture compared with that of a later reduction in water use (EconSearch, 2008).

Finally, the attitude that considers over-allocation as virtual is correlated to the refusal of implementation of the proposed reductions. Proposals to solve these divergent views include delayed such reductions so that they would be implemented only after the volumetric conversion has been finalised for more informed data, or after the WMAs change for hydrological consistency; both would be detrimental to the environment.

6.2.3.4. *Security of water rights*

The ‘security of allocation’ driver from Chapter 5 becomes in the submissions a double influence factor and is stepped up to ‘security of water rights’, integrating the underlying ‘unbundling’ of water rights (Shi, 2006; Watermark Australia, 2007). The water access entitlement—one of the four separated instruments attached to the old single water licence, along with water allocation, water resource works approval and water site use approval—secures a personal and firm property right to existing licence holders, and backs the compensation claims emerging in the submissions. This is despite water allocation, as a share of the resource, can vary depending on the

water available (Young & Hatton MacDonald, 2000). This new unbundled system was agreed upon under the NWI and is now implemented in Victoria and New South Wales States. In South Australia, the *Natural Resources Management (Water Resources and other matters) Amendment Act 2007* (South Australian Government, 2007a) enables water rights reforms and the River Murray is the first NRM region to test the system (DWLBC, 2009). The LLC WAP revision started with the objective to convert hāE water licences directly to shares of the resource (SECWM Board, 2005). However, the unbundling of water rights was later postponed to the next LLC WAP review (SENRM Board, 2007a), but the outstretched LLC WAP revision may provide an opportunity to include it sooner (SENRM Supporting Official 3, 2010).

6.2.4. Changes as drivers

Although the four main changes proposed in the LLC WAP initially seem independent (see section 5.1.2. for a reminder of those changes), some submissions suggest strong correlations between volumetric conversion and reductions to water allocation on one hand:

It would appear totally illogical to allow liberal volumetric conversion allocations in the first instance, then immediately cut them due to over-allocation or trigger issues (Submission 54);

and between reductions to water allocations and forestry regulations on the other hand:

All water allocation reductions need to be shared equally between irrigators and forestry (Submission 18).

The assumption behind the first correlation is that the generous volumetric conversion prompted reductions to allocations. The second relation assumes the inclusion of existing forest plantations in the consumptive pool, along with retrospectivity, so that farmers could significantly reduce their cutbacks by sharing them with the forestry sector. To date, water licences are indeed the only means proposed to allow for proportional reductions of forestry water use when water availability is reduced.

6.3. SOCIAL SUSTAINABILITY PERSPECTIVE

6.3.1. Social sustainability in the submissions

Similar to the findings from the news reports, social sustainability does not appear explicitly in the submissions or the related planning process, except in the following extract:

The (forestry) industry emphasised the need for consideration of the triple bottom line aspects of plantation development and the interactions with other NRM issues in the absence of markets for social and environmental issues (Submission 54).

That submission highlights the lack of consideration of the social dimension of sustainability, but it also confirms, as seen in the news reports, the existence of the belief that market instruments could resolve social and environmental issues (see section 4.1.2.1):

I think this [water transfer] would make it more equitable particularly as I understand there will be another review in 5 years (Submission 2).

Moreover, a water market also alters the purpose of public consultation—one principle of social sustainability—into a consumer's rights process, as a result of the conflictive approaches of empowerment and user engagement (Cook, 2002), which might explain this intriguing submission:

[Increase the use of the water market] is against the spirit of the WAP (Submission 51).

Conversely, social sustainability is also restricted to social equity—one of the five suggested principles—assuming it encompasses every element of fairness:

I would like to congratulate the Committee and Board on their work towards balancing the use of water resources between environmental requirements, economic activity and social equity in the region (Submission 63).

However, even if social sustainability is not explicitly mentioned in the submissions, as in the news reports, it underlies some arguments of the debate. The fairness principle again predominates among the five principles (Figure 6.16) both in the forestry or the non-forestry submissions (Figure 6.17).

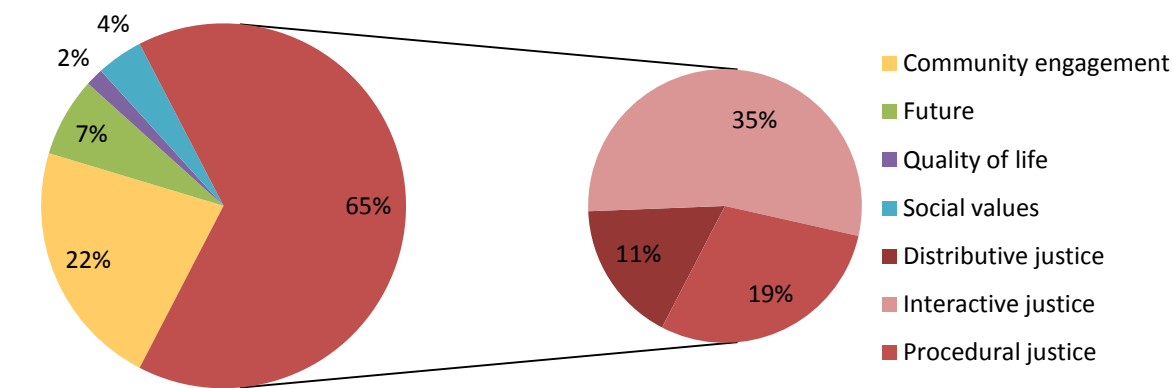


Figure 6.16. Predominance of the fairness principles

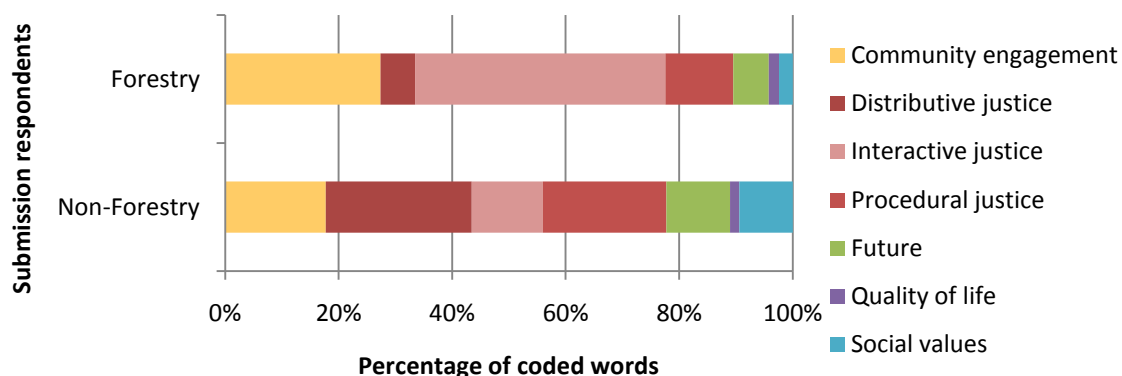


Figure 6.17. Social sustainability principles encountered in the submissions: forestry and non-forestry

6.3.2. Fairness

In spite of the fairness principle prevailing in both forestry and non-forestry submissions, its distribution varies greatly among the distributive, interactive and procedural justices in each sector. The forestry submissions clearly evoke more interactive justice, whereas the non-forestry submissions are more balanced with only a slight lead of distributive justice over procedural justice (Figure 6.17). The interactive and procedural justices' perspectives encompass various issues that are detailed in Figure 6.18.

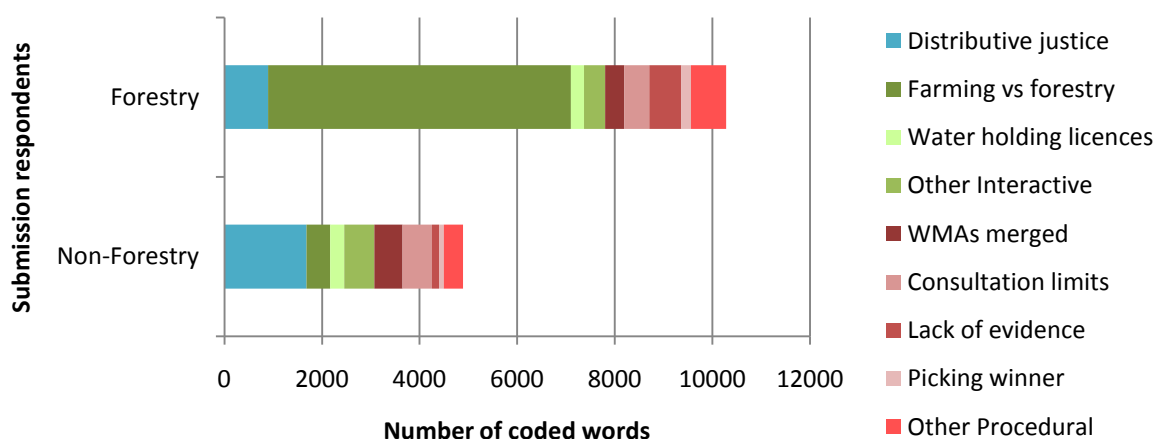


Figure 6.18. Fairness principle

6.3.2.1. Options of reallocations as a distributive justice debate

Issues concerned with distributive justice in the submissions mostly discuss the priorities of reallocation among users and propose various distributions as shown in (Table 6.10).

Table 6.10. Priorities of reallocation proposed in A2 submissions

Priority of reallocation	Proposed by submission
Forestry sharing cutbacks	14,18,22,24,26,34,43,48,49,58,59,61
Mostly forestry	1
Water taking licences first	7
Water holding licences first	54
Big irrigators first	4, 12
Hierarchical order of risk preserving prior use rights	21, 31, 52
Specific site assessment: only in hot spot areas, not at WMAs level, depending on local drawdowns	4, 17
History of extractions	34

Note: See Appendix 6.4 for list of submission number per industry group.

These proposals are strongly correlated with water licences, except the two last one, and therefore with the submissions respondents. In particular, the overwhelming ‘forestry sharing cutbacks’ originates mostly from a farming perspective, with two exceptions from the forestry industry (Submissions 22 and 34, but with associated conditions). These suggestions mostly mirror alternative options that were listed in a previous consultation:

1. *Equal percentage reduction in allocation across all licence holders, with the surrendered portion debited to the PAV*
2. *Equal percentage reduction in water taking allocation across all licences holders, with the surrendered portion converted to a water holding allocation*
3. *Reduction with preferential weighting of actively used components of the licence*
4. *Reductions on a slide scale (with larger licences receiving a greater reduction)*
5. *Weighting for smaller users*
6. *Differential reductions according to categories of use (SECWM Board, 2005).*

The first alternative is implicit in most of the submissions proposing the inclusion of forestry. The conversion of the surrendered portion into a water holding allocation, as proposed in the second alternative, has been investigated from a legal perspective (SENRM Board staff, 2009), but would be overridden by a unbundled system that allows a later increased access to the resource, when it becomes available.

However the ‘prior use rights’ proposal (Table 6.10) refers to a water doctrine that is different from the one in place in South Australia and it tightens again the perception of justice to the water doctrine (Tisdell, 2003). The pine forestry, introduced in 1870s in the South East, debates the historic use of each water licensee. This locally restricts the water use history to the white settlement period similar to that in the initial colonial paradigm of *Terra Nullius* (McKay & Marsden, 2009). It also suggests distinct attitudes towards the pine and bluegum industries; the latter being developed on a large scale beginning in the late 1990s and thus not integrated as much as the pine industry into the local community (see section 7.2.1.2).

The A2 draft LLC WAP applies the ‘across the board’ principle of reduction—common in Australia (McKay, 2010a)—including to the proposed forestry water licences in the affected consumptive pool, but exempting industry, recreational and public water supply licences. This principle, as opposed to the ‘history of extraction’ principle (Kuehne & Bjornlund, 2006), results from a general consensus from the community, although submissions display dissonant voices and combine a variety of the alternative options for reductions listed in 2005. Perceptions of inequities accompany any reallocation method, whether across-the-board or by history of extraction, as revealed by Australian legal challenges: *Murrumbidgee Groundwater Preservation Association Inc versus Minister for Natural Resources* (2005) and *Harvey & Anor versus Minister Administering the Water Management Act 2000*

(2008). In both cases, the ‘history of extraction’ principle was substituted for the ‘across the board’ one.

6.3.2.2. *Interactive justice: forestry and holding licences perceived as disadvantaged*

Interactive justice is associated with two main issues: the differences between forestry and farming in the water licensing system and the presence of discrimination to water holding licences (Figure 6.18). Both result from the SERNM Board position to respect equity among all users through implementation of a single system for all.

The interactive justice supports most of the foresters’ inequity claims against the A2 draft LLC WAP. On the one hand, they find fault with their differential treatment compared with irrigators—later entry in the water market, administrative calculations of allocation versus history of use for irrigators, etc. On the other hand, they call upon forestry specificities to be taken into account in the LLC WAP regulations; specificities that also constitute a solid barrier to change (see section 6.2.2.3). These characteristics are related to the very nature of forestry’s water consumption, which is diffuse compared to the point source consumption in other uses, and thus may require differential treatment:

The position adopted by the SENRM board in the Draft WAP would deliver the plantation forest industry with the worst of both worlds. That is, the industry would be fully implicated in the water accounting system but would have virtually no options for managing its exposure and reducing its impact in the most efficient manner (Submission 31).

Appendix 6.5 provides a detailed list of all of the interactive inequities claimed by foresters. However, only one forester explicitly reports the absence of differential treatment for forest plantations in the shallow and deep water table areas, thereby referring to the direct extraction of forests for which the forest water licensing system was initially launched:

This should be determined on the basis of whether the trees are located on shallow water tables or those that are greater than 6 metres deep at the end of the first rotation (Submission 34).

This confirms the absence of debate regarding the modified version of forestry water licensing system as was noted in the analysis of the news reports (see section 5.1.4.3).

Another interactive justice issue evoked in the submissions concerns water holding licences discrimination within the volumetric conversion, as well as in water dependent ecosystems and reductions to allocation changes (Appendix 6.3). The A2 draft LLC WAP indeed proposed that water holding licences not be eligible for any additional component of the volumetric conversion and not convert into taking licences in environmental protection zones (see section 4.3.1 for a description of the difference between holding and taking licences):

There is potential inequity in these deliberations for owners of holding licences. An 11% allocation to current holding licences (136GL) would potentially cost 15GL, however these licences are currently undeveloped and merit no special commitment compared to current taking allocations (irrigation and forestry) (Submission 54).

This under-development of holding licences would make them very vulnerable under the ‘history of extraction’ principle of reallocation, under which they would endure the most reductions.

There is however a paradoxical perception about these holding licences: on the one hand, they are viewed negatively as non-productive water, while at the same time they provide additional water for the environment: ‘No water may be used by a holding licence without development approval—it is effectively environmental water’ (Submission 54). This contradiction underlines their undefined but attached security of water, contrary to that for water licences in other Australian States that have a ‘security of supply [...] defined as the statistical probability of being able to supply a given volume of water in a year’ (Tan, 2006, p. 15). Although the system is completely different in South Australia and even though they have the same security level as the taking licences under the *NRM Act 2004*, these discussions over the priority assigned to holding licences in case of water reallocation evidence that they are potentially and informally less secure. However, holders of holding licences argue that there should be no difference between the two types of licences as the levy they attract is similar.

Finally, Appendix 6.5 displays the inequities claimed in submissions from almost all stakeholders’ perspective: forestry, holding licensees, irrigators, supply drinking water, industries, or inequities based on geographical boundaries: WMAs, EPZ and Border Designated areas. There is however no inequity reported from or regarding Aboriginal people or dryland farmers (unless regarding holding licences). This could reflect a general agreement among those stakeholders or indicate that the

consultation process did not reach these sections of the community (Cook, 2002). Aboriginal participation in the water planning is discussed further in section 6.3.6.5.

6.3.2.3. *Procedural justice*

In the submissions, four main issues dominate the procedural justice element of fairness: the community consultation, the lack of evidence supporting the A2 draft LLC WAP decisions, the merging of two over-allocated WMAs and the deliberate selection of winners (Figure 6.18). The two first issues will however be discussed in the section 6.3.3 on community engagement as it relates to both principles.

The huge over-allocation in two WMAs, Coles and Short, is partly addressed in the A2 draft LLC WAP by merging them with two under-allocated neighbouring WMAs, Killanoola and Monbulla (see map in Figure 4.8):

The plan to “get the books straight” by offsetting the notional over allocation in Short and Coles by transferring some of the allocation in Killanoola into these hundreds is an accounting (on paper) exercise which defies science (Submission 62).

This merge modifies the final estimated over-allocation, but without using a sound hydrological unit, supporting therefore both the perception of virtual over-allocation (see section 6.2.3.3) and the need for a change in the WMAs’ boundaries (see section 6.2.2.3). Likewise any inequity, perceived or actual, potentially sets a precedent that could create future conflict.

Finally, the procedural justice element, and the whole fairness principle in water planning, could be summarised in the following statement: ‘NRM is not about picking natural resource favourites; it’s about managing risk’ (Submission 36). The expression ‘picking winners’ will commonly return in the interviews chapter (see section 7.3.2.3).

6.3.3. Community engagement

The community engagement principle appears in the submissions under the same elements as found in the news reports (Figure 6.19 and Figure 6.20). The democracy principle, mostly voiced by politicians in the first peak of news reports (November and December 2004), did not appear in the submissions, consistent with the fact that there were no submissions from politicians.

The prevailing discussion on procedural justice regarding community consultation corroborates the strong relationships between the five principles of social sustainability.

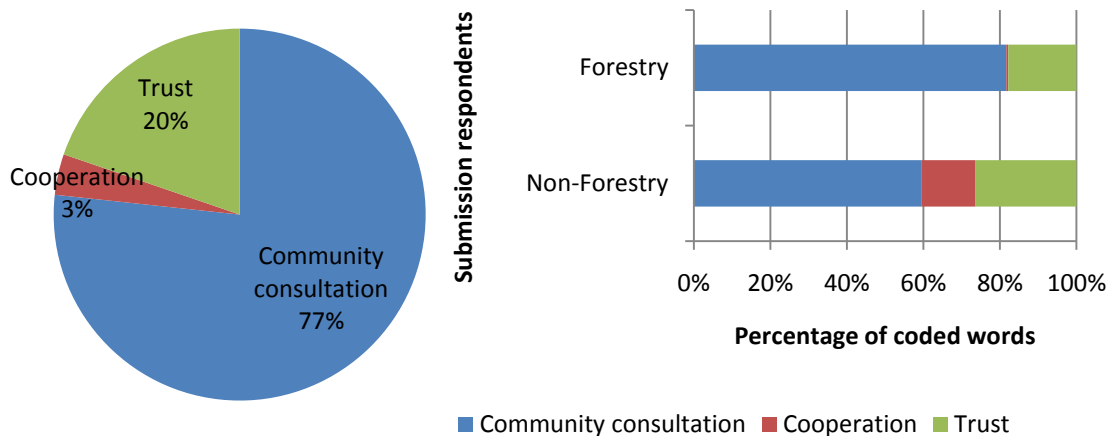


Figure 6.19. Community engagement principle

Figure 6.20. Community engagement principle by industry

The main criticism on the implementation of the A2 community consultation relates to its bad timing—at the busiest period for farmers in the year—and its relatively short duration. It is significant enough to be the sole theme touched upon in one submission (Submission 11), which is reproduced in full below:

In future, please get your information out earlier, especially during irrigation & hay silage season.

We did not receive notification of Information meeting to be held on the 29th November 2007 until 31/11/2007 TOO LATE.

This water allocation plan for the Lower Limestone Coast affects us and it is very important to us that we are able to access information and be able to ask questions.

So PLEASE in FUTURE make sure we are notified in plenty of time so we are able to attend (Submission 11).

Indeed, time is crucial for group dynamics (Buchy & Race, 2001) and for coalition building (Ingram et al., 2007). Although coalitions were mostly formed beginning in August 2007, as evidenced in the submission sent on behalf of various forestry companies and bodies, the limited consultation period leads to an infeasibility in reaching a consensus on the legal entity receiving the forestry water licence. Thus, in addition to the forestry common submission, individual submissions from the same companies expressed this point.

However, consultation timing should also be balanced in this already resource-intensive process (Cook, 2002) for both the SENRM board and the community. For

example, some forestry corporations invested significant resources in proposing alternative options for the forestry accountability, in particular without requiring a licensing system—forestry would not enter the consumptive pool as in the 2001 WAP. However, this may suggest an incorrect expectation regarding change to the outcomes (Cook, 2002), especially as the SENRM board had already designed a highly sophisticated system anticipating an amendment of the *NRM Act 2004*. Despite the SENRM board only wanted to check the practicalities of its new system, the debate, when transferred to the State level after this consultation, may prove that expectations of the forestry companies were justified. Other serious limits of the consultation process are also criticised in the submissions (Table 6.11).

While consultations always have a ‘degree of tokenism’ (Arnstein, 1969, p. 217), they suppose an easy access to information (Syme & Eaton, 1989; Hill & Zammit, 2001) and open outcomes that are however denied and manipulated (Arnstein, 1969) in the instrumentalist critique (second line in Table 6.11). Finally, the evidence-based policy movement (Young et al., 2002) stands by the last identified limit—lack of evidence—along with the need of transparency in community engagement (Magis & Shinn, 2008).

Table 6.11. Limits of the A2 community consultation

Limits	Excerpts from submissions
Tokenistic consultation	<p>‘Sadly, the feeling among many, that the plan is a “fait accompli”, and that we are going through the motions of “community consultation” to tick the boxes’ (Submission 51).</p> <p>‘Although the SENRM board claims to have considered the outcomes of the facilitated forestry and irrigator stakeholder process, the draft WAP provisions relating to plantations do not demonstrate this’ (Submission 54)</p>
Instrumentalist consultation	<p>‘[...] there is a suspicion, voiced by several I have spoken to, that the process is being rushed through “while our backs are turned”’ (Submission 51).</p> <p>‘The development of modifications to the SA Natural Resources Management Act to accommodate water licensing for plantation forestry concurrent with the development of the policy risks the conclusion that the outcome of the policy consultation process is predetermined’ (Submission 54)</p>
Lack of information	<p>The SENRM board [...] has refused to release data and information in a timely way to allow stakeholders and the public to make informed comments (Submission 31).</p> <p>‘It is unfortunate that only parts of the plan were released during the A2 consultation process’ (Submission 54).</p>
Lack of evidence	<p>‘The Draft WAP is based on a false premise and assumptions. There has been no cause and effect analysis into observed changes in the water resource’ (Submission 31).</p> <p>‘[...] inability of the SENRM board representatives to outline in any transparent manner how their conclusions were reached with respect to the allocation status of the unconfined aquifer’ (Submission 34).</p>

6.3.4. Future focus

Mentions of the future focus principle in the submissions are displayed in Figure 6.21 and disaggregated by industry in Figure 6.22. The adaptive management rule dominates the two already identified resilience and long-term perspective elements.

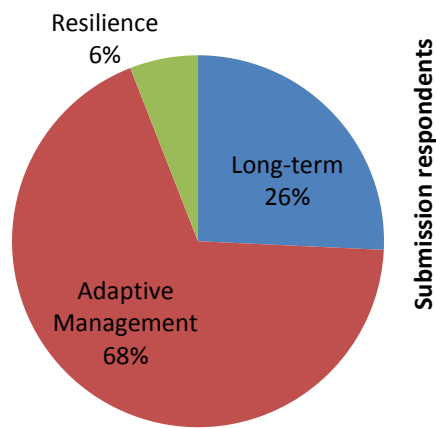


Figure 6.21. Future focus principle

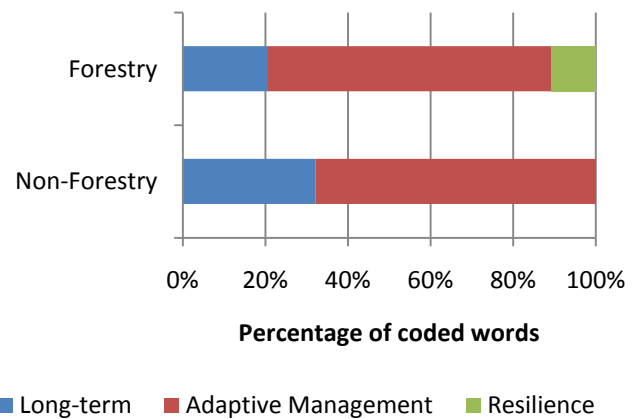


Figure 6.22. Future focus principle by industry

The A2 submissions refer to adaptive management in relation to the five year review of the plan. Reiteration is indeed a crucial feature of adaptive management (Connor & Dovers, 2004). Submissions also mention a carry-over regulation that allows irrigators to adapt to seasonal variability in using the unused part of their allocation in the following year (up to 20 per cent of their annual allocation). However, an unbundled system, when implemented, would provide far more adaptive management, with allocations based on the annual available recharge.

Future generations are sometimes mentioned in the submissions, but have a weak representation in the water planning process, supporting the view that they are ‘represented rather inexpertly by proxies’ (Syme & Eaton, 1989, p. 98).

6.3.5. Quality of life

Parallel to the finding on this principle in the news reports, the quality of life of the community appears only through employment and economic benefits in the submissions. The discussed benefits particularly derive from the forestry industry (Figure 6.23).

Wider adverse ‘social implications’ are opposed to the implementations of the draft LLC WAP, but none of these are clearly specified: ‘Any reduction in plantation area will have far reaching financial and social implications on the regional community and business’ (Submission 22).

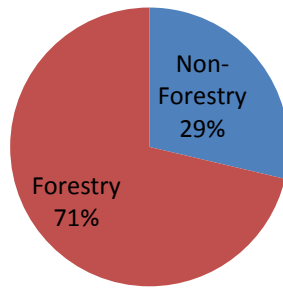


Figure 6.23. Quality of life principle

6.3.6. Social values of water

The social values of water underpinning the A2 submissions are presented in Figure 6.24. Most of them are similar to those in the news reports results. However the notion of Aboriginal cultural water licences and aesthetic values emerged to the detriment of the regional identity and the drought-proof community values, which disappeared. Moreover, the ‘basic human needs’ and ‘carbon stores’ values, representing most of the references, belonged to the non-forestry and the forestry sectors, respectively (Figure 6.25).

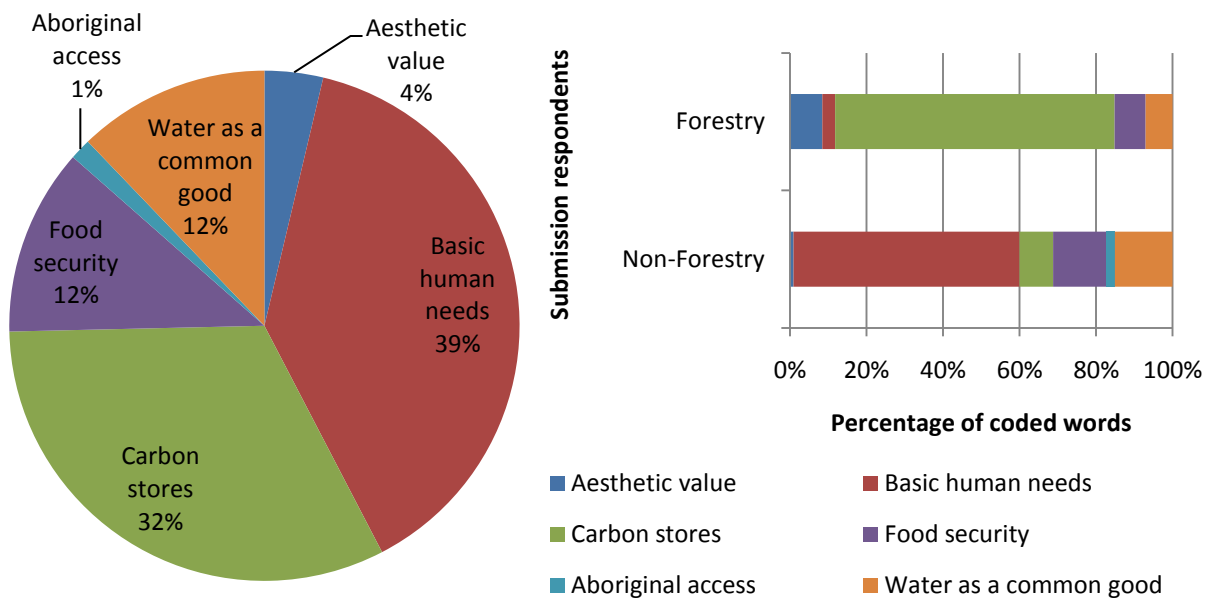


Figure 6.24. Social values of water

Figure 6.25. Social values of water by industry

6.3.6.1. *Basic human needs*

The basic human needs value is mostly held by the non-forestry respondents. It is respected in the A2 draft LLC WAP through the exemption of public water supply from reductions to water allocations:

An exemption to this principle should apply where the allocation is used for public water supply purposes due to the nature of the infrastructure and its operation (Submission 35).

The stock and domestic uses are also exempted by being kept outside of the consumptive pool; however, this could change with implementation of the proposal of ‘stock and domestic licences’ (*The Border Watch*, 12 March 2010, p. 21) in the *Natural Resources Management (Review) Amendment Bill 2010* (South Australian Government, 2010b). But their priority is not questioned: ‘As stock and domestic and holding licences (volumetric) have to be honoured [...]’ (Submission 54).

Basic human needs are clearly linked with the value of water as a common good, which is an Australian expectation (Watermark Australia, 2007) that was also encountered in the Limestone Coast region: ‘Don’t give away a substantial community entitlement for nothing!’ (Submission 1).

6.3.6.2. *Carbon stores*

The carbon stores value is confirmed as an argument from the forestry sector in opposition to the forestry water licensing system:

Due to the ratification of the Kyoto Protocol and the Australian Government’s commitment to introduce a domestic emissions trading scheme, the plantation forest sector is likely to be subject to a deforestation tax on all plantations. This will have the effect of pegging water prices in the SE to international carbon prices (Submission 31).

Foresters also introduce the idea that forest water licences would tie prices of agricultural products to international carbon prices through the price of water, which would affect the food security of the country.

6.3.6.3. *Food security*

The food security value of water is this time explicit in some submissions: ‘Water should be primarily reserved for agriculture and personal needs. You can’t eat trees!’ (Submission 23).

Finally, when forests cover the South East and one of Australia's major food bowls is turned to dust, I am sure we will all wish this had been done in a more equitable way (Submission 24).

Although the food security value that is associated with water can initially be associated with developing countries, the current trends of increased prices of agricultural commodities in international markets may explain its reinforcement in Australia; Australia also became net importer of fruits and vegetables for the first time in 2009 (Austin, 2009).

6.3.6.4. Aesthetic value

The aesthetic value of water also emerges from the submissions, however implicitly only: 'We need to protect our ecosystems' (Submission 12) or as 'these environmental services are predominately to the public good' (Submission 50).

6.3.6.5. Aboriginal cultural water access

Finally, the cultural value of water in particular to the Aboriginal inhabitants is recognised and mentioned in only one submission from a governmental entity currently in charge of introducing Aboriginal cultural water access in South Australia (SENRM Supporting Official 3, 2010). However, a South East aboriginal focus group, meeting regularly with, and advising the SENRM board on natural resources management issues, may prevent the exclusion of Aboriginal people from the water planning process.

6.4. DISCUSSION

Findings of the news reports analysis were mostly confirmed and refined in this analysis of the A2 submissions. A common submission from the forestry sector has demonstrated the existence of a coalition among foresters, who however still disagree on some implementation details that could be referred to as secondary beliefs from an advocacy coalition framework perspective (Sabatier & Weible, 2007). In their submissions, the timber sector exposes in detail the disadvantages that they perceive against their industry. In addition, the significant resources that were input into their submissions would classify them as a contender social construction, according to the typology of Ingram et al. (2007, p. 102), i.e. having ‘substantial political resources but [...] negatively regarded’. One significant impact of the forestry policies is an interpretative one that both reflects and generates a negative social construction of foresters, the targeted group. However, their effect on resource distribution does not seem to penalise them only, as indicated by the assets given to them in the form of water licence.

Conversely, farmers did not manage to put forward a joint submission, certainly because of the short timeframe available—even previously organised groups had difficulties preparing and presenting a collective submission with such a short consultation period. The assumption of an anticipated draft water plan that is almost aligned with their position, as the A2 draft was, could also have weakened the need to join forces. Moreover, written submissions do not enable to identify policy entrepreneurs in contrast to news reports or consultation meetings.

Factors influencing the process of policy change have been refined, in particular barriers to change, thanks to a multitude of practical details in the submissions. Drawing on those details to identify internal and external barriers, this chapter contributes to the ongoing debate regarding the origin of change (see section 2.2.3.2), whether it is internally or externally induced (Lin, 1989; Wegerich, 2001; Greif & Laitin, 2004). While the findings suggest that both origins play a role in water institutional change, they also question the distinctions between internal and external and where to draw the limit between them. In this research, internal is meant to indicate within the water institutions because of the institutional change focus; however, other studies have intended internal to mean within the water system or even within the water sector (Saleth, 2006). In addition, water institutional

arrangements were confirmed by the submissions as potential barriers of change, impeding progress towards institutional change.

The social sustainability principles were also reviewed and the analysis confirmed their suitability when examining water planning processes, from both a social and institutional change perspective. Fairness was again pinpointed in the submissions as the most significant principle of social sustainability. Its interactive justice element was so relevant for the forestry industry, that it became a barrier to change, as a result of forestry specificities. Such a value as an influential factor for institutional change adds to the already proposed typology (Schmid, 2004) and refines an institutional change theory in the context of water resource planning and allocation.

Two initial social impacts have already been experienced by the community as a result of the water planning process. The massive amount of detail regarding water resources and water management supporting the submissions demonstrate the refined knowledge available in the community and that was acquired as part of the social learning element of the planning process. It enhances the community's resilience. Moreover, scepticism about the consultation process emerges from those submissions indicating that some stakeholders question their influence on the decision-making (Hill & Zammit, 2001). Indeed, participation does not ensure sustainable natural resources management (Buchy & Race, 2001), but conversely, sustainable development alters significantly public participation (Razzaque, 2009). Therefore community engagement in water allocation planning—as one of the five main principles of social sustainability—is crucial for the social sustainability of communities strongly relying on irrigation.

Characteristics of the written submissions represent a limit of this analysis as they offer perspectives from a 'self-selected group of interested people' (Syme & Hatfield-Dodds, 2007, p. 13) and, in this case, an over-representation of the forestry point of view and an unbalanced perception towards criticisms and negative views on the A2 draft LLC WAP. Indeed, the success of participation depends on the point of views that reflect the diverse interests of each party (Syme & Sadler, 1994). Both public participation and water problems are considered as wicked problems and thus can only be evaluated with difficulty (Freeman, 2000; Ker Rault & Jeffrey, 2008).

6.5. SUMMARY

Findings from the analysis of the submissions for the A2 consultation on the draft Lower Limestone Coast water allocation plan confirmed and refined the results obtained from the news reports' analysis in the previous chapter. They fully supported the significance of the forestry regulations in the planning process through its recurrence among the themes that were raised in the submissions and through the high participation of foresters among this self-selected group.

On the process of change, the self-selection feature of respondents raising mostly dissonant opinions is responsible for the observation that barriers to change prevail over drivers of change, in contrast with the news reports results. However, the functional and institutional elements of the drivers and the barriers, respectively, were globally confirmed. Functional factors that were related to the specific draft water plan proposal were also added to the barriers and suggested an additional dimension, either internal or external, to the factors of policy change. Science remains the most relevant factor that had a double influence, resulting in an unsubstantiated over-allocation that is perceived as virtual and raising questions about the way to address it. Finally, policy changes were themselves observed to be factors influencing the planning process.

The social dimension of sustainability was again largely lacking in the submissions and, at its best, was restricted to social equity or to the view it is taken care of through water markets. The five social sustainability principles confirmed their suitability to examine water planning processes, not only from a social perspective but also from an institutional change perspective. The fairness principle again prevailed among the five principles, though even more largely than in the news reports. Distributive justice debated the options of water reallocations while interactive justice accounted for the disadvantages that foresters and holding licence holders perceived from the proposed draft water plan. Procedural justice was largely combined with the community engagement principle and argued about the timing and limits of the consultation.

Ultimately, these findings will again be triangulated with the analysis of the face-to-face semi-structured interviews with important stakeholders involved in the development of the LLC WAP in the next chapter.

ANALYSIS OF INTERVIEWS WITH KEY STAKEHOLDERS OF THE WATER PLANNING PROCESS

This chapter presents the analysis of twenty semi-structured interviews of key actors in the development of the water plan, either government officials or private individuals. These interviews were realised two years after the public consultation examined in the previous chapter through its submission forms. This chapter opens with an overview placing these interviews in the planning timeframe, reviews the participants' relevant characteristics for the analysis of the results, and details the themes touched upon. For easy comparison with the previous chapters, the results of the interviews analysis are similarly structured around the two research questions. Factors of water institutional change detected in the previous chapters are mostly validated and refined, stressing in particular the Federal, State or local levels involved in the transition of the nested water institutions. Ultimately, the consideration of the social sustainability in the water planning draws on these factors of change, as well as on the usual five principles: fairness, community engagement, future focus, quality of life and social values of water.

7.1. INTERVIEWS' OVERVIEW

This section gives an overview of the themes discussed during the interviews and their relative importance for the distinct participants. It also presents characteristics of the interviewees and briefly refers to the selection method, which was detailed in Chapter 3.

7.1.1. Interviews' context within the planning process

The interviews were conducted between December 2009 and January 2010, two years after the community consultation on the draft LLC WAP, whose submissions were analysed in Chapter 6. At the time of the interviews, the draft water plan had already been sent to the Department for revision (SENRM Board, 2009c) and therefore the planning process had been disconnected from its local roots and had been in its State phase of development for almost one year (see Figure 5.1 in Chapter 5). Concurrent with the interviews, the SENRM board also ran a series of community consultations on the South East regional NRM plan, which was adopted in May 2010 (SENRM Board, 2010a). The time difference between the LLC WAP (Appendix 5.6.) and the regional NRM plan—which is, however, larger in scope and geographical coverage—evidences that the LLC water planning process has been fraught with prominent difficulties.

7.1.2. Participants

7.1.2.1. *Four categories of interviewees*

As already indicated in Chapter 3, participants were interviewed in their capacity as SENRM Board Members, supporting officials, local politicians or as representatives of local industry groups:

- SENRM Board Members

The SENRM board, like all Australian NRM boards, is community-based (Robins & Dovers, 2007). The *NRM Act 2004* indeed requires that 'a majority of the members of the board reside within the relevant region' (section 25.4.c.i) and 'are engaged in an activity related to the management of land' (section 25.4.c.ii). They are selected based on skills (see section 4.3.2). This board constitutes therefore another form, although weaker, of community participation in the decisions regarding the water planning process. This type of 'elite community group tends to act more like

planners as they become more informed’ (Syme & Eaton, 1989, p. 93). Further, NRM boards prepare the draft plan but do not have authority over the final decisions, as the responsible ‘Minister may adopt the plan with or without amendment’ (section 80.3.a). A two-day induction program familiarises board members with these governance arrangements (Robins & Dovers, 2007).

The SENRM board, like most NRM bodies in the States of Victoria and Tasmania (Robins & Dovers, 2007), is mostly comprised of farmers. Only one member represents the forestry sector in the SENRM board. Additionally, no SENRM Board Member has an Aboriginal background. Thus supporting the results of a Queensland study showing that community committees ‘tend to be unrepresentative of the general public’ (Hill & Zammit, 2001, p. 10).

- Supporting officials

In addition to the appointed community members, NRM boards’ meetings also comprise supporting government officials from several departments: the then Department for Environment and Heritage (DEH, now Department for Environment and Natural Resources, DENR), the Department of Water, Land, Biodiversity and Conservation (DWLBC, now Department for Water, DFW) and the Department of Primary Industry and Resources through its Forestry section (PIRSA Forestry), in the case of the SENRM board. These officials give advice to the board based on their specific area of expertise—distinct from the local knowledge of the community members (Whelan & Oliver, 2005)—but they do not have a voting right.

- Local politicians

‘Major NRM choices tend to be political by nature’ (Buchy & Race, 2001, p. 294) and this is even more true regarding water, as politicians commonly share interests in water management (Molle et al., 2009). For example, in the Lower Limestone Coast region, two local Members of Parliament were fully engaged in the water planning process because of their positions in the government on forestry and agriculture and in the Shadow government on water for over five years during this planning review.

- Industry groups’ representatives

Local industry representatives have a direct economic interest in water management decisions, which encourages their participation in consultation (Tan, 2006) on the basis of potential associated benefits. Moreover, it also means that they are better

informed about water governance arrangements (Rydin & Pennington, 2000), reducing thus their cost to participate.

The Lower Limestone Coast Reference Group was formed in 2004 with 18 representatives of local industries (SA Water, forestry, viticulture, dryland farming, SAFF, abattoir, dairy and irrigation supplier) based on expressions of interest, as well as two Department officials and two staff of the SECWM board (SECWM Board, 2005). However, this group never actually worked (see section 7.3.3).

Ultimately, local industry representatives returned formally, but later in the planning process. In February 2010, the month following the interviews, the LLC Taskforce was established as recommended by the Inter-Departmental Committee set up in December 2008 to manage the water impacts of plantation forestry (DWLBC, 2010a). In September 2010, this taskforce formed a reference group integrating eight local industries' representation to resolve the forestry issues. This overrode thus the skill-based NRM boards and mirrored other Australian States such as New South Wales or Queensland where NRM groups reflect local interests (Murrumbidgee River Management Committee, 2001; Whelan & Oliver, 2005; Robins & Dovers, 2007). Consultation through representative groups is however partial (Rydin & Pennington, 2000)—in both of its meanings: limited and biased.

7.1.2.2. Gender

Five women were interviewed among the 20 participants. All five are SENRM Board Members. This low participation of women corroborates the results from the previous chapter (Figure 6.3) and supports findings of other Australian studies that suggest that women are in the minority in the NRM sector (Buchy & Race, 2001; Davidson & Black, 2001; Whelan & Oliver, 2005). This has implications on the social justice of NRM decisions and therefore on the social and institutional dimensions (Davidson & Stratford, 2000) of the water plan. This is further visible in Figure 7.1, which establishes that women tend to be more receptive to the social dimension of sustainability in our case study.

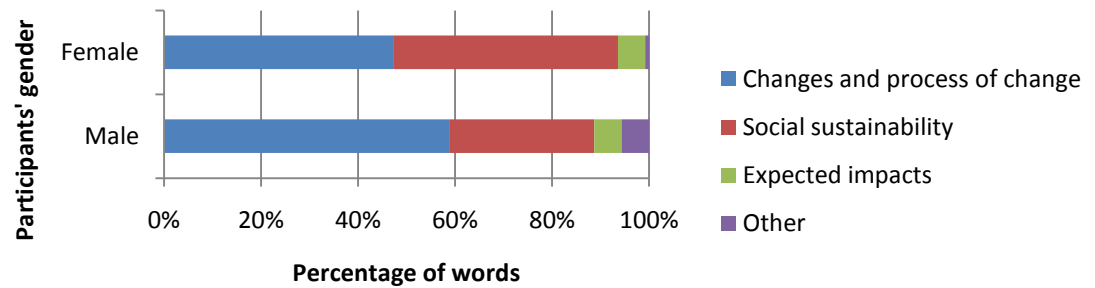


Figure 7.1. Themes discussed by gender

In the LLC water planning process, social affinity is conveyed through alternative perspectives that focus less on forestry among the four changes introduced in the LLC WAP, giving in particular more importance to the water allocation reductions (Figure 7.2).

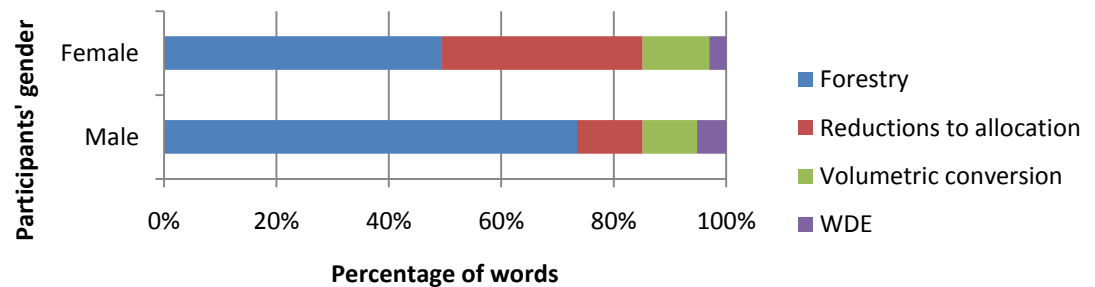


Figure 7.2. Changes discussed by gender

The under-representation of women heavily involved in the water planning process could therefore be correlated to its lack of consideration of social sustainability (see sections 5.3.1 and 6.3.1).

7.1.3. Themes

Figure 7.3 displays the themes discussed during the semi-structured interviews. The questionnaire used as the basis of these interviews is in Appendix 7.1 and Appendix 7.2 spells out the correspondences between the question base and the overall themes displayed in the following figures (see also the analytical coding tree in Appendix 7.3). The changes and the process of change topic from Figure 7.3 is disaggregated in Figure 7.4.

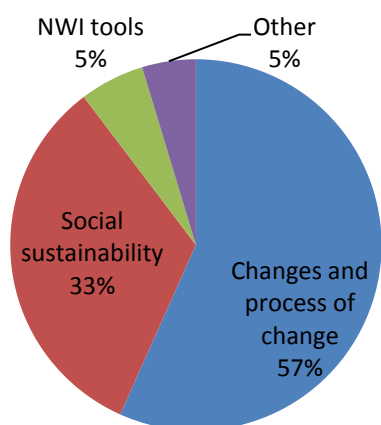


Figure 7.3. Overall themes discussed during interviews on the LLC WAP

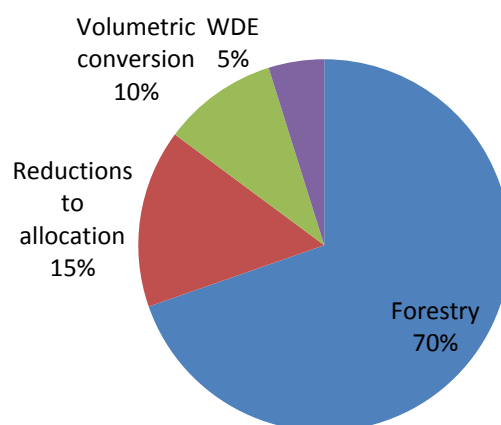


Figure 7.4. Detail of the four changes discussed during the interviews

Mirroring the two research questions, the interviews were oriented firstly towards the changes introduced in the water plan's revision and the processes that induced them, and secondly towards the social dimension of the planning process. Finally, NWl tools and mechanisms debated during the community consultation, such as security of water allocation, share of the resource and water markets, etc., were also discussed. Figure 7.4 supports the results in the two previous chapters showing a predominance of forestry over the three other changes in the planning process.

Figure 7.5 and Figure 7.6 disaggregate these results for each participant category. Digressions are unsurprisingly common in local politicians' responses; but this was to the detriment of the social sustainability topic.

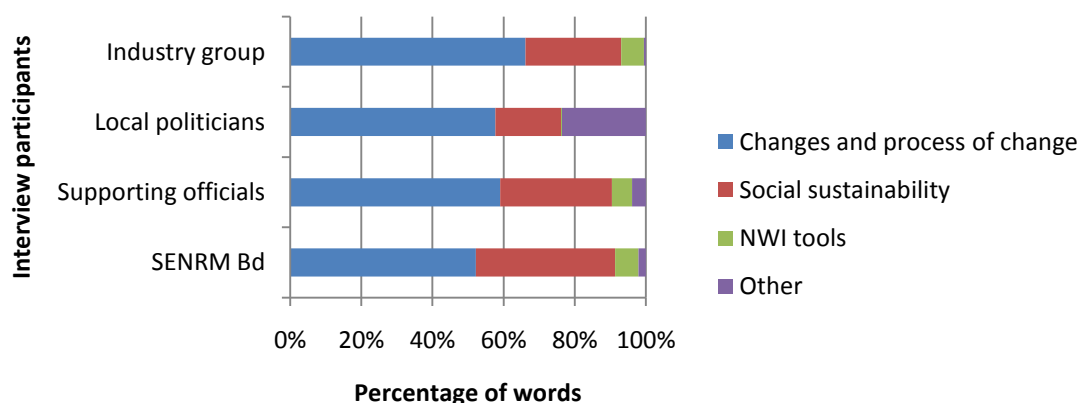


Figure 7.5. Themes by participant category

The semi-structured feature of the interviews enabled the researcher to explore the most significant issues perceived by each participant on a given topic (Barriball &

While, 1994), and therefore to determine the relative importance of each change to be introduced in the water plan (Figure 7.6).

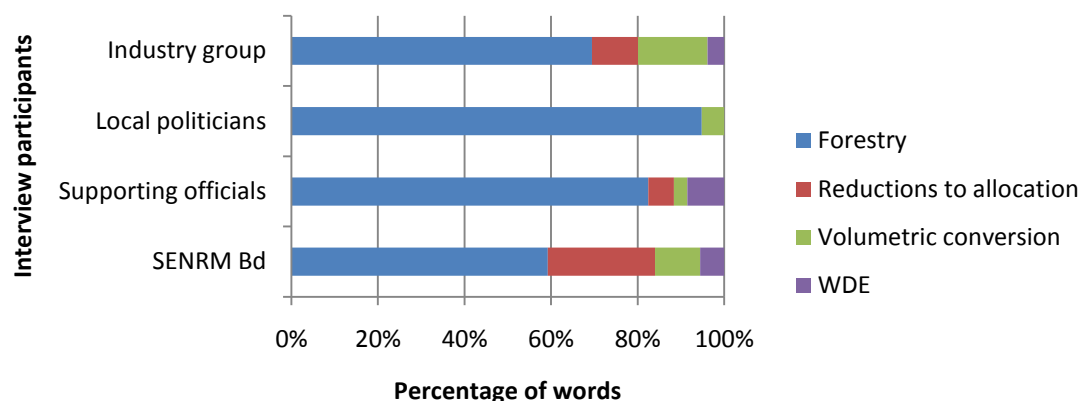


Figure 7.6. Changes by participant category

While the forestry change dominates over the other changes among each participant category, the political nature of the forestry regulations is specifically highlighted by their ascendancy over local politicians' concerns. Other participants pay broader attention to the reductions to allocations and to the volumetric conversion in particular.

The splitting of results between the forestry and non-forestry sectors used in the previous chapters is not reproduced here due to the difficulty to assign SENRM Board Members and politicians to one of these subgroups without assuming that they hold strong biases.

7.2. PROCESS OF CHANGE

Pursuing the structure applied in the two previous chapters, this section examines the factors controlling the change in water institutions in the Lower Limestone Coast region. Figure 7.7 presents the relative significance and direction of these factors in the interviews and details those for each participant category.

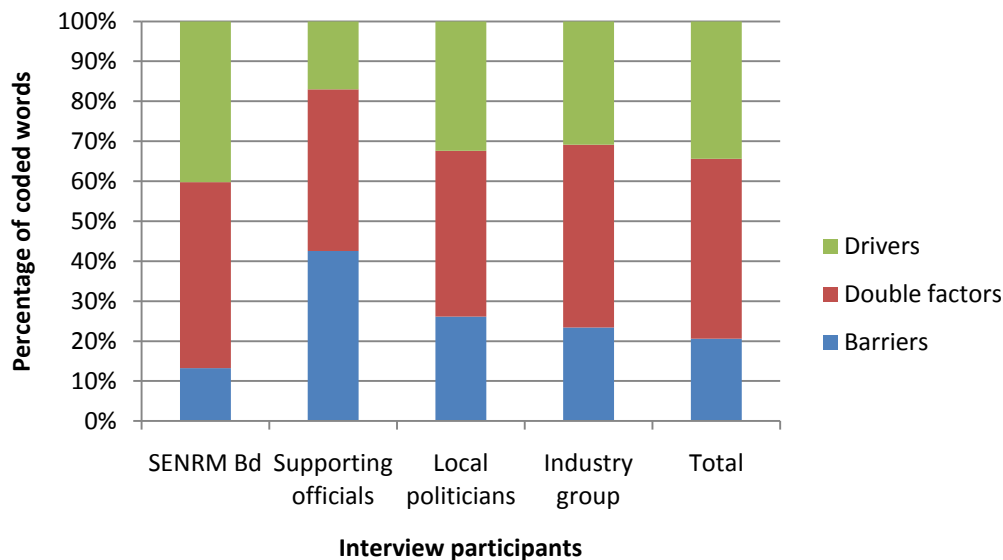


Figure 7.7. Factors influencing the water planning process

The balance between the factors influencing the process of water planning observed in the interviews contrasts with the dominating opposition in the submissions (Chapter 6) but is aligned with the positive news reports (Chapter 5). In the interviews, the portion of factors having a double influence however increases significantly.

Consistent with being the group that proposed the forestry regulations and with their dominant farming orientation, SENRM Board Members are the stakeholders that mention the fewest barriers to the planning process and to the forestry issues. Globally, local politicians have similar attitudes than representatives of industry groups and their constituency. Finally, supporting officials are the most aware of potential barriers. This might be related to the level at which these barriers appear (mostly at the State level, see 7.2.2), but also to the confusion over power control between the board and State agencies (see 7.3.3.1).

In the following sections, new factors and refinement of those identified in the previous chapters are emphasised.

7.2.1. Local functional and subjective drivers of change

The drivers of change identified in the interviews validate most of the drivers that were determined in the previous two chapters but also clarify the relationship between distinct changes, in particular the volumetric conversion and the forestry regulation changes. Additionally, a new but significant driver comes forward, the subjective social constructions held by some participants (Figure 7.8 and Figure 7.9). These drivers are mostly local.

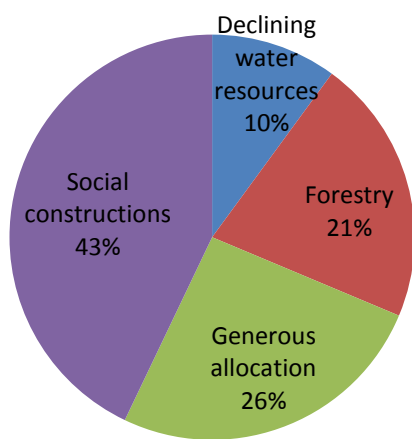


Figure 7.8. Drivers of change

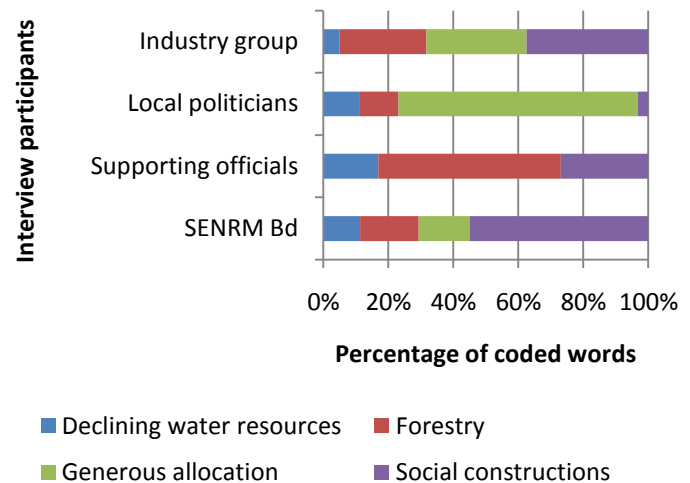


Figure 7.9. Drivers of change by participant category

The ‘declining water resources’ driver corresponds to the ‘water shortage’ and ‘environmental sustainability’ drivers discussed in Chapters 5 and 6. Likewise, the ‘forestry’ driver includes both its impact and its expansion, which were also identified in the previous two chapters, thus validating the physical and functional basis of the drivers. Other newly identified drivers are described below.

7.2.1.1. *Generous allocation*

This driver verifies and refines the ‘over-allocation’ driver determined in Chapter 5 in uncovering the perceived causes of the existing over-allocation. Chronologically those causes are:

- The initial grant from the government

This furthers issues regarding the allocation method already raised by the Select Committee in 1999 (Select Committee on Water Allocations in the South East, 1999):

So when you actually had to prove that you were using water [...], people were running around with other people's flood pumps and there was a bit of naughtiness at the time (Politician 1).

Not only was the initial granting of water allocation deemed to be fraudulent and not reflecting the actual use of water, but it also forged over-allocation:

A large portion of the water that was allocated, was allocated fraudulently. And I'll give an example. [...] At the end of the process, they gave everybody in the Hundred of Grey the amount of water they said they had been using [...]. From day 1, Hundred of Grey was allocated to the tune of 131 per cent (Politician 2).'

This claim is supported by the low proportion of allocated water that is actually used, only 55.6 per cent, in the Lower Limestone Coast (South Australian Government, 2000; SECWM Board, 2001a). This is despite the 'active and expeditious use of water' principle in the 2001 WAPs and proposed in the LLC WAP draft plan (SECWM Board, 2001d, c, b; SENRM Board, 2007b), which encourages the development of more recently granted allocations by rescinding them after 3 years if not used. This confirms that the initial allocation of rights has a real impact on the efficiency of the resources (Hartfield-Dodds, 2006) and therefore can sensibly motivate a change in allocation.

- The pro-rata roll-out in 2000

Water that remained unallocated was distributed in 2000 through the pro-rata roll-out process in order to implement a total market-based allocation system (Select Committee on Water Allocations in the South East, 1999; Young & Hatton MacDonald, 2000). It paradoxically allocated this extra water based on landholding despite the separation of water from land title that had already occurred:

There was this pro-rata allocation, so you could apply for an allocation on the basis of how much land you had, etc. And maybe they have proven in some areas to be too large (SENRM Board Member 5).

Not only had 'the government fully allocated the entire resource' (SENRM Board Member 11), but it had over-allocated it: '[...] the pro-rata was obviously wrong. It

was assumed that pro-rata water was unallocated and therefore available' (Politician 1). But the forestry use of water was overlooked. This, in addition to the initial granting, suggest that, in the region, the period that 'largely encouraged the creation of over-allocated systems' (McKay, 2008, p. 57) continued up to 2000 rather than ending in 1994.

- And last, but not least, the volumetric conversion, which was generous (already discussed in section 6.1.3.4)

This large conversion reflects more accurately the extracted volume of water than the haIE system:

The original IE had a flaw in the system; it did not recognise all the water pumped. [...] If the conversion was less generous, it would not have recognised what was happening [...] what the actual crop water use was (SENRM Board Member 3).

But the conversion also assumed initially that licensees would be able to continue to work as usual:

So we get the initial statement, the one that was never going to be able to achieve that says: every irrigator will be able to continue to do what they have already done, always done (Politician 2).

The conversion also chose to use the benchmark of the 75th percentile of water use:

And the methodology of using the 75 percentile of water use rather than the average water use to decide the base water allocation is generous (SENRM Board Member 2).

Finally, the science behind the calculations is outdated:

That's based on better science that was used 30 years ago for crops. So we're get more water, but then we get about 40 per cent of it taken away, so it brings everything back to balance. So we end up with about what we had before, so I guess we can live with that (Industry Group 1).

These four arguments explain why the volumetric conversion ultimately led to generous allocations, which in turn made it easy to obtain general support from the farming sector. Simultaneous introduction of unbundling of the water licence and of the concept of 'share' of the resource (DWLBC, 2009), as it was initially intended (SECWM Board, 2005), would have nullified any claim of 'generous' conversion in making each allocation relative to the total water available (further discussed in 7.2.3).

Along with the initial granting of allocation and the pro-rata roll-out, the volumetric conversion resulted in the current over-allocation that induced the need for reductions to allocations, and therefore became a driver of change itself (further discussed in section 7.2.5).

7.2.1.2. Social constructions biased against forestry

Social constructions articulated in the interviews concern both the forestry sector and the SENRM board. They constitute subjective factors of influence (Saleth, 2006), which in both cases inspired the gradual introduction of forestry regulations.

On the one hand, '[...] some members of the community have an antagonistic view towards forestry for various reasons' (SENRM Board Member 11). Findings from recent research indeed suggest that local communities hold negative beliefs regarding forestry (Barlow & Cocklin, 2003; Tonts & Black, 2003; Schirmer, 2006; Williams et al., 2008). Table 7.1 encapsulates the distinct arguments backing this negative social construction. Most of these originate from a farming perspective; interestingly, two—declining rural communities and long-term intention—relate to the quality of life and future principles of social sustainability.

In contrast, despite some of the employees of the SENRM board, as well as the two formers presiding members, having a forestry background, this body is seen as irrigation-oriented as a result of its historic formation:

When the NRM Board was formed, that was basically the old South East Catchment Board which was basically an irrigation Board. [...] And that was the Board that put steps in place that took us down this policy line. And there has been some changes to the personnel in the Board since then, but that hasn't...but the key drivers in the Board have continued (Industry group 4).

Table 7.1. Arguments supporting a negative social construction of forestry

Excerpts from interviews	
Pine versus Bluegum	‘Bluegums are probably a bigger threat. I think the pine industry is [...] not so much looking to get the trees into the water table, they're looking for the right soil for them with water rainfall, whereas bluegums they want rainfall but they also want to get their trees to be able to get into the water table as well’ (Industry Group 2).
Corporations versus farmers	‘[...] forestry is dominated by half a dozen very big companies, whereas all the rest of the water affecting activities is dominated by small farmers and a lot of them’ (SENRM Board Member 11). ‘[...] they are all corporate, [...] so we don't actually have relationships with them, whereas you do with other farmers’ (SENRM Board Member 4).
Declining rural communities	‘The corporate entities tend to wish to take benefits in places outside our regions’ (SENRM Board Member 9). ‘[...] with the forestry companies buying all the old grazing properties, [...] suddenly the 3/4 of your population disappears [...] and what was a very small town is gone. [...] So it tends to speed up radically the centralisation process, whereby the bigger towns remain prosper and the very small rural ones just disappeared’ (SENRM Board Member 8).
Management investment schemes	‘The bluegum industry [...] was taxation driven through these management investment schemes and so we saw zero hectare initially to thousands...’ (Industry Group 3).
Induces more wild animals	‘We also feel that there are sometimes big issues with weeds and particularly with feral animals: foxes and rabbits. [...] there is a bigger responsibility on the few remaining landowners that are getting what they would call invasive feral coming in’ (SENRM Board Member 1).
Spoils good farming land	‘They [farmers] overcame some major agricultural difficulties to clear the land and make it productive [...]. And now that's been removed to a large degree by the forestry expansion’ (SENRM Board Member 2). ‘They [trees] started to be planted in mid-1960s [...], and at the time the community called it the 'spreading green minus', the pines taking over good farm land to grow pine plantations’ (SENRM Board Member 11).
Long-term intentions of forestry companies?	‘They [foresters] are actually fighting to have permanent licences. [...] that gives them water immediately and they don't even have to prove that they're going to put in another rotation’ (SENRM Board Member 7). ‘But they don't mind if there's a negative consequence in the region because they'll just leave that region and go to another’ (SENRM Board Member 9).
Penola Pulp Mill	‘The Penola pulp mill [water] volume is not an issue in itself [...]. But the bid was to protect the bluegum forest from participating in the water balance or having to experience any reductions so that they could feed the pulp mill’ (SENRM Board Member 9).

Indeed, three of the SENRM Board Members interviewed were already members of the previous SECWM Board. However, members of the former South East Natural

Resource Consultative Committee (SENRMCC) have also been involved in the SENRM board. Nonetheless, the SENRM board is often perceived as partial, with that bias to the detriment of the forestry sector:

I think that the people within the NRM Board are so biased against forestry, they'll never come to address it. They are incredibly biased against forestry (SENRM Board Member 11).

However, these social constructions vary depending on the different stakeholders' perspective, and over time (Ingram et al., 2007). For example, viticulture companies, which are also large corporations, also experience negative opinions in the region; in general, it occurs to most corporate enterprises (Edwards et al., 2007).

In front of these local drivers, State barriers obstruct the water planning process.

7.2.2. Institutional State barriers to change

The barriers to change identified in the interviews are mostly institutional, consistent with the findings of the previous chapters. The very limited functional barriers relate to the recent wet winters, which differ from the functional barriers determined in the submissions that concerned the examined draft plan. Figure 7.10 shows the relative significance of each barrier and Figure 7.11 their distribution for each category of participant.

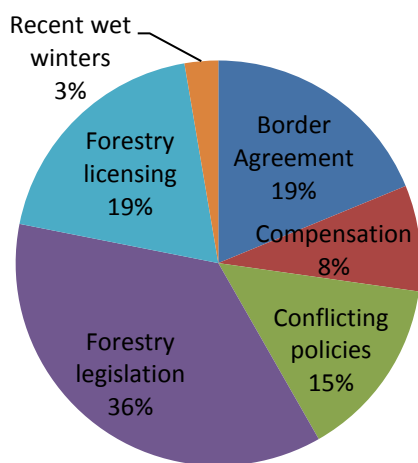


Figure 7.10. Barriers to change

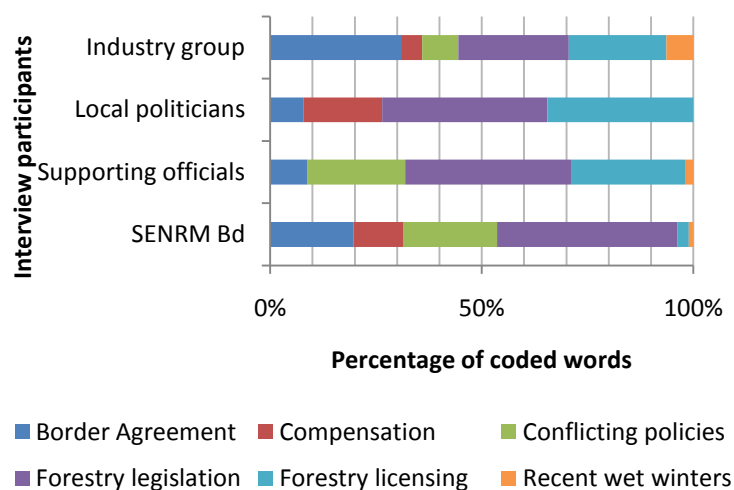


Figure 7.11. Barriers to change by participant category

The narrow functional barrier reflects the 2009 relatively wet winter (see Appendix 7.4 for annual rainfall in Mount Gambier) that lowered the need for an immediate solution. However, it echoed a former local belief that the area has plenty of water:

Because of the general view that there is plenty of water around. And if we return into a relatively wet period again, there will be water everywhere (Supporting Official 3).

Finally, it responds directly to the declining water resources driver.

The institutional barriers in the interviews emerge at the State level. Three of these barriers have already appeared in at least one of the previous chapters: i) the *Groundwater Border Agreement Act* (1985), which exacerbates the forestry issue in the Designated Zone (see section 6.2.2.1); ii) the absence of proposed compensation, which assumes that primary producers should bear the entire cost of environmental recovery and maintenance, despite the environment being enjoyed by the whole community (Hartfield-Dodds, 2006); and iii) because of the innovative concept to account for forestry water use, the draft policies conflict with the not-yet-adapted legislative environment. However, the forestry legislation and the forestry water licensing system themselves create barriers to their adoption.

7.2.2.1. Lengthy and unclear forestry legislative process

The *Natural Resources Management (Commercial Forests) Amendment Bill 2009* (South Australian Government, 2009b) was introduced in the Parliament of South Australia on the 18th of June 2009, was adjourned by a local politician and discharged the same day. Simultaneously, the South Australian policy framework on managing the forestry water use was published (South Australian Government, 2009a). The legislative process regarding this amendment is lengthy and unclear; it was sent a few months later to the Natural Resources Committee of Parliament (DWLBC, 2010a):

The Minister tabled or introduced the legislation in the Parliament and then chose not to progress it. And right before the Parliament, just before the Parliament was prorogued for the election, said that he was going to send it off to a Parliamentary Committee to look at. That was 6 months later. He introduced it I think it was in June and that was in December when he said he was going to send it to a Committee (Politician 2).

However, the amendment does not appear in the current or completed inquiries done by this parliamentary committee (Parliament of South Australia, 2010) and never

surfaced again. The Minister for Environment and Conservation and the Minister for Water last mentioned it in April 2010 as examined by a ‘joint parliamentary environment committee’ (*The Border Watch*, 6 April 2010, p. 1&2).

Distinct elements have also prolonged the legislative process (Table 7.2).

Table 7.2. Cause of lengthy legislative process

Stretched out reason	Excerpts from interviews
Legislative process itself	‘And there is an expectation by the Board that it will happen tomorrow and that will never going to happen that quickly. [...] If you follow the proper green paper, white paper, public discussion, etc, etc. you’re looking at between 12 and 18 months to get a piece of legislation into the House’ (Supporting Official 3).
Priority relative to other legislation agendas	‘[...] the amendment I think was purely just because well it’s not really high priority in the big scheme of things and so it didn’t...that’s why it didn’t make it in the agenda. They wanted to have certainly other things through’ (SENRM Board Member 4). ‘And with the election coming up as well, everything got parked into decision up to election’ (Industry Group 4).
State elections in March 2010	‘[...] because there is a State election in...is it March? So the government is now going to the care taken mode. And it’s going to be controversial, and leading into an election, the government does not really want to piss people off. Does it?’ (SENRM Board Member 4).
Forestry versus generic land use change legislation	‘[...] if you’re going to have a policy for interception, you should have a policy that addresses all intercepting water affecting activities, it should be generic’ (Industry Group 4). I was very happy to support that amendment but that was a generic amendment. [...] Now, the new attempt is not a generic power to say land use change should be enacted to empower water allocation plans to include land use change if appropriate in their WAPs’ (Politician 1).

The water planning process had already been interrupted in 2006 with a previous State election, resulting in a change in government. At the time of the interviews, a then forthcoming State election—which took place in March 2010—had already obstructed the legislative process to amend the *NRM Act 2004* with the *NRM (Commercial Forests) Bill 2009* (South Australian Government, 2009a). The forestry regulations’ orientation could also have been reversed if the government had not been renewed.

However, the perception that the forestry framework and the amendment are vague constitutes the most significant barrier to its adoption (developed in the section

7.2.2.2 as the amendment's integration with the forestry water licensing system is especially decried).

Ultimately, a consequence of this lengthy process is greater political lobbying that could have been avoided through other arrangements:

And it can be amended; there is a number of different ways that this could be done. The government has chosen a particular path on the advice of the agency. I'm sure there are some other more practical ways of doing that. So that's just another delay (SENRM Board Member 9).

This last citation demonstrates a strong divergence with the above citation of SENRM Board Member 13 (first citation in Table 7.2) and a lack of trust between the SENRM board and the government agency, which is a key issue from the social perspective (see section 2.1.2.3) and will be discussed further in section 7.3.3.

7.2.2.2. Nesting of the forestry water licensing system within the forestry legislation

In the absence of legislation accounting for land use change, the SENRM board was left with the task to account for it without any guidelines, although it was identified as having an impact on water resources since, at least, 1999 (Select Committee on Water Allocations in the South East, 1999). The forestry policies proposed in the draft WAP were deemed to be inconsistent with the State legislation; thus, not to fit within the hierarchy of cascading plans, policies and legislations (see Figure 4.1), and obstructing a smooth water planning process. Not surprisingly, SENRM Board Members disagree and do not consider the resulting forestry water licensing system, which they devised, to be a barrier (Figure 7.11):

It was not consistent with government policy at the time. So it's very nice for the Board to say "Yes you should license". But it was not consistent with the State NRM Plan, it was not consistent with the legislation, it was not consistent with anything (Supporting Official 3).

You cannot have in your new water allocation plan a mechanism which is beyond the Act. The Act does not allow you to incorporate land use change. We'll now need to amend the Act. So I just found that outrageous, that they weren't told until the last minute (Politician 1).

This is however a chicken and egg problem. Reasonably, the water plans developed by NRM boards should be consistent with the overarching plans and legislations (DWLBC, 2006a; South Australian Government, 2006). However, they also represent a sensible opportunity for the latter to be updated more closely to match the

on-the-ground context, consistent with community-based planning. Such legislation would then be more easily enforced, because of being demand-led (Marshall, 2008). More generally, it questions whether legislations should arise from the demand of a community that has achieved a consensus, or should the legislation force the consensus. The community origin of the WAP will be further discussed in section 7.3.3.

Regardless, the nested feature of the forestry water licensing system within the forestry framework and legislation is reaffirmed and emphasised in the two long but enlightening quotations:

I am not expecting any major challenge if you like to the legislation, where the real debate comes in is through the water allocation plan, because the water allocation plan sets the policies. The legislation just enables licensing to occur and says it can happen under these conditions. The policies determine how it happens, and what is allowed and what is not allowed. How you're going to run the forestry component is in the water allocation plan. And so industries, particularly the forestry industry, have requested to see the legislation and the water allocation plan so they can actually understand the whole process not just the legislation and then not understand what the policies are, or they are happy with the policies in the WAP and not understand the legislation so they want a complete package (Supporting Official 3).

The framework was meant to provide very clear guidance on how the NRM Board would treat interceptors, and unfortunately it hasn't done that. So until that is clear, we won't see any enabling of a legislation that gives every different NRM Board in the State free hands to do what it likes. Invents its own set of rules to treat one class of water user differently to one another (Industry Group 4).

Thus, although the forestry framework and legislation were prompted to assist in solving issues concerned with the impact of water from forest plantations, they are often perceived as not able to handling most of these issues. Nevertheless, the *Natural Resources Management (Commercial Forests) Amendment Bill 2009* (South Australian Government, 2009b) takes a firm position regarding the existing plantations and the entities holding the forestry water licences. It limits transfers from forestry to forestry or to generic water licences—but not the reverse—whereas the transfer conditions are usually determined in WAPs. In addition, it places a levy on the forestry licence. However the reductions to forestry water allocation are made possible, but their practical implementations—such as determining the volume of water allocated and the forest areas concerned—are left to the WAP (Table 7.3). The State forestry framework and the legislation produced were found, in this study, to not provide practical guidelines for each of the fundamental issues faced.

Table 7.3. NRM Commercial Forests Amendment Bill 2009 proposals to solve identified forestry issues

Forestry issues	NRM Amendment Bill 2009	Section
Volume allocated (incl. Forestry specificities)	Left to the WAP	s.76, s.169D(2)
Entity	‘Forest manager, i.e. the person who has effective control of the forest vegetation, either as the owner or occupier of the land [...] or as owner of the forest vegetation under a forest property (vegetation) agreement’	s.169A
recharge interception/direct extraction	Hydrological impacts include recharge interception and direct extraction	s.76
Shallow/deep water table areas	The forestry class determination is left to the WAP	s.76
Levy	Forest water licence will be subject to a NRM levy like any water licence	s.101
Reduction	‘A water allocation attached to a forest water licence may be varied (including so as to provide for a reduction in the water allocation)’	s.169E
Transfer	Allows transfer to other forestry or generic licences	s.169F
Existing forestry	‘On or after a relevant day, the forest manager for a commercial forest within the relevant declared forestry area (as the forest exists on the relevant day) is entitled, on due application under this Act made within a period specified by the relevant water allocation plan, to be issued a forest water licence with respect to that forest that has attached to the licence a water allocation granted by the Minister (without the payment of a purchase price)’	s.169I

7.2.3. Double influence factors

Similarly to the drivers and barriers previously detailed, factors identified from the interviews that have a double influence on the water planning process support and refine the results of the analyses of the new reports and submissions (Figure 7.12), in particular after disaggregating the results by participant category (Figure 7.13).

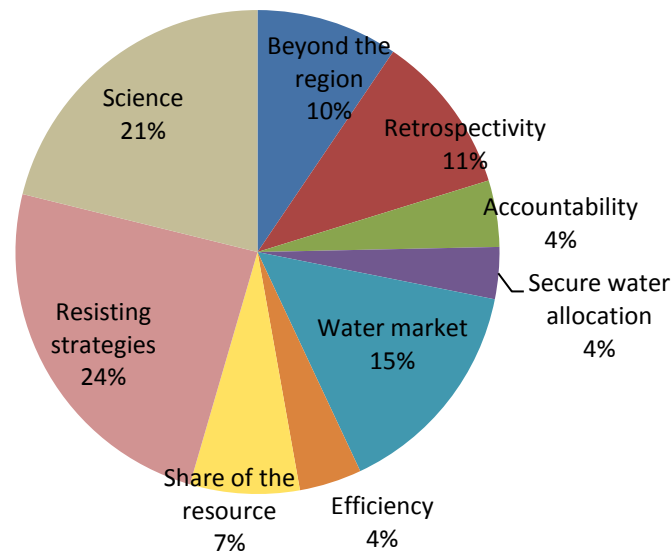


Figure 7.12. Factors having a double influence

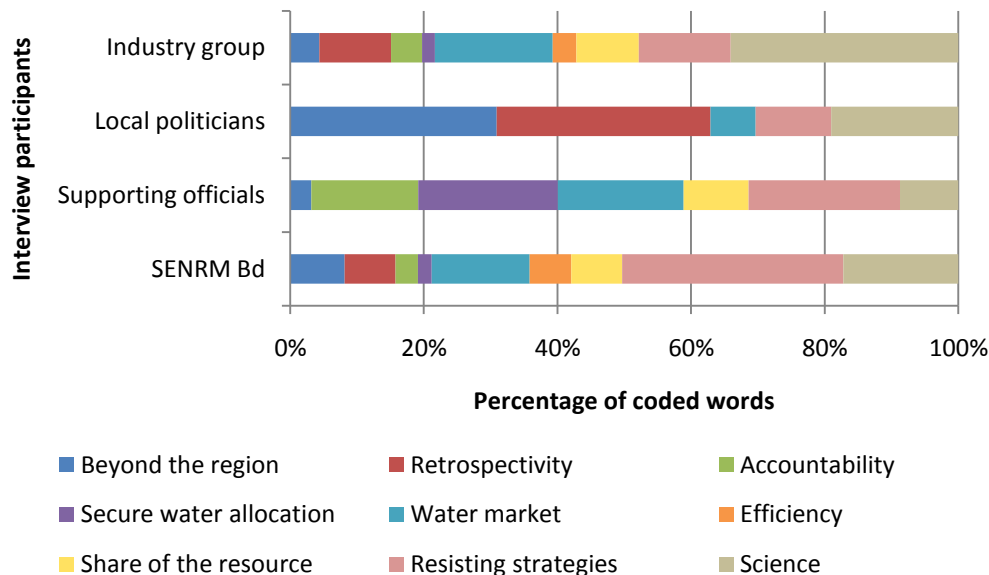


Figure 7.13. Factors having a double influence by participant category

While the science influence tends to lower in the interviews compared to that in the two previous chapters, the ‘beyond the region’ factor increases. It includes not only

the global NWI objective of sustainable water management that backs the four changes in the LLC WAP, but also includes their potential consequences outside of the region and even outside of the State. Moreover, in addition to the NWI objectives of security of allocation, accountability and efficiency already determined as double factors from the submissions, two NWI mechanisms arise from the interviews: shares of the resource and water markets. Thus, a significant part of these parallel factors actually play at the Federal level. Finally, the political lobbying factor in the new reports expands into the 'resisting strategies' factor as additional strategies are used by each stakeholder.

Only the additional aspects of already identified factors and the new factors are described below.

7.2.3.1. *Science*

In the interviews, science is interlinked with the virtual over-allocation double factor (observed in the submissions) through the science that is behind the determination of sustainable extraction limit and triggers:

The Board has some facilities under the [NRM] Act to strike a higher number. So there's one number which is one number which specifies the number of megalitres per year that can be safely extracted from a management areas, that's a scientific number. The water allocation might exceed that so the first number might be 20 000 ML, the allocation might be 21 000 ML, if the water resource is in a very good condition and looks like is staying that way, then the Board will specified sustainability number of 21 000 ML. So we'd satisfy the requirements of the National Water Initiative (SENRM Board Member 9).

Therefore this policy (South Australian Government, 2006) of easing compliance with the NWI corroborates the virtual over-allocation perception in the submissions. This reflects mistrust of the available science and reluctance to rely solely on it as a basis for some water regulations—either volumes allocated to forestry or limits established on which to base reductions:

I think most figures, while it is the best the science is giving us, we don't know, we could be a long way out (SENRM Board Member 4).

This lack of trust is however not shared equally among the stakeholders. It is a fundamental element of change for the industry groups, but it has a lower relevance for the supporting officials who are nonetheless expected to supply it to the board (Figure 7.12). Thus, despite the evidence-based policy movement encouraging policies based on science (Solesbury, 2001; Young et al., 2002), as embraced by the

Australian natural resource management (Head, 2005), science remains uncertain enough to both induce and impede the water planning process.

7.2.3.2. *Resisting strategies*

Political lobbying—or ‘economically unproductive rent-seeking’ (Hartfield-Dodds, 2006, p. 374)—identified in the news reports for industry groups (see 5.2.3.4), is also commonly practised by any stakeholder involved in policy design, including politicians and officials (Marshall, 2008, p. 84). Further, other strategies unfolded at least once during the water planning process (Table 7.4). SENRM Board Members have the strongest focuses on the strategies they had to face when drafting the water plan (Figure 7.12).

Table 7.4. Additional resisting strategies

Strategies	Excerpts from interviews
Not participating to the negotiation	‘Because in the end, they [foresters] were happy to be accountable, but to start off they wouldn't be involved in discussion about it as well’ (SENRM Board Member 6). ‘But they didn't want to come to the table and when they were, they were not participating’ (SENRM Board Member 7).
Delaying	‘I'm sure they [foresters] didn't want it to happen, so delaying was better than not having something happened that they didn't like. But they didn't agree with the model either’ (SENRM Board Member 11). ‘[...] the longer they [farmers] hold off before they are under volumetric, the better the deal they're probably getting at the moment’ (SENRM Board Member 1).

But as the first citation highlights, stakeholders have evolving strategies over the water planning process, which result in opposite influences on the water planning.

7.2.3.3. *Beyond the region: Federal elements*

‘This region has been a little bit of a test case for the country’ (Industry Group 1) as was expounded previously in the news reports (see section 5.2.2). This also implies, for some, that once adopted these forestry regulations will move beyond the region to the rest of the State, but more importantly to Victoria State and the upstream States of the Murray Darling Basin, through, respectively, the *Border Agreement Act 1985* and the Murray Darling Basin Plan (expected to be finalised in 2011):

And unless there is complementary legislation on the Victorian side then the strip along our border can't be changed (Industry Group 3).

Department in Adelaide [is...] more interested in stopping the afforestation of the catchment of the Murray. That's what has been driving. They may have some very naive beliefs that if we impose restrictions on the plantation forestry industry in South Australia, the Victorian government might do the same in Victoria (Politician 2).

However if not taken up in other States, one of their potential impacts is to move not the policies but, instead, the trees out of the area, affecting not only the water resources but also the wider local economy:

All of these bluegums that are planted in the Calendale area are downstream from them and they are not having any impact on their water table, on their water. But every time they prevent a tree from being planted up there it gets planted over the Border in Victoria which is upstream on them (Politician 2).

The NWI has also a significant position in these Federal elements as mentioned earlier: its objectives drive most of the LLC WAP changes, but its retrospectivity position also obstructs the forestry change. It was first believed to be not adapted to the region by the local politicians who, not surprisingly, do not refer to its specific objectives or mechanisms (Figure 7.12):

So many people fall into the trap of thinking that water policy, generally riparian rights, the NWI are easily translatable to the South East. They're not. [...] The Department made the assumption that the NWI was applicable to the South East. [...]. In fact, early on X and I argued [...]: '...recognize that a limited local set of unconfined aquifers do not fall within the parameters required for Tradeable Property Rights under COAG...'. Because the whole of COAG is driven around this concept of a property right, which is tradeable. This thing is not tradeable for a whole lot of reasons. One is that it's not transportable. It's not a river. [...] They're trying to create limited pool within what is basically a transferable or tradeable product...the South East is not...anyway we lost that battle (Politician 1).

More generally, the NWI fundamental objectives and mechanisms that form the basis of the water reform stimulate the water planning process, but simultaneously hinder it as they are not always achieved. The two sub-sections below detailed these parallel influences.

7.2.3.4. Water markets

The water markets in the Lower Limestone Coast are currently limited and inactive—‘There is not a lot of trading going on’ (SENRM Board Member 11). Therefore, markets are considered by foresters not able to counteract the loss of flexibility resulting from the burden of forestry water licences:

The reason you have a temporary market is to manage risk. So if you're having a water licence then you've got to have the system that enables you access that, to bring it to market to offset your use somehow (Industry Group 4).

If we had a strong market for water, then the forestry companies would say that's ok I'm going to take a reduction but I know I can buy water so I'll be ok (Supporting Official 2).

There is however a common expectation that volumetric conversion will boost the regional water market thanks to the accurate transfer enabled by volumetric licences: 'Volumetric conversion should enable trading to happen easier' (Supporting Official 3). This is confirmed by the immediate entry of water brokers in the market as soon as the volumetric conversion is in effect (WaterFind, 2010). Nevertheless, restrictions imposed by the groundwater nature of the resource will still exist. Furthermore, water markets will also be further enabled by the unbundling system introducing shares of the resource (Watanabe, 2008). As long as licences are not unbundled, the physical resource associated with a licence can potentially change, creating unreal associated values and 'water bubbles', such as some financial markets recently experienced.

7.2.3.5. Share of the resource and security of allocation

The initial intent of the water plan to couple the volumetric conversion with the introduction of resource share would have avoided the misunderstanding that volumetric licences could have a variable amount and the subsequent negotiation of this amount by industry groups:

It's unfortunate look that they've done this all volumetric conversion, they could have gone straight from area licences to shares, it would have avoid...it just raised everyone's expectations this volumetric process (Industry Group 4).

From a security perspective, the unbundling of water entitlement would have eased the implementation of reductions to allocations by preserving the corresponding entitlement. Thus, the concurrent introduction of resource shares would have reduced stakeholders' opposition to reductions:

That's people's guarantee. Because as soon as you just start talking about changing the quantum, you need to get rid of the fear that one individual or one [...] business gets more or less as a percentage. So if you guarantee the share, that takes one of those senses of insecurity or negativity, it takes it away and that's important (SENRM Board Member 8).

It would also have avoided the compensation claims associated with reductions to allocations, which evidences that the ‘perpetual share of the consumptive pool of the resource is the weakest legal right for users to date’ (McKay, 2008, p. 58), in spite of its perceived security and the NWI claims of water right security:

I guess our industry is glad to see the water ownership being more secured, of a share of the resource in the form of a water title (Industry Group 1).

7.2.4. Indirect influence: Forestry SA’s forward sale

The South Australian government Treasury announced in November 2009 an intention to investigate a forward sale of timber from Forestry SA—a major State-owned timber company in the South East—of up to three rotations (*The Border Watch*, 12 November 2009, p. 1). This indirectly puts pressure on the LLC WAP process to be resolved as certainty is required when determining the plantations’ selling price:

The Treasury Department that are responsible for the sale and their position is 'get the WAP sorted'. Potential buyer wants surety. So they want...they don't care what it is, but they just want to know what is the policy position (Supporting Official 3).

They [Treasury] don't want any policies that devalue...if the government or the Board policy is: you can only guarantee one rotation of wood, how can you sell 100 years worth? You get nothing more for 100 years than you will for 30 years, so people will only bid for 30 years, because they cannot guarantee they are going to get anything in the future. So Treasury doesn't like this at all (Supporting Official 2).

In late 2010, the local community organised a petition against this forward sale due to expectations of significant negative social impacts—it would ‘kill communities’—and labelling it a ‘privatisation’ of the State-owned forestry company (Figure 7.14).



Source: Photo taken by Gillet, V. in Mount Gambier (November 2010).

Figure 7.14. Don’t privatise SA forests

This forward sale stresses the contradictory positions held within the government, which will be further discussed in section 7.3.2.2.

7.2.5. Changes as drivers

The two strong correlations proposed in section 6.2.4 between volumetric conversion and reductions to allocation on one side, and reductions to allocations and forestry regulations on the other side, are supported by comments in the interviews:

My idea is that volumetric conversion allocated more water that was recognised under the IE system and that's where the cuts come in as a subsequent to the increased allocations (SENRM Board Member 3).

If non-forestry groups ended up being the only ones to have to absorb all the cutbacks in a zone (SENRM Board Member 8).

While the first relationship is based on the recognition of sustainable extraction limits, equity is the rationale in the second correlation.

The last link, between volumetric conversion and forestry regulations, appears in interviews and is based on the belief that volumetric conversion enables forestry licensing; also verifying the importance of water markets as a means for forest companies to cope with the introduction of forest water licences (see section 7.2.3.4):

But in the future volumetric conversion is also quite important in term of enabling us to implement the forestry development due to water trading (Supporting Official 3).

The three connections between these interrelated changes are indicated by blue arrows in Figure 7.15.

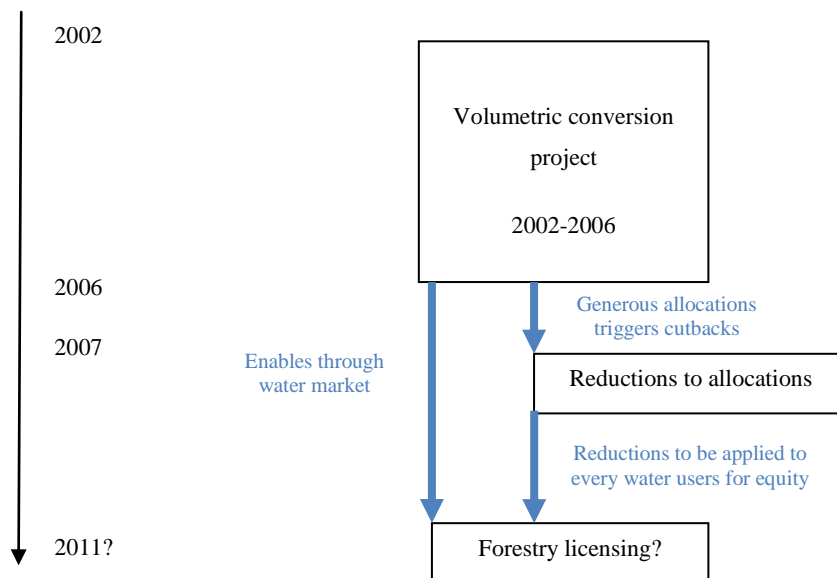


Figure 7.15. Relationships between three of the main changes in the LLC WAP

7.3. SOCIAL SUSTAINABILITY PERSPECTIVE

The general lack of social sustainability consideration is again observed in the interviews. However, some possible rationales for it also emerge: the perception that stakeholders have limited acquaintance with social studies and the indirect consideration of the social dimension:

But I think the biggest barrier for a social understanding is that to do it thoroughly it would be time-consuming and complex. [...] But also it's a whole area of science or assessment that nobody is familiar with, so we're really uncomfortable to do that. And I think that's probably one of the biggest cultural barriers (Supporting Official 2).

7.3.1. Social sustainability only dealt with indirectly

If not approached directly, the social sustainability is, however, sometimes considered through the lenses of other instruments, as reported in Figure 7.16.

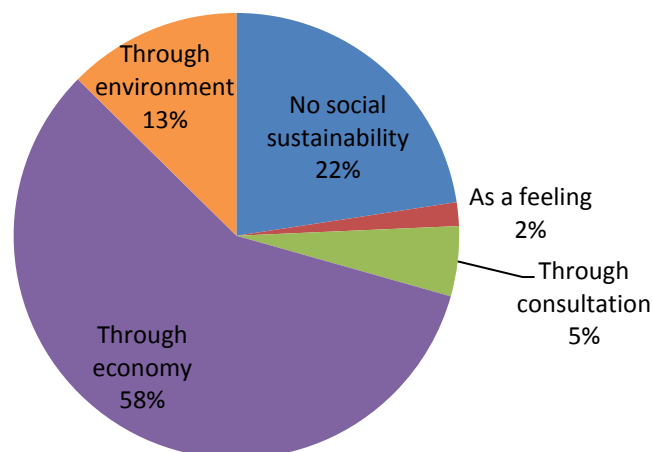


Figure 7.16. Social sustainability dealt with indirectly

For their strong relevance to this research and after a thorough examination of the reason for weak direct consideration of social sustainability in water planning processes, citations making explicit these intermediaries are presented in Table 7.5.

Table 7.5. Intermediaries to the consideration of social sustainability

Intermediary	Excerpts from interviews
Feelings	‘I just think that I have a gut feel that socially we have been reasonably equitable [...] about sharing the water’ (SENRM Board Member 1).
	‘So I think what's the Board has to do, and I think we've done reasonably well, is try to find a balance between what's best for the economy, what's best for the environment, and what's best for the...social aspect of living in the South East. [...] But socially, yes, socially, we've done reasonably well’ (SENRM Board Member 10).
	‘So the social views come through the process outlined in the NRM Act, so the Concept Statement that goes out to people. People make up society therefore the views are social views [...]. So that's the sociological side of things. So we wish to use that method’ (SENRM Board Member 9).
Consultation	‘The social aspect comes in to the way in which the Board as required by the NRM Act sets up an engagement process with the community. [...] that engagement process was to identify what are the trade-offs between different parts of the community and how do you make those decisions’ (Supporting Official 3).
	‘The social part is for me when you as an individual can get up [...] and say “I'm not happy about this and it's not equitable”. And we're happy to take on board’ (SENRM Board Member 1).
	‘[...] healthy industries bring healthy communities’ (Industry Group 1).
Economy	‘The social outcome is a result of the economic outcome. So I mean if you destroy or affect in some negative way the economic outcome, you're going to have a direct effect on the social outcome’ (Industry Group 3).
	‘[...] the market makes a lot of social decisions. [...] So I believe the market is an opportunity to address the social issues. You still might not understand the social issues, but we understand the market as a good way of resolving the social issues’ (Supporting Official 2).
	‘And the dilemma of characterising the social demands on the water resource: are they direct or indirect? So if they are indirect, it's going to be via [...] a local government or industry sector. [...] So the Board resolved to seek consistency across the region while acknowledging macro differences. It does not matter whether you're come in as a grape grower [...] or whatever: same rules for everybody. And the market can understand that’ (SENRM Board Member 9).
	‘They [swimming pools] definitely have an equitable social side where they are getting it at a fairly and extremely cheap price’ (SENRM Board Member 1).
Environment	‘[...] our underground aquifer is responsible for so much of the economic activities, that if you can manage that sustainably, then it has obviously huge social benefits’ (SENRM Board Member 8).
	‘And the other aspect of social or the other social impact is: what is the effect if we don't manage the resource properly, what is the future effect on irrigators for instance, water users?’ (SENRM Board Member 10).

The view that social sustainability is often appropriately considered through economic instruments, and in particular the water market, is upheld in the literature (Nancarrow & Syme, 2001) and was previously debated and then dismissed in section 4.1.2. This is further repelled by the emerging prospect that water could later be assumed as an investment and thus become an economic commodity only, which would imply a loss of associated cultural values:

People aren't buying water and sitting on it in the South East. People are buying water to use it, not buying water as an investment at this stage (SENRM Board Member 8).

Addressing social sustainability through environmental conservation often underlines the economic perspective as the penultimate citation in Table 7.5 evidences. However, the sole environment intermediary is also corroborated: 'social sustainability as a means to achieve ecological objective' (Foladori, 2002).

The consideration of social sustainability through consultation is also expressed by several Australian water academics (Syme et al., 1999; Nancarrow & Syme, 2001; Bowmer, 2007b); however, this overlooks the limits of the consultation process that is used in water planning, which rarely achieves the required degree of citizen empowerment (Arnstein, 1969). Moreover, it also ignores the significant distinction between public participation and building social capital (Rydin & Pennington, 2000). A national study emphasises this difference by declaring engagement, partnerships and capacity building to be the 'social foundations of NRM' (Fenton & Rickert, 2008, p. 2).

Nevertheless, the five principles of social sustainability that encompass these three social foundations were also observed in the interviews (Figure 7.17) and are shown disaggregated by participant category in Figure 7.18.

Community engagement largely leads the five principles. Social values of water are also raised, in particular the Aboriginal cultural access to water, which attracted a dedicated question. Distribution by stakeholders displays almost similar findings for each category, except for the supporting officials. Their narrow interest for the future focus and quality of life principles compared to the engagement one, verifies that the State government is less likely to recognise capacity building in NRM—interlinking these two principles—than community engagement (Fenton & Rickert, 2008).

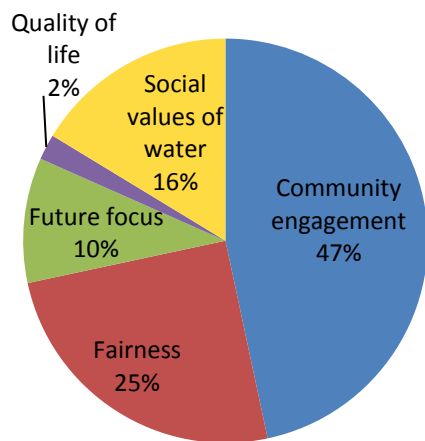


Figure 7.17. Five principles of social sustainability

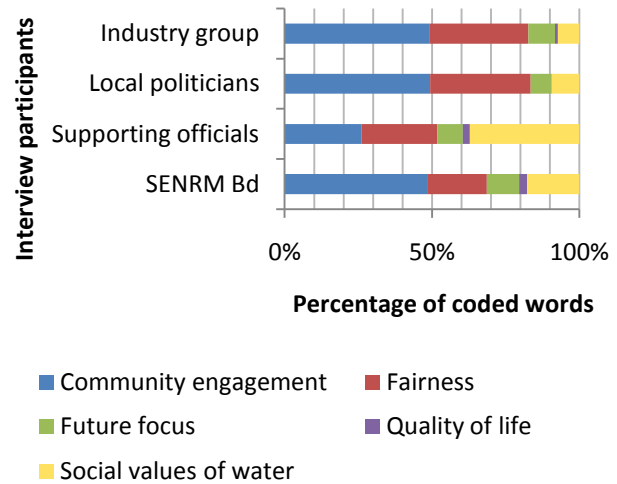


Figure 7.18. Five principles of social sustainability per participant's category

7.3.2. Fairness

Overall, the three justice elements of fairness are well balanced. However, industry groups are largely concerned by the interactive justice, politicians by procedural justice and SENRM Board Members and supporting officials by distributive justice (Figure 7.19 and Figure 7.20).

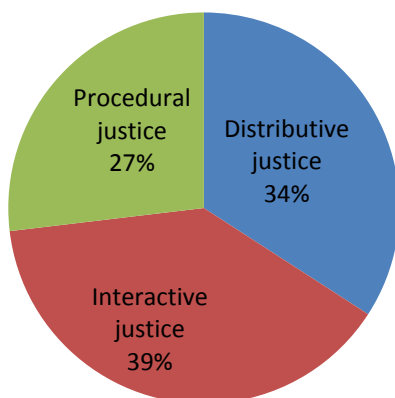


Figure 7.19. Fairness principle

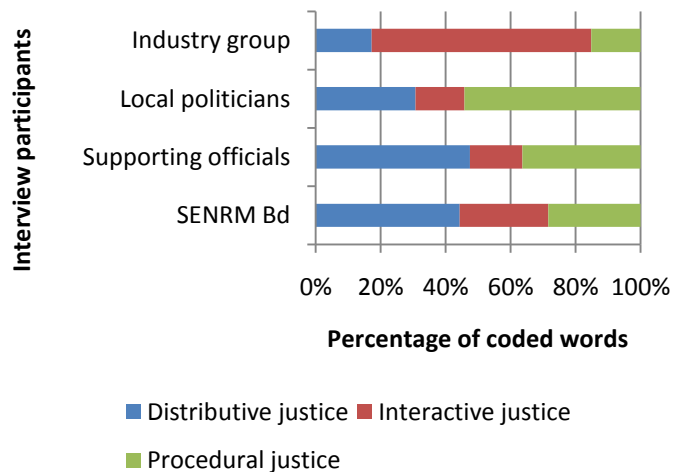


Figure 7.20. Fairness principle by participant category

7.3.2.1. Distributive justice: volumetric conversion and options for reallocations

Distributive justice shares a paradoxical relationship with the volumetric conversion process. The generous allocation provided by the conversion tends to disregard the distributive justice through an efficiency-related discourse:

But you always get winners and losers, don't you? And you would always hope that's the good guy that becomes a winner but that's not always the case in this sort of equity things (SENRM Board Member 1).

Nevertheless, the accuracy improvement derived from the conversion also fosters the distributive justice: 'But I think that going to the volumetric is something that...it will help with the equity' (SENRM Board Member 4).

However, consistent with the submissions, distributive justice is mostly concerned with the options of water reallocations and with who should bear the reductions to allocation:

So the decision for the government is that everybody shares in reductions where the resource is over-allocated. [...] But the government has to make a decision or allow the Board to make a decision that where a resource is over-allocated and showing signs of stress, that everybody...all the licensees there share the reductions or one group is quarantined for reductions and therefore the other groups takes all of the reductions, or neither of the two groups take reductions and you take it off the environment (SENRM Board Member 9).

Two stakeholders are specifically targeted. First, the forest sector, which links back to the strong relationships evidenced between the reductions and the introduction of forestry water licences (see section 7.2.5). Second, the industry exemption from getting reductions (SENRM Board, 2009f), which had a dedicated question in the interviews, seems well supported for the following reasons: i) industry does not use a large volume; ii) it is needed to process local primary production; iii) it uses the confined aquifer—agriculture uses the unconfined one; iv) it has a high level of employment relative to the volume used; and v) industrial water allocations are often granted by government and cannot be altered.

7.3.2.2. Procedural justice: lack of consistency and internal conflicting positions of the government

The procedural justice issues surfacing in the interviews are twofold. First, it concerns conflicting positions regarding the forestry accountability within the government. This is partly due to the fact that 'the government are foresters themselves' (SENRM Board Member 5) through its State-owned company, Forestry SA. In addition, it also reflects common internal rivalry between departments (Molle et al., 2009) in particular between DFW and PIRSA Forestry:

One of the other things that created an issue is there are too many people involved, too many organisations, too many parts of government involved with conflicting views as well. That's still creating some issue as well. You've got the

Board with a position, you've got the DWLBC with a position, you've got PIRSA economic development with a position. And there's conflict there (SENRM Board Member 2).

This rivalry was more clearly exposed during the State debate of the second phase on forestry licensing, through the Inter-Departmental Committee and the potential forward sale of Forestry SA (see section 7.2.4). This internal conflict not only conceals the community interest but it also delays the planning process:

But because different agencies have different agendas they can't agree, and the water allocation plan has been held up (SENRM Board Member 9).

The second type of procedural justice issue raised in the interviews is the lack of consistency. Since the LLC WAP revision started, four successive Ministers have been in charge of the environment: Hill, Gago, Weatherill and Caica; with even more involved in the forestry debate since the late 1990s:

Wotton, Kerrin, Kotz, Brindal, Hill, Gago, Weatherill: 7 Ministers. No continuity. None of these Minister even having the time to understand the issues (Politician 1).

This lack of consistency also appears at lower level: the DFW was previously named DWLBC from 2003 to 2010 and was known as DWR earlier:

And we find we get to a certain point and then there is a change of administration, whether it's a change of government or just a change of Minister or change of the public servants that are involved in or here the key people negotiating this. And that's frustrating us to no end (Industry Group 3).

7.3.2.3. Interactive justice: picking winners

The procedural issue of favouring one stakeholder over the others that was identified in Chapter 6 results in 'picking a winner', i.e. an interactive justice issue:

And we all know that the bigger disaster in government is picking winners. Sorry, the governments traditionally are hopeless at picking winners (SENRM Board Member 8).

Now, the agencies are now particularly persuasive in saying water should be taken off other industries or the environment and given to forestry. So it wants to pick a winner (SENRM Board Member 9).

The 'pick a winner' expression, which was recurrent in the interviews, particularly those of SENRM Board Members and industry groups, is also used by Rob Freeman—the former chief executive of DWLBC between 2002 and 2008—to

ensure that it is not a decision criteria for a balance between economic, social and environmental impacts (Cruse, 2010).

Moreover, the main interactive justice issue opposing the farming and forestry specificities, detailed in section 6.3.2.2, is fully validated by the interviews. However, farmers use the principle of precaution to discard the interactive injustice claims of foresters:

I understand what they are saying but I think, we irrigators, could argue about a whole lot of issues that are very similar. And I think the answer is that no model would be perfect but we have to have at least a model, which somewhere along the track may have to be modified over time (Industry Group 3).

7.3.3. Community engagement

The community engagement principle emerges in interviews through six elements, among which four are newly identified—confusion of power control, no WAP committee, WAP reflects community values and transparency—while the other two confirm features of the consultation already mentioned (Figure 7.21 and Figure 7.22).

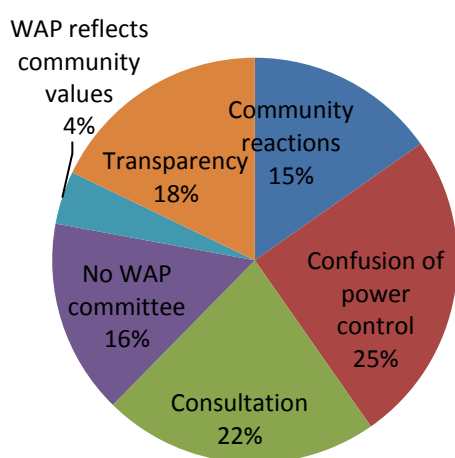


Figure 7.21. Community engagement principle

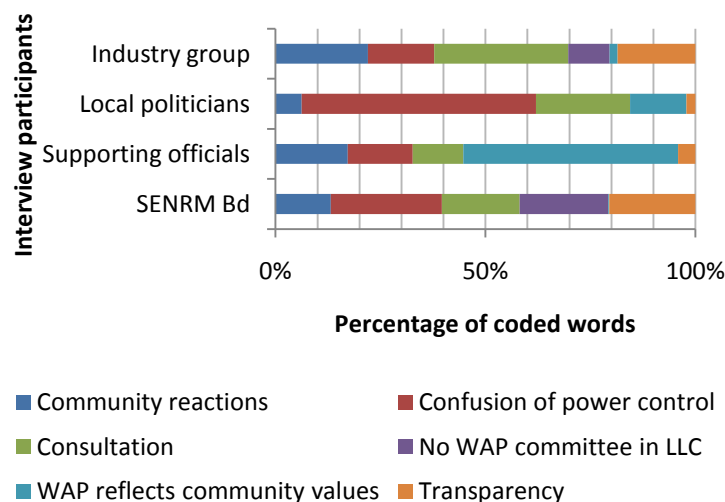


Figure 7.22. Community engagement principle by participant category

7.3.3.1. Community reactions to the water planning process

Three reactions have been identified in the community as a result of the water planning process. Among those, the general support of farmers to the volumetric conversion has already been reported (see section 7.2.1.1) and the collaboration among farmers largely confirms the coalition strategy that emerged in the analysis of

the news reports (see section 5.1.3). The third reaction has been however less discussed in this study up to now: the loss of interest in the community towards the water planning process. This reaction has two origins: i) the fatigue generated by an increasing number of consultation: ‘the biggest problem that we have nowadays is that we are all consulted to death’ (SENRM Board Member 1). A fatigue that corroborates consultation ‘overload’ (Cook, 2002, p. 517); and ii) specific to the water planning process, its lengthy timeframe and repeated delays:

I think it has just been dragging on for so long that some people are starting to lose interest and just don't want to be bothered with it (Industry Group 1).

This suggests that the delayed adoption of a revised water plan could alter the intensity of community engagement and further undermine its perceived community ownership, as well as its local adoption and implementation, thus weakening its social sustainability.

7.3.3.2. Confusion over power control

Interviews suggest a significant confusion over power control at distinct levels. First, in spite of the WAP process being under the responsibility of the NRM Board according to the *NRM Act 2004*, it is finally adopted by the Minister who makes the final decision and, therefore, can overturn a community-based decision. Such an overturn happened in the Murrumbidgee basin (New South Wales) where reductions to allocation were done based on history of extraction in spite of a community-based decision to have them reduced across the board (*Murrumbidgee Groundwater Preservation Association Inc v Minister for Natural Resources*, 2005).

Such arrangements reflect public participation without empowerment and are common because both decentralisation and subsidiary principles (Ryan et al., 2010) do not always include devolution of power (Marshall, 2008). Indeed governmental agencies are willing to share responsibility over NRM planning and management but not their power (Buchy & Race, 2001), which is based on an accountability rationale (Whelan & Oliver, 2005). However, the community committee needs to be aware of its actual role of only providing advice to the Minister (Tan, 2006) and also be aware of the distribution of responsibilities within decision-making (Bowmer, 2007a; Robins & Dovers, 2007).

Secondly and more importantly, the State debate phase introduced into the LLC WAP because of a lack of consensus achieved locally created confusion over responsibilities usually defined in the *NRM Act 2004*:

Normally we're completely in control of all the process. At the moment, there are parallel processes occurring within the bureaucracy in Adelaide between various government departments (SENRM Board Member 8).

But agencies have intervened and have wished to recast some of the approaches devised by the Board. [...] The Board has responsibility but the authority has been removed to Adelaide (SENRM Board Member 9).

While this might be justified by the need to amend the *NRM Act 2004*, better handled at a State level (Marshall, 2008), this allowed involvement of additional departments that are not usually formally associated to the water planning process through the IDC, where conflicting views at governmental level could unfold. This creates hesitations in the political sphere, which stretches the legislative and planning process timeframe even more. The LLC Taskforce, later introduced, aggravates the confusion among the local and departmental water authorities as it sidelines the SENRM board: 'The issue is that the Board is supposedly writing his policy, but it's actually the DWLBC' (SENRM Board Member 4). In the new governance of NRM involving actors from local to State levels, the State is usually required only for 'defining guidance, participatory incentives and enforcement capability' (Gunningham, 2009, p. 163). Therefore, the underlining concern regarding this process is the inattention being given to the community's perspective:

Where governments run these processes and they don't tend to take on community view's and there is very strong inputs and they tend to be more swayed by lobbyists and political things that have political prominence at the time (SENRM Board Member 9).

Not only does the planning process lose its community-based substance, but the social capital usually built by the community in the engagement process would not be fostered, as it needs to 'align authority with responsibility' (Lam, 1996 in Rydin & Pennington, 2000). The DFW substituted its usual 'facilitator' role for a 'controller' role in building the LLC water institutions (Rydin & Pennington, 2000).

7.3.3.3. No local water plan committee but WAP does reflect community values

Two of the elements discussed regarding community engagement in the LLC WAP are paradoxical. On the one hand, unlike other PWAs in the region, there was no water planning committee, despite various structures being initially proposed:

We wished to establish some reference groups by industry: a dairy reference group, a grape reference group, a pasture and meat growing reference group, and a forestry reference group. But there was no interest in doing that, so we formed one reference group where we could bounce ideas around. But there was a very adversarial tone to it (SENRM Board Member 9).

And in every case if you take Tatiara, Padthaway, Tintinara-Coonalpyn even completely outside like say the McLaren Vale, they had always had a committee that has been involved in developing the plan. So not just saying this is our policy what do you think? They have been involved in developing the policy, they have been involved in the whole process right the way through (SENRM Board Member 4).

However collaborative planning is not a ‘conflict-free zone’ (Whelan & Oliver, 2005, p. 130) and disputes can even create a bonding basis for such groups (Eisler and Montuori, 2001 in Whelan & Oliver, 2005). The large geographic area of the Lower Limestone Coast PWA and the diversity of industries included are also suggested as rationales for the failure of the group:

Well, I suppose in those other areas, there probably wasn't the diversity, there were strong community, very small geographical..., only one or two main industries (SENRM Board Member 4).

The absence of a committee is an example of institutional arrangements that encourage lobbying (Hartfield-Dodds, 2006):

At the Board level you're trying to be very careful about [...] the big industry bodies have professional lobbyists and scientists and people writing papers for them and asking for special meetings with the Board or delegation of the Board (SENRM Board Member 8).

This questions where the limit between consultation and lobbying may occur. Another implication of these arrangements is the absence, for the general community not directly involved, of an incentive to participate:

They have engaged industry, but only selected industries, so they've been very good in working with the forestry industry, the viticultural industry, and probably the dairy industry. But once you've gone outside of that...and the community as opposed to industry groups or grower groups or whatever, they have been very poor on them (SENRM Board Member 4).

On the other hand though, supporting officials are keen to state that the WAP is a reflection of community values (Figure 7.21):

The plan gets more and more sophisticated each time we visited it and it is a reflexion on the community values (Supporting Official 1).

So the community can identify what are its accepted standards of management are, the Board needs to help them to do that (Supporting Official 3).

Likewise, opinions that the forestry water licensing process started locally are common:

And in best of all worlds you need to do that first [State framework], as opposed to starting at the local level (Supporting Official 1).

In spite of the absence of a local committee, the SENRM board seemed to have managed to produce a draft WAP that is consistent with the farming community's perspective, as already indicated in the previous chapter (section 6.1.3.4).

The local initiation of the process also relates to the origin of legislation as discussed in section 7.2.2.2, on which most agree that it would have been easier to have a State framework first in place: 'it shouldn't be tasked with inventing a national licensing system for forestry, or a State system for forestry' (Industry Group 4):

I don't think that is the right way around. I think we should change the legislation, so write a plan under the current legislation and then change the legislation then write the next plan (Supporting Official 2).

Therefore we need to have a national approach before you have a State approach and before you have a local approach (SENRM Board Member 9).

The distinct institutional arrangements in the LLC WAP may have impacted severely on the resolution of the forestry issue, as well as altering the transparency of the process.

7.3.3.4. Transparency, communication and trust

The opinion about the SENRM board handling of the process is largely dependent on the sector: 'generally speaking most things are transparent' (Industry Group 2) from the farming sector, but 'it's very limited in what information are shared' (Industry Group 4) from the forestry sector. However, even from the best perspective, the process is stained by some punctual but significant transparency and communication issues:

The Board has not been able to release to the community the results, its responses to the December 2007 consultation. And many of the questions or fears which were raised in that consultation have been addressed and people will find them the solutions practical and some might even like them. But we're not in a position to share that with the regional community and this is one of the issues for the whole process of the water allocation planning (SENRM Board Member 9).

However, best practices on public participation recommend ‘communicat[ing] to participants how their input was, or was not utilized’ (Tan, 2006, p. 14). These communication issues emerge from the distance taken with the formal planning process in the *NRM Act 2004*, which did not anticipate any lines of communication:

We're not in a position to communicate with the forest sector or any other sectors other than conversations. And there is no process laid out (SENRM Board Member 9).

In addition, the confrontation of interviews reveals that the lack of communication resulted in a misunderstanding over the forestry stakeholder process: the consensus perceived by the SENRM board over the deemed rates of forestry extraction does not override the remaining sticking points that the forest sector considers fundamental.

From a social learning and engagement perspective, communication and information sharing is crucial (Syme & Eaton, 1989) to rendering the ‘centrality of stakeholders’ (Saleth, 2006, p. 17). Moreover, this lack of transparency and communication affects directly the trust that stakeholders hold towards each other. The forest sector does not trust water authorities due to previous consensuses being overruled—forestry expansion threshold and retrospectivity in particular:

So again, putting our future in the hands of a community group that's inherently biased, by its own mission and that was anti-forestry by their words and actions to date (Industry Group 4).

Furthermore, using an agency controller role as opposed to a facilitator one, could generate a lack of trust between the DFW and the SENRM board, as mentioned previously (see section 7.2.2.1) and as illustrated with the following citation:

The government representatives on the Board are allegedly on the Board as non-voting members, such that they can convey, say primary industry resources' thinking to the Board and conversely take the Board thinking back to PIRSA. It seems to me that's been a one way street, the representatives take back the Board thinking to the government agency, but the agency is not forthcoming in providing the reverse of that to the Board (SENRM Board Member 10).

This is also confirmed by the discrepancies between the views of SENRM Board Members and those of supporting officials regarding the existing barriers to change affecting the water planning process (Figure 7.7). It also supports and enlarges on the results of previous studies (McKay, 2008), including a national audit of NRM management arrangements, but it also partially contradicts findings which suggest that the level of trust from the regional NRM bodies towards the State government is high, while the reverse is relatively low (Fenton & Rickert, 2008). The discrepancies could also alter the proposed rationale of the relatively low performance of decision making and governance arrangements observed in South Australian NRM bodies—it was argued that their recent establishment was to be blamed for their low performance (Fenton & Rickert, 2008).

7.3.4. Future focus

The interviews validate the findings in the previous chapters regarding the future focus principle of social sustainability. The adaptive management dominates again, as seen in Figure 7.23.

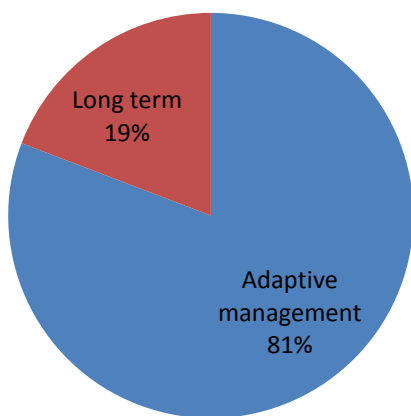


Figure 7.23. Future focus principle

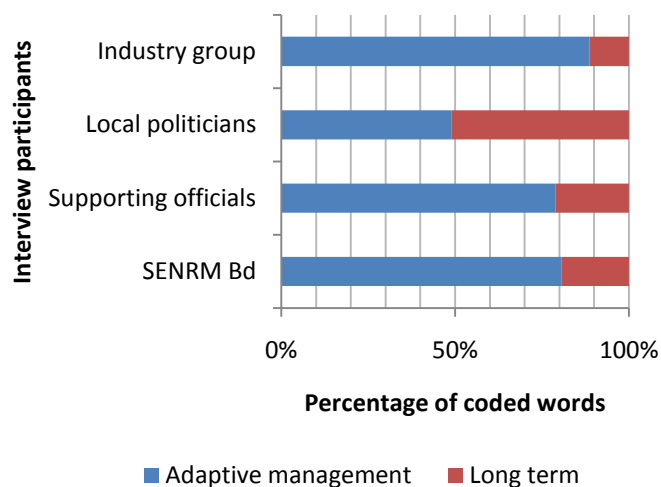


Figure 7.24. Future focus principle per participants' category

The tool cited as the best to provide adaptive management is the unbundling of licences and the introduction of shares, approaches that will reflect more closely and rapidly the actual water available:

I think the better mechanism is the mechanism that has been proposed by the State that is the separation of components of your water right. So you have a share of the resource and perhaps on an annual basis your allocation will be decided (SENRM Board Member 2).

Shares of the resource indeed adjust the planning with live data, while it was previously based on past conditions (Postel, 1999) that are now mostly invalid due to climate change (Jackson, 2008). Before shares are introduced, however, triggers associated with groundwater monitoring, were mentioned as the currently available tools that enable some allocation flexibility:

We have a very good groundwater monitoring system. [...] adaptive management is about recognising the trends and adjusting to that (SENRM Board Member 3).

There are nonetheless some doubts about the concept:

How you determine the word 'adaptive management'? Because, in some cases, that irritates me, that well...we've buggered up the landscape, so we'll adaptive manage it now (SENRM Board Member 1).

It's a terrible term. [...] if you're a competent manager, you don't need to have adaptive management because it will all happen automatically (SENRM Board Member 10).

Finally, the long-term vision and the future focus of the water plan is, in general, somehow obscured by political intrusions in the regular planning process:

I consider it [the water plan] to be a political decision, not a decision based on any strategic future thinking, or strategy for the future, which I think it's a bit disappointing (SENRM Board Member 9).

7.3.5. Quality of life

Contrary to results in the previous chapters, the quality of life principle in the interviews was conveyed not only through employment and economy—or livelihood—but also through health, well-being and, more significantly, lively rural communities (Figure 7.25).

Due to the very limited references to this principle, as well as the following one, the distribution per stakeholder was not meaningful and is therefore not presented.

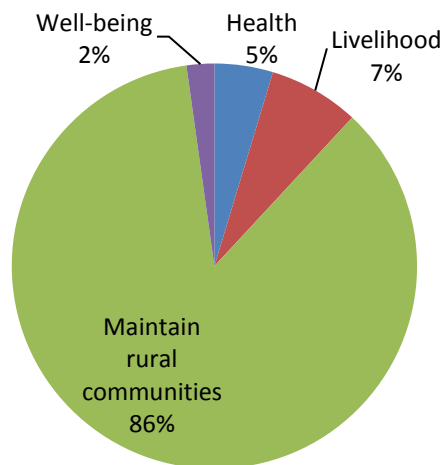


Figure 7.25. Quality of life principle

The predominant maintenance of rural communities is mostly linked with the negative social construction associated with forestry (see some relevant citations in Table 7.1), but also to the ‘yeoman’ or family farming ideal that binds the farming sector (see section 5.1.3.2):

I think maintaining communities is important. I guess there is a sort of traditional country life that has developed over many years and it's probably in decline due to the same sort of factors that are affecting timber mills: you have got to get bigger and more efficient to be economically viable. I think it's important that we don't do things that increase the decay of that social fabric (SENRM Board Member 2).

It also replaces the economy within the social dimension of sustainability (see section 2.1.1.1), as being in service of the community:

One of my great test is, even on a strong personal economic development: we live in a society of economy so your first obligation is to facilitate viable communities, not start off with viable economy, they go hands in hands, but ultimately community is what it's all about (SENRM Board Member 8).

So it's important for instance to have water bodies [...] for health and social well-being as opposed to just an economic existence (Supporting Official 1).

7.3.6. Social values of water

Results from the interviews corroborate the social values identified for the region in the news reports and in the submissions, with the only exception being the drought-proof community value (Figure 7.26). Reasons for the dominance of the Aboriginal access to water among the social values are three-fold, or a combination thereof: i) the momentum, occurring just after a discussion was initiated in a SENRM board meeting (SENRM Board, 2009d) and simultaneous with the development of a

government position on the theme (SENRM Board, 2009b); ii) a dedicated question in interviews, due to the importance of their access to water from a social justice perspective and its very weak representation in the previous data; and iii) the relatively low occurrence of other values.

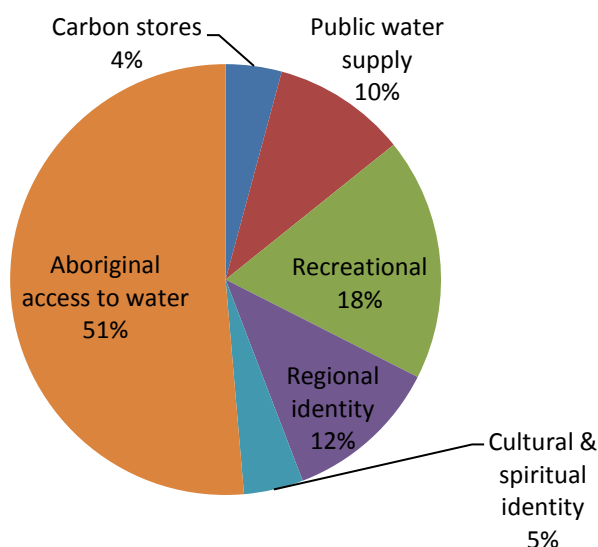


Figure 7.26. Social values of water

7.3.6.1. Recreational

Recreational water licences are discussed in interviews in the context of reductions to allocation, from which, like industry, they are exempted due to the low quantity of water they require:

We've got this stupid situation, that because two soccer pitches out there didn't apply for some water, for some reasons [...]: they are now illegally extracting water. One cupful...totally irrelevant (Politician 1).

The strong connections between the recreational values of water and the quality of life of the local community have also been underlined:

A big percentage of this community is involved with water in a recreational sense in some way or the other (SENRM Board Member 8).

Recreational water is about community good, so social good and people feeling good about where they live and it sets the place (SENRM Board Member 9).

7.3.6.2. Basic human needs

Reductions to allocation also do not concern critical human needs for water because of their low volume of water, but more interestingly because they have been given a

priority level atop any other uses, including the environment, as a way to reflect their vital value:

Water for critical human needs has been clearly identified as a priority but that issue in the South East is a relatively small volume of water for towns and all of those sorts of social types of activities (Supporting Official 3).

7.3.6.3. Carbon stores

The occurrence of the carbon stores value of water, related to forest plantations, in the news reports, the submissions and the interviews, clearly indicates that future planning has to integrate such a social objective, or provide for a mitigating policy:

There has been no consideration to the carbon sink that benefits from forests, and again that's something that's for forestry companies there is no...that's a community benefit. [...] most of the forests in this region are plantation pre-Kyoto forests so they are not eligible to count your carbon [...]...virtually none of the forests here will have any kind sink value to the owners, it will be effectively a nationalised benefit (Industry Group 4).

7.3.6.4. Regional identity

The regional identity of water is nurtured by a community that values its water resources:

And the community, as a whole, values their water resources probably in this region more than in others. People talk about water here and have a quite I think sophisticated view of the water resources. [...] people understand the value of that [water resources]. They have a lot of opportunities to think about that. [...] And of course we've got the window to the underground water resources through the Blue Lake (Supporting Official 1).

The famous Blue Lake in Mount Gambier, seen as a window on the aquifer, but also the wetlands and other ecosystems very specific to the Limestone Coast are ‘a very important part of the South East. These make the area very unique or almost’ (SENRM Board Member 3):

The South East of South Australia, and the South West of Victoria have the majority of the wetlands ecosystems of Southern Australia. And so the proper management of the underground water of the Lower Limestone Coast means that those wetlands can be sustained for the long term, [...] and the character of the region in which people chose to live. So people love their region, they love the Limestone nature of it, they like the sinkholes, they love the giant red gums in the wild coast and they love the wetlands (SENRM Board Member 9).

The special environment like the rising spring karst wetlands in the deep caves and the coastal lakes and the special peat swamps and that sort of things that are supported in the region are also of great value to the community but not easily articulated (Supporting Official 1).

7.3.6.5. Cultural & spiritual identity

Cultural identity is strongly related to the previously identified regional identity, but the bond is not specifically with a regional water feature, but rather with water and watery environments themselves: ‘The Board actually has quite a strong environmental ethos’ (Supporting Official 1):

Access to an environmental resource in a way that is non-economic, recreation and spiritual access to those resources. And [...] sort of cultural aspect of who we are and what makes us, particularly in that part of the world, water is a big part of that. So, you know, cultural connection as in what we just talked about for indigenous people, but for the non-indigenous people also (Supporting Official 1).

The Aboriginal cultural access to water definitely falls into the cultural and spiritual identity but is specific to Aboriginal people and, because of its relevance, is detailed below.

7.3.6.6. Aboriginal access to water

Recently, Aboriginal rights to water have been protected internationally with the General Comment 15 of the United Nations Committee on Economic, Social and Cultural Rights in regard to access, pollution, control and management (CESCR, 2002, section 16). This has not yet been reflected throughout Australia:

In the Lower Limestone Coast, the traditional connection to water is not well articulated by the community that's here (Supporting Official 1).

As a result, the government position on, and approach to, Aboriginal access to water is currently being drafted:

It's new thinking. [...] The concept of cultural access to water is new so our State has only just produced a discussion paper (SENRM Board Member 9).

So we're just starting to look at what sort of policies and positions should the government be putting forward in relation to water for cultural access (Supporting Official 3).

Yet, in New South Wales, where Aboriginal people are generally represented by one board position in water planning (Robins & Dovers, 2007) and where a formal Aboriginal cultural water licence exists, Aboriginal people are still ‘powerless in the decision-making processes that directly affect [...] their cultural and spiritual identity: water’ (McAvoy, 2008, p. 9). This clearly contradicts the above CESCR’s comment.

The low integration of an Aboriginal perspective is viewed as reflecting their relatively low population density in the region:

I think the lack of inclusion reflects the relatively low population of indigenous people who have strong linkages with the land within this region (SENRM Board Member 2).

In addition, the intangible and non-material features of a cultural access appear difficult to accommodate within the usual format of volumetric water licences and in the priority order of allocation. Indeed ‘cultural and spiritual values in the practice of ecosystem management forms a challenge for managers, policy-makers and local people alike’ (Verschuuren, 2007):

And I still don't fully understand what it's all about, to be honest. I guess we'll find out eventually but...I don't, I really don't fully understand it. I mean Aboriginals can access water just like anyone else can. They get a licence. I think it has more to do with accessing surface water than it does with groundwater. I think. I'm not sure about that (SENRM Board Member 10).

It is a bit hard to pin down, it's hard for us to pin down what was so important about it. So it's not easy to suffer in quantitative term and use for cultural terms (SENRM Board Member 6).

Water access to Aboriginals on their cultural sites I can understand. But to have water rights for Aboriginals per se over all land type over all sites is very worrying. We haven't got enough information about it, but I think it needs a lot of serious, serious discussions. Because after all water is supposed to be for everyone, water should not be for a sector of any community (SENRM Board Member 7).

However, their strong connections with water are recognised:

The Ngarrindjeri people have been close to water all their lives and I think because of the travesty of what's happened there and the total loss of almost their lifestyle (SENRM Board Member 1).

There's not that many Aboriginal people left in the region. [But] I can assure there are very strong cultural access issues in the South East. I have no doubt the Blue Lake is or was a very important anthropological site and its change in colour and everything would have been linked to a whole range of things. [...] So their ability to link to specific sites and specific values it's probably hard to quantify (Supporting Official 3).

7.4. DISCUSSION

The lack of consensus found at the local level regarding the forestry regulations required the State to take over in order to achieve resolution of this conflict and to resolve it from a legislative perspective. Indeed, forestry policies will not ultimately be designed by the SENRM board but, rather, by the LLC Taskforce that sidelined the board from the planning process. Furthermore, in its current version, forestry legislation ‘leaves decisions relating to important trade-off in the hands of an unelected bureaucracy’ (Crane, 2010, p. 45), despite the initial intention to provide for local adjustments and flexibility. However, the government agencies sitting on this Taskforce are expected to devise both new policies and new legislation (DWLBC, 2010b). This implies three debates.

First, it requires investigating the place that consultation has in reaching consensus. In cases of severe NRM conflicts, consultation does not usually enable the attainment of a consensus between the aggrieved parties (Rydin & Pennington, 2000), because of: i) the concerned issues and their associated interests at stake, and ii) the consultation process itself. Both causes were very well perceived by the Lower Limestone Coast stakeholders:

Consultations can be over-done. I mean in the end someone has to make some decisions on it, because some of these things will never get consensus on, not total consensus, because people want to protect their own interests (Industry Group 3).

On an issue like forestry water licensing, the opinion is so diverse that it's very hard to find a middle ground or consensus on anything. [...] So I guess I am a little sceptical about the issue of consultation to resolve serious conflict (SENRM Board Member 2).

One rationale for the inability of consultations to strike a consensus, is the very often limited difference between consultation and lobbying (see section 7.3.3.2), in particular when consultation is tokenistic and becomes a one-way communication from the government to the community, rather than two-way communication (Hillier, 2000). Thus, results of consultation tend not to reflect the best social outcomes, which further supports the finding that consideration of social sustainability through consultation only is inappropriate.

Second, examination of the origin of the legislation is critical (see section 7.3.3.2): does it come from a community push or from a government pull (Strejcek & Theil,

2002)? In the case of the concerned water plan, the change of authority in charge was paralleled by an evolution of the factor influencing the process. The initial local drivers suggesting a community push were largely replaced by State barriers once the forestry regulations were proposed and found to conflict with the NRM legislation in place. However, recommendations based on the subsidiary principle to select an appropriate level in nested institutions to implement a task indicate that it should 'be fulfilled without conferring spillovers upon other subunits' (Marshall, 2008, p. 81). This justifies largely that the State, rather than the regional NRM body, should be in charge of the development of forestry policies. Furthermore, the main issue—the gap left regarding existing forest plantations due to the recognition of future development of forestry only as a water affecting activity (retrospectivity)—emerges from the NWI, suggesting that the Federal level might be the more appropriate level for resolution, due to the precedent a South Australian position would create. This, however, would even further elongate the process; however, it could also lift the Border Agreement barrier to institutional change by facilitating the harmonisation of the forestry inclusion in the respective water budget of Victoria and South Australia.

The introduction of the unbundling system in this water plan could also potentially avoid other significant issues that the water plan faces: the final volume allocated through the volumetric conversion, the compensation claims for reductions to allocation and the perception that sustainable extraction limits do not reflect the actual water availability. The damages resulting from a delayed water plan, due to the forestry regulations, would therefore be compensated for by the ease that shares of the resource would bring to the decision-making.

Thirdly, regarding justice, and thus also the fairness principle of social sustainability, the governmental take-over of the water planning process could be justified by the fact that social arrangements resulting from the public consultation do not obligatorily promote justice, even if it may be an expression of justice (Sen, 2009). Further, the benefits of a quick adoption of a revised water plan also plead for such a take-over, notwithstanding the damages to the community engagement principle that it implies. But the difficulty to commensurate the benefits with damages an unresolved issue challenging the principle of double effects, which determines what is good to pursue despite the implied bad effects (Solomon, 1992).

Finally, on the social dimension of the water plan, the discussion revolves around the suitability of the plan to address the social objectives only indirectly (see section 7.3.1):

The plan is very technical. But it's technical to conserve the resource, and the Board's activities outside of the plan address some of the broader social issues. But the plan itself sets the framework for use of the resource basically, and via regulating the use of the resource, it protects some of these upper benefits for the community which might probably not be stated that clearly in the water allocation plan (Supporting Official 1).

This is a consequence of the fact that no social objectives were established for the water plan; thus, the plan would not encourage a ‘new water ethos’ (Rose, 2007, p. 17) that re-values water in all its forms. But the difficulty of the social suitability of water plan is that ‘NRM is about managing people’s activities as much as about managing resources’ (Davidson & Stratford, 2000, p. 1). However, the limit between encouraging people to manage their own practices and becoming social planners—‘picking’ suitable activities—is often unclear: how much did the control of forestry and of forestry expansion actually drive the forestry water licensing system? Further, the rather limited volumes required to nurture the social values of water or their non-consumptive characteristics tend to make them neglected.

7.5. SUMMARY

The analysis of the interviews that were conducted with key stakeholders involved in the development of the water plan validated most of the findings of the two previous chapters. The forestry regulations surfaced again as the most challenging change to be introduced in the revised plan. The attention allocated by women to questions on social sustainability suggests that this dimension would have been better addressed by incorporating equality of gender among the key stakeholders.

Factors influencing the process of change, detected in previous chapters, were also confirmed. In addition to the already identified functional drivers, significant social constructions biased against the forestry sector, as well as generous allocations, instigated locally the forestry transition of the plan. On the contrary, institutional barriers to change—lengthy and unclear legislative process or nested water licensing system of the forestry—occur mostly at State level. In parallel, shares of the resource, security of allocation and water markets—emblematic tools of the NWI—have a double influence in the process. Finally, both volumetric conversion and reductions to allocation also partly drive the introduction of forestry water licences.

The main findings from the social sustainability perspective is that the social dimension of the water plan is only dealt with indirectly, either through public consultations, economic issues or environmental considerations. As a result, community engagement, being the more articulated principle in the process, was also the most discussed among the five social sustainability principles. In particular, the community engagement principle clarifies the discrepancies observed in the proportions of drivers and barriers perceived between the SENRM Board Members and the supporting officials, by underlining their quite contrasted and dissimilar views of the planning process. Indeed, departure from the prescribed planning process, due to a lack of consensus at local level, created confusion over power control that resulted in misunderstandings, as well as a lack of trust between the regional and State level involved in the water planning process. Finally, significant and multiple social values of water reinforced those that were already identified, in particular the cultural—including for Aboriginal people—and regional identities that water hold locally.

DISCUSSION AND CONCLUSIONS

This chapter summarises and discusses the key findings of Chapters 5, 6 and 7 in order to answer the two research questions of this study, and more generally to clarify how well the water allocation plan addresses social sustainability in rural communities relying on irrigation. The chapter then examines the implications for social sustainability of the likely outcomes of the water planning process still to be adopted. Next, it describes the significance of this research by detailing the contributions of the results to existing theories and methodology, and it offers policy options for policymakers. Finally, the limitations of the study suggest opportunities for future research.

8.1. HOW WELL DOES THE WATER ALLOCATION PLAN ADDRESS SOCIAL SUSTAINABILITY?

This study has aimed at evaluating how well South Australian water allocation plans address social sustainability from a rural community perspective, based on an analysis of institutional change and using the Lower Limestone Coast water allocation plan as a case study. Findings from the analyses of news reports, submissions and interviews were confirmed through the review of documents and participant observations of meetings and subsequently validated by a community member. This section presents a conspectus of the results in order to take up the two research questions:

1. What are the main drivers and barriers of change directing the water planning process from a community perspective?
2. What considerations of social sustainability does the water planning encompass?

8.1.1. Factors influencing the process of water institutional change

This section first reviews graphically the various factors influencing the water planning process identified in the previous chapters. Next, it describes their influence on the way the water plan addresses social sustainability.

8.1.1.1. Lower Limestone Coast water allocation plan's model

The forestry water licensing system has been largely identified as the main topic of debate in each type of data analysed. Thus, the overall perceived factors of change that influence the water planning process can be simplified with those affecting the adoption of the forestry water licensing system (Figure 8.1).

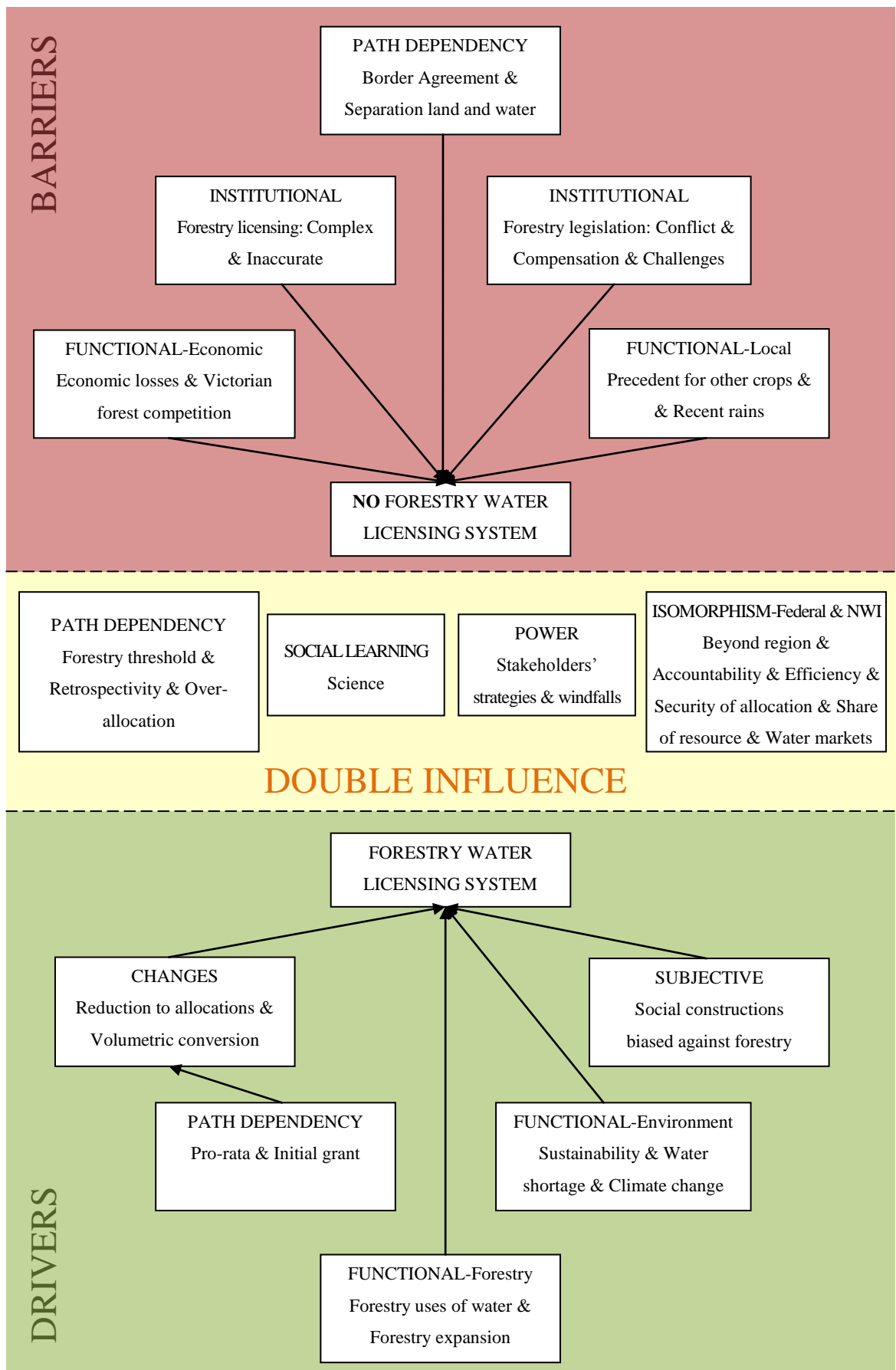


Figure 8.1. Overall perceived factors of change influencing the planning process

From a longitudinal perspective, the planning process can be encapsulated as an initial community push from non-forestry industries (see sections 6.1.3.1 and 7.2.1.2) that instigated a proposal to license the water use of plantations, and was based on local drivers of change, either: i) functional drivers: a new environmental context including an expansion of forest plantations; ii) subjective drivers: social constructions biased against the forestry sector; or iii) drivers related to changes in water institutions (bottom green box in Figure 8.1). However, this proposal and the change in legislation that it implied faced local functional and State institutional barriers (top red box in Figure 8.1) that favour the status quo. This moved the planning development to the State level and sidelined the community-based NRM board. Mediating between these two forces were multiple factors having a double influence (middle yellow box in Figure 8.1)—isomorphic (path dependency & Federal), social learning (science) and power (stakeholders) factors of change—whose directions evolved over time and varied according to the stakeholders. They therefore partly concealed the institutional change process (Saleth, 2006).

8.1.1.2. Influence of the factors of change on the social sustainability of the water plan

With the exception of the functional factors, most of the remaining factors pertain to one of the social spheres (Figure 2.1. in Chapter 2), reiterating the suitability of this examination of water planning from a social perspective. The various social spheres constitute a useful framework to review influences they exert on the social sustainability of the water plan.

At the individual level, social constructions biased against forestry are the only, but significant, driver identified in the case study that encourage the adoption of a revised water plan that includes a forestry water licensing system. Yet, from a social sustainability perspective, these social constructions have negative impacts because they distort the fairness principle and disadvantage one stakeholder over the others.

At the group level, the formation of coalitions and their respective strategies (discourses, policy entrepreneurs) drive the process in directions that depend on the objectives of each group. These strategies involve significant informal processes, including political lobbying, resulting in a water planning process that is not as organised as its prescription in the *NRM Act 2004* may imply. However, while the study suggests that farmers may have greater influence locally—from their higher

representation on the NRM board and widespread population in rural areas—, the resources and political clout available to the international timber companies working in the region ensure their prominence at the State level. This would suggest a tendency at the State level to cast out the forestry water licensing system, at least in the form proposed in the A2 draft LLC WAP that was highly criticised by the foresters. The initial competing interests of these coalitions neutralises their respective influences on the process and represents a form of impartiality from a social sustainability perspective. The latter would be better addressed using proportional equity—or using the Rawlsian equality of opportunity (Tisdell, 2003) to balance the resources available and, thus, the power of each group—but whose practical implementation is however highly difficult.

At the community level, the main social leverage on the planning process is a constant reference to fairness. The latter through its distributive, procedural and interactive justices, compares benefits obtained by each individual with those of the wider community. Fairness does not appear in Figure 8.1, because as one principle of social sustainability it is examined in a designated paragraph (in section 8.1.2.2). However, it represents a significant argument that frames each stakeholder's discourse. It also opens a path for potential consensus as all stakeholders share this common value and because all referred to distinct forms of justice—distributive for farmers and interactive for foresters. In spite of the incompatibility that these distinct forms may initially display, their evolution over the plan development phases (see Table 5.12) suggests that they leave room for negotiation. This prime consideration of the fairness principle has a substantial positive influence on the social sustainability of the water planning process.

Ultimately, the factors of change at the institutional levels are mostly barriers, logically challenging the innovative introduction in water accounting that represents the forest water licensing system. The only exception is the path dependency left by the forestry expansion threshold, which has a double influence. It indeed calls for complementary forest licences but it cannot be fully implemented until such licences legally exist and it assumed that foresters would not need any water licences in the years following its creation. Since institutional arrangements reflect values held by the community (Connor & Dovers, 2004), institutional barriers indicate that these values have changed and that institutional innovations attempt to more closely

approach the new values, supporting therefore the iterative feature of the sustainability, and in particular its social dimension.

These four-levels of nested social arrangements concurrently or successively carved out most of the tortuous path followed by the water planning process in the Lower Limestone Coast. Therefore, they have a very significant influence on the water planning process, but only a rather mixed influence on its social sustainability, with either positive effects such as with the fairness arguments, or negative ones such as with social constructions.

8.1.2. Considerations of social sustainability in the water planning process

8.1.2.1. Indirect consideration at best

At best, social sustainability is only indirectly considered in the water plan development through water markets, the environment or public consultation (see section 7.3.1). Beliefs that social sustainability is taken care of through economy and water market, already identified in the literature (see section 4.1.2.1), also exist in the region. However, despite the frequent recommendations of using water markets to address water allocation conflicts (Iyer, 2008), they ignore the social values of water outside of its commodity or utility value; thus, are not appropriate tools to specifically address social sustainability (see section 4.1.2).

The environment as an intermediary for consideration of social sustainability could be viewed as appropriate at first because the water interface mediates between the environmental and social dimensions of sustainability (see section 2.1.4). Calculations of environmental flows or sustainable extraction limits, on which water resource protection and conservation is based, nonetheless focus on environmental objectives and related criteria only. Thus attention to social sustainability is unintended and, at best, only emerges as an unexpected impact.

The reflection of social sustainability through public consultation almost appears as an indication of progress, as one of its guiding principles is partly cared for—consultation providing only token community engagement (Arnstein, 1969). However, attention of all five principles—fairness, community engagement, future focus, quality of life and social values of water—is required for the complexity of the social dimension of sustainability to be fully integrated in a water institutional change. Therefore, there is a need for direct attention to social sustainability to match

its economic and environmental dimensions. Although social sustainability is not considered directly, some of its five guiding principles received direct, but moderate, attention in the LLC WAP.

8.1.2.2. Considerations of the five principles of social sustainability

Table 8.1. presents a summary of elements discussed in Chapters 5, 6 and 7 relating to the five guiding principles of social sustainability, which affect—either positively or negatively—the way the LLC WAP addresses social sustainability.

Table 8.1. Influences of identified elements of the five principles on social sustainability

Obstruction of social sustainability	Promotion of social sustainability
Fairness	
<ul style="list-style-type: none"> – Delay – Forestry and holding licences disadvantaged – Merging of two over-allocated WMAs – Generous volumetric conversion – Lack of consistency – Internal conflicting positions of the government – Perception of winners picked 	<ul style="list-style-type: none"> – <i>Fairness discourses</i> – <i>Option of reallocation</i>
Community engagement	
<ul style="list-style-type: none"> – Consultation limits: timing, transparency, etc. – Lack of trust between NRM board and agency – LLC Taskforce sidelining NRM board – Confusion over powers – No local water plan committee 	<ul style="list-style-type: none"> – <i>Multiple public consultations</i> – <i>Cooperation by sector</i> – <i>WAP reflects community values</i>
Future focus	
	<ul style="list-style-type: none"> – <i>5-year revision of WAP</i>
Quality of life	
<ul style="list-style-type: none"> – Quality of life limited to economics 	<ul style="list-style-type: none"> – Well-being – Health – Maintaining rural communities
Social values of water	
<ul style="list-style-type: none"> – No social objectives in draft WAP 	<ul style="list-style-type: none"> – Multiple social values of water

The fairness, community engagement and future focus principles have been explicitly considered in the water planning process through efforts (in italics in Table 8.1) aimed at promoting social sustainability. However, this attention has only been modest and fragmentary, as evidenced by the unexpected obstructing elements related to these same principles. The last two principles—quality of life and social values of water—were not considered.

- Fairness

Fairness and its distributive, interactive and procedural elements, frames most of the stakeholders' arguments in the water planning process. Distributive justice is mostly concerned with the generous volumetric conversion and options of water re-allocations. Interactive justice focuses on the perceived differential treatment of agricultural versus forest water use reflecting the coalitions in place, and the view that some stakeholders are 'picked' to win. Finally, procedural justice mainly relates to the delayed adoption of the revised water plan, the lack of consistency and the internal conflicting positions within the State government. Fairness is therefore concerned with each of the changes to be introduced in the revised plan and was explicitly, although only partly, considered in the drafting of the LLC WAP through the proposal of options for re-allocation and the underlying reference to fairness. Rival arguments originate from the fact that the proposed regulations consider both equality—one water licensing system for all—and proportional equity—public water supply, industry and recreational use exemptions from reduced allocations. In addition, the non-priority permit water doctrine on which the current South Australian water legislation is based does not reconcile this rivalry.

- Community engagement

The community engagement principle is directly, but only partly, addressed through the multiple public consultations over and above those prescribed in the *NRM Act 2004* for the planning process and for the community-based planning approach that enables the reflection of community values in the water plan. The numerous consultations promoting engagement, cooperation (restricted to within each sector) and social capital (see section 5.3.3) have been, however, balanced by the limited scope of these consultations (see section 6.3.3), the lack of a local water plan committee, and the confusion over the control of power between the regional NRM body and governmental agencies, which sidelined the regional board in the last phase of the water planning process (see section 7.3.3). Despite efforts to encourage community engagement, the absence of a prescribed process in the case of a lack of consensus at the local level undermined the crucial trust between these stakeholders and the effective participation of the community in developing the water plan (Ostrom, 1990).

- Future focus

The future focus principle mostly surfaces through adaptive management and its tool currently in place that directly promotes social sustainability, the five-year review of water plan. Shares of the resource through unbundled water entitlements, despite not yet being implemented in the region are nonetheless perceived as the more efficient tool to adapt water use to its availability. In addition, a paradox lies between adaptive management and social sustainability through the future security of water entitlement. On the one hand, adaptation to climate variability ensures protection of the water resources through provision of environmental water and therefore improves water security in the long term. The latter is believed by rural communities to have significant indirect and long-term impacts on their local sustainability (Schwarz & McRae Williams, 2009). On the other hand, environmental water is also a direct short-term threat to the agricultural water users' entitlement, due to the reductions to their allocation that it implies and its associated potential social disruption.

- Quality of life

The quality of life principle encapsulates the limited consideration of the social aspects of sustainability through quantitative measures. It was not explicitly addressed during water planning, a process that lacked socio-economic impacts assessments (see section 6.2.2.1). It is only clearly articulated through employment and other economic benefits in the news reports and the submissions. However, while livelihood also appears in the interviews, the wider social implications of the water plan are also expressed on health, well-being and, mainly, on maintaining rural communities. These two last elements of the quality of life reflect two social values of water: cultural and regional identities.

- Social values of water

Multiple social values of water have been identified in this case study, mirroring the 'surfacing social values in water planning' of the South Australian Murray Darling Basin NRM region (Mooney & Lewis, 2010, p. 30). Reusing the typology from Table 2.3., these social uses and benefits can be classified into first and second order benefits depending on their direct or indirect relationship with water, as well as into consumptive and non-consumptive uses (Table 8.2).

Table 8.2. Classification of social values of water

Order \ Consumption	Consumptive use	Non-consumptive use
1 st	Critical human needs (public water supply)	Cultural and spiritual identity, (including Aboriginal access to water)
	Industry	Regional identity
	Recreational	Drought-proof community
2 nd	Food security	Water as a common good
	Carbon stores	Social cohesion
	Maintain rural population	Risk sharing

Industry water licences have not been directly identified as a social value in this study. However, their exemption from reductions to water allocations, along with the exemptions for public water supply and recreational licences, indicates a strong local will to protect, maintain and attract rural population through the employment they create.

Currently water licences have been legally defined only for consumptive uses, either direct uses for first order uses or intermediary activities for the second order uses. The only exception is forestry, an intermediary activity providing the ‘carbon store’ values to water, and whose water use is under examination in the Lower Limestone Coast water plan. The South Australian water legislation therefore remains to be completed for non-consumptive uses. The focus on consumptive uses tends to restrict water management to water quantity. In the LLC WAP, salinity is the only quality feature monitored, although the area is a significant agricultural producer with thus potential risks related to diffuse sources of pollution (fertiliser, pesticides, etc.). Regardless, water quality is often as important as water quantity in term of the cultural values of water.

In addition, among the cultural uses of water, only the consumptive recreational uses, reflecting the culture of non-Aboriginal people, were granted a water licence. The current lack of water licences for cultural uses confirms the ‘death of water in human imagination’ (Potter et al., 2007, p. 4). These social values should thus be acknowledged in water allocation plans, and their consideration ensured through the identification and monitoring of social objectives.

Benefits of the modest and direct promotion of some of the five principle of social sustainability, as well as the indirect and partial attention offered to the others, confirm the need for specific consideration of social aspects of sustainability.

8.1.2.3. Back to social sustainability and fairness theories in light of these results

The measure of a fair and sustainable community may well be how it allocates and uses water in the interests of ecologically sustainable development for the community, but also how it supports and sustains the losers—those persons who have to accept that their need for water cannot be sustained in the context of the available water and community priority (Sr. Judge Trenorden, 2010 in McKay & al., 2010).

To the above definition of sustainable community already very meaningful in relation with the community's water management, it could be specified that 'losers' are not only those whose water allocation is reduced but also those who never obtained such right. In particular the social and cultural uses of water, largely 'hidden' because not consumptive should not be forgotten but also acknowledged and supported. Besides, from a justice perspective, a court judgment regarding water allocation or reallocation induces winners and losers (Sr. Judge Trenorden, 2010 and Hon. Justice Preston, 2010 in McKay & al., 2010) when compared to the current or past situations in the short-term. However, the social sustainability perspective suggests that the whole community is winning in the long-term if the decision is taken on sustainability grounds.

This questions the objective and rationale of the proposed changes in WAP. The *NRM Act 2004* would suggest that ESD is the principle on which all decisions are taken, so in its balance between economic, environmental and social sustainability, fairness and justice should also be achieved. Thus, principles founding the water justice criteria evolved over time (ESD currently, but rural settlement or water efficiency have been invoked earlier) with water legislations and doctrines (see sections 2.2.1.1 and 5.3.2.2). This partly articulates why while it is difficult to witness and achieve justice—an unreachable ideal—injustice is often evidenced in water allocation decisions (Gross, 2010). In addition, because the current Australian water legislations is 'rights-based' rather than 'goal-based' (Hon. Justice Preston, 2010, p. 90 in McKay & al., 2010), the origin of those rights need to be examined as 'law is not adequate in all situations' (Hon. Justice Preston, 2010, p. 86 in McKay & al., 2010). This demonstrates again the usefulness to confront in this study the institutional change analysis through the identification of its drivers and barriers

determining the origin of the licensing system proposed to the social dimension of sustainability of the water allocation process. Finally, water justice and fairness is also based on consideration of the full range of values held by water. In this study, the identification of multiple social values associated with water and their lack of direct recognition in the water plan validate the ‘failure to recognize value pluralism in relation to water’ (Ingram & al., 2009, p. 2).

8.1.3. The Lower Limestone Coast water allocation plan addresses social sustainability relatively well

The previous sections suggest that the water planning process lacks a dedicated, comprehensive and direct consideration of the social dimension of sustainability and of each of its guiding principles, despite social arrangements are very influential on the process of water institutional change. Therefore, the water planning process only indirectly and partly addresses social aspects of sustainability. To achieve greater consideration of social sustainability, this study recommends a social approach mirrored to recent environmental shifts, as that could serve as a catalyst for achieving its two economic and environmental counterparts.

8.1.3.1. Parallels between environmental and social sustainability

The ESD principle induced a subtle, but significant, shift in Australia as the environment is no longer only considered at the project-scale in terms of mitigation measures. On the contrary, it has become a user in its own right with the allocation of environmental flows and the definition of environmental objectives for its general adaptation (Connor & Dovers, 2004; South Australian Government, 2006).

Since ‘the sustainability of water policy on a social level is as crucial as it is on an environmental one’ (Potter et al., 2007, p. 5), a social approach mirrored on these environmental allocations could be a solution that would promote consideration of social sustainability in a water planning process. Change in the governance of social water should be matched with ‘substantive water transition’ (Huitema & Meijerink, 2009, p. 371) echoing the environmental evolution—from mitigation to adaptation and to integration of social elements. This would mean that water planning requires not only consideration of the social impacts of the plan and its social acceptability (Cullen, 2006), but also a clear definition of potential social objectives that are to be achieved through the plan and to allocate water to ‘social flows’ (Alston & Mason, 2008). In that sense, it would ‘shift the burden of proof’ (*Bentley versus BGP*

Properties Pty Limited 2006 in McKay, 2010a) of social impact assessment in a manner that is similar to that in the case of the environmental shift. Moreover, these assessments would not be sufficiently compelling because they restrict the perspective to social impacts only, rather than to social objectives and allocations.

Moreover, the Gross Domestic Product's flaw to not reflect quality of life—an argument used by environmental economists to introduce valuation of environmental resources in economic analysis (King, 2008)—is even more valid for the social dimension of sustainability. However, within active water markets, such as that in the Murray-Darling Basin, environmental flows are obtained through buybacks schemes by the Federal government to reallocate water from consumptive uses to the environment. Another path would follow the recommendation 'for planning to look after the environment and the market to allocate what is left' (Bjornlund in Matchett, 2009). In both cases, the State assumes the role of environmental protector for the common good. Likewise, the State needs to play a similar role in the absence of entity protecting social interests of communities and in front of business companies defending their economic interests. The social-environmental parallel could thus also be extended by applying social preservation and enhancement to the water planning processes. Thus, water planning could eventuate into an essential tool for allocating water to environmental and social objectives before water trading occurs.

In the Lower Limestone Coast area, this second pathway is proposed in the 2007 draft water allocation plan for the environmental dimension as it gives priority to the environment in setting aside ten per cent of the recharged water, as well as the water being used by native vegetation (SENRM Board, 2007a). Consumptive water licences transferable in the water market are only added in the water budget after such priorities are met (Figure 4.10. in Chapter 4). In addition, some social values are also currently protected in two distinct ways:

- Stock and domestic uses, corresponding to the basic human (and animal in that case) needs, are not licensed. They therefore 'take precedence over' commodity water (Iyer, 2008, p. 27) and cannot enter the water market. Their volume is nonetheless included in the water accounting, similarly to the approach used for environmental needs.
- Recreational, industrial and public water (the latter corresponding to the human basic needs in urban areas), all identified as social values of water locally in this study (see Table 8.2), are licensed. They thus have not been

given priority over the water market, but they are still protected by the water plan, as reflected by their exemption from reductions to water allocations.

While the first protection arises from the *NRM Act 2004*, which might soon be modified to license them (South Australian Government, 2010b), the second originates from a regional decision of the NRM board. This distinction is a result of path dependency, but also evidences that the protection of social values of water has not been consistently thought through. With the co-existence of a water market, there is therefore a need to license the other identified social values and, in particular, the non-consumptive uses in order to formally ensure their protection through an exemption from reductions.

As a result of these punctual protections of social uses of water, the Lower Limestone Coast water allocation plan better addresses social sustainability than initially perceived. Its indirect and incomplete consideration of the social aspect of sustainability is however confirmed by its inconsistent and fragmentary approach. Additional benefits and rationales urging for further efforts to promote the social dimension are delineated below.

8.1.3.2. Social sustainability as a catalyst for economic and environmental sustainability

Despite the leeway in social perspective and the threats of economic and environmental predominance, the previous section suggests that water planning remains a fabulous source of opportunities for social considerations. In replacing this social perspective within the triple bottom line, it could, once properly addressed, play a catalyst role for the improvement of both economic and environmental sustainability as ‘failures in any one realm are perceived to threaten the others’ (King, 2008, p. 83).

From the economics perspective, social sustainability is considered to be an ‘antidote to a partial economics of sustainability’ limited to ‘environmental impact of individual-market interactions’ (King, 2008, p. 83). In addition, integration of the social dimension benefits both economic productivity and social sustainability (King, 2008). Finally, water re-allocation through water market will also expand once community attitudes and social dimension are integrated by removing barriers to water trading related to non-economic choices (Tisdell & Ward, 2003; Kuehne & Bjornlund, 2007). Thus, the parallel between environmental and social sustainability

can be furthered: similarly to the argument of potential productivity gains through the ‘greening’ of decisions (Dryzek, 2005), improved consideration of social sustainability can also serve as a catalyst for a full consideration of the economic sustainability.

Moreover, an improved social sustainability with social values, such as regional identity, explicitly recognised, would result in a more cohesive rural community that would be more conscious and aware of its environmental richness. This will also favour environmental preservation through stronger case for the protection of water dependent ecosystems (logic of collective action by Olson, 1965 in Ostrom, 1990).

The Lower Limestone Coast water allocation planning process achieves relatively good, although inconsistent, results in addressing social sustainability. However, it does so only through indirect, inconsistent and incomplete approaches to consider the social aspects of water sustainability. Findings in this case study suggest that a more coherent and comprehensive approach, mirroring the recent environmental shift from mitigation at the project-scale to more general adaptation, would benefit not only the social dimension of sustainability but also its two environmental and economic pillars. The following section discusses the likely outcomes of the Lower Limestone Coast water allocation plan and their policy implications.

8.1.3.3. Recommendations for the Lower Limestone Coast water allocation process from a water justice perspective

In addition to the above critical recommended social approach mirrored to recent environmental shifts, and in light of social sustainability and in particular fairness theories, three suggestions could be offered to the allocation process examined in this research.

The introduction of policies aiming towards efficiency requires for their effective adoption and implementation that ‘they are embedded in considerations of equity and justice’ (Ingram et al., 2009, p.3). In the Lower Limestone Coast water allocation process, it particularly applies to two proposed changes: first, the volumetric conversion intended to achieve water efficiency; and second, water markets as the ‘preferred institutions for pursuing economic efficiency’ (Ingram et al., 2009, p. 4). In both cases, they will only reach their proposed objectives if they have been designed based on water justice rationale, and outcomes for each water use should be checked before their full implementation.

Finally, any reference to the Riparian doctrine formerly used in the area should be removed and avoided in the future—as it was referred to for the pro-rata roll-out in 2001 when already replaced. This would contribute in reducing potential unfairness perceptions locally.

8.2. LOWER LIMESTONE COAST WATER ALLOCATION PLAN: LIKELY OUTCOMES AND POLICY IMPLICATIONS

The first attempt to introduce forest water uses in a water budget by the SENRM board was inherently a risky one, no matter what the proposal comprised, and as such the attempt should be acknowledged. Despite some criticisms detailed in the various sections of this study, the proposed forestry water licensing system has great merits. In particular, it coherently presents a system that anticipates the impacts of further expansion of forest plantations on the availability of water for other consumptive uses. It thus attempted to broaden the adaptive management by integrating forestry, a sector traditionally left out of the consumptive pool.

Although licensing of previously unlicensed uses and reductions to allocation had already happened in the SENRM region, the practicalities and distinct context of those changes prevented their simple replication for the introduction of forest water licences and to address over-allocation. The previously unlicensed uses (dairy, intensive animal keeping, intensive plant production, industry or recreation) that obtained water licences upon application in 2002—due to change to definitions in the Water Resources Act 1997 (SECWM Board, 2005)—were point source extractions, dissimilar to forestry. Furthermore, reductions to allocations occurred in the Padthaway PWA in 1983, i.e. before the introduction of water market that assigned financial value to a water licence.

A revised Lower Limestone Coast water allocation plan not yet being adopted at the conclusion of this study, the following section reviews the potential outcomes arising in the next stages and discusses their policy implications on water governance and social sustainability.

8.1.4. Likely outcomes

Under the proposed water allocation plan, the South Australian government needs to address conflicts issues created by the proposed forest water licensing system, as detailed in Table 7.3 and reused in Table 8.3. Two choices follow:

- modify the proposed forestry water licensing system to address those issues;
or
- propose alternatives to the forestry water licensing system.

The South East NRM plan, in which the water plan should be nested, was adopted in May 2010 by the Minister for Environment and Conservation, who is also responsible for the adoption of water plans. This regional plan provides a first glance of what may be the outcomes of the Lower Limestone Coast water planning process. Although it did not specifically mention forest water licences, the NRM plan confirms that it will deal only with one system of water licensing for all users, including forestry. The area concerned with the forestry regulations has been expanded to cover the entire SENRM region, while it was initially limited to the Lower Limestone Coast, an area that experienced a high concentration of commercial plantations. This anticipates the potential plantation for carbon sequestration in the other areas. In addition, the regional plan also modifies the A2 LLC WAP draft in regards to where will return water from undeveloped forest permits of the forestry expansion threshold: to the forestry expansion threshold reserve pool rather than to the general consumptive pool. Table 8.3 presents the position of the SENRM plan on the other identified forestry issues.

Table 8.3. The South East NRM plan's position on the identified forestry issues

Forestry issues	South East NRM plan 2010
Volume allocated (incl. Forestry specificities)	Forestry licence application need to comply with the 4km ² hydrological assessment, but a specific hydrological assessment is to be developed by the Minister for commercial forests
Entity	-
Recharge interception/direct extraction	Indicate that the required water allocation obtained from the forestry expansion threshold be quarantined to account for recharge interception and direct extraction (when needed <6m).
Shallow/deep water table areas	Permits for all new plantations either in shallow or deep areas
Levy	-
Reduction	Reduction of new plantation possible proportional to the reduction of volume required
Transfer	-
Existing forestry	Does not say anything about existing forestry

Source: (SENRM Board, 2010a)

However, the NRM plan does not preclude any specific water plan outcomes as a specific section indicates that these regulations would be replaced by others as specified in water plans:

The requirements of this plan shall cease to apply in a prescribed area where a water allocation plan, as adopted by the Minister, imposes a system for the

management of commercial forestry impacts on water resources. The relevant water allocation plan, as adopted by the Minister, shall apply in that prescribed area, instead (SENRM Board, 2010a, vol. 4, p. 40).

Another indication of potential outcomes of the water planning process is the position of the recently introduced LLC Taskforce, which seems to favour permits rather than water licences for forest plantations (Member of the Reference group for the Lower Limestone Coast Water Allocation Plan Taskforce, 2010), a position based on the rationale that the introduction of forestry water licences would incur a steep increase of assets for forestry companies. It would therefore infer a very low return on capital that would force Forestry SA, the government-owned company, to sell them to higher productive crops and would impact severely on local employment. This suggests that the LLC Taskforce's focus on a scientific review of the water availability and estimates of forestry water use (DWLBC, 2010b) is rather unadapted. Moreover, in a context where science does not seem to have a straight answer—as selected evidences may back respective arguments of proponents and opponents of a forestry water licensing system—, a social approach would have been more appropriate (Davidson & Stratford, 2000). This tendency towards the use of permits is confirmed by the recent *NRM (Commercial Forests) Amendment Bill 2010* (South Australian Government, 2010a) introduced in Parliament in November 2010—at the conclusion of this study—and, which includes both a forest water licensing system and an expanded forest permit system (Department For Water, 2011).

However, without any certainty about the outcome of the revised Lower Limestone Coast water allocation plan, the two choices available to the government of South Australia are successively examined in the next two sections.

8.1.4.1. Forestry water licensing system turndown

The political clout of forest companies at State level or the LLC Taskforce's position in favour of permits rather than licences could both promote the rejection of the forestry water licensing system as proposed by the SENRM board. The momentum or window of opportunity (Zahariadis, 2007; Huitema & Meijerink, 2010) for the introduction of a forestry water licensing system may indeed have closed. The powerful conjunction of dropping water tables, significant forest plantations expansion and sympathy for the argument at the Ministerial level, is fading concomitant with the return of average rainfalls (see section 7.2.2), a slowdown in

forestry expansion and the regular changes in Ministries (see section 7.3.2.2). Another possibility is that the closure of this window results from an excess of ambition in expanding the initial licensing from future plantations in shallow water table areas to all existing and future plantations, whether in deep or shallow water table areas.

The complete rejection of the proposed forestry water licensing system would imply for the South Australian government and, more specifically, for the LLC Taskforce now in charge of the development of the water plan that they must either:

- propose another approach to include forestry in the consumptive pool and thus attempt to address some of the shortcomings of the current water accounting method; or
- exclude forestry from the consumptive pool and keep the already in place, or a similar, water accounting method. This second alternative would maintain the current forestry precedence over the consumptive pool.

In both cases, the ‘regional bodies will simply become delivery vehicles for government initiatives’ (Gunningham, 2009), which would overrule the new governance structure of NRM management in South Australia. In future planning processes, it would probably be difficult for the SENRM board to regain self-confidence and community trust to develop and deliver innovative plans, as well as to strengthen its relationship with the governmental agency.

8.1.4.2. Introduction of a forestry water licensing system

As a result of the issues with the proposed forestry water licensing system identified in this study and detailed in Table 8.3, and in particular the retrospectivity issue, the LLC Taskforce would need either to:

- exclude existing forest plantations from the proposed licensing system and to address the identified inequities and their perceptions. This would imply dealing with two systems of management of forest water use: some plantations with water licences and other exempted, as well as with distinct regulations to ensure their transfer and renewal for future rotations; or
- modify the proposed forestry water licensing system for all types of commercial forest plantations. For example, ‘another scheme currently under

consideration involved plantations forestry leasing water licences from the government' (*The Border Watch*, 3 December 2010, p. 1&2).

Since the selection of 'the actual choice of institutional strategy [...] matters less than persistence of the commitment to that strategy' (Connor & Dovers, 2004, p. 227) in order to achieve sustainability, the introduction of a modified forestry water licensing system seems more appropriate than its complete turndown. It would further acknowledge the work invested by the SENRM board in the previous proposal. However, this would also call for a revision to the membership of the SENRM board to reflect the significance of forestry in the region's natural resources management, as that sector could end up with up to one third of the regional water allocations.

The next section recapitulates the contributions of these findings to various theories and practices featuring the significance of this research.

8.3. SIGNIFICANCE OF THE RESEARCH

The findings summarised in the previous section, and the answers to the research questions they offer, determine the significance of this research in contributing to various theories and bodies of knowledge that were introduced in Chapter 2, but also to methodology, and to policy design and implementation.

8.1.5. Contributions to theories

8.1.5.1. Contributions to a theory of institutional change

Through special attention given to the transition in water institutions that represents the revision of water allocation plan and the factors affecting this planning process, this research has contributed to the definition of a theory of institutional change. In particular, it found that:

- In front of incentives or drivers of change as described by Schmid (2004), barriers to institutional change were identified (see sections 5.2.2, 6.2.2 and 7.2.2) and were found to have a counterbalancing effect that tend to obstruct change and promote the status quo (Ostrom, 1990; Huitema & Meijerink, 2009). They introduce a directional dimension in the characteristics of the factors of institutional change.
- This direction of change is often difficult to identify confirming Saleth's view that the effects of factors of change are not easily isolated (2006). The direction of change indeed evolves over time or according to the stakeholders, resulting in factors that can have a double influence on the process of institutional change (see sections 5.2.3, 6.2.3 and 7.2.3), both promoting and hindering it, simultaneously or successively. This suggests that the relevance and significance of factors of change evolves during a long policy development process.
- In addition to the functional, social learning, isomorphism and power typology of factors of institutional change (Schmid, 2004) introduced in the literature review, the study has evidenced institutional and subjective factors (see sections 5.2.2, 6.2.2, 7.2.1 and 7.2.2). Institutional factors do not pertain to the isomorphic category that includes path dependency because they arise from innovative institutions that do not mimic (isomorphism) existing ones. Subjective factors are based on the values and attitudes of individuals.

- Factors of change can be both external and internal to the water institutions (see section 6.2.2), enriching therefore the current debate on the origin of institutional change (Lin, 1989; Wegerich, 2001; Greif & Laitin, 2004). External factors in this study were elements related to water but not yet internalised in the proposed water institutions, or elements not water-related. This also calls for the definition of a unit of analysis, which could be the institutions under study.
- Since water institutions are multi-levelled (Livingston, 2005), factors of institutional change have also a level or geographical scale dimension (see sections 7.2.1 and 7.2.2). This dimension is two-fold as it includes both its origin and its domain of influence, which can vary because of the nested features of institutions. In this research, three levels were involved: local, State and Federal.
- Institutional changes can become factors of change themselves (see section 7.2.5). The simultaneous introduction of various changes in institutions induces influences for change among them. This is a case of path dependency even before the changes have been adopted in the revised institutions, and thus may never be adopted. Therefore, proposed institutional changes also delineate the path dependency of future institutions.

These findings unveil the complexity of institutional change processes that needs to be integrated in an analytical framework for institutional change. Through those findings, the change, its source and its direction—three of the four elements defining North’s framework (North, 1993)—have been examined, even if only partly. However, the agent of change, the fourth element, remains to be explored. Furthermore, to the specific field of institutional change for sustainable development, this study emphasised and thus supports the idea that ‘institutional change must seek some congruence with publicly held values’ (Connor & Dovers, 2004, p. 208).

8.1.5.2. Contributions to policy analysis theories

By using some policy analysis theories—identified in Chapter 2 for their relevance to the social perspective—in the examination of the dynamics of the institutional process of change, this study has contributed to clarifying their context of validity, their effects on fairness and their investigating methods.

Findings of this analysis have evidenced that the Advocacy Coalition Framework, the Social Construction and Policy Entrepreneurs theories can co-exist in an institutional change process (see section 5.1.3), and that their combination can more closely approximate the dynamics of the process of change than each of them applied independently. This reinforces the idea that, individually, they are ‘useful for explaining some, but not all, aspects of institutional change’ (Saleth, 2006, p. 9). The social elements playing in the process of change seem too complex to fit within only one theory, even when more socially focused. In particular, their complementarity contributes directly to refining the framework created by Saleth and Dinar (2005), which aims to bring together various factors of change and theories. However, this calls for a better integration of the existing theories of policy analysis in the analysis of institutional change, and in particular, for a better definition of the context in which they can co-exist; such integration may also be expanded to other theories that were not discussed in this study.

In addition, while social constructions and advocacy coalitions favour a social perspective of the policy under examination, they also tend to have a negative impact on fairness as they promote the status quo through the dominant advocacy coalitions (Sabatier & Weible, 2007) or through advantaged stakeholders (Ingram et al., 2007), both of which typically have more resources. Policy entrepreneurs on the other hand, have a more neutral effect on fairness as they can arise from any group even the less advantaged, but the effectiveness of their strategies is also relative to their available resources.

Finally, it can be recommended to the recent Policy Entrepreneur theory (Huitema & Meijerink, 2009) to use data that have been generated in collective ways (such as focus groups) or for a collectivity (such as public information and news) in order to more easily pinpoint these key stakeholders. In this research, the use of news reports enabled the identification of policy entrepreneurs, while data from individuals such as submissions or interviews could not, unless a prior analysis had led the researcher to them. It is indeed when they are placed in a group that their strategies and influences become most salient or that the criteria for identification can be confronted.

8.1.5.3. Contributions to a theory of social sustainability

This research examined social sustainability within the specific field of water governance and institutions, expanding therefore the domain of application that had been previously investigated (housing or urban planning, education, development, social justice or NRM in general). Furthermore, the five guiding principles proved to be useful in this specific field as they enabled examination of the multi-faceted relationships between the community and the water resources.

To the first major issue of the existing social sustainability literature, that is people should be placed at the core of social sustainability, either individually or collectively, the findings of this study attest that there has only been indirect and non-intentional integration of social sustainability in the decision-making of the water allocation plan. This corroborates the view that social sustainability is subdued by its two counterparts (King, 2008), which receive dedicated attention. However, the identification of the social values of water, such as the basic needs and the regional or spiritual identity found in the region, proves that people are not only perceived locally as a threat to the environment but that they also rely on it, enjoy it and are inspired by it. Therefore even if people have not been replaced fully at the core of the decision during the water planning, these are significant evidences that this is where they belong. The formal recognition of these values in the water plan should help in replacing people at the centre, and also create a ‘new water ethos’ (Rose, 2007, p. 17).

In addition, the findings provide evidence that women tend to respond more positively to social sustainability (see section 7.1.2.2) than men, suggesting that they not only have more positive environmental (Wu, 2009) but also social attitudes. Thus, gender parity in committees in charge of developing water plans may not only be a question of equity and representation, but might also be a step towards a more coherent and comprehensive approach to social sustainability.

Turning now to the second critical debate of social sustainability, discussed in Chapter 2, on whether social sustainability is a state, a process or both. This research examined only the process, as the water allocation plan had not been adopted by the end of the study period, so only a partial answer can be brought to this debate. The findings of this research show that factors of change have a strong influence on social sustainability and that they evolve over time, resulting in an evolving intensity

of social sustainability that could not characterise a final state. Moreover, a final state would mean that during the long transition processes, such as the current revision of the Lower Limestone Coast water allocation plan, there is no social sustainability at all. Therefore this study discards the possibility that social sustainability can be a state alone. In addition, during institutional transitions, not only did the institutional change attempt to integrate current community values but also modified them towards sustainability (Connor & Dovers, 2004). This therefore results in two-way influences, characteristic of a continuous process of change, and corroborating the suggestion that social sustainability is at least a process.

Thus, this research, in expanding the domain of application of the social sustainability concept and in providing some arguments to its two major debates, contributed to the construction of a consolidated theory of social sustainability, in particular in clarifying the causal relations located at the interface of social and environmental sustainability. The study indeed found that despite a local dispute about water allocations, the water plan addresses social sustainability even if only indirectly and inconsistently to ensure protection of crucial social values of water, suggesting that environmental conflicts cannot fully undermine social sustainability.

8.1.5.4. Contributions to water governance

In investigating elements to consider for equitable allocation of scarce water resources among multiple and heterogeneous users, this study contributed to one of the main challenges of global water governance (Ballabh, 2008).

It also assisted in exploring the scope for community intervention in the new or collaborative water governance in Australia, by addressing the wicked problem aspect of both public participation and water rivalries (see section 6.4) (Freeman, 2000; Ker Rault & Jeffrey, 2008). The findings of the study indeed suggest that this new water governance involves concurrent regionalisation, through the NRM bodies, and centralisation, through the National Water Initiative (Chapter 4). These two elements conflict because the former assumes a better representation of the various stakeholders in the process (Gunningham, 2009), while the latter restrict their management options and thus their autonomy, resulting in uniformity (Robins, 2007) rather than diversity. The significant (Ryan et al., 2010) but controversial subsidiarity principle (Connor & Dovers, 2004) partly unravels this paradox. As the forestry issue has exemplified, the level responsible for the decision can be disputed by the various

stakeholders involved in this new governance. This is exacerbated in Australia where a 'contest of power and responsibility of various level of government is continuing feature of the Australian federation' (Connor & Dovers, 2004, p. 225). Further, under this new governance, current South Australian prescribed planning processes and NRM boards' capacities do not provide formal arrangements to resolve conflicts over water allocation in the absence of local consensus.

The examination of water markets from a social perspective (Chapter 4) enabled a more accurate definition of the social aspirations that they actually encompass. Water markets hold two contradictory values in the community: individual gain maximisation and equitable opportunities for all. The latter tends to hinder collective social considerations and provides equity only for economically valued uses of water. Thus, in neglecting its cultural uses, water markets do not address social issues. This calls for an explicit recognition of the competing values of water markets and social sustainability. Furthermore, the forestry issue in the LLC WAP demonstrates the difficulty to license new uses of water once a water market has been introduced.

In addition, this research also contributed to the clarification of the South Australian water doctrine through the delineation of the private-public domains boundary in the new water governance. This boundary indeed becomes blurred in situations where decentralisation implies a greater role of the civil society in the public affairs (Ballabh, 2008). Findings of this study suggest that the public sector has nevertheless a crucial role to play for the appropriate consideration of the social dimension of sustainability, similarly to its role for the environment—through funding of buyback schemes or giving the environment precedence over the water market (see section 8.1.3.1). This expands the traditional State responsibility to ensure basic human rights to water (Iyer, 2008) and to grant water licences (King, 2008). Further, interpretation of the water doctrine was also refined through its use as a reference against which to assess the fairness principle. What just institutions are evolves over time with a piecemeal alteration of the water doctrine (see section 5.3.2.2). This is however counterbalanced by Sen's notion that outcomes of just institutions do not always reflect social justice (Sen, 2009).

Finally, an unexpected outcome of this study is its contribution to the debate on the impacts of forest plantations on water resources, and their inclusion as a diffuse recharge interceptor and water extractor in the water budget. Issues perceived by the

community and discussed in this case study that challenge the proposed forest water licensing system might be helpful when developing further alternatives regarding the inclusion of forestry in the water consumptive pool.

8.1.6. Contributions to methodology

This qualitative study fills a gap left by research on water disputes ‘obscured by an overwhelming concern with quantitative research’ (Trottier, 2001, p. 8). Although not its prime objective, the findings of this study provide evidence of the suitability of qualitative approaches to assist in the resolution of water conflicts through the definition of local values associated with the water resources and the identification of potential areas of consensus. Since water rivalries are likely to have significant social origins and influences, the combination of qualitative approaches and social perspectives proved very useful.

In addition, the results from Chapters 5, 6 and 7 endorse the complementarity of the quantitative and qualitative content analyses. While the former permit the examination of the significance and relevance of themes discussed in the documents analysed, the latter provides an overview of the values, meanings and issues associated with each of these themes. The combination of both types of content analyses is highly recommended for in-depth explorations required in inductive research.

8.1.7. Contributions to policy design and implementation

Drawing upon the previous findings and contributions, this research proposes a number of policy options for an improved consideration of social sustainability in water allocation planning processes:

1. Explicitly recognise the competing values set between water markets and social values (Connor & Dovers, 2004) to help clearly establish the need for improved consideration of the social aspect of sustainability in water planning.
2. Identify specific social values of water and their corresponding social objectives in each prescribed wells areas and introduce them in the corresponding water plan.
3. Introduce licensing arrangements for non-consumptive uses of water in order to allocate water to these social and cultural values. Any new licensed use of

water should be then reflected in the board membership to ensure their appropriate representation.

4. Protect the social values of water that the community believes have precedence over the consumptive uses, through exemption to reductions and/or through better integration of water quality issues.
5. Achieve better gender balance among the policy makers.
6. Engage in activities to restore the trust between the NRM body and the governmental agency.
7. Finally, include in the formal planning process a procedure for conflict resolution and adhere to it when no consensus is found locally, such as was the case in the LLC WAP. In particular, it should specify any alteration in responsibilities and power of each stakeholder and specifically consider the maximum timeframe for the planning process. These would ensure that future water disputes do not damage the trust between the various stakeholders and prevent water allocation plans intended for five years to double their lifespan.

The next section reviews the limitations of this study, which prompt directions for further research.

8.4. LIMITATIONS OF THE STUDY & DIRECTIONS FOR FUTURE RESEARCH

Despite its contribution to theories, methodology and practice, this study has some limitations and leaves some areas to be further explored. Some methodological and analytical limitations have already been detailed in Chapter 3 (see section 3.4). More general limitations or limitations arising from the findings are added in this section. Drawing upon these, directions for future research are also suggested.

A limitation to the study is introduced by the frequent use of government sources in news reports (Solesbury, 1976); such usage could result in a lack of objectivity in the reports with an over-representation of the government's positions. However, findings from interviews reported the presence of internal conflicting positions within the government during the development of this water plan, as it owns a forest company but is also responsible to monitor the water availability (see section 7.3.2.2). This double position counterbalances the identified limitation as it suggests that a diversity of opinion from various agencies may be reflected in the news reports. In addition, the ascendance in the news reports of the governmental perspective is offset in this study by the use of complementary data—the submissions and interviews—that present mostly a community viewpoint.

The process of water institution change examined in this research remains partly uncovered due to the interference of factors whose double influence on the process evolve with time or according to the stakeholders. While this makes arduous the task to conclude on the incentives driving the process of water institutional change, it however enabled the detection of the changing nature of some drivers of institutional change. A deeper exploration of some of the factors identified as having a double influence would greatly contribute to the better definition of a theory of institutional change. A relevant example on which to start with could be scientific uncertainty, such as the one witnessed in this water planning process. Such uncertainty is indeed becoming increasingly common, especially with climate change affecting most of the natural resources management.

The findings reported that none of the social values of water corresponding to non-consumptive uses have been legally and thus formally recognised yet with water licences. Further investigation on practical licensing methods for non-consumptive uses could considerably ease the licensing of cultural values of water and, in particular, the traditional cultural access to water for Aboriginal people; thus,

benefiting the social sustainability of water allocations. A global review of cultural licences for water or other natural resources, as well as an evaluation of these using the five guiding principle of social sustainability would help policy makers who currently struggle to grasp the meaning of cultural licences and assist in translating them into water policy.

Another support for policy makers would be a global review of transitions in water doctrines and legislations and especially identify success example of how the new legislations managed to completely replace the former ones in each of the water users' mind.

This study examined the social sustainability of a water allocation plan confined to a rural area of South Australia. However, social values associated with water are certainly quite different in an urban area, because of distinct lifestyles and attitudes towards the environment. In order to have a full understanding of the social values associated with water and how well water allocation plans actually address social sustainability more generally, the same research could be conducted for a water allocation plan that regulates an urbanised area. In addition, other limitations preventing the generalisation of the findings of this study throughout the whole State relate to the importance of primary production and forestry in the South East region, as well as the groundwater origin of the water resources, which is quite uncommon in South Australia. In particular, the Riverland—another significant region of the State in term of agricultural production—is part of the Murray-Darling Basin whose management has recently been overturned to the Commonwealth, and thus is regulated by different legislations and policies. This study can however provide recommendations and elements to consider social sustainability in other areas.

To further assess the interest of the five guiding principles of social sustainability in contexts other than the South Australian rural area examined, it would be useful to test their validity in developing countries. Indeed, it is in the rural areas of developing countries that multiple uses of water actually occur largely—with often a single source for all types of usages—and correspondingly its associated social values multiply: livelihood, gender justice and opportunity, health, etc.

Ultimately and as already mentioned in the methodological limitations (see section 3.4), the lengthy timeline of the water planning process continues to unfold after the time allocated to this research had elapsed. As a result, the outcomes of the revised

water plan have not been investigated. Thus, an extremely valuable follow-up of this research could examine, a few years after the adoption of the revised Lower Limestone Coast water allocation plan, the social impacts that the new regulations implemented by the plan had on the community. It could also thus determine the validity of, and perhaps complement, the factors influencing the planning process that were identified in this research. Finally, it could monitor the evolution of social values that are associated with water in the region, and perhaps witness their integration in the plan in the form of social objectives.

8.5. CONCLUSION

Few studies in water governance have paid attention to the way water institutions and water policies address social sustainability, the third and weakest dimension of sustainability. This is in spite of the increasing scarcity of water and its recognition as a basic element in the support of human life and one that cannot be substituted. This study therefore embraced this gap by examining from a social sustainability perspective a water allocation plan, a regional tool of water policy. To do so, it conducted a dynamic analysis of the process of water planning from a community perspective—the two convergences of the social sustainability literature and the theories of policy analysis—placed within a wider framework of institutional change. As a result, it investigated the main drivers and barriers that influence the water planning process and their influences on its social sustainability. It also presented a comprehensive picture of the intricate relationships of the rural community with water, based on five guiding principles of social sustainability. Accordingly, multiple social values of water have been identified locally, but paradoxically, no social objectives were introduced in the revised water plan.

The study found nonetheless that the Lower Limestone Coast water allocation planning process achieved relatively good, although inconsistent, results in addressing social sustainability. However, it does so only through indirect, inconsistent and incomplete approaches to consideration of the social aspects of sustainability. This calls for more coherent and dedicated attention to be paid to social sustainability in water planning through a shift from mitigation of social impacts to adaptation and integration of social values, requiring, in particular, some form of protection such as the licensing of cultural and non-consumptive uses of water.

This research concurrently provides insights and recommendations for both policy makers and academics in the field of institutional change, social sustainability, policy analysis and water governance.

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APPENDICES

APPENDIX 2.1. MULTIPLE DEFINITIONS OF SOCIAL SUSTAINABILITY FOUND IN THE LITERATURE

Definition	Field	Origin
Social sustainability refers to a positive and long-term condition within communities and a process within communities that can achieve and maintain that condition.	Education	Australia (Willis et al., 2009)
A socially sustainable society is one that is just, equitable, inclusive and democratic, and provides a decent quality of life for current and future generations.	Industry development	Australia (Partridge, 2005b)
Social sustainability occurs when the formal and informal processes, systems, structures and relationships, actively support the capacity of current and future generations to create healthy and liveable communities. Socially sustainable communities are equitable, diverse, connected and democratic and provide a good quality of life.	Housing	Australia (Barron & Gauntlett, 2002)
<p>Socially sustainable development:</p> <ul style="list-style-type: none"> -meets basic needs for food, shelter, education, work, income and safe living and working conditions; -is equitable, ensuring that the benefits of development are distributed fairly across society; -enhances, or at least does not impair, the physical, mental and social well-being of the population; -promotes education, creativity and the development of human potential for the whole population; -preserves our cultural and biological heritage, thus strengthening our sense of connectedness to our history and environment; -promotes conviviality, with people living together harmoniously and in mutual support of each other; -is democratic, promoting citizen participation and involvement, and -is liveable, linking the form of the city's public places and city dwellers' social, emotional and physical well-being. 	Urban planning	Canada (Hancock, n.d.)
A socially sustainable community must have the ability to maintain and build on its own resources and have the resiliency to prevent and/or address problems in the future.	Urban management	Canada (Cooper, 2006)
Inclusion of all population groups [...] through guaranteed access to housing [...] and the right to work.	Urban society	International (Borja and Castells, 1997 in Koning, 2001)
An activity is socially sustainable if it conforms with social norms or does not stretch them beyond the community's tolerance for change.	Environment	Canada (Environment Canada, 1996)

Social sustainability means maintaining social capital.	Environment	United States of America (Goodland, 2002)
Sustainable society has ‘equitable distribution of economic resources; equality of civic, legal and industrial rights; fair and equal access to essential services such as housing, health and education; and opportunity for everyone in terms of personal development and participation in community life and decision-making’.	Social justice strategy	Australia (Commonwealth of Australia, 1992) in (Partridge, 2005a)
Social sustainability refers to a society that is just, equal, without social exclusion and with a decent quality of life, or livelihood for all. Capability of a human unit (individual, household or family) to gain and maintain an adequate and decent livelihood.	Development	The Netherlands (Koning, 2001)
Social sustainability depends on addressing the social, economic and cultural needs of the communities affected by a conservation initiative and on assuring the conditions (e.g. finances, technology, political authority and social organization and consensus) to maintain the conservation practices established.	Natural resources conservation	Switzerland (Wollenberg & Colfer, 1997)
Social sustainability concerns the ability of human beings of every generation to not merely survive, but to thrive.	Sociology	United States of America (Dillard et al., 2008)
Social sustainability calls for policies and institutions that have the overall effect of integrating diverse groups and cultural practices in a just and equitable fashion. Social sustainability for cities is development (and/or growth) that is compatible with the harmonious evolution of civil society, fostering an environment conducive to the compatible cohabitation of culturally and socially diverse groups while at the same time encouraging social integration, with improvements in the quality of life for all segments of the population.	Urban planning	Canada (Stren and Polese, 2000 in Larsen, 2008)
The quest for social sustainability cannot take place in isolation from the environmental and economic milieu in which people find themselves. Social sustainability must, as a beginning point of departure: a) build inclusion at the level of the individual, groups and society; b) provide for basic human dignity, which includes at least basic human sustenance, freedom from tyranny, freedom of association and basic human liberty; c) provide a means for people to influence their governance; and d) create the capacity for learning at the level if individual, groups, collectives, governments, corporations and society.	Sociology	United States of America (Larsen, 2008)
Socially sustainable development as one that “guarantees for both present and future generations an improvement of the capabilities of well-being (social, economic or environmental) for all, through the aspiration of equity on the one hand— as intra-generational distribution of these capabilities—and their transmission across generations on the other hand”.	Development	France (Ballet et al., 2003)

Social sustainability is: a life-enhancing condition within communities, and a process within communities that can achieve that condition.	Social justice	Australia (McKenzie, 2004)
Social sustainability is defined as' both (a) the processes that generate social health and well-being now and in the future and (b) those social institutions that facilitate environmental and economic sustainability now and for the future'.	Sociology	United States of America (King, 2008)

APPENDIX 3.1. CODING FRAME FOR DATA ANALYSIS

1. Descriptive coding: Attributes assigned to each type of collected data

	News reports	Submissions	Interview
Attributes	Publication date	Reception date	Gender
	Page	Submission format	Participant's category
	Position regarding forestry	Submission mode	
	Type of article	Respondent's group	

2. Topic coding

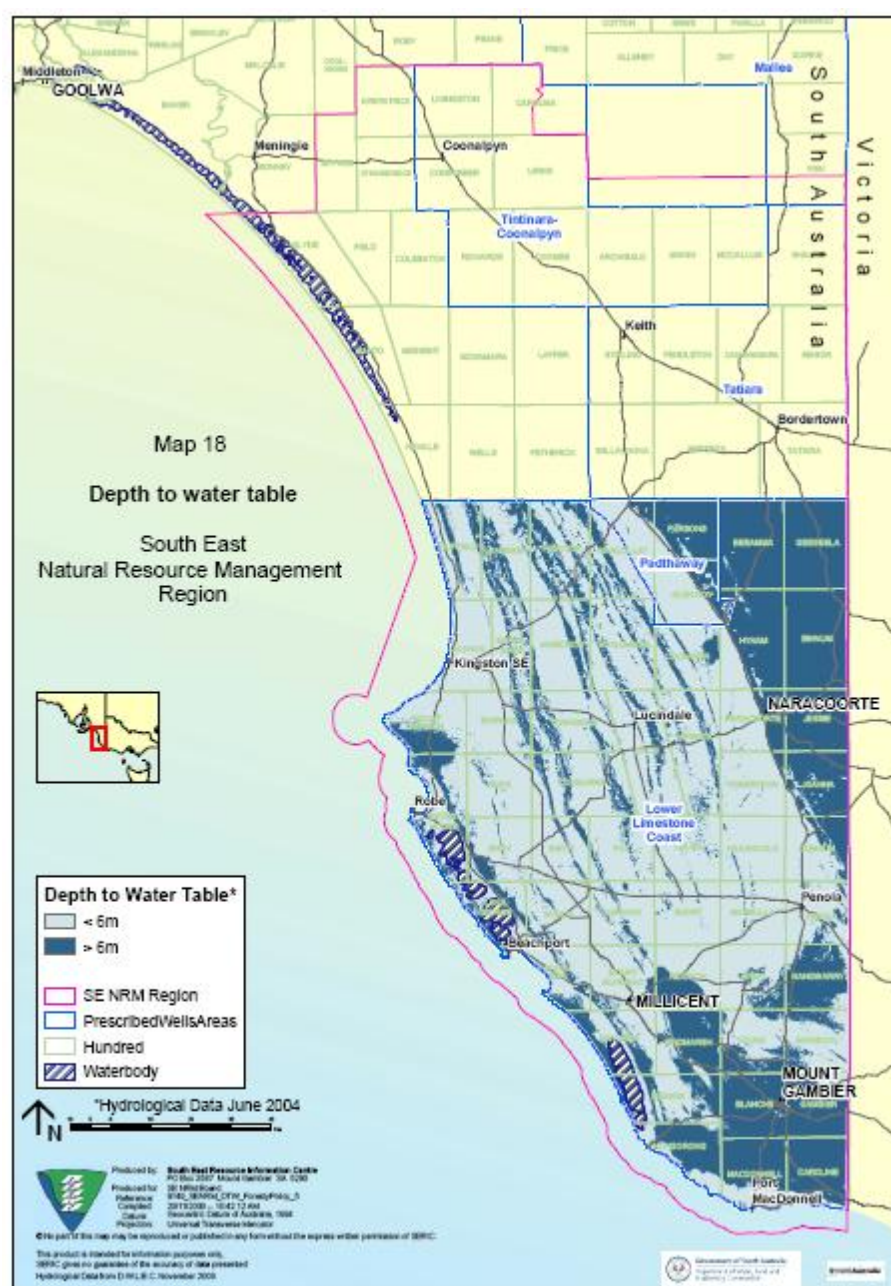
- 2.1. Themes:
 - Equity in sharing resources
 - Sustainability
 - Water depletion/water table decline
 - Salinity
 - Over-allocation
 - Forestry recharge's impact and extraction
 - Deficiencies in WAP
 - Climate change
 - Reduction of water allocation
 - Better scientific knowledge
 - Public consultation/submission
 - Current licensing system (2001 WAP)
 - New licensing system (2006/2007/2008 WAP as successively called)
 - Water policy
 - Equity in sharing resources
 - Volumetric conversion
 - Information dissemination
 - Frost protection
 - Drought/low rainfall
 - Water shortage
 - Research/study/new science
 - Water wasted
 - Drain
 - PAV
 - Border Agreement (surface and groundwater)
 - Water dependent ecosystems
 - WAP process
 - Water trading rules
 - Penola Pulp mill

- Forestry expansion threshold
- Long term horizon of forestry
- 2.2. Stakeholders:
 - Stakeholders mentioned in the document or those spoken of
 - Advocacy Coalition/Conflicting interests
 - Social construction
 - Policy entrepreneurs

3. Analytical coding

- 3.1. Factors of change
 - Isomorphism (including path dependency)
 - Power
 - Functional
 - Social learning
- 3.2. Social sustainability
 - Fairness
 - Community engagement
 - Futures focus
 - Quality of life
 - Social values of water

APPENDIX 4.1. DEPTH TO THE WATER TABLE IN THE LOWER SOUTH EAST



Source: (SENRM Board, 2010a)

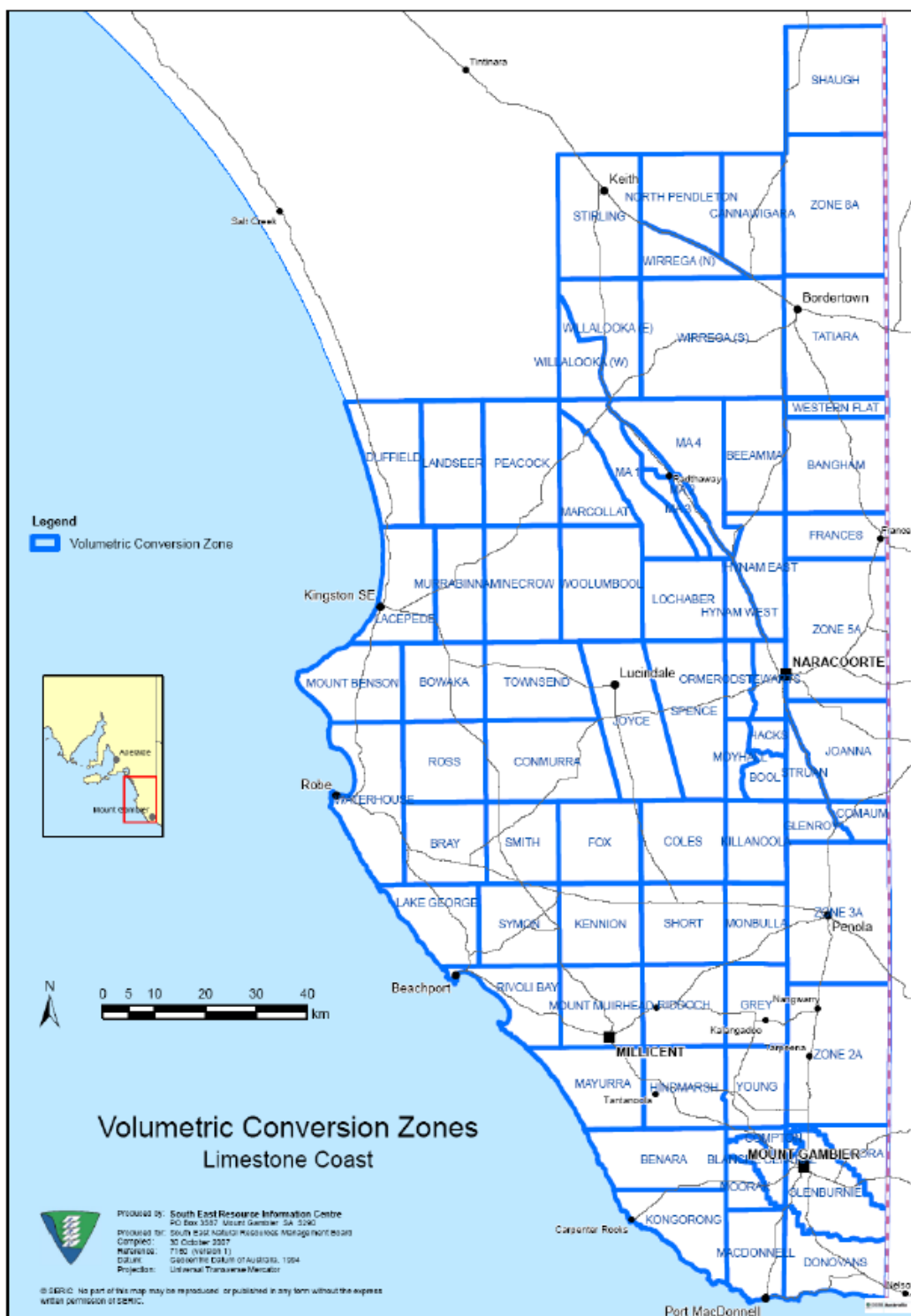
APPENDIX 5.1. LIST OF THE SELECTED *BORDER WATCH* ARTICLES

Title	Publication's date	Page
Future of SE forestry sound- Need for accountability on water resources	11/06/2004	17
Water plan opportunities	11/06/2004	25
Volumetric conversion project workshop	13/08/2004	16
Forests clean- Plantations not drawing from underground water supply	24/09/2004	1+2
Forestry threat- Mount Gambier 'closed for business' if legislation succeeds	13/10/2004	1+4
Minister content	13/10/2004	4
Water board review plans	14/10/2004	10
Keep out of debate- Politicians muddy the water	29/10/2004	5
Water row erupts	3/11/2004	4
Forest uproar- Rob Kerin's leadership on the line: McEwen	11/11/2004	1+2
Forestry rules sound vignerons' death knell	12/11/2004	5
Forestry regulations are absurd: Redford	12/11/2004	6
An insult: Osborne- Redford says water board 'out of control'	17/11/2004	3
Timber outcry	18/11/2004	1+2
Williams: I will not back down	19/11/2004	4
Williams hits back	23/11/2004	8
Jobs threatened- Calls for forestry reforms to be scrapped	24/11/2004	3
Forestry revolt- Moves to block reforms spark anger	25/11/2004	7
Farmers ' nothing to fear'	26/11/2004	4
A loss of farming rights	30/11/2004	8
No real water connection	1/12/2004	8
Debate on water is over	1/12/2004	8
Accountability the key in SE water debate	1/12/2004	10
Water decision concern grows	2/12/2004	8
Forestry regulations unsound	3/12/2004	8
Need for debate on water issue	7/12/2004	8
Farmers need a say on water	8/12/2004	8
Water issue too important to mess up	8/12/2004	10
Clearing water facts	8/12/2004	10
Logic lacking in water debate	17/12/2004	6
Let market decide where water goes	21/12/2004	8
Water Policy release overdue	29/12/2004	6
Water allocation plan draft changes	31/12/2004	24
Farmers and graziers forgotten	11/01/2005	8
Irrigator workshops: up to date information on volumetric conversions	22/04/2005	11
Vignerons to discuss water	13/05/2005	17
Water licence changes welcome	2/09/2005	17
Direction sought on water	2/09/2005	18
Water level drops	7/06/2006	1+2
Forestry draining aquifer	9/06/2006	5
Editorial: water action needed	9/06/2006	8
Pines spark anger	15/06/2006	3
Ban short-sighted	16/06/2006	3
Call for water balance to protect resource	16/06/2006	3
Irrigators must share blame in water issue	28/06/2006	7
Word on water preservation	30/06/2006	8
Water reports released	21/07/2006	10
Water efforts rewarded	21/07/2006	11
SE water plan review	22/09/2006	22
Report could have stopped pulp mill	28/09/2006	5
SE water reform push	1/11/2006	3
Water allocation fear	17/11/2006	9
Water allocation fears	28/11/2006	2
Water allocations review	30/11/2006	11
Water plan puts pulp mill at risk	21/02/2007	1+2
Water brawl!: industry to face major cut-backs	22/02/2007	1+4
Water allocation warning	22/02/2007	4
Forestry changes mooted	22/02/2007	4
Editorial	22/02/2007	8

1200 jobs threat	23/02/2007	1+2
SAFF farming leader calls for moratorium	23/02/2007	6
Editorial	23/02/2007	8
Government allays forestry fear	28/02/2007	5
Farmers launch bluegum attack	8/03/2007	3
Water claim rebuke	8/03/2007	2
Farmers urged to 'soak up' water allocations	9/03/2007	5
Bluegums not to blame for drop in water levels	9/03/2007	6
Water use reduction	9/03/2007	6
Plantation group hits back at SAFF claims	14/03/2007	4
Williams rejects bluegum impact claims	21/03/2007	7
Allocations burden water resource	23/03/2007	5
Water top concern for farmers	23/03/2007	16
Union joins water allocation debate	28/03/2007	6
Water drop block forestry expansion	4/04/2007	3
Hardwood push: plans to expand bluegum share	11/04/2007	1+2
Tough times ahead	24/04/2007	1+4
Water pressure builds across the SE	25/04/2007	11
No compensation for potential water impact	1/05/2007	7
Irrigator usage eclipses proposed pulp mill	2/05/2007	8
Farmers call for mill Bill delay	11/05/2007	5
Water over-allocation to force forestry relocation	16/05/2007	6
Timber industry hits out at resource policy	16/05/2007	6
Farming group supports forestry cuts	17/05/2007	7
Water inequality concern	18/05/2007	17
Drought blamed for water table drop	18/05/2007	17
Call to cut pulp mill's water	29/05/2007	2
Groundwater concerns	1/06/2007	9
Wicked waste' of water	5/06/2007	7
Bluegum farming always in the firing line	6/06/2007	6
Forestry causing angst: inclusion in water allocations under fire	6/06/2007	6
Farming body calls for mill Bill changes	7/06/2007	7
Water discussion flashpoint	8/06/2007	9
SAFF slams pulp mill Bill	12/06/2007	2
Water allocation plan being developed	12/06/2007	6
Water cut warning issued	13/06/2007	7
Williams hits out at new water proposal	14/06/2007	7
Drought triggers licence concern	19/06/2007	1+4
Water conversion delayed year	29/06/2007	18
Allocation sidestep	6/07/2007	5
Water shock: plantation growers up in arms over new State Government policy	2/08/2007	1+2
Farmers praise forestry decision	2/08/2007	2
Forest future bleak: Union boss hits out over 'rainfall tax'	3/08/2007	1+6
Forest industry slams water policy	3/08/2007	6
Rainfall' tax blow to forestry	3/08/2007	9
Editorial	7/08/2007	8
\$1.5b Penola mill development to be pulped: Williams	9/08/2007	1
Rory silent: water policy undermines McEwen	10/08/2007	1+4
More research needed into forestry impact	10/08/2007	8
Taxing the life out of timber	10/08/2007	9
Timber chief hits out at government policy	14/08/2007	6
SA farming group rejects irrigation increase concern	14/08/2007	6
Water balance needed	14/08/2007	8
Auspine weighs into water fight	15/08/2007	1+2
Timber industry not to blame for water concerns	15/08/2007	8
Water plan draws wine praise	16/08/2007	7
Water reform sends shockwaves	17/08/2007	9
Farmers tackle current issues	23/08/2007	5
Regulations no forestry threat	23/08/2007	6
Finger of blame pointed	23/08/2007	6
Lost sight of true water problems	23/08/2007	8
Water answers needed	24/08/2007	6
Cannot see the water for the trees	4/09/2007	8
Water rules gain support	7/09/2007	16

Water decision under fire	8/09/2007	5
Drought pinch remains amid water changes	8/09/2007	13
Forestry industry calls for independent review	11/09/2007	6
Minister defends SE water change	11/09/2007	6
Irrigators pose greatest threat to water	11/09/2007	8
History shows impact of pine plantations	13/09/2007	8
Forest water licensing stoush erupts	14/09/2007	15
Spotlight on irrigators	14/09/2007	15
Time for farmers to stand up for water right	21/09/2007	6
Water regulations need 'proper debate'	25/09/2007	8
Water not looked after	28/09/2007	3
Water use science incomplete	28/09/2007	7
SAFF slams forest water use	3/10/2007	18
SAFF calls for city water support	4/10/2007	4
Water allocations based on best information	4/10/2007	6
Residents to have say on water	27/11/2007	12
Farmers face water cuts	7/12/2007	7
Williams slams draft water plan	12/12/2007	7
Libs take aim at water policy	13/02/2008	1+4
Public opinion sought on water allocations	14/02/2008	5
Victoria rules out 'rainfall tax'	15/02/2008	9
New research blames climate for water woes	6/03/2008	3
Accountability for significant water affecting activities	13/03/2008	8
Water policy threatens investment security	25/03/2008	3
Report outlines plantation impact	27/03/2008	6
Water resources under close observation	1/07/2008	8
Water freeze urged	9/07/2008	1+5
Farming 'rort': forestry sector 'in limbo' under rainfall tax moratorium	9/07/2008	1+5
Water use accountability call	15/07/2008	3
Coonawarra concern over ongoing water shortages	18/07/2008	20
SE forester hits out at SAFF water claims	23/07/2008	6
Water tops dairy concerns	25/07/2008	5
Rainfall tax threatens forest jobs	29/07/2008	7
Timber exodus warning	29/07/2008	7
Forestry investors bypass region	30/07/2008	5
Community water discussion	30/07/2008	10
Water sustainability fear	24/09/2008	3
Forest water use under spotlight	26/09/2008	4
SAFF calls for halt to water allocation	10/10/2008	24
Water agreement plan uncertainty	12/11/2008	5
Growth potential	26/11/2008	1+4
Water worry	4/03/2009	1+5
Allocation cutbacks planned	4/03/2009	5
Water drop sparks irrigation outcry	6/03/2009	5
Forest water licences plan	23/06/2009	5
Allocation plan delays threaten water resource	29/09/2009	5
Forest industry warns against water plan	11/12/2009	5
Cutting-edge water research program launched	25/02/2010	5
Water war looms	5/03/2010	1
Mixed views expressed on water policy issue	9/03/2010	3
Tide may turn on water fears	12/03/2010	21
Water policy slammed	19/03/2010	3
Water plan push	6/04/2010	1+6
Water drop worry	21/04/2010	1+4
Water plan wait	22/06/2010	1
Farmers raise water plan concerns	23/06/2010	3
Water allocation agreement sought	29/07/2010	3

APPENDIX 5.2. MAP OF THE VOLUMETRIC CONVERSION ZONES



APPENDIX 5.3. ANALYTICAL CODING TREE FOR NEWS REPORTS

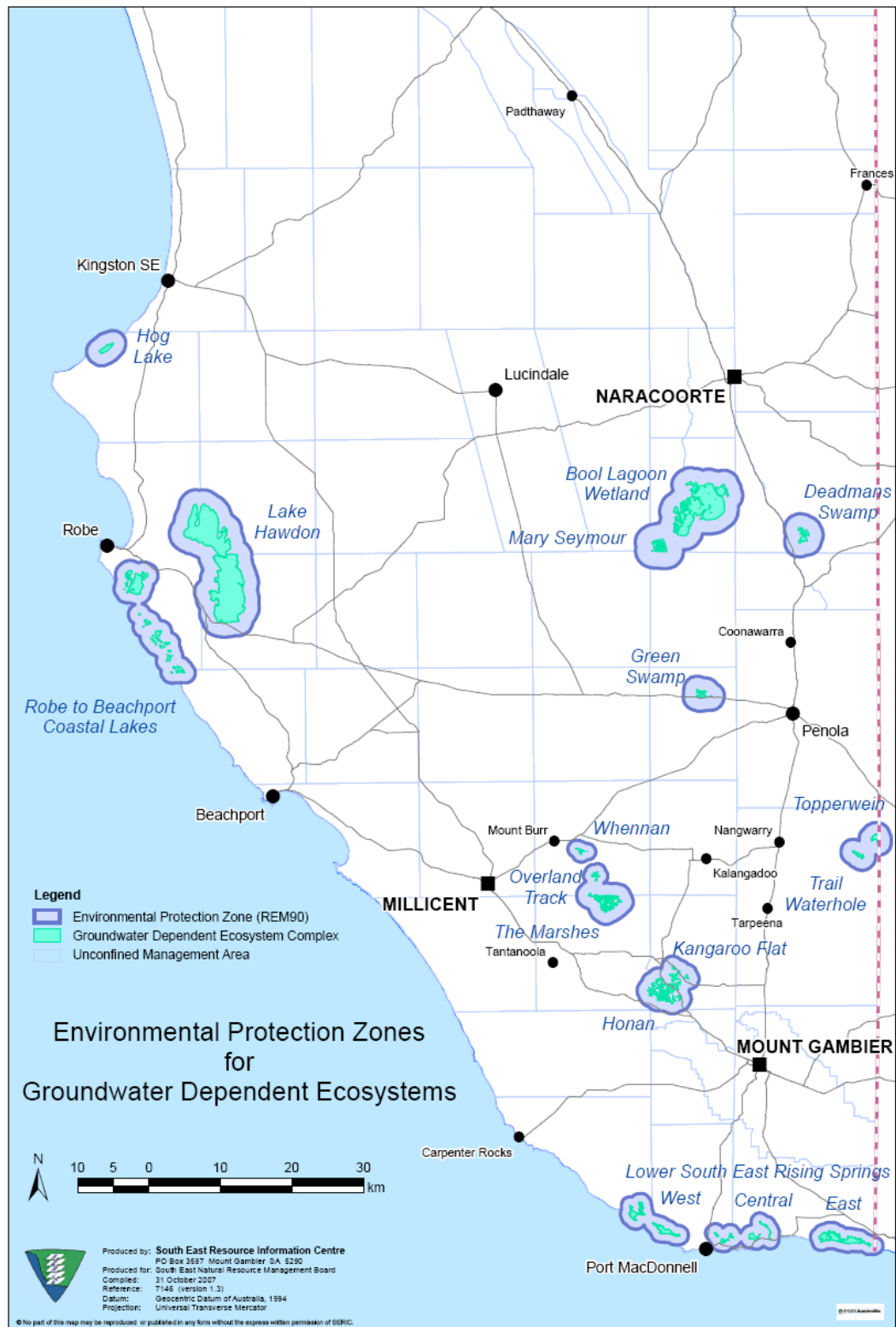
Tree Nodes

Name	Sources	References
Barriers of change	0	0
Conflicting policies	26	38
Job or economic losses threat	56	127
Political game	33	76
Rainfall's entitlement	36	70
Set precedent - Land use change	37	76
Victoria competition	14	26
Changes in WAP	13	19
Forestry accountability	92	169
Reduction to water allocations	41	80
Volumetric conversion	21	49
Frost protection	3	3
Water meters	8	9
Water-dependent ecosystems	4	4
Double influence factors	0	0
Better scientific knowledge	90	186
Beyond the region	23	30
Forestry expansion threshold	45	85
Political lobbying	27	42
Retrospectivity	18	35
Drivers of change	0	0
Accountability	19	22
Environmental sustainability	92	160
Forestry's impact	87	201
Over-allocation	47	97
Quick forestry expansion	15	20
Security of water allocation	26	38
Water shortage	56	117
Social sustainability	0	0
Community engagement	0	0
Cooperation-collective action	21	31
Democracy	7	9
Public consultation	76	156
Trust	17	22
Fairness	0	0
Distributional justice	22	26
Share the pain	12	16
Interactive justice	51	88
Procedural justice	39	52
Representativeness	13	21

Tree Nodes

Name	Sources	References
Stakeholders without voice	11	19
Transparency	15	16
Future focus	0	0
Long-term vision	29	34
Resilience	23	34
Lack of social attention	21	25
Triple bottom line	13	16
Quality of life	0	0
Job or economic losses threat	56	127
Social values	0	0
Basic human needs	8	9
Carbon stores	12	17
Drought proof community	14	14
Food security	6	6
Regional significance	7	7
Water as a common good	8	10
Various	0	0
Advocay coalitions	0	0
Facts-Events	42	64
Impacts	58	121
Issues	37	57
Scapegoat	11	13
Social construction	0	0
Stakeholders	3	3
Standing position	0	0
WAP Process timeline	37	67

APPENDIX 5.4. MAP OF THE PROPOSED WATER DEPENDENT ECOSYSTEMS IN THE LOWER LIMESTONE COAST



Source: (SENRM Board, 2007b)

APPENDIX 5.5. WATER MANAGEMENT AREAS AFFECTED BY THE FORESTRY REGULATIONS



Source: (Department For Water, 2010)

APPENDIX 5.6. CALENDAR OF THE MAIN LOCAL EVENTS

Before the LLC WAP review

- *1999*: Select Committee of Inquiry on Water Allocations in the South East re-convened in 2001 to examine land use change in the SE
- *2001*: Select Committee of Inquiry on Groundwater resources in the South East examining impacts of land use change on groundwater resources
- *2002-2004*: 18-month consultation resulting in the forestry expansion threshold

2004

- *June*: New commercial plantation forest prescribed as a water-affecting activity in the *Water Resources Regulations 1997* under the *Water Resources Act 1997*
- *June*: Introduction of the forestry expansion threshold: provision of 59,416 ha of forest expansion before water licences needed, under the *Water Resources Act 1997 regulation 'Lower South East – Commercial Forestry'*
- *June*: Amalgamation of the three former Prescribed Wells Areas of Comaum-Caroline, Lapedede-Kongorong and Naracoorte Ranges into the Lower Limestone Coast Prescribed Wells Area
- *June*: Federal National Water Initiative recommends inclusion of large scale forestry in the water balance as a water-affecting activity
- *September*: CSIRO study released on forestry's impacts on groundwater
- *October*: Community information and consultation on the LLC WAP review based on the draft statement proposal
- *November*: Rejection of a disallowance motion against the Lower South East–Commercial Forestry regulations

2005

- *July*: *NRM Act 2004* replaces the *Water Resources Act 1997*
- *September*: A1 Community consultation for the LLC WAP

2006

- *May-December*: Forestry facilitated stakeholder process was held as part of the LLC WAP review
- *June*: Comprehensive study of the region's aquifers released
- *July*: Volumetric conversion reports released

2007

- *February*: Proposal to reduce forestry expansion threshold and to cut back water allocations in over-allocated water management areas
- *February*: SAFF calls for a moratorium on all new developments in over-allocated water management areas
- *March*: SAFF calls for a moratorium on all water allocations in 25 water management areas and to 'soak up' forestry expansion threshold
- *March*: Short-term moratorium on the forestry expansion threshold in 5 areas and threshold reduced in 8 over-allocated water management areas
- *April*: Attempt to expand bluegum share in the forestry expansion threshold
- *May*: Proposal to relocate forestry at the end of rotation in over allocated water management areas
- *August*: Forestry water licence for new plantations in shallow areas
- *September*: Release of a booklet 'Forestry and water use—science for decision makers brief' by Eric Abetz, Federal Forestry Minister
- *November*: *Penola Pulp Mill Authorisation Act*
- *December*: A2 consultation on the draft LLC WAP and reduction to water allocation announced

2008

- *February*: Victorian study on forestry's impact on water
- *July*: Call from SAFF to freeze for 12 months all new plantations and irrigation allocations and renewed call to 'soak up' the forestry expansion threshold
- *November*: Meeting between farming groups and Minister for Forests regarding LLC WAP
- *December*: Meeting between farming groups and Environment Minister Jay Weatherill

- *December:* Establishment of an Inter-Departmental Committee to review State policy on forestry water use

2009

- *January:* Meeting of Limestone coast Wine Industry chairman with Scott Ashby, DWLBC
- *June:* New CSIRO report on water use by forest plantation
- *June:* Commercial forestry policy framework release and introduction in Parliament of the *NRM (Commercial Forestry) Bill 2009*
- *November:* Forward sale of Forestry SA investigated

2010

- *February:* Establishment of the LLC WAP Taskforce
- *March:* South Australian State elections
- *September:* Establishment of a Reference Group consisting of 8 local industry representatives for the LLC WAP Taskforce
- *November:* Introduction in Parliament of the *NRM (Commercial Forests) Amendment Bill 2010*

APPENDIX 5.7. WAP TIMELINE IN THE BORDER WATCH'S ARTICLES AND
CONSECUTIVE DELAY

Planning Stage	Expected	<i>The Border Watch</i> edition
A2 consultation (actually occurred in December 2007)	Late 2006	22 September 2006
	October 2006/Early 2007	17 November 2006
	Early 2007	30 November 2006
	Mid 2007	22 February 2007
	July-August 2007	6 June 2007
	Next few months	23 August 2007
	Later 2007	11 September 2007
	Soon to commence	27 November 2007
B consultation (Not yet as of February 2011)	2 nd half of 2008/ 1 st half of 2009	1 July 2008
	Late 2008/Early 2009	15 July 2008
	Mid 2009	4 March 2009
WAP completed and adopted (Not yet as of February 2011)	2006	22 April 2005
	2007	17 November 2006
	May 2008	1/05/2007
	July 2008	6 June 2007
	1 st half of 2008	29 June 2007
	Late 2007/Early 2008	9 March 2008
	2008	14 February 2008
	July 2010	29 September 2009
	July 2011 at the earliest	22 June 2010

APPENDIX 6.1. LLC WAP A2 CONSULTATION MEETINGS SCHEDULE

Location	Date	Time
Drop-in Sessions		
Mount Gambier	29 November 2007	2–6pm
Kingston	30 November 2007	11am–3pm
Naracoorte	3 December 2007	11am–3pm
Community consultation meetings		
Millicent	4 December	1–4pm
Kingston	5 December	9.30am–12.30pm
Naracoorte	5 December	7–10pm
Mount Gambier	12 December	9.30am–12.30pm and 7–10pm
Coonawarra	13 December	9.30am–12.30pm

APPENDIX 6.2. REPRODUCTION OF THE LLC WAP A2 CONSULTATION SUBMISSION FORM

**Lower Limestone Coast Water Allocation Plan Review
A2 Consultation – Written Submission Form**

SE Natural Resources Management Board

Please return this form to the Board by fax (08 8723 2965), post (PO Box 30 Mount Gambier, SA 5290) or contact the Board on 08 8724 6000 or reception@senrm.sa.gov.au, by Friday 21st December 2007

Name_____

Address_____

_____Postcode_____

Phone_____Fax_____

Email_____

Please use extra space for comments if required

What parts of the draft plan do you agree with? Why?

What parts of the draft plan do you disagree with? Why?

NO FURTHER ALLOCATION OF WATER

Do you agree with the proposal that no further water be allocated from the Crown during the life of this Plan (except from the forest threshold expansion opportunity)?

Yes ☐ No ☐ Unsure ☐

Why do you think this?

VOLUMETRIC CONVERSION OF ALLOCATION

Do you have any specific concerns about the proposed process for the volumetric conversion of allocations?

Yes ☐ No ☐ Unsure ☐

Why do you think this?

BRIDGING VOLUMES

Do you agree with the proposal to reduce bridging volumes by 20% of the original volume granted each year, over the 5 years following the date of adoption of the WAP?

Yes ☐ No ☐ Unsure ☐

Do you agree that there should be no Bridging Volumes where reductions are being implemented?

Yes ☐ No ☐ Unsure ☐

Why do you think this?

INDUSTRIAL PLANTATION FORESTS & FARM FORESTRY

Do you have any concerns with the proposed forests and water policy?

Yes ☐ No ☐ Unsure ☐

Why do you think this?

ENVIRONMENTAL PROTECTION ZONES

Do you agree with the proposed EPZ policy for priority groundwater dependent ecosystems?

Yes ☐ No ☐ Unsure ☐

Why do you think this?

TRANSFER OF ALLOCATION ACROSS MANAGEMENT AREA BOUNDARIES

Do you agree that allocations should be transferable across management area boundaries, for a limited time period?

Yes ☐ No ☐ Unsure ☐

Do you think that this policy will increase the use of the water market?

Yes ☐ No ☐ Unsure ☐

Why do you think this?

REDUCTIONS TO ALLOCATION

Do you agree with the proposals to reduce allocations in areas where the groundwater is showing signs of stress (i.e. dropping water tables and/or increasing salinity) or which are over-allocated?

Yes ☐ No ☐ Unsure ☐

Why do you think this?

CONFINED AQUIFER

Do you agree with the proposed policies for management of the confined aquifer?

Yes ☐ No ☐ Unsure ☐

Why do you think this?

OTHER COMMENTS















Do you have any other comments about the draft Plan?

APPENDIX 6.3. ANALYTICAL CODING TREE FOR SUBMISSIONS

Tree Nodes

Name	Sources	References
Barriers of change	0	0
External	4	24
Drains	16	28
Forestry specificities	9	34
Socio-economic analysis	9	26
WMAs	13	40
Institutional	0	0
Border Agreement	19	39
Compensation	20	33
Conflicting policies	6	30
Legal challenge	7	10
Separation water and land	10	15
Internal	0	0
Complexity	9	24
Confusion	20	50
Heavy administration	5	29
Inconsistency	10	48
Too regulated	10	43
Double influence factors	0	0
Accountability	16	27
Efficiency	31	72
Financial windfall	7	9
Who gets the licence	9	12
Overallocation	21	61
Retrospectivity	3	23
Science	26	113
Reject deemed rates	5	17
Security of water rights	7	11
Driver of change	0	0
Climate change	16	21
Environmental sustainability	42	70
Forestry expansion	8	11
Social sustainability	0	0
Community consultation	20	54
Cooperation	5	6
Trust	6	9
Fairness	0	0
Distributive justice	34	79
Interactive justice	18	31
Procedural justice	18	40

Tree Nodes

	Name	Sources	References
[-]	 Future focus	14	16
	 Adaptive Mgt	21	34
	 Resilience	4	4
	 Quality of life	5	12
[-]	 Social values	0	0
	 Aesthetic value	2	2
	 Basic human needs	9	17
	 Carbon	6	8
	 Food security	4	4
	 Indigenous	1	1
	 Water as a common good	4	6
[-]	 Various	0	0
+	 Impact of WAP	1	1
+	 Quantitative content analysis-Themes	0	0

APPENDIX 6.4. LIST OF SUBMISSION NUMBER PER INDUSTRY GROUP

Industry group	Submission number
Forestry	22, 31, 33, 34, 36, 50, 52, 54, 55, 57
Non-forestry	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19, 20,21,23,24,25,26,27,28,29,30,32,35,37,38,39, 40,41,42,43,44,45,46,47,48,49,51,53,56,58,59, 60,61,62,63,64,65

APPENDIX 6.5. PERCEIVED INTERACTIVE INEQUITIES REPORTED IN A2 SUBMISSIONS

	Interactive inequities	Submissions
FORESTRY	No difference for forestry over shallow or deep water tables	34
	Already penalised by drought so reduction is a double payment	22, 31, 34, 52
	Few alternatives to reduce water consumption while irrigators have a lot	22, 31, 34
	Few land suitable for relocation	34
	Late entry on water market	31, 34
	Water saving by forestry not recognized (when drought or fire)	31
	No allowance for decline in tree water use associated with the effect of climate change (as compared to deemed rate)	31, 52
	Forestry expansion threshold if not developed reversed to Crown rather than back to the threshold (taking licence reverses to holding)	36, 52
	Forestry expansion threshold not increased when PAV converted to TARd (overall increased) while generous volumetric conversion for irrigators	54
	Administrative calculations for forestry against history of use for irrigators (in volumetric conversion)	34, 54
	SPR rejected for forestry nursery	31, 54
	No access to the DC, SPR, BV and CF after buying a tradeable component: irrigators gets more water for a same price	34
	Temporary transfer limited only to 5 years (not adapted to long forestry rotations)	31, 34, 36, 52, 54
	Temporary licence do not encourage for relocation in under-allocated WMAs	31, 36
	Forestry licence nowhere else so impact on South Australian forestry competitiveness	36, 54
	Reductions always impact on forest estate as use 100 per cent of allocation but irrigators have 'cushion' with unused part of their allocation	34, 36
HOLDING LICENCES	Do not benefit from the additional component of the volumetric conversion	1, 54
	Moratorium in EPZ	2, 23

PUBLIC SUPPLY	Water restrictions do not apply to other users (irrigators, forestry, industry, etc.)	35
	No carry-over	35
INDUSTRY	No carry-over	33
IRRIGATORS	No further allocation but forestry get some thanks to forestry expansion threshold	14, 18, 24, 26, 37, 39, 48, 61, 62
	Reductions disadvantage irrigators who bought their licence compared to those who were given licence by Crown	17, 27, 42
	BV 24 months whereas SPR 6 months application period	34
	Quick reduction while forestry may wait for up to 35 years	19, 59
EPZ	All in the Lower SE, none in the Upper SE	9
	Affected landowner giving up more than others	19, 37 43, 49, 52, 56
WMAs	Coles and Short favoured in detriment of Killanolla and Monbulla	20, 26
	Over-allocated WMAs do not get BV	15, 19, 53
	Forestry encouraged to move towards west	25
	Reduction stepped over 5 years in over-allocated areas except for Coles, Short and 3A over 10 years	38
	Buffer zone for Blue Lake but no for other water supply areas	35
	Kingston allowed to be over-allocated	63
DESIGN ATED AREA	For those in designated area: more reduction PAV instead of TARd	18, 22, 39, 45, 51, 65

APPENDIX 7.1. SEMI-STRUCTURED INTERVIEWS

Part A: Attitude, values and beliefs of the community on the water planning impacts regarding the following issues

1. What is the main change introduced in the plan? Why? Priority of changes? Which one considered as the more important (improvement/threat) regarding social sustainability? Any change you would have liked to see and that did not occurred? Can any significant change still occur?
2. What are and were the main issues related to the water plan revision according to you? Are they different for each stakeholder? Which change was the most controversial? The more readily accepted?
3. What are or were the main objectives/reasons behind these introduced changes?
4. Water planning process: What were and are the political forces playing in planning process that resulted in the current draft plan according to you? Main influences driving the water planning process? Same drivers since June 2004 when revision started? Coalitions?
5. Does the community influence the water plan? How? On which areas? Is there any non-negotiable area?
6. Consultation process: Is the community engaged? Are all stakeholders heard/involved in the process? Does it ensure equity/ distributional justice between uses and users? What does it brings to the process? Can it influence the final plan?
7. Do you feel the community trust the SENRM Board? See transparency in its decision?
8. Cultural access to water by aboriginal locals: Have they been involved in the planning process? Is there any cultural water use? Is there any related issue?
9. What do you think of when NWI or NRM Act mentions social sustainability? What are the social objectives the plan should consider? What future for the community? Does the plan project future community? Future quality of life?
10. Does the planning process (and current draft plan) provide for procedural justice? Why?
11. Adaptive management: Does the plan provide for enough adaptive management? Under which mechanisms? All scenarios covered? Will the community be more resilient to potential change with this plan?
12. Over-allocation: Do you consider the water resources to be over-allocated? If yes, why is it over-allocated? Is the plan addressing the over-allocation? Why when triggers not exceed, over-allocation not address?
13. Water allocation reduction: Why decided? What are its impacts at individual and community level? Any change in crop or irrigation techniques? Why no reduction to industry and public supply?
14. Volumetric conversion: Why decided? Do you agree or disagree with the proposed conversion? Any expected impacts on the community? Don't you think people are trying to get as much water as possible because of market?
15. Recognition of water affecting activities like forestry: Do you agree or disagree with it? How did the recognition come about? Do you think this is now done? Does the NRM Act will be amended? Are there any other activities you would like to see recognised as water affecting activities? (Farm dams, drains)

16. Why focus on forestry when reductions to allocation and volumetric conversion could have more impact on water licensees? Does forestry engender less sustainable rural communities?
17. WDE: no discussion? Most people ready?
18. Security of allocation: Is the plan ensuring/modifying the security of the water allocations? And security of environmental allocation?
19. Water efficiency: Does the plan favour efficient water use? Which activities do you consider water efficient?
20. Water markets: What is the impact of the plan on the trade of water? Would you favour the water markets? Already done some trade? Why not?
21. Sharing of water: historically most water used by irrigation, does the board want to change those proportions? How?
22. Water management areas: Would you recommend changing the WMAs in this plan? Before reduction to allocations?
23. Water allocation as a share of the consumptive pool: Would you like to see it done in this WAP or the next? What are the impacts you expect from it? Security? If done after reduction, no return?
24. Monitoring and evaluation of the plan and planning process: what are the indicators? Who is in charge? Any social indicators?
25. Timeline of WAP: too long or expected as such? Reasons and impacts of delay? Additional delay due to timber companies bankruptcy?
26. What are the strengths/weaknesses of the water plan?
27. What are the main impacts/benefits from the plan? At Social level?
28. What do you think of the 2001 WAP?
29. Is there any other issue/impact from the water plan that we didn't discussed?

Part B: Influence of the interest groups & consultation process

1. Membership in other committees, boards or groups working on natural resources management
2. Reason of their involvement as a member of the committees
3. Way of collecting & valuing comments from users/members. Why groups lobby directly Minister and not through you?
4. Process of informing users/members and discussing new policy
5. What are your main criteria when deciding over a new regulation or change?
6. Negotiation between uses and users during planning process: process and results?
7. Do/Did you lobby the government to influence the planning process? How? Regarding which issue? Any success?

Part C: Conclusion

The participants will be:

- Given thanks for their time
- Asked if they would accept to be contacted again by phone/email only if anything discussed needs to be clarified
- Offered a written transcript of the interview
- Offered copies of future reports/publications

APPENDIX 7.2. CORRESPONDENCE BETWEEN THE THEMES ANALYSED AND THE QUESTIONS ASKED IN INTERVIEWS

Themes	Questions asked during the interviews (see Appendix 7.1)
Change and process of change	1, 2, 3, 4, 5, B5, B6, B7
- Forestry	15, 16
- Volumetric conversion	14
- Reductions to allocation	12, 13
- Water dependent ecosystems	17
Social sustainability	6, 7, 8, 9, 10, 11, B3, B4
NWI tools	18, 19, 20, 21, 22, 23
Other	B1, B2








































Note: Questions 24, 25, 26, 27, 28 and 29 were dispatched among the above themes according to the answer given. B numbering corresponds to questions in part B of the questionnaire.

APPENDIX 7.3. ANALYTICAL CODING TREE FOR INTERVIEWS

Tree Nodes

Name	Sources	References
BARRIERS	0	0
Barriers per change	0	0
Border Agreement	0	0
Implication for volumetric	1	1
Implications for reductions to allocation	12	23
Compensation	0	0
Regarding forestry	4	8
Regarding reductions	1	4
Regarding WDE	1	2
Conflicting policies	0	0
First to include	11	24
Forestry already included	2	2
Forestry issue not resolved	8	11
Forestry legislation	0	0
As opposed to land use change	7	21
Legislative process timeline	13	22
State election	6	9
Forestry licensing	0	0
Framework sets license and WAP how licensi	5	13
Licensing not consistent with government poli	7	9
Recent wet winters	0	0
Plenty of water	4	4
Wet winter	2	2
DOUBLE FACTORS	0	0
Beyond SE	0	0
Moving transition across the border	5	10
NWI as a driver	14	22
NWI not translatable to groundwater	4	5
Send forestry into Victoria	1	1
Forestry given a worth asset	5	7
NWI tools	0	0
Good water accounting	8	11
Manage the resource properly	8	13
Much weaker form of forestry accountabili	1	1
Secure water allocation	0	0
Impact on business decisions	6	9
Secure forestry's future	3	5
Share of the resource	7	14
Any increase after reductions to allocation	2	3

Tree Nodes

Name	Sources	References
 No clear understanding of volumetric	1	1
 Water market	12	34
 Forestry enable trade	1	1
 Volumetric conversion encourage water tr	5	8
 Water use efficiency	9	14
 Cutbacks whether efficient irrigators or no	1	1
 Winners are not the efficient farmers	1	1
 Resisting strategies	0	0
 Delay of volumetric by irrigators	2	2
 Forestry resisting	0	0
 Forestry delaying	6	10
 Forestry doesn't want to negotiate	15	40
 Forestry lobby	17	33
 Irrigators lobbying	15	27
 Retrospectivity	8	28
 Science	0	0
 Bd can change over-allocation nb	1	2
 Research on forestry use	8	10
 Science needed to quantify Forestry	11	28
 Science not good enough red	10	11
 Science not perfect Vol	3	4
 DRIVERS	0	0
 Declining water resources	0	0
 Deepen bores due to forestry	3	4
 From forestry	12	19
 Implications for volumetric	2	4
 Induced reductions	6	14
 Sea intrusion	1	1
 Drivers per change	0	0
 Forestry	15	26
 Control of forestry	4	5
 Forestry expansion	11	13
 Anticipate expansion in other areas	1	1
 Significant area of forestry in SE	4	6
 Forestry impacts	0	0
 Accelerated change in rural area	2	2
 Fire to realise how much water forestry us	4	4
 Impact of forest on wDE	5	7
 Generous allocation	0	0

Tree Nodes

Name	Sources	References
From initial grant	4	8
From pro-rata roll out	4	10
From Volumetric	9	16
Induced reductions	4	7
Social constructions	0	0
Negative views regarding forestry	0	0
Bluegums vs Pines	13	22
Corporations vs farmers	7	13
Declining rural communities	7	13
Forestry induce more wild animals	2	2
Long-term intentions of forestry companie	4	4
Management investment schemes	7	9
Penola Pulp Mill	5	9
Spoil good farming land in planting trees a	2	3
NRM and previous Catchment Board irrigatio	4	11
Social sustainability of WAP	0	0
Community engagement	0	0
Community reactions	0	0
Collaboration among irrigators	13	27
General support of volumetric conversion	10	18
Loss of interest in community	3	4
Consultated to death	4	7
Confusion on power control	13	33
Government deciding	14	34
Government prescribed forestry	8	9
Hesitation in political sphere	5	8
Consultation	0	0
Bad timing	2	2
Consultation miss some	15	28
Do not allow consensus when conflict	2	2
Forestry facilitated process	8	11
Process to handle forestry to be improved	2	3
Resistance to listen forestry	1	4
Resources playing in submission	5	9
Tokenistic	4	6
No WAP committee in LLC	5	17
Bd encourage lobby group	7	12
Transparency - Communication	15	48
WAP is a reflexion on community values	2	2

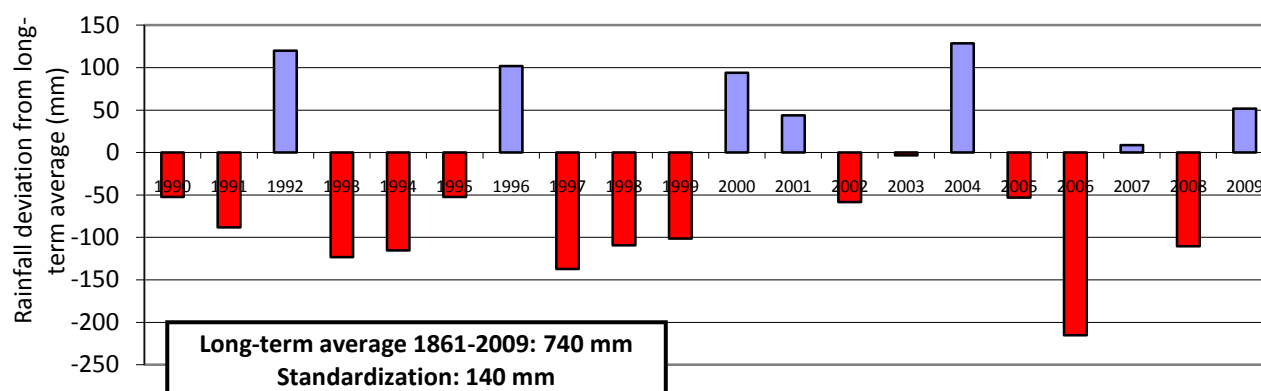
Tree Nodes

Name	Sources	References
Community accepted standards of mgt	1	5
Process started locally	5	7
WAP open discussion	2	2
Fairness	0	0
Distributive justice	11	20
Forestry also reduced	11	20
Industry not reduced	10	19
Interactive justice	11	14
Inequity forestry vs farming	16	42
Procedural justice	10	23
Board worked less on LLC WAP	3	3
Conflicting position within the government	11	25
Lack of consistency	3	6
Future focus	0	0
Adaptive management	14	31
Long term	10	19
Indirect social sustainability	7	12
Social sustainability as a feeling	2	2
Social sustainability through consultation	4	4
Social sustainability through economy	15	37
Water as an investment (loss of values of	3	3
Water's cheap price as social sustainabilit	1	1
Social sustainability through environment	8	10
Quality of life	0	0
Health	2	2
Livelihood	1	3
Maintain rural communities	7	11
Well-being	1	1
Social values of water	0	0
Aboriginal access to water	14	38
Carbon stores	2	2
Cultural & spiritual identity	2	5
Public water supply	8	10
Recreational	10	17
Regional identity	0	0
Community values their water resources	2	2
Wetlands unique part of SE	8	14
Various	0	0
Impacts	0	0

Tree Nodes

Name	Sources	References
Quantitative content analysis-Themes	0	0

APPENDIX 7.4. ANNUAL RAINFALL DEVIATION AT MOUNT GAMBIER



Source: (Department of Primary Industries, 2009)